Yellowstone Park Guide.

ILLUSTRATED

1894.

912

A. W. Pendergast

Hutchinson. Minn

Fountain. Yellowstone

National Park. Friday

morning. June 21. '95.

Just before setting out for

the Upper Geyser Basin

and "Old Faithful"

Summer solstice. Thy.

30° at 6. AM. Heavy frost

H. L. Collins Co.
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St. Paul.

For information on the facilities, roads, scenic attractions,
and Yellowstone Park in general
the Yellowstone Park Company recommends
the Haynes Guide, illustrated, 192 pages
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Department of the Interior.
The book is available postpaid for $1.20
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April 15 to November 1,
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from November 1 to April 15.

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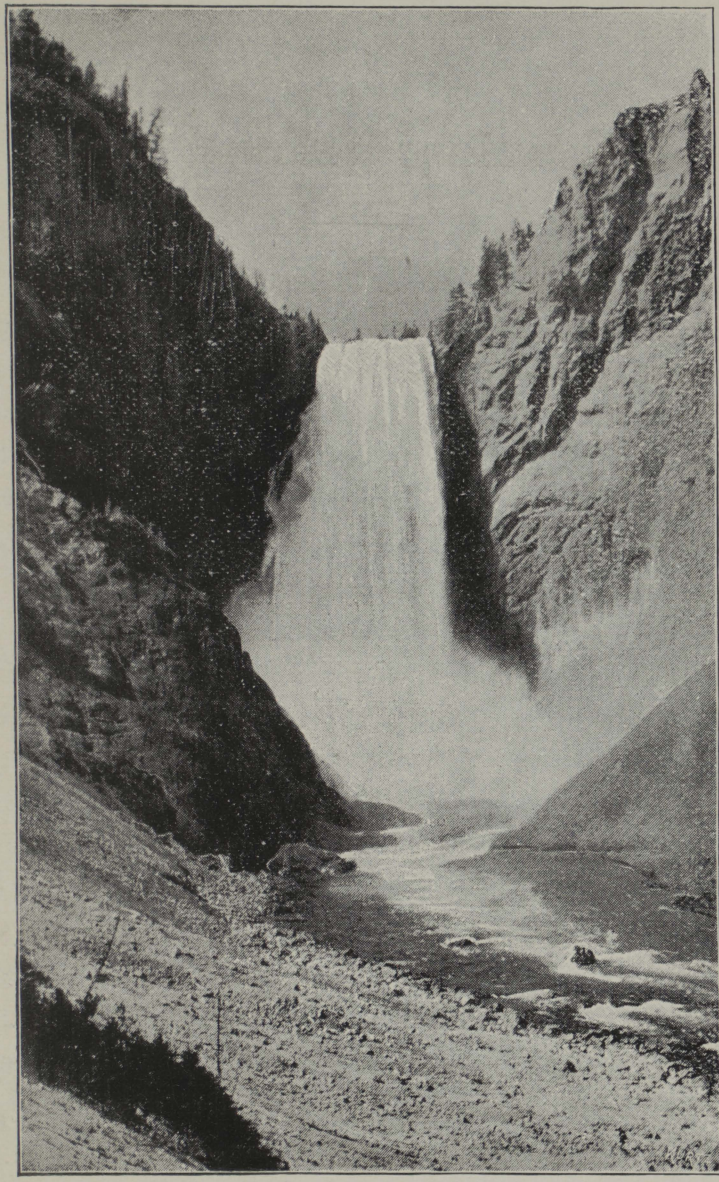


Great Falls of the Yellowstone, 360 feet.

Yellowstone National Park.

In the Northwest corner of Wyoming in the heart of the Rocky Mountains is located Yellowstone National Park. Its boundaries overlap a few miles into Montana on the north and into Idaho and Montana on the west. The reservation is about 65 miles east and west and 75 miles north and south. No valley within its limits has an elevation of less than 6,000 feet, while many of the mountain peaks within and adjacent to the Park rise from 10,000 to 14,000 feet above sea level. Yellowstone Lake, 15 by 20 miles in size, is the largest body of water in North America at this altitude (8,000 ft.). Three of the largest rivers in the United States, the Missouri, Yellowstone and Columbia, have their source in Yellowstone Park. The geysers of this region outclass anything of the kind in the known world. There are over 50 that throw a column of hot water 30 to 250 feet in the air at intervals of one minute to 14 days. The Grand Canyon of the Yellowstone, 10 miles long with an average depth of 1,200 feet, is acknowledged by travelers to be the most brilliantly colored landscape in existence. The Mammoth Hot Springs are the only colored terrace building hot springs known that have such beauty and magnitude. Cliffs of volcanic glass, unsurpassed waterfalls, mountains

of petrifactions, charming valleys, hills of brimstone, perpetual snow-clad peaks, interspersed with thousands of natural curiosities, fittingly characterize this as the Wonderland of the World.

Modern hotels have been constructed throughout the Park conveniently located near these objects of interest. Substantial roads and bridges have been built leading to all the chief attractions. Steamers have been placed on the lakes, mountain streams have been stocked with rare species of the finny tribe, military posts have been established, railroads have approached the Park boundary,—all for the pleasure, comfort, protection and enjoyment of the people.

LIVINGSTON TO MAMMOTH HOT SPRINGS.

Livingston, Mont., on the main line of the Northern Pacific Railroad, is about midway between St. Paul and the Pacific coast. From this point a branch of the Northern Pacific extends 51 miles south to Cinnabar near the northern boundary of the Park, following the valley of the Yellowstone the entire distance. Livingston is an enterprising little city, located at the base of the Snowy and Belt ranges —spurs of the Rocky Mountains. Three miles from Livingston the Park branch passes through the first canyon of the Yellowstone, or Gate of the Mountains, forming a natural entrance into the Upper Yellowstone Valley. The canyon is over a mile long and just wide enough to comfortably admit the road and river, the mountain walls rising some

2,000 feet perpendicularly on either side. Passing through the first canyon, Paradise Valley is immediately entered; it extends from the mouth of the canyon some 30 miles up the river, and is from 7 to 12 miles wide. This valley has been settled by ranchmen for twenty-five years; it is very fertile, easily irrigated, and well adapted to stock raising. On the east side of the valley, a very picturesque mountain range is seen, constantly changing as the train moves south; the hills on the west are not as abrupt, but are very interesting from a geological point of view. Emigrant Peak (elevation 10,629 feet and some 6,000 feet above the valley) is a prominent mountain located near the south end of Paradise Valley.

The Second, or Yankee Jim, Canyon.—Forty miles from Livingston the Park branch passes through the second, or "Yankee Jim" canyon of the Yellowstone. For several years prior to the building of the railroad, an enterprising individual called "Yankee Jim," having constructed a wagon road through the canyon at quite an expense, enjoyed a lucrative business in collecting toll from each visitor to the Park. Yankee Jim is still located at the south end of the canyon and has many guests during the tourist season, who find in the swift waters of the river the best of trout fishing—equal to any of the many excellent fishing stations along the Yellowstone. The second canyon is far more picturesque than the first; the mountain walls rise higher, and the gorge, within which the river is com-

pressed, is scarcely a hundred feet wide. An excellent view is had from the cars as the train winds slowly through the gorge.

Cinnabar, Mont., the terminus of the Park Branch Railroad, derives its name from Cinnabar Mountain, a conspicuous landmark on the Upper Yellowstone. As the train passes along its base, from the car window is plainly seen the "Devil's Slide," two walls of trap-rock (some 150 feet apart) extending up the mountain nearly 2,000 feet, and embracing a reddish-colored mineral resembling cinnabar. Tourists are conveyed from the station to the Mammoth Hot Springs Hotel, seven miles distant, in six-horse tally-ho coaches. The mountainous character of the country and the necessity of ascending nearly 2,000 feet (the altitude of Mammoth Hot Springs above Cinnabar) in so short a distance render the construction of a railroad further south impracticable. The carriage road leads along the Gardiner River, a characteristic mountain stream, clear and rapid, and a favorite resort for the angler. Within two miles of Mammoth Hot Springs the road leaves the river for the ascent of the mountain.

Boiling River empties into the Gardiner at this point; it is the congregation of all the waters from the Mammoth Hot Springs, and is famous from the fact that fish may be caught in the cold stream and cooked in the hot, without change of position.

MAMMOTH HOT SPRINGS.

The recent volcanic eruptions in New Zealand which destroyed the famous pink terraces of Rotomahana, leaves the Mammoth Hot Springs of Yellowstone Park without a rival as the most remarkable development of thermal action to be found in the world—occupying over 170 acres, with 13 distinct terraces and over 50 active springs. Dr. Hayden, in his report for 1871, describes these springs as follows: "The wonderful transparency of the water surpasses anything of the kind I have ever seen in any other portion of the world. The sky, with the smallest cloud that flits across it, is reflected in its limpid depths, and the ultramarine colors, more vivid than the sea, are greatly heightened by the constant, gentle vibrations. One can look down into the clear depths and see with perfect distinctness the minutest ornament on the inner sides of the basins; and the exquisite beauty of the coloring and infinite variety of form baffle any attempt to portray them either with pen or brush. And then, too, around the borders of the springs, especially those of rather low temperature, and on the sides and bottoms of the numerous little channels of the streams that flow into these springs, there is a striking variety of the most vivid colors. I can only compare them to our most brilliant aniline dyes—various shades of red, from the brightest scarlet to a bright rose tint; also yellow, from deep bright sulphur through all the shades to light cream color. There are also various shades

of green from the peculiar vegetation. These springs are also filled with minute vegetable forms, which, under the microscope, prove to be diatoms, among which Dr. Billings describes *palmella* and *oscillara*. There are also in the little streams that flow from the boiling springs great quantities of a fibrous, silky substance, apparently vegetable, which vibrates at the slightest movement of the water, and has the appearance of the finest quality of cashmere wool. When the waters are still these silken masses become incrusted with lime, the delicate vegetable threads disappear, and a fibrous, spongy mass remains like delicate snow-white coral."

The present active portion of the Mammoth Hot Springs is in a small valley on the mountain side, nearly two miles from Gardiner River, and from 1,000 to 1,200 feet higher than the surface of the same. Evidence of ancient hot water deposit is seen over the entire expanse between the now active portion and the river. The overflow from the springs disappears at the base of each terrace and finds its way through subterranean passages underneath the hotel plateau—via Boiling River—into the Gardiner, the former having only 200 feet surface exposure above its confluence with the latter river.

Viewing the Terraces.—It requires fully two hours to leisurely visit all the springs; the high altitude, nearly 7,000 feet above the sea, will not admit of a rapid inspection. Provide yourself with a walking stick, umbrella and



Liberty Cap and Mammoth Hot Springs Hotel.

a pair of smoked or blue glasses; the reflection from the water and white formation on a sunny day is painful to many. Select, if possible, early morning or afternoon, as the heat is intense in midday; upon cloudy days the reflection, of course, is not noticeable, nor is the coloring of the springs as brilliant. The bell boys of the hotel act as guides over the formation; however, it is not absolutely necessary to have a guide, as the paths are easily followed and the hotel and valley are always in sight. Those not wishing to walk the entire distance can arrange with the stage company for carriages to the top of the formation. The walk back to the hotel is quite easy and allows inspection of these beautiful springs.

Liberty Cap, an extinct hot spring cone, standing at the foot of Terrace Mountain, near the road, is 52 feet high and 20 feet in diameter at its base. It is formed of overlapping layers of deposit, evidently having been built up by the overflow of water through the orifice in the top. Scientists have been unable to decide whether it was built up independently or formed by the action of the elements wearing away the soft material surrounding it.

The Devil's Thumb, a cone of similar structure, but smaller, is located some 200 feet west of Liberty Cap, partially imbeded in the hillside. The path leading to the *formation* past the Devil's Thumb is generally taken when returning, the one for the ascent branching off the main road a short distance south of Liberty Cap.



Minerva Terrace, Mammoth Hot Springs.

Minerva Terrace is a mass of deposit 40 feet in height, covering on area of nearly three-fourths of an acre, with a hot spring on its summit some 20 feet in diameter, the temperature of which is, at the edge, 154 degrees Fahrenheit. The constant changing of the overflow and the intermittent character of the spring make it impossible to predict, a season in advance, which will be the active side of the terrace, or whether it will be active at all. At times the spring disappears entirely, and the terrace remains inactive (and uninteresting in consequence) for months. The change in overflow when the spring is active, is accounted for by the rapid deposition of carbonate of lime, which forces the water eventually over the entire surface. The quantity of water overflowing is very small compared with the amount of deposit, which, under favorable circumstances, is about one-sixteenth of an inch in four days. Articles of iron, glass, or any hard substance placed where the water can run over them, are soon coated with a crystal-white deposit. During periods of activity, basins or pools, fringed with stalactitic masses, line the east side of the terrace, presenting the most delicate coloring, from the lightest cream at the top to the deepest shades of red at the base, the predominating color being bright orange; each pool or basin being filled with transparent blue water. The elevation (some 20 feet high) immediately back of the terrace, is an excellent point from which to obtain a good view of the interior of the spring. This terrace is about

78 feet above the level at the base of Liberty Cap, while the main portion of the hot springs are on the mound 90 feet higher.

Jupiter Terrace.—The spring overflowing this terrace is the largest on the *formation*, being nearly 100 feet in diameter, while the terrace itself covers an area of five acres. The various paths leading throughout offer an excellent opportunity of inspecting the delicate form and coloring characteristic of these wonders. East of the spring, on the slopes leading down from the edge of the terrace, are some of the handsomest basins to be found in this locality; their peculiar shape suggests the very appropriate name "Pulpit" Terrace. From the prominence west of Jupiter Terrace, under which is located Cupid's Cave, an excellent general view may be had. The path leading west from Cupid's Cave passes along the summit of Narrow Gauge Terrace, which terminates at the hill, where the main path leading to the hotel is intersected.

Narrow Gauge Terrace is a fissure ridge 300 feet long, filled with numerous miniature geysers and springs which deposit the most brilliant coloring.

Orange Geyser, Devil's Kitchen and Bath Lake, on the next terrace above Narrow Gauge, are well worth the visit if one has the time and inclination.

Extinct Hot Spring Vents.—The numerous openings and caves visible from the hotel veranda are extinct hot spring vents.

McCartney Cave.—About 500 feet distant from the hotel may be seen a small fence surrounding three sides of what is known as McCartney Cave. This is an irregular opening in the level surface of the plateau some four feet in diameter; it is visited by many for the purpose of examining the ancient hot water stratified deposits plainly indicated throughout the cave. Called a cave, it is simply the crater of an extinct hot spring. By means of a ladder one can descend vertically some 30 feet to the first level; thence 20 feet on an incline to the bottom of the main chamber, with perfect safety. The venturesome may, by means of a rope and light, continue explorations 100 feet further without, ordinarily, experiencing much discomfort from the carbonic acid gas. Far beneath, in a subterranean chamber, water can be distinctly heard by the rope-supported tourist; but the hot vapors and gases constantly arising discourage investigation, and stimulate an earnest desire to ascend to the surface. The stratified deposits seen on the sides of the cave are of varied thickness, indicating that they were greater during some years than others. This cave was discovered by a Mr. McCartney, who located in the vicinity in 1869, hoping to claim the locality as a homestead; his cabin still stands in the gulch near Liberty Cap. In the winter of 1881 there was a heavy fall of snow, sufficient to cover many of the openings on the plateau. The following spring Mr. McCartney noticed a large pair of antlers protruding, apparently, from

the ground; investigating, he discovered that an unfortunate elk had broken through the crust of snow, and falling into the cave, had died, suspended by his horns, in the opening.

PARK PROTECTION.

Fort Yellowstone.—At the Mammoth Hot Springs is stationed a company of United States cavalry, the commanding officer being superintendent of the Park. During the summer months *cantonments* are scattered throughout the Park, consisting of a non-commissioned officer and two to four cavalrymen; their duties being to protect the various objects of interest from vandalism, see that no specimens are removed, that no hunters enter the Park, and to prevent the spreading of forest fires, generally originating from camping parties. The Park is entirely free from questionable characters, owing to the rigid enforcement of the orders of the commanding officer, his policy being to allow no one in the park unless there for business or pleasure. Several scouts are employed by the Government, who roam over the entire area; they look after the game, chiefly, their occupation being similar to that of a detective; they do not travel on the regular roads, and are liable to come upon the violator of regulations at any moment. Much credit is due the military and scouts for their efficient efforts in protecting the Park. The rules provided for the government of the *reserve* will be found on back pages of this hand-book.



East Entrance to Golden Gate.

Tour of the Park.

SOUTH FROM MAMMOTH HOT SPRINGS.

Golden Gate.—Four miles south from Mammoth Hot Springs is one of the most picturesque points in the Park. It is a rugged pass between the base of the lofty elevation of Bunsen Peak and the southern extremity of Terrace Mountain, through which flows the west branch of Gardiner River. The sides of these rocky walls, which rise 200 or 300 feet above the roadway, are covered with a yellow moss, suggesting the appropriate name the pass now bears. The pillar at the east entrance, some 12 feet high, was originally a part of the canyon wall. The construction of this road—scarce a mile in length—was accomplished at an expense of $14,000, it being the most difficult piece of road building yet encountered by the government engineers. Golden Gate being nearly 1,000 feet higher than the Hot Springs, necessarily makes this portion of the journey rather slow; still the beautiful drive through forest and glen fully compensates for the extra time consumed. The favoring of one's horses at the outset of the trip is a matter of importance. Rustic Falls, occupying a conspicuous position at the west end of Golden Gate, add a charm to this beautiful spot, and when seen in the early part of the season are especially fine. The stream is fed by mountain

snows and springs along the base of the hills a mile or two beyond. The fall is some 60 feet, over a series of shallow basins worn into the dark moss-covered ledge, disappearing underneath the surplus of rock deposited in the canyon from the construction of the roadway. The view obtained of Golden Gate upon the return trip is equally as interesting.

Swan Lake Basin.—A pleasant surprise awaits the visitor immediately beyond Golden Gate, in Swan Lake Basin, it being quite unlike the region just traversed, and one of the many typical mountain prairies hemmed in by snow-clad peaks found throughout the Park. Evidences of old Indian camps are seen in many places, and during the fall and winter it is inhabited by hundreds of elks and deer. The magnificent range to the west is the Gallatin Mountains, among which are Bells Peak, Quadrant Mountains and Mt. Holmes; the last named having an elevation of 10,578 feet. Vast fields of perpetual snow are in sight throughout the summer. To the north about eight miles is Electric Peak, the highest mountain in the northern part of the Park, whose summit is 11,125 feet above sea level, deriving its name from the fact that a great deposit of mineral renders the working of the surveyor's transit impossible when on the mountain. The peculiar electrical display from its rugged peaks during a thunder storm is a sight witnessed by only a favored few. The drive continues south through Swan Lake Basin, nearly upon this same level, to Norris, crossing Indian and Obsidian creeks, the two forming the Middle Gardiner River.



Obsidian Cliff.

Obsidian Cliff.—This bold escarpment of volcanic glass is 12 miles south of Mammoth Hot Springs. The roadway passes along its base for 1,000 feet between it and Beaver Lake. The vertical columns of pentagonal-shaped blocks of obsidian, rising some 250 feet above the road, present a glistening, mirror-like effect when illumined by the sun's rays. The greater part of this mineral glass is jet black and quite opaque, with traces of similar formation variegated with streaks of red and yellow.

