PHILETUS W. NORRIS.

LETTER

FROM

THE SECRETARY OF THE INTERIOR,

ACCOMPANYING

A report of the superintendent of the Yellowstone National Park for the year 1872.

FEBRUARY 4, 1873.—Ordered to lie on the table and be printed.

DEPARTMENT OF THE INTERIOR,
Washington, D. C., February 3, 1873.

SIR: I have the honor to transmit herewith, for the information of Congress, a copy of the report for the year 1872 of N. P. Langford, esq., superintendent of the Yellowstone National Park.

I am, sir, very respectfully, your obedient servant,

C. DELANO,
Secretary.

Hon. SCHUYLER COLFAX,
Vice-President of the United States and President of the Senate.

REPORT OF THE SUPERINTENDENT OF THE YELLOWSTONE NATIONAL PARK FOR THE YEAR 1872.

On the 20th day of May last, I received from the Department of the Interior the following letter of appointment as the superintendent of the Yellowstone National Park:

DEPARTMENT OF THE INTERIOR,
Washington, D. C., May 10, 1872.

SIR: Congress, by an act approved March 1, 1872, has set apart a tract of land near the head-waters of the Yellowstone River, in the Territories of Montana and Wyoming, as a public park or pleasure-ground "for the benefit and enjoyment of the people." The reservation so set apart is to be known as the "Yellowstone National Park," and is placed under exclusive control of the Secretary of the Interior, and you are hereby appointed superintendent of the same, to act as such, and to carry out the provisions of the act of Congress, under such instructions as you may receive from time to time from the Department. It is not the desire of the Department that any attempt shall be made to beautify or adorn this reservation, but merely to preserve from injury or spoliation the timber, mineral deposits, and various curiosities of that region, so far as possible, in their natural condition.

As Congress has not provided any appropriation to carry out the purposes of the act, your appointment must be without pay until such time as an appropriation is made for that purpose. You are at liberty to apply any money, which may be received from

leases to carrying out the object of the act of Congress, keeping account of the same, and making report thereof to the Department.

You will forward also from time to time, as you may deem for the best interests of the service, reports of the condition of the park, and such suggestions relative to its management and care as your experience may dictate. So soon as regulations for the care and management of the park are prepared, they will be forwarded to you.

Very respectfully, your obedient servant,

B. R. COWEN,
Acting Secretary.

Hon. N. P. LANGFORD,
Saint Paul, Minnesota.

On the 25th of the same month, in response to my application therefor, more specific instructions were forwarded to me, and, in pursuance to the recommendations therein set forth, I immediately repaired to Fort Hall, near Snake River, in the Territory of Idaho, and there united with that part of Dr. F. V. Hayden's geological survey which, under the immediate direction of Mr. James Stevenson, his assistant, was charged with the exploration of the valley of Snake River to its junction with Henry's Fork, and thence along that stream to the head-waters of the Madison, at or near its union with the Fire Hole River, where, at the Lower Geyser Basin, it expected to unite with the main portion of the survey, which, under the charge of Dr. Hayden, was approaching the same point from the north. On our way thither we deflected from the main route, and visited the Three Tetons, so long known as the great landmarks of that portion of the country. With much difficulty the ascent of the loftiest of these singular mountains was effected by Mr. Stevenson and myself. The general topography of the country was corrected in many important particulars, and much needful information respecting its adaptation to utilitarian purposes obtained, to which, but for its connection with improvements which have an important bearing upon the interests of the park, as they will be fully presented by Mr. Stevenson in his report, I should scarcely allude.

The park is at present accessible only by means of saddle and pack trains, a mode of travel attended with many privations and inconveniences. As it is likely speedily to become an object of general interest, both at home and abroad, some safer and more convenient and expeditious mode of communication is desirable. A few years only can elapse before it will be reached by railroads; but until then it must be accommodated with good wagon-roads, or remain unvisited except by the few who are willing to endure the privation and exposure incident to horseback travel. The access to it from the south, by way of Snake River, is favorable to the cheap construction of good wagon-roads. The visitor can now approach the Geyser Basin with a wagon to a point fifty miles above the junction of Henry's Fork with Snake River. Thence to the basin is about eighty miles. The route passes over or through the main range of the Rocky Mountains, by either the Henry or Targee Pass, either one of which needs but little improvement to convert it into a remarkably fine road. For the entire distance, although in the midst of the mountains, such is the favorable configuration of the country that a road can be built without a grade to exceed fifty feet to the mile.

Another route, commencing at the same point on Henry's Fork, and following up the Middle Fork, is entirely practicable. The only obstacle is the obstruction offered by fallen timber for a portion of the distance, and this not a serious one. This route would be shorter than the other, and lead more directly to the Geyser Basin and Yellowstone Lake.