The construction of the roadway along its base was accomplished in a novel manner and with considerable difficulty; the use of blasting powder being out of the question, great fires were built around the huge blocks of glass, which, when expanded, were suddenly cooled by dashing water upon them, resulting in shattering the blocks into small fragments. This process made possible the construction of this really wonderful roadway, probably the only piece of glass road in the world. There being no other exposed ridge of obsidian in the Rocky Mountains, and this material being more desirable than flint for the manufacture of arrow heads, it was once a famous resort for all tribes of Indians, who congregated here in great numbers. Obsidian Cliff was "neutral ground" to all the Rocky Mountain Indians and undoubtedly as sacred to the various hostile tribes as the far-famed Pipestone country of Minnesota. Chips of obsidian and specimens of partly finished arrow-heads are found throughout the Park, gen-

erally at places occupied by the Indians as summer camps.

Beaver Lake.—The roadway continues along the east side of Beaver Lake, which is about one mile long and a quarter of a mile wide. More than a dozen beaver dams are constructed across the lake, forming a series of artificial obstructions, each having a fall of from two to four feet. A beaver house, still inhabited, is located near the west shore of the lake. Since the rigid enforcement of the Park regulations regarding the killing of game, Beaver Lake is becoming alive with numerous water fowl, the passing carriages not seeming to alarm them. The reflection of the pine-clad hills among the dense growth of pond lilies which line its shores, adds to the beauties of this lake.

The drive from Obsidian Cliff to Norris, though not of especial interest, is over one of the natural "passes" between the headwaters of the branches of the Yellowstone and Missouri rivers, but the ascent of the divide is so gentle, it is impossible to know when it is passed. Twin Lakes, Mineral Lake, Roaring Mountain and Frying Pan, are the attractions between Beaver Lake and Norris.

NOTE—From Norris, a wagon road runs in a nearly due east direction to the Great Falls and Grand Canyon (12 miles distant) leading up the valley of the Gibbon River, through Virginia Canyon, turning a sharp angle of rocks known as the "Bend in the Road" and passing (just beyond) a series of pretty cascades, called Virginia Cascades—thence on through an undulating pine forest, though the last few miles of the way the country is more "open," affording occasional glimpses of the rugged scenery along the Yellowstone River. On the whole, this road is both pleasant and interesting; its grades are comparatively easy and its forest surroundings render it refreshingly cool.

This is the return route from the Grand Canyon to Mammoth Hot Springs, and will doubtless be used as such until the Government shall have constructed a wagon road over Mt. Washburn.



Virginia Cascades.

NORRIS GEYSER BASIN.

Many prefer leaving the hotel immediately after lunch in advance of their carriages, which can overtake them near the Monarch Geyser, about a mile distant, the walk through the basin allowing a more satisfactory inspection than possible to obtain in any other way.

This region, called the Gibbon Geyser Basin in Dr. Hayden's report, was discovered in 1875, by Col. P. W. Norris, then superintendent of the Park. Since 1881 it has been called Norris Geyser Basin, which name it is quite likely to retain. It covers an area of six square miles, and is one of the most interesting portions of the Park from a geological standpoint, from the fact of its being one of the highest geyser basins in the Park, and many of its active geysers being of quite recent origin. While the geysers of Norris basin do not compare, in point of eruptive violence, with those of the Upper Basin (thirty miles south), they are of great interest to travellers never before witnessing this strange freak of nature; hence it is better to inspect them when first passing through, as they appear insignificant upon the return trip.

The road follows along the ridge on the east side of the basin, affording a commanding view of the surroundings. The first impression one gets, especially upon a cool day when the steam is visible, is that he is entering a manufacturing locality; the terrible noise and rumblings, the hissing of escaping steam and very unpleasant odors excite

a feeling of natural but unnecessary caution, as the roadway and numerous paths leading through the basin can be followed with impunity. The Congress, Constant, Black Growler, Mud Geyser, Monarch Geyser, New Crater and Emerald Pool comprise the chief attractions of Norris Basin, while many beautifully formed and delicately tinted springs contribute to the visitor's enchantment.

The flat or valley to the southwest is filled with numerous openings, the water in many being clear and transparent, and in others of a milky hue, constantly boiling and splashing, many of the vents sending forth a disagreeable, sulphurous odor. This section can be visited if great care is exercised; many of the craters, being but thinly crusted, are insufficient to support a person's weight.

The Congress.—The first interesting sight that attracts the visitor is this beautiful spring. It is located quite near the driveway on the east side and is the largest spring of its class in the geyser basins. The diameter of the same is about 30 feet. Its pale blue water is in a state of violent agitation, rising nearly to the rim of the crater with a slight overflow. For several years there existed near the Congress the "Steam Vent," one of the attractions in this section. It consisted merely of an opening in the rocks from which a great quantity of steam was constantly escaping, the roaring of which could be heard for miles. During the winter of 1893 the "Steam Vent" ceased, and the new spring now called the Congress appeared. The



Constant, or "Minute" Geyser, Norris Basin.

first eruptions were of great force and completely blockaded the road with masses of earth and formation.

Constant.—The little geyser at the south end of the flat is the "Constant," or "Minute Man," which has an eruption every sixty seconds, with only a slight variation; the pool is 24 feet in diameter, filled with water of crystal clearness. The absence of a cone or deposit surrounding the geysers of this basin, such as is found around the geysers in the Upper Basin, tends to substantiate the theory of scientists as to the age of this locality. During an eruption of the Minute Man jets of water are thrown 40 feet in the air, while the main body is lifted scarcely 30 feet. The overflow is not large, as most of the water returns into the crater after each display.

The Black Growler, with a chimney-shaped opening, is located quite near the road, at the head of a gulch leading from the plateau. Very little water is thrown out, while a large quantity of steam is constantly escaping, producing a peculiar sound. The deposit surrounding it being of inky blackness, is evidently the origin of its name. The water is not clear and has a strong odor of sulphur, which is probably the cause of its turbidity.

The geyser a few feet to the north—known as the "Hurricane"—is similar to the Black Growler in the character of its eruptions, which are very irregular, and destructive to surrounding vegetation and foliage.

Mud Geyser is located near the road, on the highest

point in the basin; its crater is about 12 feet in diameter, having a raised margin 5 feet high on the east side, sloping nearly to a level at the west. The eruptions occur at intervals of twenty minutes and continue about five; the lead-colored contents (about the consistency of paint) being raised 8 or 10 feet during each pulsation. Its contents are severely agitated, the turgid mass rising nearly to the edge of the crater. During the past year the character of this geyser changed considerably, becoming more clear, and another, with predominant muddy features, broke out near by. These phenomena tend to substantiate the theory that all geysers in their earlier stages of development, partake of the nature of mud springs. The path leading south from Mud Geyser passes Emerald Pool and New Crater, and continues on to the Monarch.

Emerald Pool is somewhat concealed in the timber, and is a handsome, emerald-tinted spring, 40 x 50 feet in size. The sulphur-lined basin with coral walls, most beautifully shaped, can be seen to an appalling depth. It is one of the many quiet springs, simply overflowing. The water is quite hot, having a temperature of 186 degrees Fahrenheit at its edge.

The New Crater.—On the hillside, about 500 feet south of Emerald Pool, is found this prominent object of interest, surrounded by huge blocks of recently disturbed rock, a narrow ravine leading to the basin below being covered with sand and deposit by its overflow. The erup-

tions of this new geyser during the past season, occurred every two hours, continuing about twenty minutes. The rock-covered crater prevented the discharges attaining any great height. Reports from the Park since the close of the last tourist season, indicate that it is developing into a large and powerful geyser.

The Monarch Geyser.—The location of this geyser is beneath a prominent bluff of brilliantly colored rocks, nearly upon the level of the plateau; the crater consists of two oblong openings in the rock, the larger of which is 20 feet long and 3 feet wide. Eruptions of the Monarch occur without warning, and consist of a series of explosions, frequently more than a dozen, in which columns of water are thrown 100 feet high, flooding the level country surrounding. The intervals of eruption vary from year to year, ordinarily about twelve hours. The Fearless, Vixen and Steamboat are geysers of minor importance, but are well worth a visit. Three miles from Norris Basin the road enters Elk Park, a beautiful valley surrounded by heavily timbered hills and mountains, the Gibbon River quietly winding through it. A short distance before entering Gibbon Canyon, which is followed for some miles, a very interesting group of paint pots can be visited.

Gibbon Paint Pots.—Half a mile east of the entrance to Gibbon Canyon, surrounded by a dense growth of pine timber, are located these remarkable paint pots, a carriage driveway connecting them with the main road.

They consist of numerous openings in the highly colored clay, and are intensely curious, their brilliant coloring and fantastic shapes being the admiration of all. The greater part of the hot springs are at the base of the hill, while the most beautiful paint pot is some 50 feet up the hillside. This, the main attraction, has a funnel-shaped crater with walls of finely ground clay extending about six feet high; each puff of steam through the thick, pasty material in the bottom of the crater moulds a perfect rose in full bloom, to be soon replaced by one equally as handsome. Visitors should avoid leaving the regular paths, as the treacherous character of this formation renders it quite unsafe.

GIBBON CANYON.

This rugged mountain pass affords the only fairly easy means of exit from Norris Geyser Basin to the valley of the Firehole. The roadway enters the canyon on the east side of the Gibbon River, and follows the latter's course as nearly as practicable, shadowed by precipitous cliffs,—some of them 2,000 feet in height,—the frequent sharp approach of which to the banks of the river compels the crossing and recrossing of the rapid but shallow stream—here across a substantial bridge; there by a convenient natural ford.

At the northern entrance to the canyon a foot bridge and bridle-path lead to the summit of Mt. Schurz, upon which is located Monument Geyser basin, at an altitnde of 1,000 feet above Gibbon River. Interesting as this "basin" un-

questionably is, its difficult access, together with the time necessarily consumed in climbing and descending the somewhat steep trail, is, unless to one inclined to scientific observation, scarcely compensated by even the closest scrutiny of the dozen or so crumbling geyser cones—some of them steaming and rumbling, others apparently extinct—which constitute the sum total of attractiveness and gives to the locality a distinctive name.

Proceeding along the pass, the numerous little puffs of steam arising from either bank of the river, near the water's surface, need no watchful guide to apprise the passer-by of the countless hot springs with which the gorge abounds. Many of these springs are curious and interesting, and all can be sufficiently observed as one passes leisurely along, without stopping to examine each in detail. One of them, however, Beryl Spring, is rather more than usually attractive, and deserves, as it seldom fails to receive, somewhat of particular notice. The largest boiling spring in the canyon, being some 15 feet in diameter, it is located close by the roadside, about a mile from the entrance to the canyon, and can be readily viewed from a passing carriage; the voilent boiling of its surface, coupled with the noisy hiss of escaping steam, while lending something of nervous apprehension to the feelings of the traveler, strangely enough possesses no terrors for the stage-horse, although the constant overflow of scalding water from the edges of its basin-like rim pours across the roadway itself.

The road, throughout the canyon's entire length, could hardly have been better constructed to afford a more complete and thorough inspection of the wild beauty of rock and glen, and, as it nears the southern exit from the pass, permits a good view of one of the many charming cataracts of this region.

Gibbon Falls, whose waters, tumbling in a foamy torrent down a series of steep cascades on one side of a bold, rocky ledge, and on the other—and most readily observed side—streaming in a thin, shining ribbon of silvery spray from a height of something over 80 feet, fittingly conclude the attractions at Gibbon Canyon.

After leaving the falls the road passes for a distance of some eight miles over a succession of pine and fir-clad terraces, from the southern crest of which, on a clear day, may be seen the three snow-capped "sentinels" of the Teton Mountains, 75 miles distant, forming a portion of the boundary between the States of Wyoming and Idaho, their dizzy height, full 14,000 feet, overtopping all other peaks of the Rockies.

The dense volume of steam rising from Excelsior Geyser, distant about 8 miles, is also plainly visible from this point.

Leaving the terraces, the road passes, by a gentle descent, into the valley of Firehole River (Lower Geyser Basin), whose two forks, together with the waters of the Gibbon, unite to form the Madison River, one of the three principal sources of the Missouri. Continuing up the Fire-

ole for a short distance, the road crosses its east fork near he summer *cantonment* occupied by a troop of U. S. avalry, stationed here for the better protection of this art of the *reserve*; and skirts along the east side of the *asin* for a mile or so—to the Fountain Hotel, one of the est hostelries of the Park—the end of the first day's ourney.

LOWER GEYSER BASIN.

This is a comparatively wide valley, extending southward from the junction of the east fork of Firehole River with the main stream, and embracing an area of 30 to 40 square miles. Over this valley or *basin* are scattered hot springs in groups, of which Dr. Hayden, in his official survey of the Park Region, has catalogued 693 exclusive of 17 geysers. The central portion of the basin is a nearly level plateau, 6 or 7 miles in width, only partially timbered, and covered with either spring deposit or marsh. The general elevation is about 7,250 feet, while the surrounding slopes, which are, for the most part, heavily timbered, are 400 to 800 feet higher.

Fountain Geyser.—One of the chief objects of interest—occupies a slight eminence—some 25 feet higher than the roadway—and only a few minutes' walk from the hotel, which is in plain sight. The formation or deposit from the waters of this geyser covers an area of several acres, the crater of which is 30 feet in diameter, surrounded by a rim-like edge, to the margin of which the water rises, except

upon the south side, where a mound of beaded geyserite has been built up to a height of 3 or 4 feet. On the north side of the geyser proper is a considerably larger pool which receives the overflow from the crater.

The cushion-like masses of geyserite, which are plainly visible through the transparent blue water, in both the crater and the pool, are very much admired.

The eruptions of the fountain occur at intervals of from two to four hours, and continue with great force from ten to fifteen minutes, usually.

During activity the main volume of water does not reach a height beyond 15 or 20 feet, though jets are frequently thrown 50 or 60 feet. Indications of an eruption are as follows: When both the pool and crater are full of water to the rim it is probable that an eruption will soon take place, as immediately after action the water falls from 12 to 18 inches below the crater rim, from which point it rises gradually until the climax is reached.

Clepsydra Spring, some 50 feet west from the Fountain, has recently developed into an active geyser of no small eruptive power, its frequent displays being really quite violent for so small a "spouter," and very pleasing withal.

Mammoth Paint Pots.—Some few hundred feet east of the Fountain, from which they are separated by a fringe of trees, are situated these wonderful paint pots. This remarkable mud caldron has a basin which measures



Mammoth Paint Pots.

40x60 feet, with a mud rim on three sides, which is from 4 to five feet in height. In this basin is a mass of fine, whitish substance, which is in a state of constant agitation. It resembles some vast boiling pot of paint or bed of mortar, with numerous points of ebullition; and the constant boiling has reduced the contents to a thoroughly mixed mass of silicious clay. There is a continnous bubbling up of mud, producing sounds like a hoarsely whispered "plop, plop," which rises in hemispherical masses, cones, rings and jets. On the north side of the mud basin the rim is low, and forms the edge of a flat of pink and red, which is cracked and seamed, and over which are scattered thirty or forty mud cones, generally of a pink and rose color,—though a few are gray,—averaging from two to three feet in height.

A very interesting section of country lies to the south of the Fountain and Paint Pots, but, at present, cannot be reached with safety. Here are situated numerous geysers, among them the Great Fountain, a very powerful one, which will greatly add to the Park attractions when made accessible. In one of these springs may be seen the whitened skeleton of a mountain buffalo. No king or saint was ever more magnificently entombed than this monarch of the hills in his sepulchre in the wilderness.

Leaving the Fountain and the Paint Pots, the road bears to the west, crossing Fountain Creek and passing numerous hot springs, until it strikes the west bank of the Firehole;

where it turns south, proceeding up that stream until, emerging from a strip of timber, Excelsior Geyser is brought into full view. Strictly speaking, this section constitutes the upper portion of the Lower Basin, and is about three miles from the Fountain group. Being about midway between the extremes of the Upper and Lower Basins, however, this locality is given a distinct designation, that of

MIDWAY GEYSER BASIN.

Excelsior Geyser.—"Early explorers in this locality discovered, in 1871," says Dr. Peale, "on the west bank of Firehole River, an immense pit of rather irregular outline, 330 feet in length by 200 feet in width at the widest part. The water is of a deep blue tint, and is intensely agitated all the time, dense clouds of steam constantly ascending from it. It is only when the breeze wafts this aside that the surface of the water, which is 15 or 20 feet below the level surrounding, can be seen. The walls on three sides are perpendicular, cliff-like, and in places overhang, having been worn away on the other." Cliff Caldron, with every indication of a powerful geyser with long intervals of eruption, was, however, not known to be a geyser until some ten years later.

Visited by thousands annually, this interesting section became known as "Hell's Half Acre," a name it retained till 1881, when discovered by Col. P. W. Norris to be a geyser of great force, and named by him "Excelsior." Its erup-



Excelsior Geyser, Firehole River.

tions in 1881 began in the fall, after the tourist season had closed, and before the season of 1882 opened had wrought a great change in the appearance of its crater. Col. Norris witnessed upwards of thirty eruptions, varying from 75 to 250 feet in height, at intervals of one to four hours.

No further eruptions of this geyser are recorded until early in the spring of 1888, when reports became current that Excelsior was again in action, and many residents of the surrounding territory were attracted to the Park when the only means of travel was upon snowshoes. Eruptions of great force continued during the entire season of 1888, and kept up with unabated vigor during the succeeding winter. The present size of the crater is some 250 feet in width by 400 feet in length, having enlarged quite a good deal during the past two years. This process of enlargement, if kept up, will, in time, undermine Turquois Spring, and, eventually, Prismatic Lake also; the latter fully 500 feet distant from the geyser crater.

The intervals of eruption during 1888 were at first about every hour and fifteen minutes, increasing toward the latter part of the season to two hours. The only possible indication of an approaching display is the increase in the volume of overflow, there being a steady filling of the crater after periods of activity.

Immediately preceding an eruption a violent upheaval occurs, raising the entire volume of water in the crater nearly 50 feet, when instantly one or two, and sometimes

three, terrific explosions occur, followed closely by the shooting upwards of columns of water, and oftentimes masses of the rocky formation, to a height of 200 to 250 feet. Tons of rock have in this way been hurled into Firehole River, some pieces fully 500 feet from the crater, while specimens may be seen scattered all about the vicinity. At each upheaval sufficient water escapes to raise Firehole River several inches. The wearing away of the formation at the outlet of the "overflow" has plainly exposed to view the hoof-prints of buffalo, undoubtedly made centuries ago. The inactivity, during 1888, of two of the largest geysers in the Upper Basin is attributed to the wonderful activity of Excelsior, which, at each eruption, ejects as much water as all the geysers in this basin combined. The afternoon displays are considered the best, owing to the presence of less steam than earlier in the day, and from the main road fully as satisfactory a view is obtained.

Turquois Spring is situated about 150 feet north from Excelsior, being a silent pool, about 100 feet in diameter, and remarkable for its beautifully blue transparent water. There used to be a constant overflow from this spring, which was carried into the Firehole River through a channel some 2 feet wide and 8 or 10 inches in depth, its sides and bottom being most exquisitely colored; but during the latter part of the season of 1888 the waters of the spring suddenly settled some 10 feet, since which

time no overflow has taken place. West of Turquois Spring and, in itself, a marvel, is a small spring of cold water, which, though rather "brackish" to be palatable, is attractive as being the sole cold spring in this region of thermal waters.

Prismatic Lake.—Probably the very largest, and certainly one of the most beautiful springs in the entire Park Region, is that designated by the above appellation. It is situated some 500 feet or so west of Excelsior Geyser, its dimensions being 250 x 350 or 400 feet. Over the central pit, or bowl, of this spring the water is of a deep blue color, changing to green towards the margin, while that in the shallower portion of the lake surrounding the central basin has a yellow tint gradually fading into orange. Outside its rim there is a brilliant red deposit, which shades into purples, browns and grays, all seemingly painted upon a ground of grayish white, which forms the mound, built up of layers of silicious deposit, upon which the spring is situated. This coloring is in vivid bands, which are strikingly marked and distinct. The water flowing off in every direction, with constant wave-like pulsations, over the artistically scalloped and slightly raised rim of the lake, has formed a succession of terraces, each a few inches in height, down the slopes of the mound, particularly upon its southern face. It is impossible to exaggerate the delicacy and richness of the coloring in and about this wonderful phenomenon of nature. The temperature of the water

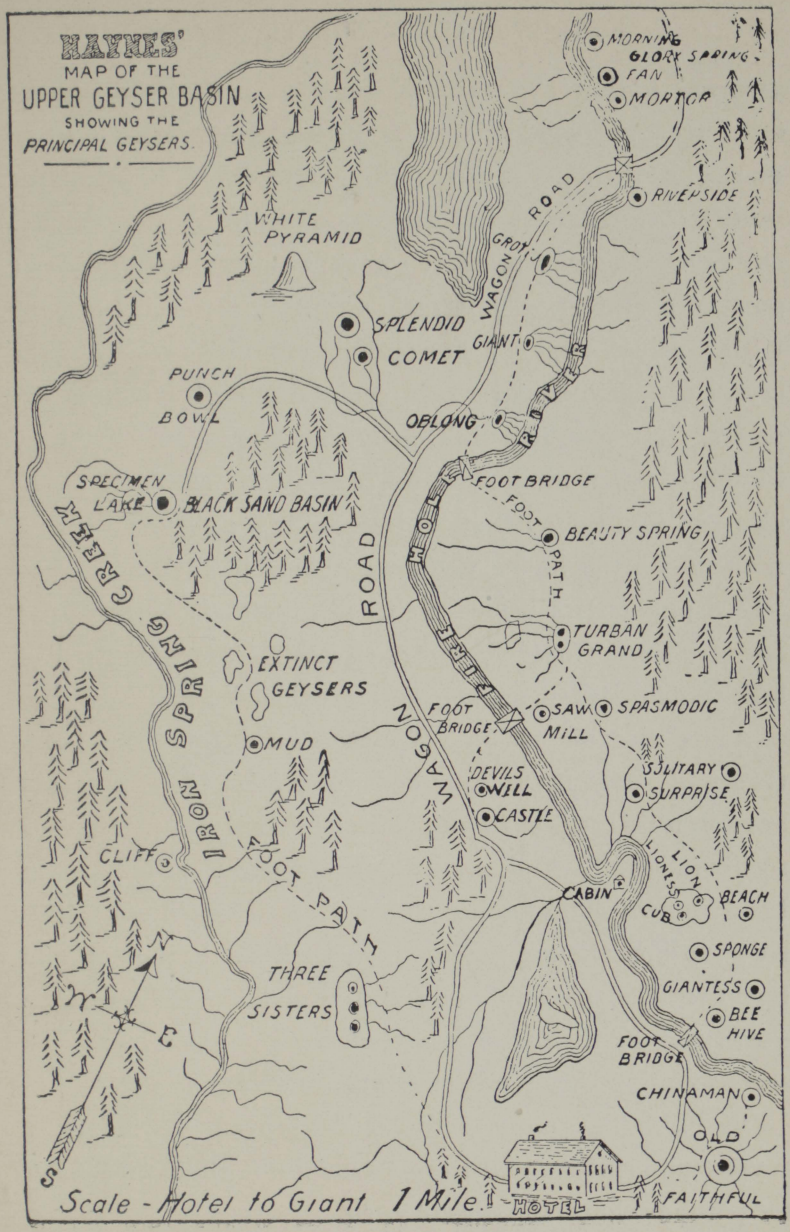
is about 146 degrees Fahrenheit, and the constantly rising clouds of steam sometimes render difficult a good view of the lake surface; but viewed from the proper standpoint (generally with the sun to the back), these same volumes of steam are exceedingly attractive, reflecting the colors of the rainbow or prism, whence the name of the spring, though some attribute it to the variegated tints of its waters. Leaving Excelsior, the road passes numerous springs and pools, and, about half a mile to the south, intersects the main road between Upper and Lower Basins which skirts along the west side of Midway Basin.

The entire drive from Midway to the Upper Basin, some five miles, is among these natural wonders, but tourists usually proceed to the hotel located at the extreme south end of the Upper Basin, before beginning a minute and detailed examination of them.

UPPER GEYSER BASIN.

This basin is triangular in form, and embraces an area of about four square miles; it contains 26 geysers and upwards of 400 hot springs. Iron Springs Creek bounds it on the west; timbered mountain slopes, extending from southeast to northwest, form the *hypotenuse* of the triangle, and a wavy line of dark forest conifers, its southern base.

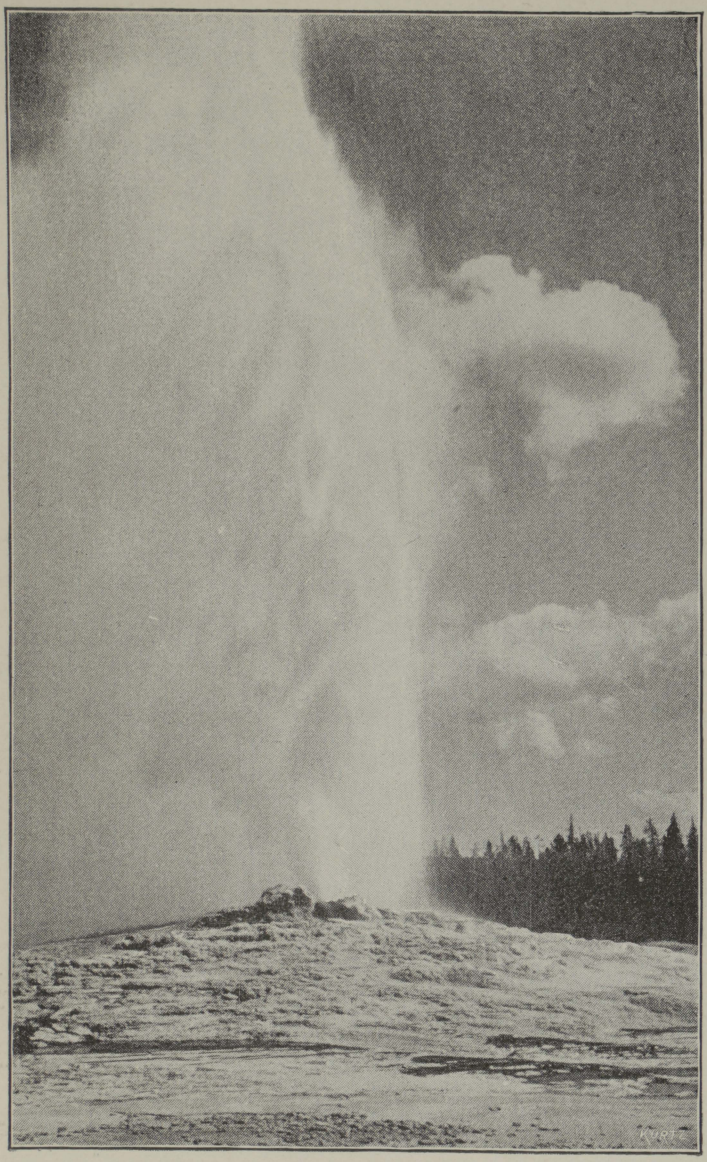
The main Firehole River drains it, centrally; its shelving banks are thickly pitted with steaming hot-springs and studded with mounds and cones of geyserite. Here,


HAYNES'
MAP OF THE
UPPER GEYSER BASIN
SHOWING THE
PRINCIPAL GEYSERS.
MORNING GLORY SPRING
FAN
MORTAR
RIVERSIDE
WHITE PYRAMID
GROT
WAGON ROAD
SPLENDID
COMET
GIANT
PUNCH BOWL
OBLONG
RIVER
SPECIMEN LAKE
BLACK SAND BASIN
FOOT BRIDGE
FOOT PATH
BEAUTY SPRING
MOE
ROAD
TURBAN GRAND
EXTINCT GEYSERS
IRON SPRING CREEK
FOOT BRIDGE
SAW MILL
SPASMODIC
MUD
DEVILS WELL
CASTLE
SOLITARY
SURPRISE
CLIFF
FOOT PATH
LION
LIONESS
CUB
CABIN
BEACH
SPONGE
THREE SISTERS
GIANTESS
BEE HIVE
FOOT BRIDGE
CHINAMAN
OLD
FAITHFUL
HOTEL
Scale - Hotel to Giant 1 Mile.

grouped within the narrow space of, perhaps, a square mile, are the grandest and mightiest geysers known to man, and silent pools of scalding, meteoric water that for beauty of formation and delicacy of coloring are, simply, marvels. The surface of the basin consists, for the most part, of a succession of gentle undulations, each crowned with a geyser-cone or hot-spring vent and covered with layers of silicious sinter and crumbling carbonaceous deposits, that give it a dull, grayish-white, sepulchral hue. Clouds of vapor hang shroud-like above it; the earth trembles and is filled with strange rumblings; the air is heavy with sulphurous fumes, and vegetable life is extinct.

In a paper read before the Cardiff (Wales) Naturalists' Society, Prof. Chas. T. Whitwell said: "Nowhere else, I believe, can be seen, on so grand a scale, such clear evidence of dying volcanic action. We seem to witness the death throes of some great American *Enceladus*. Could Dante have seen this region he might have added another terror to his inferno." And, continuing, the same writer quotes Lord Dunraven, as saying that a view of the Firehole Valley gave him the impression that some modern cities had been overwhelmed, and had so lately sunk amid flames into the bowels of the earth that the smoke of their ruins was still ascending through heaps of smouldering ashes.

The following more detailed description of the chief geysers and springs will serve to acquaint the reader with the peculiar characteristics of each.



Old Faithful Geyser.

Old Faithful.—Less than 1,000 feet east, and in plain sight from the hotel, is located this reliable friend of the tourist. Every sixty-three minutes (with rarely a variation of five minutes), day and night, summer and winter, this wonderful freak of nature gives its exhibition, without money and without price. Situated at the south end of the basin, it commands a clear view of nearly every other object of interest, and its moonlight displays are sights once seen never to be forgotten. Its eruptions begin with a few spasmodic spurts, during which considerable water is thrown out, and these are followed in from five to eight minutes by a column of hot water two feet in diameter, which is projected upward to a height of 125 to 150 feet, where it remains apparently stationary for about three minutes. The position and direction of the sun and wind vary the appearance of this geyser, which is one of the most popular in the Park, because of the remarkable regularity with which its eruptions occur, and the excellent opportunities afforded for observation. Its crater, an oblong opening 2 x 6 feet on the inside and 4 x 8 on the outside, is situated on a mound of gyserite, measuring at the base 145 x 215 feet, at the top 20 x 54 feet, the whole rising about 12 feet above the surrounding level. This mound is composed of layers of deposit in a succession of distinctly marked terraces which are full of shallow, basin-like pools, the water in which is clear as crystal, and their edges or rims exquisitely beaded and fretted, their bottoms showing

delicate tints of rose, white, saffron, orange, brown and gray. The north end of the crater has large globular masses of beaded, pearly deposit, and its throat is of a dark yellow or rusty color.

Bee Hive.—Crossing the foot-bridge leading to the east side of Firehole River, this geyser is found about 100 feet from the river bank. Its name was suggested by the peculiar shape of its cone, which is about 4 feet in height, 3 feet in diameter at the top, by 7 at the base, and nearly circular. Its nozzle-like opening, or crater, is about 18 inches across at the apex, narrowing gradually till the base of the cone is reached. The Bee Hive's eruptions are irregular, generally occurring about three times daily. It has, however, been known to have periods of activity not more than three hours apart and, *per contra*, to remain inactive for several weeks. There are, usually, several eruptions, about three hours apart, immediately following action of the Giantess.

There is no terrace-shaped deposit surrounding this geyser, as is the case with most of the others, and it is the only one close up to which persons can approach with perfect security while in action, as no rocks are thrown out, and so hot is the water ejected that it, for the most part, evaporates while in the air. The height attained varies from 170 to 220 feet. A minature geyser, or indicator, a few feet from its base, is, generally speaking, a faithful forerunner of activity in this geyser, by shooting up jets or

spurts of water, which are followed in about fifteen minutes by a column of steam and water from the main crater, hurled upward with great force and in a steady stream.

Giantess.—Some 300 feet east from the Bee Hive, upon the highest point of elevation in this portion of the Upper Basin, is located the Giantess, considered by many a geyser of unusual importance, whose eruptions, occurring at intervals of fourteen days, none should fail to see. However, owing to the fact that, in order to witness and fully appreciate its entire display, one must remain in its vicinity at least twelve hours, this geyser is often disappointing. Its crater, bowl-shaped, and some 60 feet in depth, is 24x30 feet in size at the surface, and is wholly devoid of the highly colored ornamentation and cone so characteristic of other geysers in this region. As the crater rapidly fills with water after an eruption, it resembles, to most visitors, a large, slightly agitated pool of sapphire-tinted water, with no outward indication of being the powerful geyser which it really is. At the beginning of an eruption the entire contents of the crater are instantly forced out, flooding the whole region round about. Relieved from this immense pressure of water, the geyser at once begins to eject forked-like columns of water and steam into the air, throwing them to a height of from 60 to 100 feet above the surface. These displays continue at short intervals throughout a period of about twelve hours, or until the water in the geyser tube is entirely exhausted,

when an interesting "steam period" takes place, lasting nearly an hour, and producing a roaring sound audible in all parts of the basin, and when occurring at night often awakens guests at the hotel.

In the earlier stages of eruption, during which the emptying of the crater takes place, shocks, similar to those produced by earthquakes, are distinctly felt throughout the basin, while the disappearance of adjacent springs and the generally succeeding activity of the Bee Hive give rise to the theory of subterranean connection between geysers and springs upon this "bench."

The Sponge.—A short distance to the north of the Giantess is a curious little geyser called the Sponge, whose slightly raised, circular cone strongly resembling a huge sponge in the character and color of its formation, attracts the eye of the passer-by.

Lion, Lioness and Cubs.—This interesting group is next visited. The Lioness and Cubs occupy a conspicuous mound of geyserite to the west of the Lion, which has an irregular flat-topped cone about four feet in height, and is separated from the rest of the group by a slight depression. Eruptions of the Lion occur daily; those of the Lioness are irregular as to time, and, as the Cubs play more frequently, it often happens that the Lioness and Cubs play together, though it rarely occurs that the Lion and Lioness are seen in eruption at one and the same time. The former is the most powerful of the group, and throws

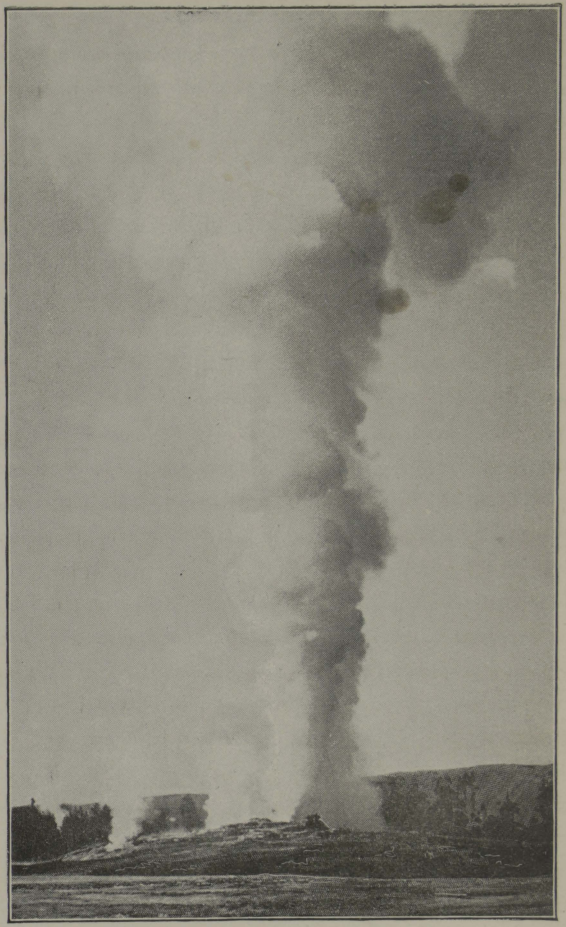
a column of water 50 or 60 feet high, frequently continuing in action ten or fifteen miuutes.

Sawmill Geyser.—Leaving the group just described, the pathway leads down the basin, passing through a point of timber close by the river, emerging from which one is confronted by a number of active springs and small geysers (situated upon a "bench" similar to the one just left), among which are the Tardy, Bulger, Spasmodic and Sawmill, the last named being the chief attraction, as well as the largest of the group. This locality may be also reached from the west side of the river by means of a foot bridge near the Castle.

The basin of the Sawmill is shallow, and about 40 feet in diameter, inclosing another basin of about half its size, in the centre of which is located its funnel-shaped crater, some seven feet across the top, and sloping to a small orifice. Its eruptions are very frequent, usually five or six a day, each continuing in operation fully an hour. The peculiar noise accompanying activity (suggesting its name), coupled with its spiteful vigor, render this geyser quite attractive.