From the Geyser Basin to the Yellowstone Lake is a distance of about twenty miles. The country is rolling, and for a part of the distance filled with fallen timber. To make the circuit from the southwest estuary of the lake to the point ten miles below its foot, it would be necessary to approach both extremes by roads from the Fire Hole Basin. From the point where these roads intersect below the lake, a road should be constructed to Tower Falls, and thence directly to the Hot Springs on Gardiner's River, and in as near a direct line as possible from that point to the northern boundary of the park. A continuation of this road for fifteen miles from the boundary to the first settlements above Boteller's ranch would furnish all road improvements necessary to approach the park, either by way of Snake River or by the way of the Yellowstone.

Another road that is entirely practicable should be constructed from Gardiner River Springs, in a direct line across the park to the Lower Geyser Basin, a distance not to exceed forty-five miles.

These roads, when completed, would enable the visitor to reach all the great points of interest by carriage, and at any of these points horses would be provided for interior exploration. The opening of these roads would insure the early erection of large and commodious public houses at Mammoth Springs, Yellowstone Falls, Yellowstone Lake, and the Upper and Lower Geyser Basins.

Frequent application has been made to me during the past season by responsible persons for authority to improve these several routes by the construction of toll-roads, but I have invariably, with a single unimportant exception, (in which the applicants have not availed themselves of the privileges allowed,) declined to grant these applications, believing that inasmuch as this territory had been set aside and dedicated as a national park, the Government would prefer to construct its own roads, and make them free to all who wished to visit this wonderful region. It is, however, of the highest importance that roads should be constructed at an early day for the accommodation of tourists.

I am satisfied, from the numerous applications I have received for leases of property for hotel purposes at the leading points of interest, that if the park were rendered accessible by good wagon-roads, it would immediately prove a source of considerable revenue to the Government, and in a few years would largely repay any expenditures needful for its present improvement. Leases have been refused to all, simply because it was deemed necessary, first, to know, after fuller exploration of the park, what might be the intention of Congress respecting it. With a liberal appropriation now for roads, and a few other needed improvements, it is impossible to foresee what will be the future of this remarkable aggregation of wonders.

Leases have been sought for the construction of saw-mills in parts of the property where timber could be spared. The manufacture of lumber will prove a lucrative employment whenever the erection of public houses shall be commenced. In fact, with roads such as I have recommended, the business might be extended to reach the settlements of Montana, in most of which lumber commands a high price. A large portion of the park is covered with a heavy growth of pine timber, fit only for manufacture into lumber.

There is no land in the park suitable for agricultural purposes. Bunch-grass of a good quality, affording feed for horses, grows there in abundance, and will always abound in sufficient quantity for the use of tourists. No mines have yet been discovered, and it is the general opinion of

prospectors with whom I have conversed, that none will be found within the limits of the park.

A few months before the passage of the act of March 1, 1872, creating the park, several persons had located upon land at some of the points of greatest interest, with a view to establish a squatter's right of pre-emption, and they have since made application for such pre-emption of property, which embraces some of the chief attractions of the locality. Certainly their settlement upon these lands established no right of pre-emption or purchase in their favor. Any expenditures they may have made were at their own risk, especially if made after the passage of the act. A joint application of this kind from two of these persons (appended hereunto and marked A) has been referred to me by the Department. With no desire to impair any supposed rights these applicants may have, and with no personal objection to them as tenants, I still feel it a duty to recommend that their application be refused. To grant it would be to establish a precedent which would open the door for scores of similar applications, under which exhausting process the park would soon lose all its distinctive features of nationality. No sales of property within its boundaries should be made to any one; but whenever, in good faith, improvements have been made, with a view to future purchase or occupancy, such improvements should either be purchased of the persons who made them, or received in payment of the premises occupied by them, for such term as may, on full consideration, seem just and equitable. The realty of the land should be held alone by the Government, and be subject to such rules and regulations as may, from time to time, be adopted by the Department of the Interior. Several improvements for convenience of visitors had been made before the act of dedication was passed. These should be acquired by the Government, by making adequate compensation to the persons by whom they were erected, and these persons, if it should be their choice, should have a preference, upon equal terms, over other applicants for the rental of the premises they have improved.

The wild game of all kinds with which the park abounds should be protected by law, and all hunting, trapping, and fishing within its boundaries, except for purposes of recreation by visitors and tourists, or for use by actual residents of the park, should be prohibited under severe penalties. Laws prohibiting the cutting of timber, except in such localities as may be prescribed by the superintendent, should be adopted.

It is especially recommended that a law be passed, punishing, by fine and imprisonment, all persons who leave any fire they may have made, for convenience or otherwise, unextinguished. Nearly all extensive conflagrations of timber in the mountains may be directly traced to negligence in extinguishing camp-fires. In the timber regions, these fires are generally kindled against stumps and dry trunks of trees, by which, unless carefully extinguished, they often, after many days, communicate with the forest, and spread over immense tracts, destroying large quantities of valuable timber. Nothing less than a stringent law punishing negligence and carelessness, can save the extensive pine timber fields of the park from destruction.

As connected with this subject of legislation I would also recommend that the park be attached to Gallatin County, Montana, for judicial purposes, and that the laws of Montana be enforced within its boundaries. In order to make this recommendation effectual I would respectfully suggest that all that portion of the park not included in the boundaries

of Montana, but which is now in Wyoming, be added to Montana. This will embrace nearly the entire park.

The reason for such annexation is apparent, when it is considered that the park is only accessible from Montana. It is impossible to enter it from Wyoming. Attempts to scale the vast ridge of mountains on the eastern and southern borders have been made by several expeditions across the continent, commencing with that of William G. Hunt, the chief of Astor's overland expedition in the year 1811. As late as 1833 the indomitable Captain Bonneville was thwarted in a similar effort, and after devising various modes of escape from the mountain labyrinth in which he was lost, he determined to make one more effort to ascend the range. Selecting one of the highest peaks, in company with one of his men, Washington Irving says:

> After much toil he reached the summit of a lofty cliff, but it was only to behold gigantic peaks rising all around and towering far into the snowy regions of the atmosphere. He soon found that he had undertaken a tremendous task; but the pride of man is never more obstinate than when climbing mountains. The ascent was so steep and rugged that he and his companion were frequently obliged to clamber on hands and knees, with their guns slung upon their backs. Frequently, exhausted with fatigue and dripping with perspiration, they threw themselves upon the snow and took handfuls of it to allay their parching thirst. At one place they even stripped off their coats and hung them upon the bushes, and thus lightly clad, proceeded to scramble over these eternal snows. As they ascended still higher there were cool breezes that refreshed and braced them, and springing with new ardor to their task, they at length attained the summit.

As late as [illegible], after repeated efforts to cross this barrier, was obliged to make a *détour* of four or five hundred miles, to reach a point on the head-waters of the Yellowstone not fifty miles distant from his camp. While camped at the southeastern base of this formidable range of mountains, Captain Raynolds (Senate Ex. Doc. No. 77, Fortieth Congress, first session) wrote:

> To our front and upon the right, the mountains towered above us to the height of from three thousand to five thousand feet, in the shape of bold, craggy peaks of basaltic formation, their summits crowned with glistening snow. It was my original desire to go from the head of Wind River to the head of the Yellowstone, keeping on the Atlantic slope, thence down the Yellowstone, passing the lake and across by the Gallatin to the Three Forks of the Missouri. Bridger said at the outset that this would be impossible, and that it would be necessary to pass over to the head-waters of the Columbia and back again to the Yellowstone. I had not previously believed that crossing the main crest twice would be more easily accomplished than the transit over what was in effect only a spur, but the view from our present camp settled the question adversely to my opinion at once. Directly across our route lies a basaltic ridge, rising not less than 5,000 feet above us, its walls apparently vertical, with no visible pass or even cañon. On the opposite side of this are the head-waters of the Yellowstone. Bridger remarked triumphantly and forcibly to me upon reaching this spot, "I told you you could not go through. A bird can't fly over that without taking a supply of grub along." I had no reply to offer, and mentally conceded the accuracy of the information of the "old man of the mountains."

As this portion of Wyoming Territory is thus entirely separated from the settled portions, which can only be reached by more than one thousand miles of travel, by way of Montana, Idaho, and Utah, and as there is not the most remote probability of any settlement in Wyoming in this region, except within the boundaries of the park, the annexation of the park to Montana for judicial purposes is an absolute necessity. It is not improbable that occasion may often render the services of the United States marshal necessary to eject defaulting or troublesome tenants. In such cases it would be impracticable to send a thousand miles for that officer, when, by the act of annexation, one could be obtained within a hundred. Aside from the delay which would thus be avoided, when haste might be really necessary, the expense would be so

greatly diminished as of itself to furnish a conclusive argument in favor of including the park within the boundaries of Montana. For further information upon this subject I respectfully refer to Washington Irving's "Astoria" and "Bonneville's Adventures," and to Captain Raynolds's official report.

The park can be visited any time between the last of April and the first of November, but it appears to the best advantage during the months of July, August, and September. Then the weather is warm and pleasant, storms rarely occur, and the forests, plains, and foot-hills are in full verdure. Tourists desirous of reaching the park by the most picturesque route will proceed by railroad to Corinne, Utah, where they can purchase their outfits for the trip cheaper and to better advantage than at any advanced point. The difference between a long and tedious stage-ride to Helena, and a ride on horseback from Corinne to Taylor's Bridge, is decidedly in favor of the latter, both as regards comfort and opportunities for observation. So much of the outfit as relates to food, groceries, and cooking-utensils, can be advantageously purchased at the stores in the vicinity of Taylor's Bridge, to which point, and on to Market Lake, the route lies over the main route to Montana.