The Grand and Turban.—At the base of a rocky bluff, some 500 feet east from and nearly opposite the Castle, are situated the above important geysers. An observer is naturally led to suppose that the irregular, pit-shaped crater, noticeably prominent, is that from which the Grand plays; such is not the case, however, as this crater

is merely a water-basin or reservoir, undoubtedly having connection with the Turban, but entirely unconnected with the Grand, which plays from an opening situated a few feet to the south, surrounded by cushion-like masses of geyserite formation. Eruptions of the Grand are somewhat irregular, usually occurring at intervals of from nine to thirty hours; its inactivity during the latter part of the season of 1888 being attributed to the extraordinary demonstrations of Excelsior. The outbursts of the Grand are among the finest to be witnessed in the Park, having a series of eight to twelve distinct eruptions, lasting from twenty to thirty minutes, and throwing at each discharge forked columns of water to a height of 200 feet, allowing ample time for visitors, who may chance to be in any other part of the basin, to reach its vicinity in time to witness some, at least, of its several magnificent displays. The Turban plays, mainly, from a fissure-like opening in its formation immediately north of its main crater, which, meantime, is greatly agitated, often overflowing, and discharging quite large quantities of its hot flood into the crater of the Grand, just below it on the south. The frequency of the Turban's eruptions occasionally presents the unusually fine spectacle of both geysers, Grand and Turban, in action at the same time. On the way from this point to the Giant and Grotto, Beauty Spring is passed, one of the largest silent pools in the Upper Basin, remarkable for the vivid coloring and exquisite beauty of its highly ornamented

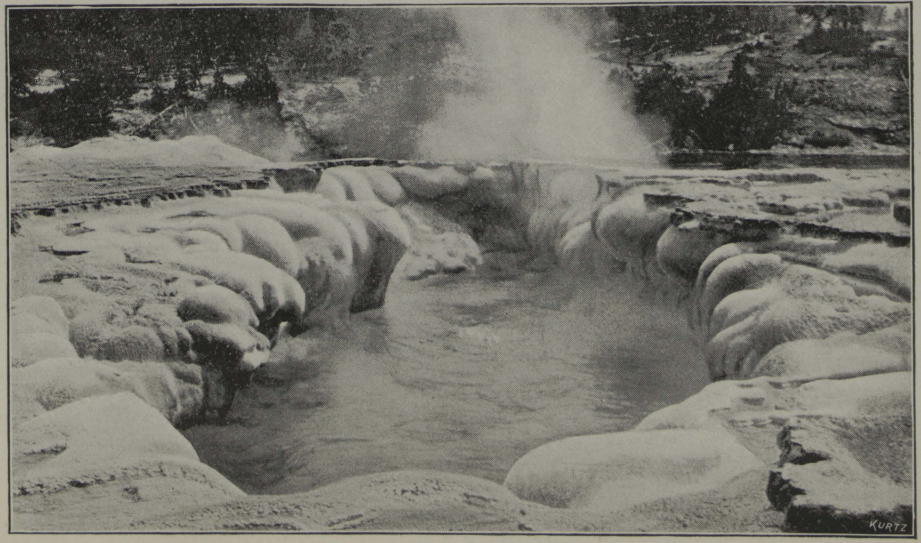


Giant Geyser.

margin, and its limpid blue waters. Near by are situated many interesting springs and pools yet unnamed, among them a miniature geyser called the

Economic, from the curious fact that there is no overflow nor waste whatever from it, as its waters, though frequently thrown 10 or 15 feet in the air, fall again into its crater, and disappear. From the regularity of its displays, it has also come to be called "Young Faithful."

The Giant.—It is nearly a mile from the hotel to this monarch of geysers, situated, like many others, in close proximity to Firehole River. Its cone, about 10 feet in height, though some 200 feet from the roadway, is conspicuous. A few feet to the north is an irregular mound, from which considerable steam escapes from sundry small holes, undoubtedly connected in some manner with the geyser and acting as its escape valves. The platform of deposit upon which the cone stands is about 75 feet in diameter. The cone is broken on the west side from the apex nearly to its base, affording a good view of the contents of the crater, which are almost constantly in a state of turbulent boiling and splashing. In 1881 the break in the cone was not nearly so large, being not more than half its present proportions. This is undoubtedly the result of unusually violent eruptions. The Giant usually "plays" every six days, for a period of one and one-half to two hours. Its inactivity during 1888 was by many attributed to the same cause which is supposed to have affected the Grand



Crater of Oblong Geyser.

and which has already been alluded to. When in action, an immense column of water is lifted 250 feet into the air at its initial outburst, the height of the column gradually decreasing until the close of the display, which is preceded by a rumbling sound not unlike a distant train of moving cars. Not until 1887 did the eruptions of this geyser take place in the day time, and those fortunate enough to have been eye witnesses of its gigantic display have enjoyed a treat most rare.

The Oblong.—Quite near the river bank and a short distance south from the Giant is situated the Oblong. Its crater is about 30 x 50 feet in size—hence its name—the interior of which, immediately following an eruption, is exposed to a depth of several feet, and, lined, as it is, with large globular masses of formation, affords the finest view of interior geyser structure to be seen in the entire Park region. Two large openings can be clearly seen in the bottom of the crater, and when the water is not agitated the eye readily penetrates these to unknown depths. Eruptions of the Oblong occur about every six hours, lasting only a few minutes, during which the contents of the crater are raised bodily some 20 feet.

The Grotto.—By far the most curious geyser cone of all is that of the Grotto, situated close by the road side, some 500 feet northwest of the Giant. The various cave-like openings in its peculiarly shaped cone give rise to its name. Its eruptions take place about four times daily,

each display lasting about half an hour, though, owing to its singular construction, its waters are not thrown to any considerable height (scarcely 20 feet). During eruptive periods, however, immense volumes of steam escape with great force. Separated from the main cone some 20 feet is a smaller crater which acts with the main geyser during eruptions.

Riverside Geyser.—A short distance above the wagon bridge across Firehole River is seen the Riverside Geyser, whose cone is close to the water's edge; it consists of two chimney-like craters, the larger being at the same time the higher. The geyser "plays" from the lower opening only, though visitors are apt to arrive at a reverse conclusion when viewing the locality between periods of eruption. An overflow of water is a certain indication of approaching activity, occuring about thirty minutes previous to eruptions and continuing until the outburst, which takes place about every eight hours, throwing an arching column to a height of 80 or 90 feet, the entire contents of the discharge falling into the river.

The Fan and Mortar.—On the east bank of the Firehole, about 300 feet below Riverside Bridge, are located these quite interesting geysers. The former has an eruption every eight hours, generally following the Riverside, its ejected waters spreading out in fan-shaped jets, from the fact of its having two crater orifices which throw out diverging streams. The pink geyserite forming its crater is



Splendid Geyser.

quite unlike that of any other geyser. The Mortar, close by, is very uncertain as to its periods of activity, and when viewed from the bridge above alluded to, resembles in its eruptions that particular piece of ordnance from which it derives its name.

The Splendid.—One of the most remarkable geysers in the Upper Basin is the Splendid. It is located fully 1,000 feet west of the Giant and a short distance south from a prominent mound of geyserite, called, from its color, the White Pyramid. The entire absence of anything like cone structure, and the numerous crater-like openings in its vicinity, puzzle one at first to locate the geyser proper; however, the extreme western opening, nearest the knoll and timber, is that from which the Splendid plays; the most peculiar feature of which is, that its eruptions occur at intervals of three hours, every other day, only, and as it has the reputation of being a frequent "spouter," persons happening to visit it on its quiet days are apt to find their expectations disappointingly blasted. When in action it throws a powerful stream fully 150 feet in height, increasing in force very preceptibly during the earlier stages of its eruptions, and not reaching the climax for several minutes, apparently maintaining its greatest vigor from five to eight minutes. Quite unlike other geysers, the Splendid throws its stream at a sharp angle instead of vertically, which fact, when it was first discovered, caused it to be called The Comet; this designation, however, soon gave way to its present more appropriate appellation.

During the afternoon eruptions, if the sun be visible, highly colored rainbows add to the rare beauty of the displays, and when seen, as it occasionally is, in conjunction with eruptive activity of other small geysers of the Splendid group, produces a truly marvelous effect. No perceptible change in the appearance of its crater follows or precedes periods of activity, and even during its quiet days the same violent boiling of its waters is always the subject of noticeable comment.

The Punch Bowl.—Both the footpath and wagon road leading westward from the Splendid toward Black Sand Basin and Specimen Lake pass the Punch Bowl, by far the handsomest spring of its peculiar class to be found in the geyser region, if not in the world. Situated on the summit of a small mound of silicious deposit, some five feet above the general level, it is about 10 feet in diameter, with a glittering rim of brilliantly colored formation 18 inches in height. The constant boiling of its contents, though only a small part of its surface is agitated, as the bubbles of escaping steam and gas arise, produces a wave-like undulation over the entire spring and gives it a steady and not inconsiderable overflow. A small cave-like opening on one side of the mound or cone is very handsome and much admired, having the appearance of being lined with satin of the rarest beauty and texture. Early visitors to the Park during the seasons of 1873 and 1875, speak of this spring as being an active geyser, while during 1888

similar reports gained currency. Nothing, however, is certainly known as to the correctness of these reports, though they are highly probable.

Black Sand Basin and Specimen Lake.—Dr. Peale's description of Black Sand Spring is interestingly comprehensive, and is as follows: "This is one of the most beautiful springs in the Upper Basin. It has a delicate rim, with toad-stool-like masses around it. The basin slopes rather gently toward a central aperture that, to the eye, appears to have no bottom. The water in the spring has a delicate turquois tint, and as the breeze sweeps across its surface, dispelling the steam, the effect of the rippling of the water is very beautiful. The sloping sides are covered with a light brown crust; sometimes it is a rather dark cream color. The funnel is about 40 feet in diameter, while the entire space covered by the spring is about 55 x 60 feet, outside the rim of which is a border of pitch-stone (obsidian) sand or gravel sloping 25 feet. From its west side flows a considerable stream, forming a most beautiful channel, in which the coloring presents a remarkable variety of shades; the extremely delicate pinks are mingled with equally delicate tints of saffron and yellow, and here and there shades of green." The overflow from this spring spreads out over a large and very interesting area, called Specimen Lake, which deserves more than a passing notice. Absorption of the surrounding silica has destroyed many of the trees in the vicinity, the dry, lifeless trunks adding to the attrac-

tiveness of the place, geologically speaking, by affording the appearance of petrifactions.

The roadway continuing westward from Black Sand Basin terminates at Iron Spring Creek. On the opposite side is the intensely interesting

Sun Light Basin, composed of several large, silent pools, whose coloring far surpasses anything seen in the Park. The most fascinating spring in this collection is Emerald Pool, the most southern one in the group. It is frequently spoken of by returning visitors as the most beautiful object in the Geyser Basins.

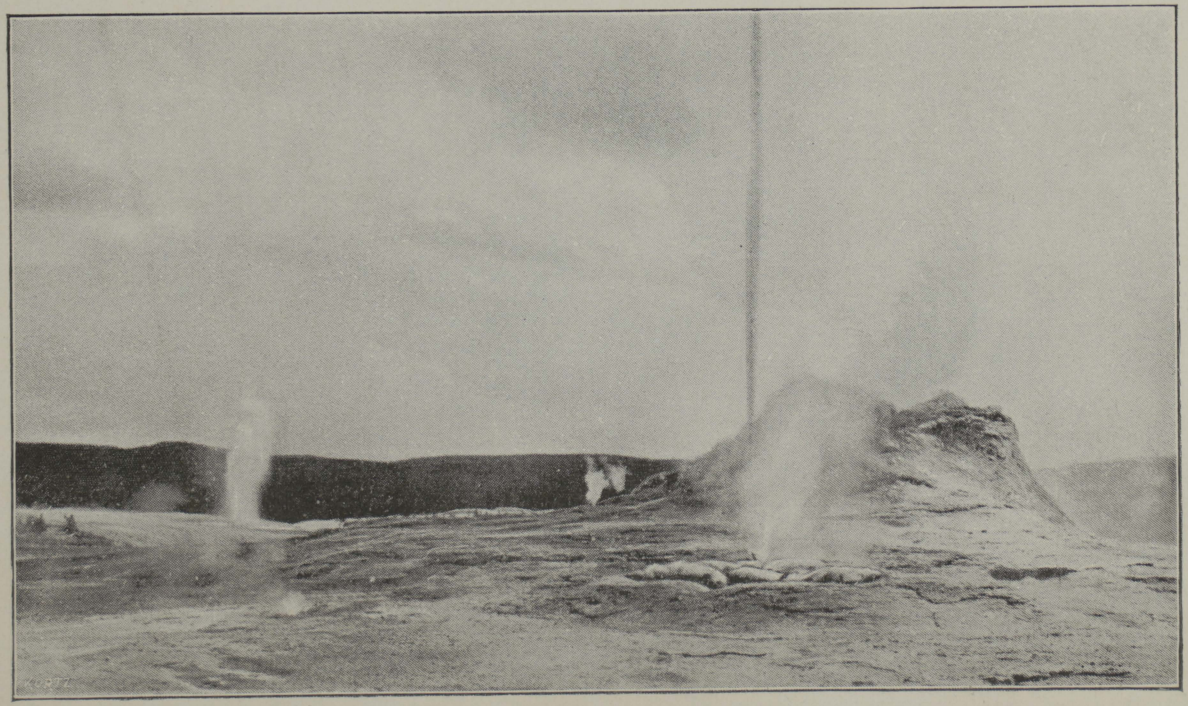
A footpath from the crossing of Iron Spring Creek leads to the hotel, passing some ancient geyser cones and the "Three Sisters," a trinity of springs quite interesting.

Castle Geyser.—The Castle is at once recognized, as it occupies a very prominent position close by a point of timber midway between the Grand Geyser and the hotel. It is visible from nearly all points of the basin, the main road being around its west and south sides. The great amount of deposit, perhaps 100 feet in diameter at its base, and the possession of the largest cone in the whole region, while giving it an air of conspicuousness, at the same time indicate that it is one of the oldest active geysers in the Park. The broken condition of its cone on the east side renders possible an easy ascent to its summit, which is about 20 feet across. The orifice of the geyser tube in the top of the cone is about three feet in diameter, quite round, and is lined with a formation of bright orange color.

Eruptions of the Castle occur at intervals of about thirty hours, preceded by the occasional throwing out of jets of water to the height of 15 or 20 feet, perhaps. These premonitory symptoms of eruption generally continue five or six hours, when more violent demonstrations, during which columns of water are shot upward to a height of fully 75 feet, ensue, and, continuing for half an hour or so, are followed by a "steam period" similar to that of the Giantess. Several times each season it has eruptions of an unusual character, in which its columns of water are thrown to twice their usual height and its subsequent "steam periods" are proportionately forcible. A violent boiling spring is situated near the base of its cone, on the north side, and used to be a favorite resort of the "camper-out" in earlier days, as excellent coffee can be made in this spring in fifteen minutes, and other edibles, requiring the action of boiling water to prepare them for the table, are well and thoroughly cooked in a correspondingly short time.

The large, crested spring, 100 feet north from the Castle, is usually very handsome. It generally is filled to overflowing, and the bottom and edges of the channel leading out of its north side are very highly and beautifully colored. This spring is some 20 feet in diameter, and is commonly known as Castle Well. A short distance below Riverside Bridge, is

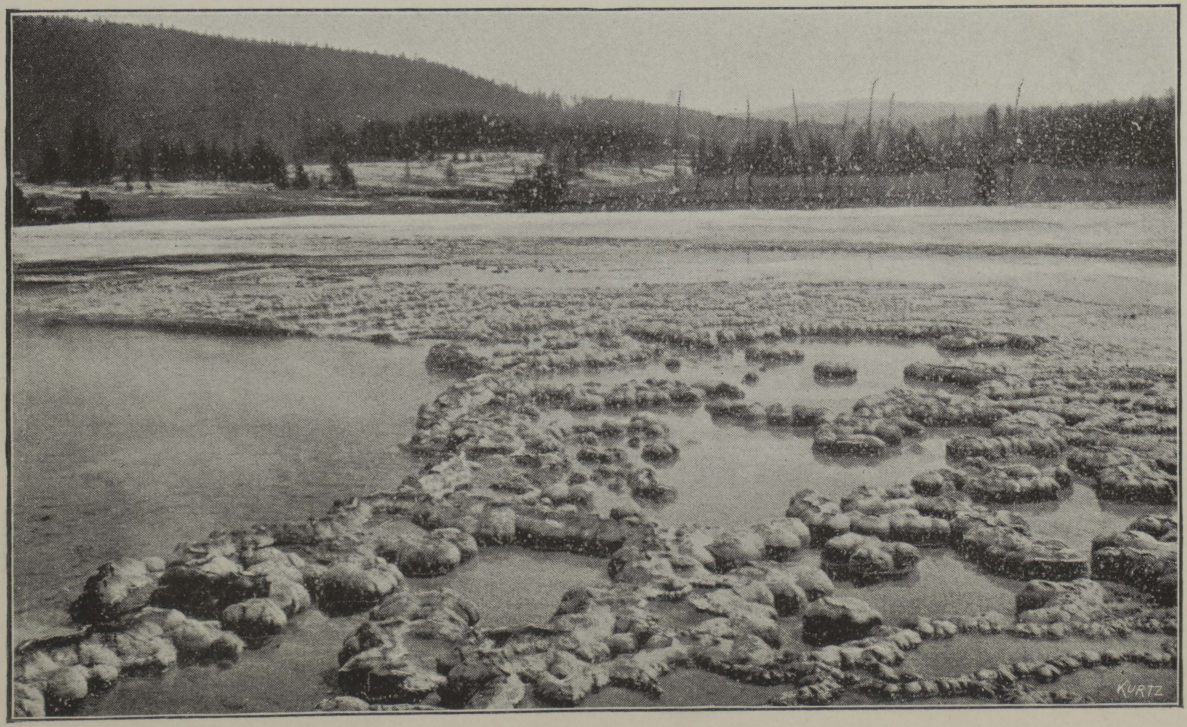
Morning Glory Spring, a silent pool, some 20 feet



Castle Bee Hive and Old Faithful Geysers.

in diameter, overflowing slightly at the west. The peculiar shape of its funnel-like crater, whose walls are delicately colored, together with the beautiful transparency of its waters, suggests its very appropriate name, and it is best seen from a stage or carriage, a slightly elevated point of observation affording a better view. Half a mile below is

Artemisia Spring, situated between the road and river, quite near the former, which is elevated some 15 or 20 feet above the spring. Stepping to the edge of the bank, an excellent view of the crater is obtained, the crystal clearness of its waters allowing a distinct view into its apparently bottomless depths. The spring is 60 feet in diameter and generally very little agitated, merely overflowing. The surrounding formation, quite unlike that of any other spring, is as hard as flint, and of a peculiar olive-green color. Although for the most part very quiescent, this spring has occasional pulsations in the nature of eruptions, at which times large quantities of water are forced out, fairly flooding the formation between it and the river. These eruptions are, however, extremely irregular, too few of them having been witnessed, in fact, to render the regularity of its periods of activity a matter of record or even of authentic rumor. The bank of the Firehole, some 30 feet high at this point, is the most highly colored section of the river to be found in the Upper Basin. The best view is obtained from the bridle-path on the west side of the river. This path leads south from the Splendid, crossing the Fire-



Sapphire Pool, Biscuit Basin

hole just above its confluence with Iron Spring Creek, near which it joins the main road.

Biscuit Basin.—This portion of the Upper Basin is on the west side of Firehole River, and on the north side of Iron Spring Creek, being about one mile below Riverside Bridge. The somewhat difficult ford across Firehole River prevents many from visiting this very interesting locality at the present time; however, it is hoped that the construction of a substantial wagon road will soon overcome this difficulty. The principal attraction of Biscuit Basin is Sapphire Pool, whose highly ornamented margin suggested the basin's rather odd name. Hundreds of small, symmetrical, biscuit-like knobs of olive-green formation surround the spring, which is of the variety known as pulsating or breathing springs (geysers in fact), the constant ebb and flow of its waters, now rising threateningly and flooding the margin of hard, biscuit-shaped masses, from one to another of which one must pick his way in order to get a good view of the pool itself; now gently and noiselessly receding, presenting, the while, a spectacle as curious as it certainly is interesting. A few feet to the west is

Jewel Geyser, whose eruptions, occuring with the remarkable frequency of from three to five minutes, render this little geyser extremely interesting, particularly as it manifests considerable power, throwing its jets of water and steam to a height of 25 or 30 feet.

Scarce 500 feet further west are the Black Pearl and

Silver Globe. The former has a beautiful basin, studded thickly with what at first appear to be black pearls, each about one quarter of an inch in diameter. A curious feature of this little "spouter" is the fact that its formation surrounds the roots and stump of a tree, completely encrusting the same with its rich, black ornamentation.