From Market Lake to the park the country is wild and unsettled, and all provisions must necessarily be transported by pack-trains. Following the road from Market Lake to the ford on Henry's Fork of Snake River, a distance of thirty miles, the traveler from that point has nothing to guide him but a faint bridle-path. While passing over this part of the route, he will have many fine views of the Tetons, the great mountain landmarks of this region. Ascending Henry's Fork a distance of seventy miles, he will arrive at the frontier cabin of Gilman Sautelle and Levi Wurtz, on the shore of Henry's Lake, in which the fork takes its rise. In Messrs. Sautelle and Wurtz he will find men who, with all the better qualities of sagacious and expert mountaineers, unite fine moral natures and rare culture. Perfectly familiar with the entire region, these gentlemen will give the traveler all needful information as to his future journey of thirty-five miles to the Lower Geyser Basin, the first of the interesting localities in the park. In this basin there are many objects of rare interest. The geysers, though comparatively small, are very wonderful in the eyes of the visitor who first beholds them. So, also, are the hot springs; but they are merely a foreshadowing of the greater wonders of the Upper Geyser Basin, which is ten miles farther up the Fire Hole River.

The ride between the two basins is full of interest. The Upper Basin is the location of all the great geysers of the park yet discovered. No one has ever remained long enough in it to be able to detail with accuracy the number and size of all these wonderful water-spouts.

There are at least two thousand hot springs, large and small, in this basin, and of this number probably two hundred are geysers. The whole basin is enveloped in steam, and, seen at a distance, is like the approach to a cluster of manufactories. The geysers project water with terrific force, and in fabulous quantities, and in every conceivable form, to heights varying from 20 to 250 feet. These, seen in the rays of a midday sun, or in the beams of a full moon, are inexpressibly grand. Unlike any other scenery in the world, they amaze the beholder by their magnitude and novelty.

It is fifteen miles from this basin to Yellowstone Lake, over a path running through a pine forest, greatly obstructed the entire distance by fallen timber. Several beautiful cascades in the Fire Hole River may be visited on this part of the route. The lake is nearly 8,000 feet

above the ocean. It is twenty-five miles in length, embosomed amid mountains, gemmed with green islands, unique in form, and surrounded on all sides by hot springs of great variety, number, and beauty. Jets of steam may be seen issuing from the hot springs, from the islands, even from the bosom of the lake itself. Some of the loftiest and most inaccessible mountain-ridges on the continent lift their snow-clad summits in the immediate vicinity. The scenery is colossal and full of savage grandeur.

Following the river from the foot of the lake for the distance of nine miles, the visitor reaches the locality of Sulphur Mountain, the Mud Geyser, the Mud Volcano, and the Blowing Cavern, all objects of separate interest, and presenting novelties of rare and curious character.

Ten miles farther down the river are the two great cataracts, and the Grand Cañon, of the Yellowstone, perhaps the most stupendous elements of scenery in the park. The upper fall is 115 feet in height; the lower, which plunges directly into the cañon, is 350 feet, and the cañon itself, varying from one to three thousand feet in depth, is forty miles in length, and for the whole distance presents to the eye the most wonderful chasm in the world. Jets of hot vapor issue from its sides, and color them with the most brilliant colors of nature. From its profound depths stars are visible in the day-time. Lieutenant Doane, who, in 1870, succeeded in reaching the bottom of the cañon, at a point where the walls are nearly 3,000 feet in height, in his official report (Senate Executive Document, No. 51, Forty-first Congress, third session) says: "It was about 3 o'clock p.m., and stars could be distinctly seen, so much of the sun-light was cut off from entering the chasm."

About eighteen miles farther, and at a point of one mile divergence from the cañon, the beautiful fall of Tower Creek, with its grotesque surroundings, meets the eye; and, twenty-five miles below this point, the most wonderful hot springs of Gardiner's River, with all their variety of beauty and novelty, assert their claims to be considered the most remarkable of the curiosities of the park.

Thus, in a circuit of perhaps ninety miles, the greatest attractions of the park may be seen, and, at the close of the tour, the visitor is within seventy-five miles, over a good road, of Fort Ellis, and the beautiful town of Bozeman, in Montana Territory.

It is impossible, in this report, to convey the faintest idea of the grandeur of the mountain and river scenery everywhere present on this ride. We venture to say that there is not in the world, within the same limit, so many wonderful freaks of physical geography, so much to amaze and delight the beholder.

The trip thus finished through the park, the traveler, at any time before the middle of August, may fitly complete it by proceeding from Bozeman to Helena, through the beautiful valleys of the Gallatin and the Upper Missouri, thence by coach through a highly picturesque country one hundred and forty miles to Fort Benton, where, in a fine river-steamer, he may complete the trip by a sail of six or seven days, of two thousand miles down the Missouri, to Omaha, or to the junction of the Northern Pacific Railroad, whence he may reach the sea-board by rail.

I regard the explorations of this region as but just commenced. New wonders are continually presenting themselves. Jets of steam as yet unvisited are seen in all directions while passing through the park, many of which indicate the location of very extensive groups of springs. Columns of vapor, apparently 500 feet in height, seen Lieutenant Doane and myself on my first visit in 1870, while on one of our mountain expeditions, have not as yet been visited. Mr. Stevenson

during the past year discovered, near the head of Snake River, a basin which he believed, from casual observation, to contain nearly as many springs and geysers as the Lower Geyser Basin on the Fire Hole.

A party of tourists from Bozeman also discovered a similar basin between the Mammoth Springs at Gardiner's River and the Fire Hole Basin. The whole country is full of interest, and presents to tourists a rare opportunity for exploration, and to scientific men a wonderful field of investigation.