The Silver Globe derives its name from the constant rising to its surface of large, silvery globules or bubbles of gas or steam, which, of course, immediately disappear on reaching the air. These and many other equally interesting points of interest will tend to make this locality deservedly popular when more generally accessible.

UPPER GEYSER BASIN TO YELLOWSTONE LAKE.

The construction of the stage road from the Upper Basin to Yellowstone Lake, affording a glimpse of Shoshone Lake and the Teton Mountains *en route*, has added much to the attractiveness of the Park tour, rendering easily accessible to visitors a new and extensive region, charming in scenery.

Leading up the Madison River (being the same stream known as the Firehole River during its meandering of the geyser basins), the road crosses the river, and climbs a gentle ascent to

Kepler Cascades (two miles from the Upper Basin Hotel), whose waters leap from shelf to shelf of a rocky

GEYSER TIME TABLE.

A RECORD OF THE ERUPTIONS OF THE ACTIVE GEYSERS IN THE UPPER GEYSER BASIN, YELLOWSTONE NATIONAL PARK.

NAME.	HEIGHT FT.	INTERVALS OF ERUPTION.	DURATION.
Old Faithful, . . .	150	65 minutes.	4 min.
Bee Hive, ...	200	10 to 30 hours.	8 "
Giantess, ...	150	14 days.	12 hrs.
Lion, ...	60	24 hours.	8 min.
Lioness, ...	80	Irregular.	10 "
Cub, ...	12	Frequent.	20 "
Surprise, ...	100	Irregular.	2 "
Spasmodic, ...	40	Irregular.	20 "
Sawmill, ...	35	Very frequent.	30 "
Grand, ...	200	15 to 20 hours.	30 "
Turban, ...	40	Following the Grand.	20 "
Riverside, ...	100	8 hours.	15 "
Mortar, ...	60	8 hours.	6 "
Fan, ...	70	8 hours.	10 "
Artemisia, ...	150	Irregular.	10 "
Atomizer, ...	20	Irregular.	10 "
Jewel, ...	50	5 minutes.	1 "
Grotto, ...	30	4 hours.	30 "
Giant, ...	250	6 days.	90 "
Oblong, ...	30	8 hours.	4 "
Splendid, ...	200	3 hrs every other day.	10 "
Comet, ...	60	Irregular.	5 "
Castle, ...	150	24 to 30 hours.	25 "
Mud, ...	30	Irregular.	5 "
Cliff, ...	100	Irregular.	8 "
Lone Star, ...	75	40 minutes.	10 "
Chinaman, ...	40	Irregular.	2 "

chasm in a series of enchanting falls, aggregating 100 to 150 feet in height, and whose charms are enhanced by the dark background of forest on either hand. From this point the roadway continues up the Madison about two miles to the third crossing, when it leaves the river for the ascent of the "divide." At this point a trail continues up the west bank of the river about one-half a mile to

Lone Star Geyser.—The cone of this geyser is about 10 feet in height by 12 in diameter at its base, tapering slightly towards its summit, which is fully six feet across; its crater consisting of one large central opening surrounded by numerous small orifices, from all of which water is thrown during an eruption. The Lone Star plays every half hour, each alternate display being the better, its boiling contents being thrown in a fine spray, mingled with steam, to a height of 60 feet. The chief beauty of this geyser lies in its cone, which is striped, vertically, with bands of white, lavender and brown, intermixed with varying shades of yellow, and is completely covered with an almost endless variety of elegant pearl-like beads.

In leaving the Madison the road deflects to the eastward and climbs the continental water-shed, surmounting which it skirts along the bow of the divide and ultimately descends to the forest-fringed shores of the West Bay or "Thumb" of Yellowstone Lake. From Shoshone Point on the summit, an excellent view is had of Shoshone Lake and the Teton Mountains. The outlet of the lake is the Lewis or Snake River, a branch of the Columbia.



Lone Star Geyser.

YELLOWSTONE LAKE AND VICINITY.

It is about 18 miles from the Upper Geyser Basin to the "Thumb." A lunch station is located here and tourists have an opportunity of taking a steamer from this point to the Lake Hotel if they desire. The stage road follows the shore of the lake the entire distance to the hotel at the outlet.

There are no less than seven hot-spring areas surrounding Yellowstone Lake, containing in the aggregate more than 200 springs, great and small, of hot silicious water, but those of the west arm, or Thumb Bay, as it is called, are by far the most interesting. There are 66 springs and paint pots in this group (the temperature of whose waters averages about 190 degrees Fahrenheit) and several geyser cones; one of which rises above the lake surface just a few feet from the shore, standing upon which one may catch trout, and, dropping them into the hot water in the crater of the cone, cook them without removal from the hook. Some of these springs have a considerable overflow, caused by what seems to be a forcing up of their contents, which rise and fall alternately like the bosom of a sleeping giant; these are called breathing or pulsating springs, in contra-distinction to those whose waters maintain the same quiet level.

The water of nearly all these springs posseses the same delicate blue tints noticeable in other portions of the Park. The lake-shore at this point consists of sloping terrace-like

layers of silicious deposit, which extends some distance back from the water's edge and even out into the lake. Most of the springs are scattered over this formation, back a little way from the lake, though several are close to the water's edge, and a few, even, may be seen beneath the lake surface, occasional points of bubbling betraying their presence.

Some 400 or 500 feet back from the lake, and nearly opposite the "fishing-cone," is a paint pot basin similar to that near Fountain Geyser, in the Lower Basin.

This basin is about 50 feet in diameter, and is a seething mass of beautifully colored and finely granulated clay, the prevailing tints being pink and red in varying shades, though creamy white and pale blue colors are noticed. Around the edges of the basin are a dozen or more hollow mud cones, 2 to 3 feet in height, from which discharges of mud occasionally occur. By many this basin is considered the most attractive of all the paint pots of the Park.

Hotel at the Outlet.—This spacious and elegantly appointed hotel tends greatly toward making Yellowstone Lake the resort, *par excellence*, of the Park. Here everything is so arranged that guests can spend the entire season, if they so desire, making short, easy trips of sightseeing or explorations to all points of the great reserve. The falls and canyon are distant but 18 miles, a well-constructed road leading thither; the Great Geyser basins are scattered along a stage route, whose extreme length is



Yellowstone Lake, Hot Springs Cone.

not above 35 miles from this hotel, and some five miles southwesterly, just off the main road leading from the Outlet to the Thumb, is an arch of stone spanning a creek, forming a natural bridge; while to the eastward lies the

Hoodoo Region, or Goblin Land, a weirdly wild region, as yet visited by only a few sportsmen and ambitious explorers, but which time and the construction of roads will render accessible to all.

At present, a better field for exploration would be difficult to find, even though it lies at the threshold, almost, of one of the most cosmopolitan of American watering-place hotels.

To visit any, or all, of the points of interest circumjacent to this grand mountain lake, vehicles of all kinds, saddle and pack-animals, guides, rowboats, sailboats and steamers are ever at command, and as for trout fishing, he who has never cast a "fly" into the blue depths of this vast natural "trout preserve" and its large river outlet knows little or nothing of its delights.

Fifteen by twenty miles in size, of irregular outline, somewhat resembling the human hand, and embracing an area of about 150 square miles, this is the largest body of water in North America at so great an altitude—7,788 feet above sea level.

Several islands dot its surface, the largest being Stephenson's, near the south end, and Frank's, midway of the lake, and its very considerable depth (from 5 to 50 fathoms) renders navigation practicable and safe. The river Yellow-

stone is, at once, its principal affluent and sole outlet, its upper portion draining a considerable area tributary to the lake on the southeast, and the vast body of water thus accumulated in this natural mountain reservoir serving not only to furnish a never-failing supply for one of the grandest of the Missouri's tributaries, but supplying the means for the successful irrigation of the entire Lower Yellowstone Valley.

YELLOWSTONE LAKE TO FALLS AND CANYON.

The road from the lake to the Grand Canyon follows the valley of the Yellowstone the entire distance, about 18 miles, and most of the way quite near the river. It passes Mud Geysers, Sulphur Mountain and across Hayden Valley.

Mud Geysers are about five miles from the Lake Hotel and consist of several large craters filled with blue, pasty mud, one and all emitting odors far from agreeable. The attractive feature of this locality is the

Mud Volcano, situated a few rods to the west of the road, at the base of the cliff, whose funnel-shaped crater is 30 feet in depth, formed by mud ejected from below through a cave-like opening, out of which a sickening, lead-colored mass of mud, of the consistency of soft mortar, is constantly belched, accompanied by dull, muffled sounds, and in a manner at once repulsive and fascinating. The strange phenomenon presented by the foliage in the vicinity, covered as it is with a coating of mud, is accounted for by



Hayden Valley, Between Lake and Falls.

the theory that it is carried there in minute particles by the action of escaping steam, and not as the result of eruptions, as some suppose.

Hayden Valley extends from Mud Geyser to Alum Creek along the Yellowstone and west from the river to Mary's Mountain. It's the largest valley in the reservation, and especially adapted as a range for game, being well watered by Trout and Alum creeks. During the winter of '93-'94 a herd of about 100 buffalo and over a thousand elk wintered in this valley.

Sulphur Mountain, or ***Crater Hills,*** consist of a group of isolated hills or "buttes," each about 150 feet high, of which a splendid view is obtained from the roadway as it skirts along their western base. Large blocks of detached rock are scattered about, in all of which a large percentage of pure sulphur is noticeable. The fumes arising from the various vents are exceedingly disagreeable. The chief attraction is a large boiling spring at the base of the mountain, on the west side. Of this, Capt. G. C. Doane, of U. S. A., has given the following graphic description: "The greatest spring in appearance lies at the base of the highest hill, and is intensely sulphurous, great clouds of vapor continually escaping from it. It measures 15x20 feet on the inside, and its waters boil up constantly from 3 to 7 feet in height; the whole surface rising and falling, occasionally, with a flux and reflux of four feet additional, overflowing its basin, and receding

every few minutes. The basin is built up with a solid rim, or lining, of pure, crystalized sulphur, four feet in width all around the edge, probably amounting to forty tons in weight. The water is clear, but of a whitish cast, and above the boiling point, steam being evaporated from its surface. A small channel leads down the slope, and for several hundred feet its bed is incrusted with a sulphur deposit, showing that the spring occasionally flows a considerable quantity of water, the deposit being from 3 to 10 inches deep."

On the west side of the road are numerous mud caldrons and springs, the contents of which are varied, some being of thick mud, others of leaden-hued water, all incessantly agitated and throwing upon their surrounding edges a finely mixed muddy deposit. The road from Sulphur Mountain to the Canyon Hotel (some four miles distant) passes over a rolling country, and skirts along the banks of Yellowstone River until nearly to the Upper Falls, when it deflects somewhat from the river and, after winding through a belt of timber for a short distance, crosses Cascade Creek and climbs the hillside to the Grand Canyon Hotel.

UPPER FALLS OF THE YELLOWSTONE.

About a quarter of a mile above the falls, the current becomes very rapid, tumbling over a succession of cascades and swirling around masses of rock left surrounded in mid-



Rapids Above Upper Falls.

stream. Just before reaching the brink of the falls, the river makes an abrupt turn to the eastward, from which fact an unobstructed view of the former cannot be obtained from its hotel side. Above the falls a jutting point of rocks affords an excellent view of the rapids and the foaming waters rushing on over the precipice itself. The Upper Falls have a perpendicular drop of 140 feet, and the water, striking the shelving rock-formation at the bottom of the abyss, shoots out rocket-like columns plainly seen from the ledge above. A quarter of a mile below, the river takes another leap of 360 feet, called the Lower Falls. The water between, while seemingly placid, from points of observation most readily accessible and therefore usually visited, is exceedingly rapid, though its remarkable clearness affords a view of its apparently smooth, rocky bottom the entire distance. A footpath leads to the bottom of the Upper Falls, where very fine trout fishing may be enjoyed, and midway between this point and the Lower Falls, Cascade Creek enters the river.

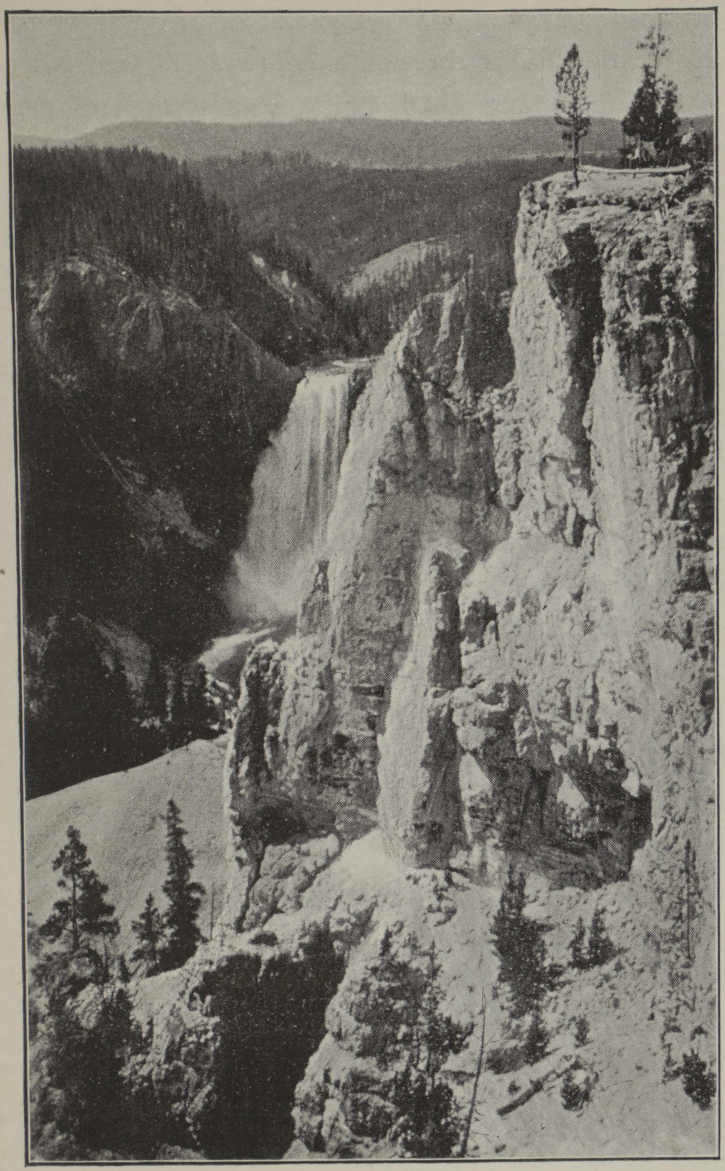
Cascade Falls are directly below the bridge which spans the creek. Their aggregate fall, including the cascades above, is about 130 feet, and a ladder to Grotto Pool allows an inspection of them, though these minor attractions possess little, if any, charm to the sight-seer when so near a sight justly rated among the grand est among earth's many marvelously grand scenic displays.



Grand Canyon of the Yellowstone.

GREAT FALLS AND GRAND CANYON OF THE YELLOWSTONE.

A short distance beyond Cascade Creek the road passes a point from which the first glimpse of the canyon is obtained. Inspiration Point may be seen some three miles away. The eye follows the river's course to the brink of the Great Falls, where it suddenly disappears, to be seen again some distance below, meandering, like a slender ribbon of silver, between frowning canyon walls. A sign-board points out the trail to the brink below, following which (on foot) the visitor soon stands upon a natural platform of rock upon the very edge of the canyon, overlooking the awful plunge of seething waters. At this point the river, though some 250 feet in width a short distance above, narrows to just 74 feet, and while the view is grand almost beyond expression, it is not the best to be obtained of the falls, Point Lookout and Red Rock being regarded the best points from which to see them; however, probably no better view (certainly none more comprehensive) of the canyon is obtainable than that to be had from the platform overlooking the brink of the falls. Gazing down the canyon, Point Lookout is seen rising from 1,200 to 1,500 feet above the river. Almost directly opposite, on the right-hand side of the canyon, is Artist's Point, so called from being the position selected by Thomas Moran from which to paint his celebrated picture, which may be seen hanging in the nation's capitol at Washington.



Point Lookout and Great Falls.

Inspiration Point, three miles below, is hidden from view by an intervening bend, but a vast stretch of rugged canyon wall may be seen on either hand. The only possible footing to be found in the canyon below the falls, and from which the latter may be clearly seen, is on the right, immediately at the foot of the falls. This point has been reached by but few, and then only by the aid of 800 feet of rope, by which the adventurous explorer is assisted in descending and ascending the almost perpendicular cliffs. The subject of the frontispiece illustration was secured from this position. To reach the south and east side of the canyon it is necessary to cross the river above the Upper Falls, which may be readily and safely accomplished by boat, and ere long will be made possible by means of a foot bridge to be constructed at their brink. The descent of the Grand Canyon will undoubtedly be made possible, at no very distant day, by means of an elevator.

Leaving the brink of the Lower Falls, the trail is ascended back up the canyon's side, past the sign-board, to its top; from which point, directly above the verge of the Lower Falls, the river and Upper Falls come prominently into view, and, as one passes along the dizzy edge of the canyon toward Point Lookout, glimpes are caught, through the timber, of the Great Falls, a full 1,000 feet below. Point Lookout is, by trail, about half a mile below the falls, and commands altogether the best combined view of the Great Falls and Canyon; though Red

Rock, just below, and to which a perfectly safe trail leads down the ravine under Point Lookout, affords the best view of the falls, themselves, possible for tourists to obtain.

Inspiration Point is considered by many as being, of all points, the best from which to see and appreciate the vast immensity of the canyon; and, although it is two miles from Point Lookout, the grandeur of the view, when considered together with the various other points and projections from which a more or less extended inspection of the canyon may be made, well repays one for the extra effort required. Inspiration Point is 1,500 feet above the river, and would afford an excellent distant view of both canyon and falls, were it not for Point Lookout intervening. Looking down stream, the view of the canyon is especially fine; though the brilliant coloring of its walls is not so noticeable as above the point. Beside the trail, a short distance from this locality, may be seen a large boulder of granite, a most interesting relic of glacial deposit, said by geologists to have been stranded here during the "ice period."

The opposite side of the canyon possesses many excellent points from which to observe both canyon and falls, giving the reverse effect of lights and shadows, which in itself is highly interesting. Particularly is this true of Artist's Point, from which an unobstructed view of both canyon and falls may be had, and when rendered more accessible,

will be fully as popular as the points visited to-day. The banks of the river throughout the entire length of the canyon (some 10 miles) are lined with hot springs, and the great quantity of hot water poured from them into the river current has the effect of increasing the temperature of the river fully 20 degrees, between the Lower Falls and a short distance below Inspiration Point. Quite a powerful little geyser is noticed on the south bank, playing from a knob-like deposit some 50 feet above the surface of the river, and a short distance up stream from Inspiration Point, above which the canyon walls rise in a sheer, perpendicular height of fully 1,000 feet. Field-glasses are quite necessary to enable one to make a satisfactory inspection of these numerous attractions; among which an eagle's nest, situated upon an inaccessible crag, fully compensates for the trouble of bringing a glass, in the interesting study it affords the beholder. With respect to scenic effect, that obtained in the morning from Inspiration Point and that in the afternoon from the brink of the Great Falls are considered by many the best. However, each and every hour produces an effect of light and shade possible for no artist to portray in faithful detail.