The destructive and reproductive agencies at work in all this region are not the least marvelous of its phenomena. The two years which have elapsed since the first discoveries in this region have wrought marked changes. In that period old geysers have ceased to act, and new ones have been produced; small geysers have increased in size, while large ones have decreased in volume. The same may be said of the springs. Many that were clear two years ago are now muddy caldrons, their contents boiled down to thick paste. The mud volcano, which on my first visit was in active operation, had entirely disappeared, and when Professor Hayden visited the spot the following year, its only remains were hillocks of mud and a shapeless hole thrice the former size of the crater. Large pine trees, 125 feet high, which grew near the edge of the crater in 1870, had been completely ingulfed by it at the time of its destruction, before the summer of 1871.

The reproductive power of the waters of the Mammoth Springs at Gardiner's River is very wonderful. This is the only group of calcareous springs yet discovered in the park. All the others are siliceous. The different pools formed by water of these springs in its descent of the mountain, the frozen cascades, the corrugated borders, all most exquisitely and delicately formed of lime deposit, may, if broken up for specimens, or worn out by age, or abandoned by the falling water, all be speedily restored to their beauty by exposing for a few days the injured parts to the action of the waters.

The whole hill-side may by this process be improved and made to assume any form, at the pleasure of the most fantastic fancy. During the past summer little ornaments of wire, baskets, and other objects, wound with cloth, have by suspension in these springs, for a period of eight or ten days, been taken therefrom most beautifully incrusted with a coating of crystallized lime, pure as alabaster, of half an inch in thickness. At any point, by penetrating the crusted surface made by the flowing of these springs, a vapor bath is easily obtained.

I cannot close this report without returning my thanks to Colonel Baker, commandant at Fort Ellis, and to Captain Putnam, commandant at Fort Hall, for their kindness in furnishing camp equipage and guns for myself and my assistant, and for many other attentions; to Professor Hayden, for transportation and for unnumbered personal kindnesses; and to Captain Stevenson and the members of the United States geological survey, for the assistance rendered by them upon all occasions, and to the Union Pacific and Central Pacific Railroad Companies for the courtesy of free passes for myself and assistant. Their liberality will not soon be forgotten. My assistant, Mr. Charles L. Spencer, will also accept this public tender of my thanks for the able services he rendered on a trip which was both protracted and toilsome, and afforded him no other recompense for his assistance than an opportunity to see the wonders of the park.

I desire, also, to add my testimony to that of Dr. Hayden, in praise of the accuracy and artistic skill with which that accomplished artist, Thomas Moran, has depicted the grandeur, both in general appearance

and coloring, of the Grand Cañon of the Yellowstone. By some who have seen this picture its coloring has been criticised, because they could not realize that such a remarkable natural combination of colors was possible. But in this respect the painter's tints cannot equal the original. Mr. Moran has but approached it, simply for the reason that the coloring of nature is more brilliant than painting can be. The picture is in no degree exaggerated. It is the work of a very accomplished artist, and reflects the highest credit upon his skill and accuracy. All who have seen both the cañon and the painting will readily agree that in grandeur, in coloring, in the number of its steam jets, and in its general effect, it is not overdrawn. But this is only one of the wonders of that great region of marvels. Could all be portrayed with the same faithfulness, and made to adorn the walls of our Capitol, how greatly would they exceed in grandeur and vastness our ordinary art decorations.

Nothing has been, nothing can be said, to magnify the wonders of this national pleasuring-ground. It is all and more than all that it has been represented. In the catalogue of earthly wonders it is the greatest, and must ever remain so. It confers a distinctive character upon our country, greater than that of Niagara, Yosemite, or Mammoth Cave, though each of these is, in itself, without parallel. But here, the grandest, most wonderful, and most unique elements of nature are combined, seemingly to produce upon the most stupendous scale an exhibition unlike any other upon the globe. It should be sustained. Our Government, having adopted it, should foster it and render it accessible to the people of all lands, who in future time will come in crowds to visit it.

Very respectfully, your obedient servant,

N. P. LANGFORD,
Superintendent Yellowstone National Park.

Hon. C. DELANO,
Secretary of the Interior, Washington, D. C.

ATTACHED MAP / DRAWING

SEE ORIGINAL

Report Upon the Yellowstone National Park to the Secretary of the Interior by P.W. Norris, Superintendent For the Year 1877

REPORT

ON THE

YELLOWSTONE NATIONAL PARK.

NORRIS, MICHIGAN, *October* 20, 1877.

SIR: In accordance with your instructions, based upon the act of Congress, approved March 1, 1872, setting apart the Yellowstone National Park, and providing for the management thereof, I have the honor to submit the following report.

Upon receipt of my appointment as superintendent of the said park I appointed Mr. J. C. McCartney, the pioneer proprietor of the Mammoth Hot Springs Hotel, resident assistant. I soon after published in the Norris Suburban, (a newspaper widely circulated in the West,) a copy of the act dedicating the park, your rules and regulations for its management, notice of my own and my assistant's appointments, and a spirited appeal to my old mountain comrades, tourists, and the general public, to assist in checking vandalism in the wonder-land, sending hundreds of extra copies to presses and parties in the West.

As a practical mode of attracting general attention I also had a large number of spirited cautions against fire and depredations in the park printed upon durable cloth and affixed to trees, and otherwise at prominent points of interest therein and the adjacent places of resort.

I also, in the Suburban and other sheets, regularly published items of interest relating to my explorations in the park and the routes thereto.

The published reports of Langford, Everts, Hayden, myself, and others having more clearly demonstrated the existence of matchless wonders within the park than any direct or practical route of reaching it, I sought to explore a new one by ascending the Yellowstone River, its natural outlet.

Leaving Washington in April, and Norris in May, passed the Sacred Pipestone or Pipe-stone quarry of Dakota *en route* to Bismarck. Thence, after unusual delays upon steamboat ascending the Missouri, reached Fort Buford, at the mouth of the Yellowstone, June 18. Unfortunately for the Government, the public, and the *present* popularity of the Yellowstone route to the National Park, Commodore Coulson failed to secure contract for the immense Government transportation thereon. He thus hauled off the Josephine, the first boat of recent years to ascend the Yellowstone, which, in 1875, reached the highest point yet attained, at Baker's battle-field near the mouth of Clark's Fork; the Fart West, which carried the wounded after Custer's and Reno's defeat from the mouth of the Little Big Horn River, in 1876, the intrepid Captain Grant Marsh, commanding on both occasions; and also other boats and officers fitted or qualified for the trade.

This left the Yellowstone Transportation Company with a totally inadequate supply of necessary light draught powerful steamboats, or officers of experience on that route.

I am explicit upon this point, as the all-important one, which, after much of a season's unfortunate experiment of running huge, loggy Ohio and Mississippi packets upon the large and beautiful but unknown, uniformly rapid, and often rocky Yellowstone, terminated in an amicable arrangement by which much of the immense public and private freightage thereon was speedily done by the first-named and similar boats and officers.

Despite the most gentlemanly treatment by the officers of these large boats, so annoying became the delays that I left Tongue River post, with two comrades, upon Indian horses captured at General Miles's Rosebud fight, ascending the Yellowstone on the north bank to the Big Horn, and up the latter and the Little Big Horn to Custer's field, at disinterment of the officers' remains. Thence returned to the Yellowstone, and, through terrible storms of rain and hail, ascended it to and through the Snowy Gate of the mountains, Bottler's Park, and the second cañon to the Mammoth Hot Springs, in the National Park.

Thence made a brief visit to Forts Ellis and Bozeman for consultation with the leading military officers and citizens in relation to invalids and tourists at the bathing-springs, and, securing an outfit, returned to Bottler's.

Anxious to explore the nearly unknown northern portions of the park and its approaches, I crossed to Emigrant and over the basaltic terraces bordering a chain of lakes to Fitzgerald's lonely ranch, at the foot of Dome Mountain.

Near these lakes, the basaltic terraces back of Bottler's and in Trail Creek Pass are long, often parallel, lines of small rude stone-heaps, and near the latter many mining shafts and drifts of some prehistoric race for a rare, wavy, ornamental rock, the first evidence of ancient mining discovered in these regions. From their adjacent burial-cairns, discovered by me in 1870, specimens of this rock, arrow-heads, and other implements and tools of obsidian or volcanic glass, were found and sent to the Smithsonian Institution, hoping for future interesting exploration.

The mountain snows were unusually deep and slow in melting, but by following an ancient game and Sheepeater Indian trail some miles from and at least 2,000 feet above the river in the second cañon, I crossed Dome Mountain, descending to the river opposite Cinnabar Mountain. Thence ascended the valley, passed several active and the crumbling craters and cones of countless extinct hot springs, often capping the basaltic cliffs hundreds of feet in height, like (save a more yellow tinge in weathering) the most ancient and elevated of those at the Mammoth Hot Springs, and doubtless of a common age and character, to Gardiner River and Bear Gulch. The latter enters the Yellowstone through a yawning chasm, deep, through the hot springs formation and basaltic lava, into the underlying gold-bearing rocks, upon a lode in which four miles up the gulch (probably just without the park) is an excellent arrastra amid promising lodes and placers. The initial point of the park boundaries at the confluence of the Yellowstone and Gardiner Rivers is in a deep eroded valley, elevated but a few feet above their rocky beds, a good permanent starting-point for survey of the boundary-line, which is excellent for a few miles in the Yellowstone Valley to the west, but to the east it soon enters and continues along a towering, most of the year snowy, range, gashed from one to three thousand feet deep by Bear Gulch, Crevice, Slough, and Soda Butte Creeks, and their eroded side cañons. A narrow belt near their mouths *within* and much more *without* the park contains probably valuable deposits of gold, silver, copper,

and other valuable minerals, amid basaltic buried petrified forests of matchless wood opal, amethyst, chalcedony, &c.