Believing that the purposes of a guide book are best subserved by confining its scope to plain descriptive statements, calculated to enable the reader to readily find, and recognize when found, the subjects concerning which it treats, all attempts at "word pictures" have been rigidly

excluded from this little hand-book. It would fail, however, to even faintly convey to the mind of the intending visitor, for whose benefit, of course, special reference was had in its inception, anything like an intelligent idea of the wonders of the National Park, if it neglected to acquaint him with the expressed opinions of some among the many distinguished *literateurs*, scientists, artists and others who have carefully inspected this region.

The following interestingly graphic, and, withal, faithful, pen picture of the Grand Canyon and Great Falls of the Yellowstone River, by the Rev. Dr. Wayland Hoyt, is subjoined for this purpose:

"Well, we have reached Cascade Creek at last, and a beautiful grove of trees, beneath whose shade a clear stream, whose waters are free from the nauseous taste of alkali, furnished a delightful place to camp. Now—dismounting and seeing that your horse is well cared for, while the men are unloading the pack-mules and pitching the tents—walk up that trail winding up that hillside; follow it for a little among the solemn pines, and then pass out from the tree shadows and take your stand upon that jutting rock, clinging to it well meanwhile and being very sure of your footing, for your head will surely grow dizzy, and there opens before you one of the most stupendous scenes of nature, the Lower Falls and the awful Canyon of the Yellowstone.

"And now, where shall I begin, and how shall I, in anywise, describe this tremendous sight; its overpowering grandeur, and, at the same time, its inexpressible beauty?

"Look yonder! Those are the Lower Falls of the Yellowstone. They are not the grandest in the world, but there are none more beautiful. There is not the breadth and dash of Niagara, nor is there the enormous depth of leap of some of the waterfalls of the Yosemite. But here is majesty of its own kind, and beauty too. On either side are vast pinnacles of sculptured rock. There, where the rock opens for the river, its waters are compressed from a width of 200 feet between the Upper and Lower Falls, to less than 100 feet where it takes the plunge. The shelf of rock over which it leaps is absolutely level. The water seems to wait a moment on its verge; then it passes, with a single bound, 360 feet, into the gorge below. It is a sheer, unbroken, compact, shining mass of silver foam. But your eyes are all the while distracted from the fall itself, great and beautiful as it is, to its marvelous setting; to the surprising, overmastering canyon into which the river leaps, and through which it flows, dwindling to but a foamy ribbon there in its appalling depths. As you cling here to this jutting rock, the falls are already many hundred feet below you. The falls unroll their whiteness down amid the canyon glooms. * * * * These rocky sides are almost perpendicular; indeed, in many places the boiling springs have gouged them out so as to leave overhanging

cliffs and tables at the top. Take a stone and throw it over; you have to wait long before you hear it strike. Nothing more awful have I ever seen than the yawning of that chasm. And the stillness, solemn as midnight, profound as death. The water dashing there, as in a kind of agony, against those rocks, you cannot hear. The mighty distance lays the finger of silence on its white lips. You are oppressed with a sense of danger. It is as though the vastness would soon force you from the rock to which you cling. The silence, the sheer depth, the gloom burden you. It is a relief to feel the firm earth beneath your feet again, as you carefully crawl back from your perching place.

"But this is not all, nor is the half yet told. As soon as you can stand it, go out on that jutting rock again and mark the sculpturing of God upon those vast and solemn walls. By dash of wind and wave, by forces of the frost, by file of snow plunge and glacier and mountain torrent, by the hot breath of boiling springs, those walls have been cut into the most various and surprising shapes. I have seen the 'middle age' castles along the Rhine; there those castles are reproduced exactly. I have seen the soaring summit of the great cathedral spires in the country beyond the sea; there they stand in prototype, only loftier and sublimer.

"And then, of course, and almost beyond all else, you are fascinated by the magnificence and utter opulence of color. Those are not simple gray and hoary depths, and reaches

and domes and pinnacles of sullen rock. The whole gorge flames. It is as though rainbows had fallen out of the sky and hung themselves there like glorious banners. The underlying color is the clearest yellow; this flushes onward into orange. Down at the base the deepest mosses unroll their draperies of the most vivid green; browns, sweet and soft, do their blending; white rocks stand spectral; turrets of rock shoot up as crimson as though they were drenched through with blood. It is a wilderness of color. It is impossible that even the pencil of an artist can tell it. What you would call, accustomed to the softer tints of nature, a great exaggeration, would be the utmost tameness compared with the reality. It is as if the most glorious sunset you ever saw had been caught and held upon that resplendent, awful gorge.

"Through nearly all the hours of that afternoon until the sunset shadows came, and afterward, amid the moonbeams, I waited there, clinging to that rock, jutting out into that overpowering, gorgeous chasm. I was appalled and fascinated, afraid, and yet compelled to cling there. It was an epoch in my life."

From the falls and canyon, stages will make the return trip to Mammoth Hot Springs by way of the Virginia Canyon road to Norris, as stated on page 26; but with the construction of a wagon-road over Mt. Washburn, to the north of the falls forming a junction with the Cooke City road, near Barronette's Bridge, not only will a new and charming portion of the Park be opened to general travel, but the entire circuit of the reservation will be possible without retracing any part of the way.

SIDE-TRIP TO MOUNT WASHBURN.

This, the observatory of the Park, rises midway between the Grand Canyon Hotel and Tower Falls, with which it is at present connected by two bridle-paths, and, soon will be, it is expected, by a substantial wagon-road. It is about ten miles from the Grand Canyon Hotel to the summit of the mountain, which may be readily reached from either trail; that between the mountain and river is the one most traveled. This path winds around the edge of the canyon for a mile or more below Inspiration Point, gradually drawing away from the river toward the mountainside, through dense forests and open parks, until the highest part of the trail is reached (fully 4,000 feet above the river). If it is desired to ascend to the summit of the mountain, the trail is left at this point, horses being able to climb the mountain-brow without special fatigue. If the climb to the summit be deemed undesirable, the trail may be continued to Tower Falls; the descent is gradual to the valley of Antelope Creek, which is followed nearly to the falls.

As has been said, Mt. Washburn is the observatory of the Park; and, while a trip to and from its summit consumes a day, the grand view obtained amply repays the effort. Dr. Hoyt thus describes it:

"Let us take our stand for a little now upon Mt. Washburn. Its rounded crest is more than 10,000 feet above the level of the sea, and perhaps 5,000 feet above the level of

the valley, out of which it springs. Its smooth slopes are easy of ascent. You need not dismount from your horse to gain its summit. Standing there you look down upon the whole grand panorama as does the eagle yonder, holding himself aloft upon almost motionless wings. I doubt if there is another view at once so majestic and so beautiful in the whole world. Your vision darts through the spaces for 150 miles on some sides. You are standing upon a mountain lifting itself out of a vast, saucer-shaped depression. Away yonder, where the sky seems to meet the earth on every side around the whole circumference of your sight, are lines and ranges of snow-capped peaks shutting your glances in. Yonder shoots upward the serrated peak of Pilot Mountain, in the Clark Fork range. Joined to that, sweep on around you in the dim distance, the snowy lines of the Madison range. Yonder join hands with these, the Stinking Water Mountains, and so on and on and around.

"Take now a closer view for a moment. Mark the lower hills, folded in their thick draperies of pine and spruce, like dark green velvet of the softest and deepest; notice, too, those beautiful park-like spaces where the trees refuse to grow, and where the prairie spreads its smooth sward freely toward the sunlight. And those spots of steam breaking into the vision every now and then, and floating off like the whitest clouds that ever graced the summer sky, those are the signals of the geysers at their strange

duty, yonder in the geyser basins, 30 miles away. And those bits of silver, flashing hither and thither on the hillsides, amid the dense green of the forests, these are waterfalls and fragments of ice glaciers, which for ages have been at their duty of sculpturing these mountains, and have not yet completed it. And that lovely deep blue sheet of water, of such a dainty shape, running its arms out toward the hills, and bearing on its serene bosom emeralds of islands; that is the sweetest sheet of water in the world; that is the Yellowstone Lake. And that exquisite broad sheen of silver, winding through the green of the trees and the brown of the prairie; that is the Yellowstone River starting on its wonderful journey to the Missouri, and thence downward to the gulf, between 6,000 and 7,000 miles away. But, nearer to us, almost at our feet, as we trace this broad line of silver, the eye encounters a frightful chasm, as if the earth had suddenly sunk away; and into its gloomy depths the brightness and beauty of the shining river leaps, and is thenceforth lost altogether to the view. That is the tremendous canyon, or gorge, of the Yellowstone."

SIDE-TRIPS FROM THE MAMMOTH HOT SPRINGS.

Middle Gardiner Falls and Bunsen Peak.— Surrounding the Mammoth Hot Springs, and not on the main traveled roads, are many interesting places that can be visited by ladies and gentlemen fond of horseback riding.

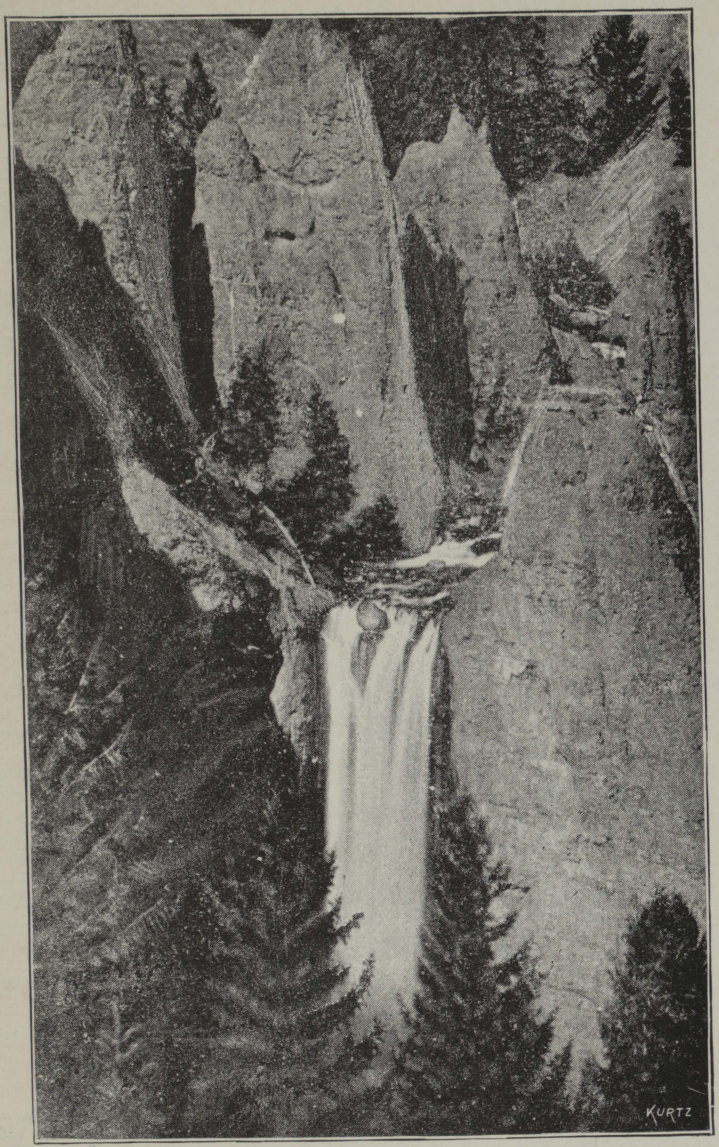
The Middle-Gardiner-Falls-trip is probably the most interesting. The trail leaves the Golden Gate road about half a mile south from the hotel, passing along the west side of the government inclosure to the West Gardiner River, crosses the West Gardiner and passes over the eastern slope of Bunsen Peak to Observation Point, which is 1,200 to 1,500 feet above the river. The walls of the canyon are nearly perpendicular, especially on the east side, and resemble more nearly the Grand Canyon of the Yellowstone than any other place in the Park. The total drop of the falls is 300 feet, the first 100 feet being perpendicular; the trail continues around the slope of Bunsen Peak, intersecting the main road at Golden Gate. The comparatively easy road around the mountain, though slightly longer, is preferable to returning over the trail just followed. The ascent to Bunsen Peak is easily made from the south side; the view from its summit is grand and impressive. To the south the lofty Teton range (forming part of the boundary between Idaho and Wyoming), though 100 miles distant, can be plainly seen on a clear day; the magnificent Gallatin range lies to the west; while Electric Peak, Hot Spring Valley and the Yellowstone range occupy the north and east. No better point can be found in this portion of the Park from which to study the geography of the reserve. From the west entrance of Golden Gate, one has the choice of two routes to the hotel—the regular carriage-road and the *old* road. The latter leads along the west side of Ter-

race Mountain, crossing the same through the *pass* called Snow Gate; thence down over the *formation* to the hotel. The entire distance of this trip is about eight miles, and can be easily accomplished in half a day. If the ascent of Bunsen Peak is made, it will be necessary to start in the forenoon and lunch at Gardiner Falls.

Mt. Evarts and East Gardiner Falls.—The gigantic wall, rising some 2,000 feet above Gardiner River, is the west face of a broad, triangular mountain, comprising an area of 20 square miles, known as Mt. Evarts—a designation that has been attached to it since 1870. The story of Mr. Evarts' adventure and suffering is well known, and the fact that his rescue from a horrible death took place in a little valley just back of the summit of the mountain gives a tinge of romance to the locality and makes the name more than usually appropriate. Mr. Evarts was a member of the Washburn-Langford party who explored the Park in 1870. While this party was in camp at Yellowstone Lake, some 50 miles distant, Mr. Evarts decided to part company with the explorers and return to Bozeman. Being positive that he could reach his destination without the assistance of a guide, he was allowed to depart, mounted on a horse, with a pack horse to carry his provisions and camp equipage. Overtaken on the way by a severe storm, he became bewildered; and, while searching on foot for evidence of a trail, lost his eye-glasses, and was unable to return to his horses. For three weeks he wandered helplessly

over the country, but was found at last by scout Barronette, upon this mountain, in a very precarious condition Mr. Evarts' rescue was largely due to the prompt investigation set on foot by Gen. Washburn upon the return of his horses to the explorers' camp, and, happily, he fully recovered from his thrilling experience and privation.

The wagon road from Mammoth Hot Springs to Cooke City (a mining camp just outside the northeast corner of the Park), passes East Gardiner Falls, which are nearly on a level with the eastern slope of Mt. Evarts; it is possible to ride a horse to the edge of this mountain which overlooks the Hot Spring Valley and commands one of the finest views of this locality. Mt. Evarts is a favorite summer range for game; and it is not uncommon for visitors to see elks, antelopes and "big-horn" sheep while on the mountain. East Gardiner Falls are composed of two cascades, the upper one having a drop of nearly 50 feet, while the lower falls are more broken and have a total drop of about 80 feet; they are but a short distance apart. An excellent view of Gardiner Canyon and the Hot Springs in the distance may be had from the ledge near the lower falls. The East Gardiner Falls are five miles from the hotel; the summit of Mt. Evarts, overlooking the Hot Springs, is a mile and a half further. Persons on horseback can cross over Mt. Evarts and strike the Yellowstone trail, which intersects the road from Cinnabar to the Hot Springs near Gardiner City. Excellent fishing may be found in the Yellow-



Tower Falls.

stone River near the mouth of Black-Tail-Deer Creek, which crosses the Cooke City road some two miles east of Gardiner Falls, and can be easily followed to the river.

Yancey's Tower Falls and Petrified Trees. —Those desiring to visit the eastern part of the Park, not available on the grand tour until the proposed Government road over Mt. Washburn shall have been constructed, can spend two or three enjoyable days at "Uncle" John Yancey's; have the best of trout fishing, and visit Tower Falls and the petrified trees. Yancey's place is eighteen miles from the Mammoth Hot Springs, on the Cooke City road. The character of the country is quite unlike any other portion of the Park, and the ride, generally, is very much enjoyed. Fishing in the Yellowstone is excellent above the junction of the East Fork to Tower Creek. Tower Falls are three miles from Yancey's (where guides to the fishing grounds can be secured). Tower Creek empties into the Yellowstone a short distance below the falls; these are 110 feet high, deriving their name from the peculiar rocky formations which rise, tower-like, several hundred feet above their brink. The petrified trees are one and a half miles from Yancey's, and are reached by an easy trail. They are the only specimens of petrified trees (standing in their natural position) to be found in the Park. On Specimen Ridge, across the Yellowstone, some 10 miles from Yancey's, are numerous specimens of petrifactions, many of them being four and five feet in diameter. All visitors to "Uncle"



Snowshoe Party Passing Obsidian Cliff.

John's speak in glowing terms of the trip. His hotel, with accommodations for twelve to fifteen ladies and gentlemen, is located in Pleasant Valley, where Mr. Yancey has resided for twenty years, selecting this romantic portion of the Yellowstone in preference to all others.

THE PARK IN MIDWINTER.

The first attempt to explore this region in the winter occurred in January, 1887. The expedition was headed by Lieutenant Frederick Schwatka, of arctic fame, and accompanying him were several eastern gentlemen and F. Jay Haynes, as photographer, together with a corps of guides, packers and assistants. The party was outfitted with arctic "sleeping bags," the Norwegian "ski," the Canadian "web" snowshoe, and toboggans to carry supplies, photographic equipment and astronomical instruments, it being the intention to camp wherever night overtook the party, regardless of the hotels. The expedition consumed three days in reaching Norris, leaving the Mammoth Hot Springs January 2d, and camping at Indian Creek the first night, with the thermometer 37 degrees below zero. The second camp was near Obsidian Cliff. This very slow rate of traveling was due, in great measure, to the depth and lightness of the snow, in which the toboggans sank readily, making them difficult to draw. At Norris, Lieutenant Schwatka unfortunately fell ill, and was compelled to abandon further exploration.

Mr. Haynes, who was specially desirous of obtaining a line of photographic negatives of winter scenes that should embrace the most interesting portions of the great *reserve*, employed two of the sturdiest men of the Schwatka party, and, accompanied by Edward Wilson, a government scout, pushed on, and succeeded in making a complete circuit of the *reservation*, visiting the Lower and Upper Geyser Basins, the Falls and Grand Canyon, and crossing over Mt. Washburn to Yancey's, and thence by the Cooke City road back to Mammoth Hot Springs.

The fallacy of attempting to drag toboggans was proven in getting to Norris, hence this party resorted to the customary fashion of packing upon their backs their equipment, sleeping bags and provisions, each carrying from 30 to 45 pounds. The Norwegian snowshoe, or *ski*, is a slender runner of tough, springy wood, slightly turned up at the forward end, some four inches wide by twelve feet long, and fitted with a looped thong or strap, into which to insert the foot. They are slid over the snow, the operator carrying a pole some eight feet long to assist him in maintaining his balance, and to be used as a brake when descending mountain sides, without which a velocity would be attained that would be extremely dangerous. In ascending, a "tacking" process, similar to that of a sailboat proceeding against the wind, has to be resorted to, unless it is found necessary to climb an abrupt section, then the operator resorts to the "corduroy step," which is simply step-



Foliage Near Geysers in Winter.

ping sidewise. In leaving the Norris Hotel the first grand sight presented was in Norris Basin, where the great amount of steam congealed on the trees in the vicinity produced all the fantastic shapes and forms possible to imagine, while the numerous vents sending up their columns of steam resembled a vast manufacturing city. The telephone wires, happening to be over a hot spring, were generally broken down by the immense weight of accumulated ice, frequently assuming a diameter of two to three inches. The Upper Basin, however, presented the most striking appearance, the greater amount of steam and more numerous hot springs affording a grand sight. The president of the Yellowstone Park Association kindly offered the party the use of the hotel, which was soon found to be colder than outdoors. It's a summer hotel, and the draught produced by kindling a fire inside was more disagreeable than a camp on the lava formation near Old Faithful, which was dry and entirely free from snow on account of the internal heat. Securing a tent from the hotel, the party camped here for several days, during the first five of which a blinding snowstorm raged continuously. The morning of the sixth day broke crisp and clear and revealed a sight seldom seen, in which Old Faithful, the Giantess and the Grand were in eruption at one and the same time. The dense volumes of steam rising from these geysers, in majestic columns, to a height of over 1,000 feet, mingled with that constantly arising from numerous other openings, produced an effect



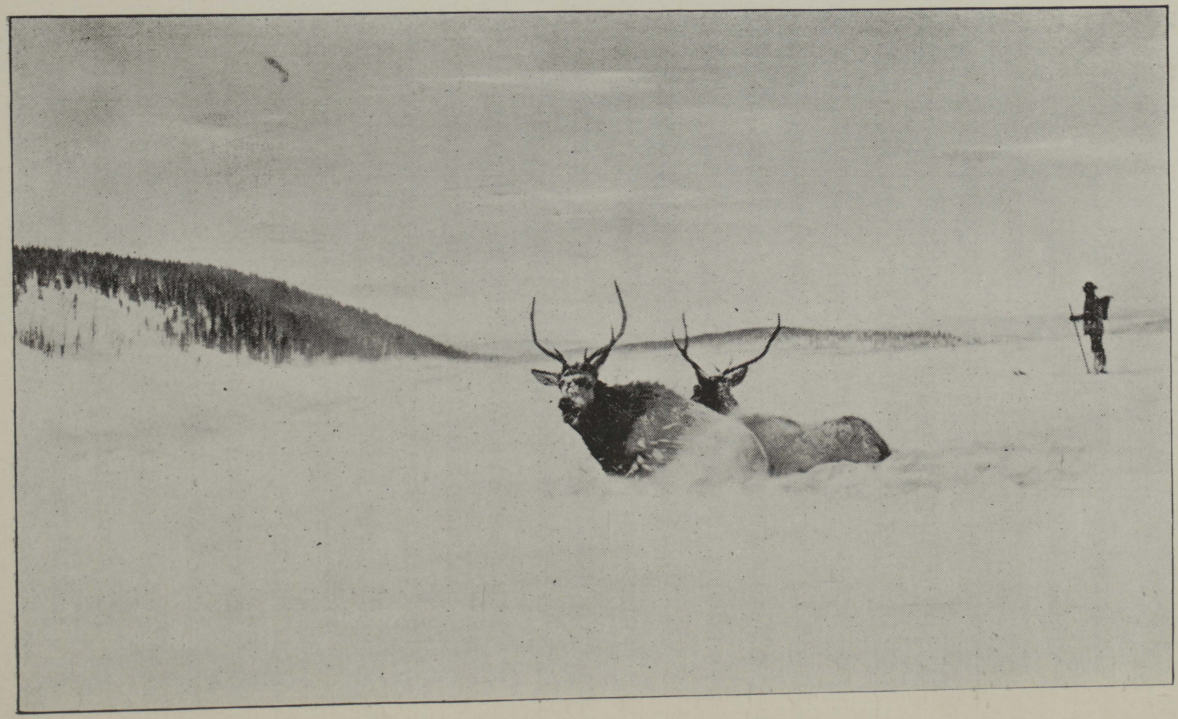
Great Falls of Yellowstone in Winter.

truly wonderful. The foliage surrounding each geyser was most artistically ornamented with ice and frozen spray. The great fall of snow throughout the Park, fully eight feet in depth, gave a quite different aspect to the country. The Grand Canyon was entirely changed, the beautiful coloring on the slopes being hidden. The Great Falls presented a strange sight; the north half was frozen over, immense icicles, 200 feet in length, hanging therefrom; an ice-bridge, fully 100 feet high, was formed at the base, coming up fully to the spray line, which is usually one-third the height of the falls, and the brink was frozen over, being hidden by an arch of ice fully a dozen feet thick. The trip over Mt. Washburn, in which the entire party nearly lost their lives, was one of hardship and privation, a blinding snow-storm being encountered on the mountain, lasting for three days, in which this little party wandered day and night, without food, shelter or fire, an adventurous experience few care to undergo. On the exposed ridges of Mt. Washburn thousands of elks were seen, this being their winter range. The extreme rigors of this section prevent it ever becoming a winter resort.

The circuit of the Park on snowshoes covered nearly 200 miles, the temperature varying from not warmer than 10 degrees below zero to 52 degrees below, during the entire twenty-nine days consumed by this expedition.

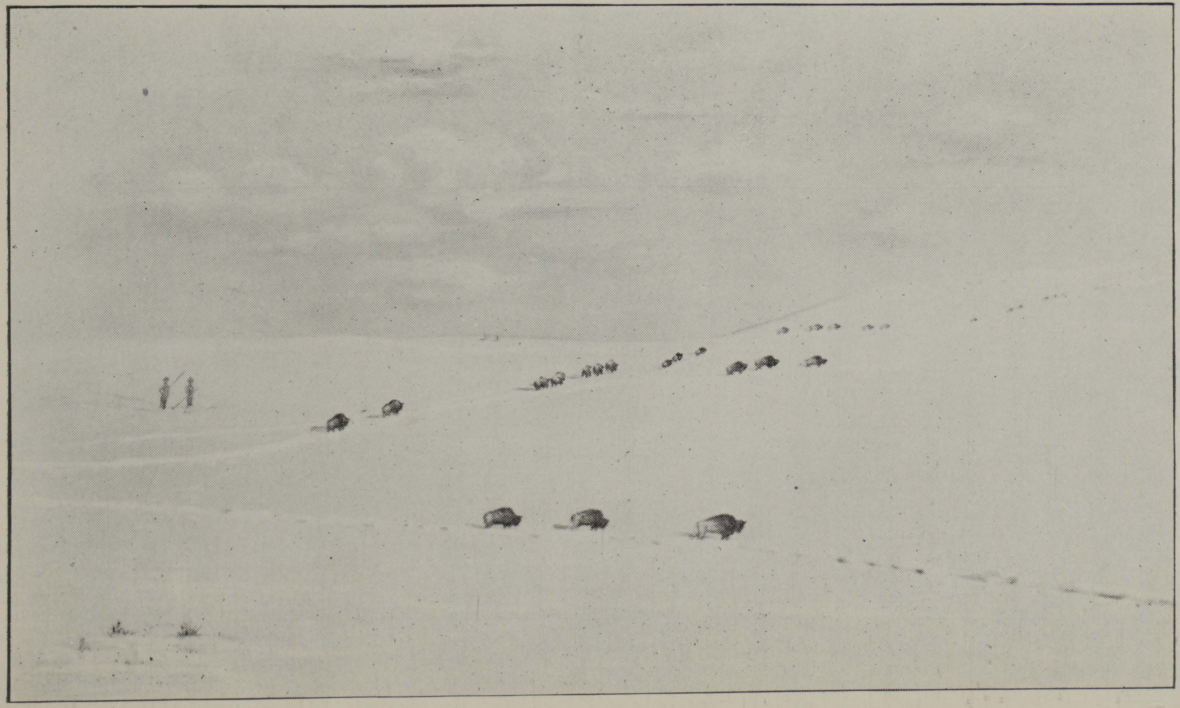
GAME OF THE PARK IN WINTER.

Early in March, 1894, a party was organized at Ft. Yellowstone for the purpose of visiting the winter ranges of the game, to ascertain, as near as possible, the exact number of buffalo that still exist, and secure photographs of the same. The party consisted of Captain Scott, Lieut. Forsyth, Scout Burgess, Mr. Burns, Photographer Haynes and three non-commissioned officers. Mounted on the Norwegian snowshoe, with packs of sleeping bags, provisions and camera, they proceeded directly to Hayden Valley via Norris and the Grand Canyon. As most of the buffalo congregate here during the winter months, they found 81 buffalo in the valley, 73 comprising the main herd, and numerous small groups of elk aggregating fully 300. After a stay of several days in Hayden Valley the party went to Yellowstone Lake. Captain Anderson had instructed Scout Burgess not to overlook the country east of the lake, as a small herd of buffalo usually winter there. The first day out from the lake only elk were seen, there being no sign of buffalo. The party went into camp about 12 miles up Pelican Creek. The second day they discovered, in a secluded spot, the "cache" of a poacher, very much to their surprise, as it was supposed that no one was in the Park killing game. The cache consisted of a canvas tepee, sleeping bag, provisions and toboggan, and six buffalo heads suspended in a tree near by. A trace of fire in the tepee led the scout to be-



Elk, Hayden Valley.

lieve that the poacher was in the vicinity, and the next move was to capture him. It had been snowing constantly all the morning, and all snowshoe tracks leading from the camp were entirely obliterated. Some five miles from the camp they heard five or six rifle shots fired in rapid succession. Hastening through the timber to the opening in the direction of the firing, they came directly upon the poacher. He had driven six of the buffalo into the deep snow and slaughtered the entire band. Knowing these men to be of a desperate character, and being armed only with a pistol, it was a brave act for Scout Burgess to arrest him. Fortunately it was snowing hard, and the approach of the scout was not noticed by the poacher or his dog until the arrest was made. He was taken to the Lake Hotel and escorted from there to the guard house at Fort Yellowstone. Besides the twelve buffalo that were killed by this poacher, a small herd of seven was seen in the Pelican country making less than 100 now in existence. If these can be protected they will increase rapidly, otherwise the only remaining species of large American game (the bison) will soon be exterminated. Elk were found on the foothills of Mt. Washburn, on Specimen Ridge along the east fork of the Yellowstone, on Slough Creek and along the Yellowstone to Mount Evarts, in great numbers. Fully 5,000 have wintered in the above country. Small bands of mountain sheep, deer and antelope were seen on Mount Evarts. The open water of the Yellowstone between the lake and falls was alive



Buffalo, Hayden Valley.

with duck and swan. The red fox and coyote are numerous, and an occasional black fox and tracks of mountain lion and bear were seen. The party was in the park about thirty days and traveled over 300 miles.

HISTORY AND EARLY EXPLORATION.

The following brief history of the Park and account of the early exploration of the region is taken from the report made to the late Dr. F. V. Hayden, Chief of the Geological Survey of Territories, by Henry Gannet, E. M., on the geographical field work of the U. S. Geological Survey during the season of 1878:

"The first authentic information regarding the great natural wonders of the Park was derived from a prospecting party under the leadership of Capt. W. W. DeLacy, who, in 1863, visited the Lower Geyser Basin. Previous to this time it seems that the region was known to but a few hunters and trappers, and their tales were treated as the wildest of romancing, as, indeed, many of them were, the mind of the trapper being singularly prone to exaggeration. The earliest reference to the hot springs is in the stories of a trapper by the name of Colter (or Coulter), who accompanied Lewis and Clarke's celebrated expedition across the continent. On the return of this expedition, when below the mouth of the Yellowstone, Colter was discharged, at his own request, and immediately returned to the country above the forks of the Missouri. In this neighborhood,

probably on the Jefferson, his companion, Potts, was killed by Blackfeet, and he was captured. Almost miraculously he escaped from them, and, entirely naked, made his way to a trading post on the Big Horn. After this he lived for a year or more among the Bannacks, whose range included what is now the Yellowstone Park. Either during his perilous journey, after his escape from the Blackfeet, or during his sojourn among the Bannacks, he became acquainted with the region of the hot springs and geysers, for we find him in Missouri, in 1810, telling marvellous tales of lakes of burning pitch, of land on fire, hot springs and geysers. His stories were, of course, treated as travelers' tales, and 'Colter's Hell' was classed with Lilliput, Symmes' Hole, and other inventions of over-developed imaginations.

"Later we find the knowledge of this country more generally diffused among this people. Colonel Raynolds, in his report on the 'Exploration of the Yellowstone,' in 1859–60, refers to 'some of these Munchausen tales' as follows:

"'One was to this effect: In many parts of the country petrifactions and fossils are very numerous, and, as a consequence, it was claimed that in some locality (I was not able to fix it definitely) a large tract of sage is perfectly petrified, with all the leaves and branches in perfect condition, the general appearance of the plain being *unlike* (like?) that of the rest of the country; *but all is stone;* while the rabbits, sage hens and other animals usually found in such localities are still there, perfectly petrified, and as natural

as when they were living; and, more wonderful still, the petrified bushes bear the most wonderful fruit; diamonds, rubies, sapphires, emeralds, etc., etc., as large as black walnuts, are found in abundance.'

"This story, absurd as it sounds, has a large basis in fact. The narrator, however, had mixed up distinct phenomena, and over all had spread lavishly the coloring of his imagination. There are fields of sage, as well as bits of forest, which, lying in the immediate proximity to groups of springs, have been petrified while standing. The hot, silicious water from the springs is drawn up through the pores of the wood, and between the wood and the bark, by capillary attraction, and depositing silica wherever it goes, the tree or bush is rapidly transformed into rock.

"The story of the remarkable fruit borne by these stone trees is not far from correct, the main difference between the story and the fact being that the fruit is borne on the outside and inside of the trunks of the trees, instead of on the ends of the branches. The mineral species are not as given in the story, either, but that is a matter of no vital importance. In the process of the silicification of wood the last result of all is the production of quartz crystals. The tree trunk is converted totally into crystalline quartz, radiating from within outward, the crystals being all crowded out of shape. The inside and outside of the hollow cylinder of quartz, which represents the former tree, are covered with the characteristic quartz pyramids. Such products of silici-

fication are very abundant in the Park, particularly on Amethyst Ridge, and are, undoubtedly, the 'stone fruit' of the petrified trees and bushes. The crystals are colorless, amethystine or yellow, and, according to the color, are known to the mountain man as diamond, amethyst, topaz, etc. It is unnecessary to say that the part of the story relating to animal life was manufactured from whole cloth.

"Many other legends had long been current among mountain men, some of which are briefly referred to in Colonel Norris' report to the Secretary of the Interior for 1878, but none of them seem to have attracted any attention. That white men have been in the Park prior to any printed record is evidenced by the discovery by Colonel Norris, as noted in his report above referred to, of a block house near the Grand Canyon, of a cache of marten traps near Obsidian Canyon, and other relics of the early trappers.

"In 1863, Captain W. W. De Lacy, in command of a large party of prospectors, left Montana to prospect on the upper waters of the Snake. Striking that river near the junction of Henry's Fork, they followed up the main river through the Canyon, prospected in Jackson's Hole, and, not finding gold in paying quantities, they broke up the party, some returning one way, some another. Captain De Lacy, with a portion of the party, followed up the Snake and Lewis Fork, discovering Lewis and Shoshone (De Lacy's) Lakes, the Shoshone and the Lower Geyser Basins. The geographical work done by Captain De Lacy on this

trip was embodied in a map of Montana, drawn by him, and published by authority of the Territory in 1864–65, and the material thus made public was afterwards used by the land office in the compilation of maps of that region.

"The results of this trip seem to have attracted little or no attention, for we hear of no one going into the country until 1869, when two prospectors, Cook and Folsom, made a prospecting tour through the Park. They followed the Yellowstone up to the mouth of the East Fork, then up the latter stream for a few miles, crossing over to the Yellowstone at the Great Falls; thence they went up this stream to the foot of the lake, and around the west side of the latter to the extremity of the west arm, thence crossing over to the Geyser Basins on the Madison, and finally left the country by following down the Madison River. Their story immediately attracted attention, and the following summer a large party, composed of citizens of Montana, under the leadership of General Washburn, then Surveyor General of Montana, was made up for the purpose of exploring this region. A small escort from Fort Ellis, in charge of Lieut. G. C. Doane, accompanied them.

"This party made quite extensive explorations on the Yellowstone and Madison rivers. Passing up the Yellowstone by the well-known trail, they traveled completely around the lake, visiting all localities of interest along the route, with the single exception of the Mammoth Hot Springs, on Gardiner's River.

"The following year, 1871, Captains Barlow and Heep, U. S. A., made a reconnaissance of this country, and presented the results in a brief report and a map of their route.

"In the same year Dr. Hayden devoted a portion of the season to a reconnaissance of this region, making quite an extended tour through it. The result of this work, including geological reports, maps, etc., was published in the annual report for that year. This was sufficient to fix the public attention upon this great collection of natural wonders, and, when Dr. Hayden presented to Congress a proposition to reserve this section from settlement as a national park, it was adopted with little opposition. The following year, 1872, Dr. Hayden continued the reconnaissance of the Park, and the country to the north and south of it, publishing the results in the report of that year and in a series of maps.

"This region has, ever since its discovery, proved an attractive field for exploration, and scarcely a year has passed that some party, under more or less of official sanction, has not traversed it, nominally, at least, for purposes of exploration.

"In 1873, Captain W. A. Jones, U. S. A., took a large party through it. He entered it from the head of the Stinking Water, crossing one of the many passes near Mt. Chittenden (it is impossible to tell which). After visiting most of the points of interest in the Park, he went out *via* the Upper Yellowstone, on the way verifying the old trappers'

legend about the 'Two Ocean River,' and discovering a practicable pass (Togwotee Pass) and route from the south to the Park. This discovery was by far the most valuable result of the expedition.

"In 1875, Captain William Ludlow, U. S. A., in charge of a reconnaissance in Central Montana, made a flying trip to the Park. He developed little that was new save accurate measurements of the Upper and Lower Falls of the Yellowstone."

THE ACT OF DEDICATION.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That the tract of land in the Territories of Montana and Wyoming, lying near the headwaters of the Yellowstone River, and described as follows, to wit: Commencing at the junction of Gardiner River with the Yellowstone River, and running east to the meridian passing ten miles to the eastward of the most eastern point of Yellowstone Lake; thence south along the said meridian to the parallel of latitude passing ten miles south of the most southern point of Yellowstone Lake; thence west along said parallel to the meridian passing fifteen miles west of the most western point of Madison Lake; thence north along said meridian to the latitude of the junction of the Yellowstone and Gardiner rivers; thence east to the place of beginning,—is hereby reserved and withdrawn from settlement, occupancy or sale

under the laws of the United States, and dedicated and set apart as a public park or pleasure ground for the benefit and enjoyment of the people; and all persons who shall locate, settle upon or occupy the same or any part thereof, except as hereinafter provided, shall be considered trespassers and removed therefrom.

SEC. 2. The said public park shall be under the exclusive control of the Secretary of the Interior, whose duty it shall be, as soon as practicable, to make and publish such rules and regulations as he may deem necessary and proper for the care and management of the same. Such regulations shall provide for the preservation from injury or spoliation of all timber, mineral deposits, natural curiosities or wonders within said park, and their retention in their natural condition.

The Secretary may, in his discretion, grant leases for building purposes, for terms not exceeding ten years, of small parcels of ground, at such places in said park as shall require the erection of buildings for the accommodation of visitors; all of the proceeds of said leases, and all other revenues that may be derived from any source connected with said park, to be expended under his direction, in the management of the same, and the construction of roads and bridle paths therein. He shall provide against the wanton destruction of the fish and game found within said park, and against their capture or destruction for the purpose of merchandise or profit. He shall also cause all persons tres-

passing upon the same after the passage of this act to be removed therefrom, and generally shall be authorized to take all such measures as shall be necessary or proper to fully carry out the objects and purposes of this act.