These I explored, as also the mining-camps at heads of the Little Rosebud and Clark's Fork, (the latter giving name to the whole mining region,) and in pursuance of a long-cherished desire sought a pass thence through the Big Horn or Shoshone Sierra Range to the main Yellowstone below.

Failing on my route up to find a guide or even a comrade from the Crow Indian agency from below, I now employed Mr. Adam Miller to guide me from above down the Little Rosebud.

Quickly crossing a sharp divide fully 8,000 feet high and from his mining-camp at the head of Soda Butte Creek, we in four miles descended to about 7,000 feet at the famous Red Trout Lake. This is the head of Slue Creek running south into the East Fork, thence in the same park without an intervening ridge to the head of the Little Rosebud or Stillwater running northerly into the main Yellowstone. We found neither falls, narrow cañons, nor other serious impediments; in fact, the descent and pass many miles through the main divide so unexpectedly favorable, that I decided to return through and complete its exploration *en route* home, after tour of the park.

But before returning we ascended a snowy peak of the main divide near the pass, and August 2 got an open, clear view of the Slue Creek Valley, both of the Yellowstones near their forks, Tower Creek Falls, and Mount Washburn looming grandly in the southern background. To the north a deep, narrow, but direct and apparently fine open pass connecting Slough Creek with the Rosebud, and through the last crest of the range to the treeless foot-hills, and timber-fringed valleys of the Rosebud, Stillwater, and main Yellowstone beyond the Crow Indian agency, to limit of the horizon in the dark Bull Mountain.

After finding that my injury at Tower Falls would compel my return down the river in a boat, I employed Mr. Miller to explore the pass thoroughly, and report promptly and fully, which the unexpected Indian raid has prevented, in time for this report. But I retain great confidence that this pass, cutting off, as it does, nearly one hundred miles in distance and several cañons and mountain-spurs along the Upper Yellowstone, will prove, to at least the East and Clark's Forks mining regions, much if not all of the year, exceedingly valuable, if only for pack-trains, with strong promise of a wagon-route during at least the summer. This, in addition to ordinary traffic, would give tourists a direct route from the navigable waters of the Yellowstone past the Crow agency, magnificent mountain scenery and valuable mines through the petrified forests to the forks of the Yellowstone, and great central point of the "wonder land."

Descended the Soda Butte, East Fork, and main river to near Trail Creek Pass below Bottler's, to meet General Sherman, and returned with him to Hot Spring Creek, near the forks of the Yellowstone. Anxious to explore a route between the Grand Cañon and Mount Washburn, I started alone at daybreak, pushing rapidly to Tower Falls. There the roar of waters, with fumes of sulphur from the Grand Cañon, frightened my horse to backing and the breaking of a stirrup-strap, hurling me headlong through a clump of service-bushes many feet down a precipice upon the jagged lava rocks below, breaking compass, watch, and field-glass, and rendering me temporarily insensible. Though partially recovered before arrival of the General and party, the injury to my nearly broken neck and back, my arm, and an old shoulder-wound, was so severe as to compel my most reluctant return to the Mammoth Hot Springs.

Greatly benefited by two days' bathing there, I was with great difficulty enabled to reach Bottler's, and thence in a small Mackinaw boat descended the river through the Gate of the mountains, and some 400 miles to the steamboat Far West, below the mouth of the Big Horn, and upon her to Bismarck; thence returned via the Northern Pacific Railroad to Duluth, and the Great Lakes to Detroit, thence to my suburban home, after nearly four months of constant, toilsome, and often dangerous travel, and am still suffering from, I fear, a permanent injury to my shoulder and spine.

I heard the first tidings of Gibbon's fight at the Big Horn, the Nez Perces raid into the Geyser Basin, and first massacre of tourists in the Park, at Duluth, and still later of the burning of Henderson's ranch, the bridges, and killing of other tourists at the Mammoth Hot Springs.

From General Sherman's extremely weak escort of only five men, beside a like number of my citizen comrades, it is evident that he did not anticipate incursion of the Indians so closely behind him, nor did others. Even after, as is now known, the Nez Perces were slaughtering tourists at the Geyser Basin, no tidings had reached my assistant at the Mammoth Springs, who then wrote me that tourists were pressing on to the believing the Indians were descending Snake River. He subsequently did all in his power to assist the wounded and bury the dead, narrowly escaping with his life after loss of his horses, buildings, &c.

Deeply as I regret my absence, I was, even aside from my injury, in no situation to have rendered very material additional assistance, as I was totally without park police, or personal escort, authority to raise, or funds to pay for them, or even an official salary, obligation to, or expectation of a prolonged stay in the park this year. I understood my season's duties to be exploration of the Yellowstone River, a new pass to the East Fork, arousing public sentiment against destruction of animals and wonders in the park, with a rapid review of it, for the latest knowledge attainable for intelligently recommending practical legislation and rules for its future management. This, despite all obstacles and mishaps, I have mainly accomplished.