RULES AND REGULATIONS OF THE YELLOWSTONE NATIONAL PARK.

The following eminently proper rules have been prescribed for the government of the Park and the protection of its multifarious objects of public interest and noble game:

1. It is forbidden to remove or injure the sediments or incrustations around the geysers, hot springs or steam vents; or to deface the same by written inscriptions or otherwise; or to throw any substance into the springs or geyser vents; or to injure or disturb in any manner any of the mineral deposits, natural curiosities or wonders within the Park.

2. It is forbidden to ride or drive upon any of the geyser or hot spring formations, or to turn loose stock to graze in their vicinity.

3. It is forbidden to cut or injure any growing timber. Camping parties will be allowed to use dead or fallen timber for fuel.

4. Fires should be lighted only when necessary, and completely extinguished when not longer required. The utmost care should be exercised at all times to avoid setting fire to the timber and grass.

5. Hunting, capturing, injuring or killing any bird or animal within the Park is prohibited. The outfits of persons found hunting or in possession of game killed in the Park will be subject to seizure and confiscation.

6. Fishing with nets, seines, traps, or by the use of drugs or explosives, or in any other way than with hook and line, is prohibited. Fishing for purposes of merchandise or profit is forbidden by law.

7. No person will be permitted to reside permanently or to engage in any business in the Park without permission in writing from the Department of the Interior. The superintendent may grant authority to competent persons to act as guides, and revoke the same at his discretion.

8. No drinking saloon or bar-room will be permitted within the limits of the Park.

9. Private notices or advertisements shall not be posted nor displayed within the Park, except such as may be necessary for the convenience and guidance of the public upon buildings upon leased ground.

10. Persons who render themselves obnoxious by disorderly conduct or bad behavior, or who violate any of the foregoing rules, will be summarily removed from the Park under authority of the statute setting apart the Park "as a pleasuring ground for the people," and providing that it "shall be under the exclusive control of the Secretary of the Interior, whose duty it shall be to make and publish such rules and regulations as he shall deem necessary or proper,"

and who "generally shall be authorized to take all such measures as shall be necessary or proper to fully carry out the object and purposes of this act."

FAUNA AND FLORA OF THE PARK.

It is but proper that the reader of even a guide-book be given some idea of the animal and plant life to be found in this region; however, it should be borne in mind that an exhaustive treatise on this subject is not attempted herein.

Among the wild animals to be found in the Park are: Buffalo, moose, elk, big horn (mountain sheep), deer, antelope, bear, mountain lion (panther), wolf, fox (red, gray and black), coyote, beaver, otter, mink, marten, sable, muskrat, ermine, rabbit, badger, porcupine, hare, squirrel, chipmunk, wolverine and skunk.

Among the birds (principally migratory) are: Grouse, owl, hawk, eagle, vulture, duck (in great variety), goose, brant, pelican, swan, crane, crow, raven, bluejay and blackbird.

Reptiles are rare, though the rattlesnake is found in parts of the Yellowstone Valley, below an altitude of 6,000 feet.

Among the animals enumerated the larger varieties are only occasionally met with, and then, as a general thing, only in the more inaccessible and densely wooded portions of the Park, the latter being about three-fourths its entire area.

The principal varieties of trees found here are: Black spruce, fir (black, red and balsam), white pine, red cedar, aspen (poplar), dwarf maple and willow; while among the shrubs may be seen the choke-cherry, gooseberry, bullberry, currant and buffalo-berry.

Grasses are quite abundant, the predominating varieties being the buffalo, bunch and gramma, which are wonderfully nutritious.

Wild flowers, of almost every hue, and in well-nigh endless variety, are quite plentiful and exceedingly hardy, often withstanding severe frosts without injury. Singularly, also, the more beautiful varieties are found upon the higher elevations, such as Mt. Washburn, Electric Peak and the like, which at certain seasons are gaily bedecked with flowers of rare color and fragrance; however, many interesting specimens of flora are to be found in the lower altitudes.

FISH AND FISHING.

To many, one of the most interesting features of the Park is its excellent fishing, mountain trout being abundant and widely distributed with respect to its various lakes and streams, while grayling are found in the Madison and Gallatin rivers, and whitefish in the Madison, Gardiner and Yellowstone.

During the summer of 1889, by order of the U. S. Fish Commission, quite a large number of young trout were placed in Park waters, President David S. Jordan, of the

University of Indiana, assisted by Dr. Charles H. Gilbert, having direct charge of the work.

An extract from Dr. Jordan's report will serve to show in what streams and lakes fish are to be found:

"We found trout in Yellowstone River and Lake, and in all tributaries both above and below the falls, except Tower Creek. Fishes are plenty in Snake River and Heart Lake, and in the Madison below the falls of Firehole. There are none in the Upper Gardiner above the falls; none in Firehole nor Louis Rivers, nor in Lewis or Shoshone Lakes. In the Gibbon, above the falls, are no trout, but plenty of a little fish called 'Blob,' or 'Millers' Thumb.'

"Grayling are found only in the Madison and Gallatin; whitefish in the Madison, Lower Gardiner and Yellowstone.

"The U. S. Fish Commission has placed fish as follows:

"Eastern Brook Trout (*Salvelinus fontinalis*) in Upper Gardiner and Glenn Creeks.

"Rainbow Trout (*Salmo iridens*) in the Upper Gibbon, above Virginia Cascades.

"Loch Leven Trout (*Salmo trutta levenensis*) in the Madison, above Keypler Cascades.

"Whitefish (*Coregonus Williamsoni*) in Yellowstone Lake and Twin Lakes.

"Native Trout (*Salmo myhiss*) in Lava Creek."

WHERE TO FISH.

The regular tourist making the trip through the Park will have only one opportunity for first-class fishing unless stop-overs are made. This will be at the lake. Upon arrival at the hotel secure a row boat and oarsman, and proceed to the outlet, about two miles, and you will find the best trout fishing in the Park. The "Brown Hackle," "Black Gnat," "Coachman," "Silver Doctor" (or "Yellowstone Park" Conroy's) flies are especially attractive in this stream.

In the vicinity of Mammoth Hot Springs Hotel are the Gardiner River, Yellowstone River, Lava Creek, Willow Creek and Indian Creek.

Near the Fountain Hotel: Fire Hole, Madison River and Nez Perces Creek.

Near the Upper Basin Hotel: In the Fire Hole above and below Keppler's Cascades.

At Yancey's: In Yellowstone River, East Fork and Slough Creek; an excellent place for camping parties with saddle animals.

PRACTICAL INFORMATION.

At many eastern and western points coupon tickets can be purchased which include rail and stage transportation to and through the Park, also sleeping and dining car accommodations, and board at the various hotels within the Park. These coupon tickets include all traveling expenses,

and are used by nearly all tourists. Raymond & Whitcomb's excursions and Cook's tours embrace all the above privileges, and being in charge of well-informed conductors are liberally patronized. Coupon books can be purchased at St. Paul, Minneapolis, Duluth, Tacoma, Seattle or Portland, including all necessary expenses to the Park and return, or from Livingston, Mont., and return. Six days are required to visit all prominent places within the Park, and this period is covered by the coupon tickets. Those desiring to prolong their stay can procure reduced rates at the hotels after the expiration of the ticket. The railway part of the ticket is good until October 1st. Credit letters are issued for any extra accommodations tourists may desire while south of the Mammoth Hot Springs, where valuables may be safely deposited until their return. Camping parties can secure complete outfits at the Mammoth Hot Springs, such as guides, tents, provisions, cooks, saddle and pack horses, etc. They can visit a few remote places in the Park not included in the regular tour, and these trips are especially recommended for gentlemen desiring a few weeks' "roughing it." August and September are the best months for camping, there being little choice in the time for the regular tour, except that in June and September you escape the rush of July and August. The Park season is from June 1st to October 1st.

THE HOTELS OF THE PARK

Are four in number (exclusive of the three lunch stations at Norris, Upper Basin, and "Thumb" of Yellowstone Lake, respectively). These chief hostelries are located as follows: At Mammoth Hot Springs, Fountain Geyser (Lower Geyser Basin), outlet of Yellowstone Lake and Grand Canyon. All are steam-heated, electric-lighted and supplied with bathing facilities (both hot and cold). Refreshing baths of hot mineral water may be enjoyed at the hotel at "The Fountain." In furnishing and table service these four hotels compare favorably with those of metropolitan cities.

TELEGRAPHIC COMMUNICATION.

The Yellowstone Park Association has telegraph service at all hotels and lunch stations (except the Thumb) connecting with the Western Union Telegraph Company.

ORIGIN AND THEORY OF GEYSERS.

Geysers are merely eruptive hot springs. They differ from volcanoes only in that they erupt water instead of molten lava. The name is derived from an Icelandic word meaning "gusher." The *Bunsen Theory* of geyser phenomena, endorsed by Prof. Tyndall and other eminent men of science, is: 1. The presence of igneous rocks (still retaining their heat) at a considerable distance below the surface of the earth's crust. 2. Meteoric water (supplied mainly by snow

and rainfall) having access to these heated rocks. 3. A tube by which the heated water may reach the surface. This tube is kept filled (or nearly so) with water as the result of lateral drainage. The temperature of this water-column, at any given point in the geyser tube, is below the boiling temperature corresponding to the atmospheric pressure at that point. Steam is constantly forming below, becoming sufficiently expansive in time to lift the water column slightly. Thus the all but boiling water deep down in the tube is raised to a level where the pressure from above is less than that required to prevent ebullition. The result is an almost instantaneous generation of steam, the layers of water, being successively relieved of pressure, rising and flashing explosively into gaseous form. Then follows the eruption, or violent expulsion of water and steam from the geyser tube, which phenomenon continues until the tube is nearly emptied, when a period of rest ensues. The character of the water supply and the differing sizes and shapes of tubes will necessarily produce a wide variation in eruptive displays. Geysers (so far as known) exist only in Iceland New Zealand, the Azores, Thibet and the Yellowstone National Park—those of the last named locality being by far the most powerful and interesting as well as easy of access.

TABLE OF DISTANCES.

	MILES.
Cinnabar to Mammoth Hot Springs,	8
Mammoth Hot Springs to Golden Gate,	4
Mammoth Hot Springs to Obsidian Cliff,	12
Mammoth Hot Springs to Norris Basin,	22
Mammoth Hot Springs to Lower Basin,	42
Mammoth Hot Springs to Upper Basin,	52
Upper Basin to Thumb Bay (Yellowstone Lake),	18
Thumb Bay to Outlet (Yellowstone Lake),	18
Yellowstone Lake to Grand Canyon,	18
Grand Canyon to Norris,	12
Grand Canyon to Yancey's (trail),	23
Yancey's to Mammoth Hot Springs,	18
Entire Circuit of the Park Stage Road about	150

ELEVATIONS OF THE PARK.

	FEET.
Mammoth Hot Springs Hotel,	6,387
West Entrance Golden Gate,	7,300
Norris Geyser Basin,	7,527
Lower Geyser Basin,	7,252
Upper Geyser Basin,	7,394
Yellowstone Lake,	7,788
Mary's Lake,	8,336
Grand Canyon Hotel,	7,710

ALTITUDE OF MOUNTAINS.

	FEET.
Electric Peak,	11,155
Quadrant Mountain,	10,127
Mt. Evarts,	7,600
Bunsen Peak,	8,775
Mt. Washburn,	10,388
Mt. Langford,	10,902
Mt. Sheridan,	10,385
Index Peak,	11,702
Grand Teton,	13,654

June 17. 1895. D. N. W. Pendergast & Wife. - Abbie L. Pendergast - left Hutchinson, Minn. at 4:25 A.M. for a trip to Yellowstone Nat'l. Park. Spokane. Wash. Seattle Helena Butte Silver Bow. Ogden. Denver, Kansas City. Omaha. St. Paul and back to Hutchinson.
Procured tickets at St. Paul & Seattle, Park. and return from Seattle to Helena via N. P. Ry and tickets from Spokane & Seattle & back via G. N. Ry.
At Minneapolis & got ticket from Helena & Silver Bow. via Butte - Ogden Denver & St. Paul.
We left St. Paul at 4:15 p.m. June 17, arrived at Mandan the next morning and Ret watch 1 hour slower. The 2nd

morning-Wednesday Jn. 19- we were at Livingston, Mont. and saw the Mts. south of us covered with snow. At 8 a.m. we left Livingston for Cimabar, at 8 a.m. reaching there at 10. when we found Tally-ho stage waiting to take us to Mammoth Hot Springs Hotel where we took dinner at 12:30. The afternoon was spent viewing the Springs. cave and other interesting objects. then came supper- or, let me see- did they not call it dinner?) and soon after bed and welcome rest. Abbie completely worn out.

Thursday June 20. Abbie somewhat

rested but not yet feeling well.
We left Mammoth Hot Springs at 8 am,
Thursday June 20th 1895: with 4 horse Tally-ho stage
and reached Norris Geyser Basin
at noon. (22 miles) Here we took din-
ner in a "cotton tavern" and at
2 p.m. set out for the Fountain
Geyser, in Middle (or Lower) Geyser
Basin. Reached Fountain Hotel
at 5 p.m. Abbie more tired than on
the evening previous. retired sup-
perless. and feeling decidedly ill.
Friday, June 21. — Abbie better. Rode
in stage to "Upper Geyser Basin,"
saw Old Faithful. the Castle. the Cubs
River Side and several smaller

play. Riverside would satisfy the average right beer as well as old Faithful.

At 2:10 started back to Fountain & spend the night reaching there at 5.40

MEMORANDA

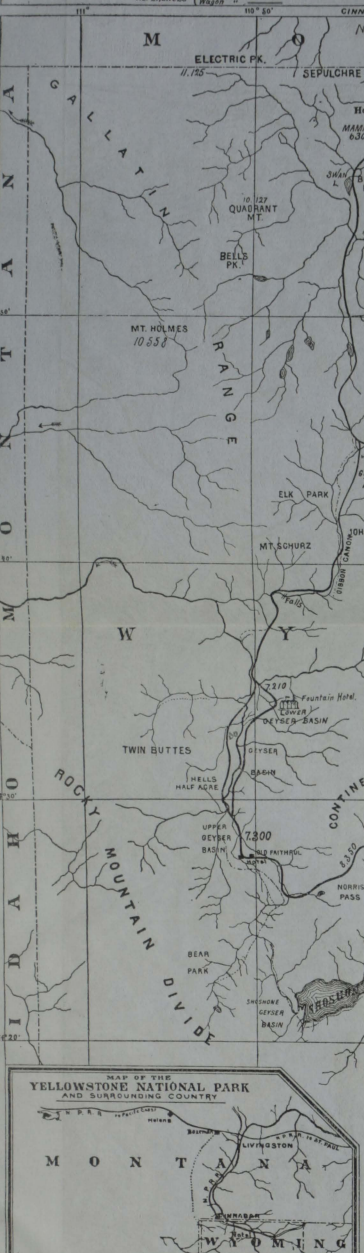
MAP OF THE YELLOWSTONE NATIONAL PARK

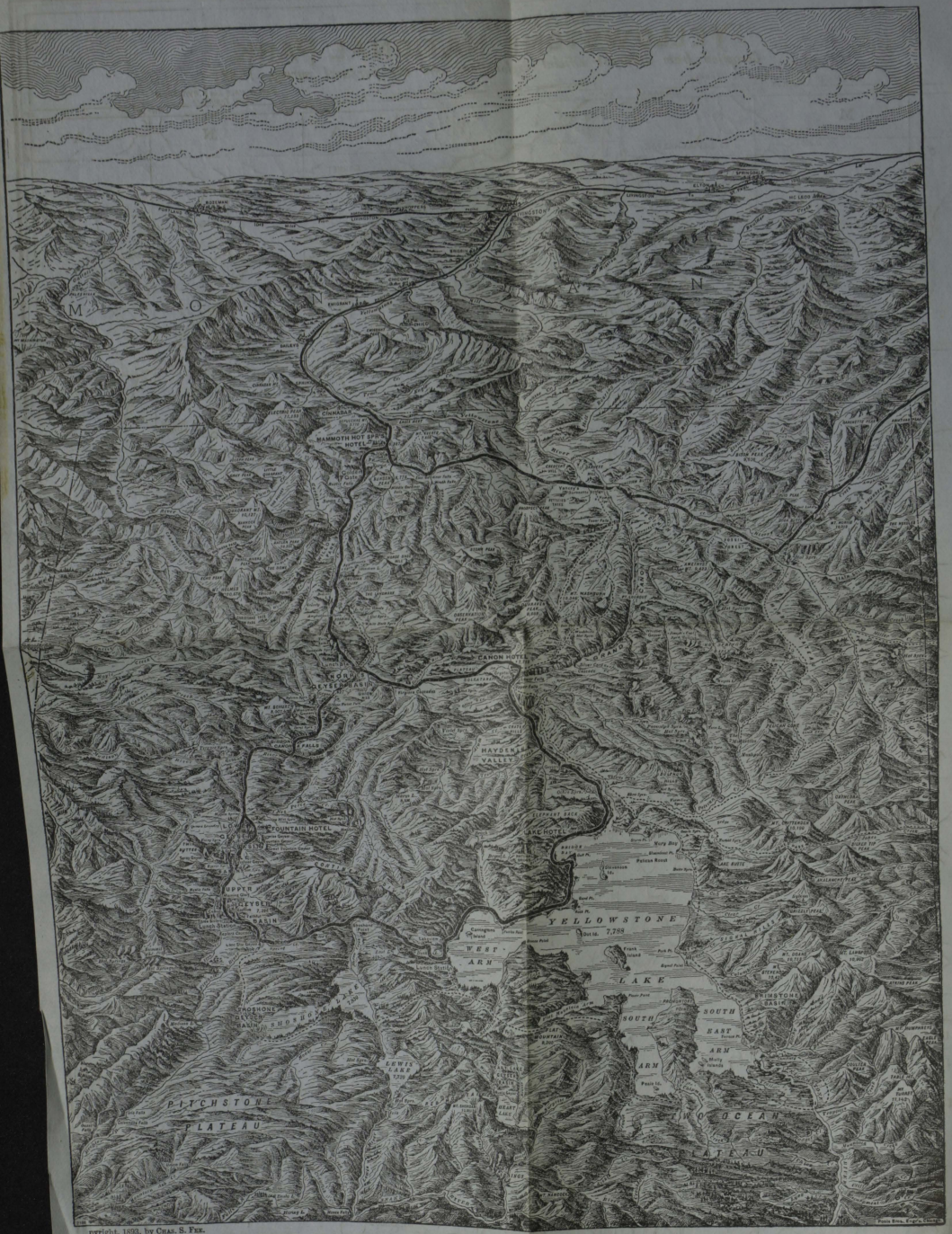
Compiled from different official explorations and our personal survey, 1882.

REFERENCES: Stage Roads_____ Wagon " _____ Trails.....

SCALE

CARL J. HALS and A. RYDSTROM, Civil Engineers.





Pyright, 1883, by Chas. S. Fee.

YELLOWSTONE NATIONAL PARK. NORTHERN PACIFIC RAILROAD.