The portion of the park which I failed to review this season is that well known to myself and others; much of what I did visit, little known, and yet a knowledge of it necessary for appropriate legislation. I also deem my exploration of the pass to the Little Rosebud and the entire length of the Yellowstone River, by boat or on horseback, as being to myself and the public, for many reasons, extremely valuable.

The location, size, and general features of the Yellowstone National Park, and its two old routes of approach, are, from many public and private accounts, so well understood as to require few comments, other than all admit the existence there of an unrivaled concentration of wonders, and also the wisdom of Congress in promptly setting it apart as a permanent health and pleasure resort, and placing it under the control of the Interior Department. They, however, with equal unanimity press the necessity for additional legislation, and especially for speedy appropriation of funds to survey and plainly and permanently mark its boundaries, and also salary of a superintendent to justify his residence there, and efforts to protect the wonders, open roads, and assist tourists with information and guidance.

When returning from a fruitless effort to reach the geysers in spring of 1870, I at Bottler's met Adam Miller, who after subsidence of the floods which had disabled my comrade and forced our return, ascended the main river and East Fork, and discovered the Soda Butte and Clark's Fork mines.

This was months in advance of Washburn, Doan, and comrades, the first in any sense official explorers of the park, and nearly two years before it was legally declared such, and yet during all this intervening time (save when temporarily driven out by Indians or starvation) himself and other occupants of these mines have labored in utter ignorance of whether they were living under the usual regulations of mining camps, or trespassers upon a national pleasure-park.

There is now one valuable argentiferous galena-smelter, owned by spirited Montana capitalists, and some thirty or forty resident gold-placer miners in this annoying situation.

Besides, the laws and customs of our people are too well established in reference to mines and miners to anticipate revenues or assistance from them, other than perhaps construction of a substantial highway and bridges, where, and under such regulations as the superintendent of the park or the Secretary of the Interior may prescribe.

Should these mines develop as they now promise these improvements can doubtless be secured, thus greatly counterbalancing the annoyance of a fifty-mile line of ordinary traffic through even the border of the park. But the entire character of ownership and development of all these mining interests are so dissimilar to the anomalous rules and regulations necessary for the management of a wild national pleasure-resort, that antagonism and annoyance so arises and increases at every phase of their contact that the permanent good of both absolutely requires a speedy survey of the boundaries of the park, followed by either a recession or special rules for management of these, probably the only valuable mines that will ever be found even partially within the park.

As C. J. Barronette had, at great danger and expense, constructed a bridge at the forks of the Yellowstone, where indispensable for access to the mines or of travel in much of the park, and J. C. McCartney had, with much expense and cost, constructed hotel, bath, and other accommodations at the Mammoth Hot Springs many months before the setting off of the park, and have constantly and more beneficially to the public than to themselves held peaceable possession of them until the recent Indian raid, it seems but fair they should either be paid a reasonable remuneration for surrender of their improvements, if taken by the Government, (which I do not recommend,) or allowed a fair preference in securing ten or twenty years' leases for bridge and hotel rights at their respective localities.

These are all the permanent occupants or improvements, in addition to the above-mentioned mining interests within the park; the rude cabins, corralls, &c., of ranchmen upon the East Fork and Soda Butte, should, without expense, be utilized by the Government in leases for like purposes. There should also be ten or twenty years' leases for hotel accommodations at each of the Fire Hole Basins, the Great Falls, and foot of Yellowstone Lake, with yacht and ferry license at the latter place.

The early interesting and truthful reports of Professors Hayden, Comstock, and others of the beautiful and grand geysers and other hot-springs and salzas, with their snowy white, or beautifully-tinted and scalloped borders and terraces, elsewhere unequaled by nature, and inimitable by art, still fails in description of the Lion, Lioness, and many other geysers then unknown, and being constantly discovered by myself and others. Besides, as *then* conjectured and *now* known, although uniform and permanent in general character, there are constant and often great changes in the volume of water, power, and periods of eruption and repose of many of the geysers, as well as in their birth, growth, deca-

dence, death, and decay. This is especially evident at the Mammoth Hot Springs, the crumbling and all-eroding effects of the elements, adding the halo of ceaseless contrast and change to the other weird wonders of the "fairy land."

This assures constant interest in new view and description of and anxiety to revisit it, especially by those benefited by bathing in any of the countless medicinal springs.

The lamentable Indian raid, burning of houses, bridges, and massacre of innocent tourists within the park, soon after my leaving there, is as anomalous as unexpected; the first, and probably the last of the kind, as it is wholly aside from all Indian routes, and only chosen in the desperation of retreat by the Nez Percés, who have acquired sufficient civilization and Christianity to at least overpower their pagan superstitious fear of *earthly* fire-hole basins and brimstone pits.

Doubtless many interesting specimens of opalized wood, chalcedony crystals, &c., have, without serious injury to the park, been removed therefrom to the public and private museums or cabinets of the world, greatly adding to a correct knowledge of, and desire to visit, the matchless "wonder-land."

But millions of specimens have been obtained by the grossest vandalism; many of the inimitable scalloped cones and turbaned borders of geysers, salzas, and springs, specimens of centuries of nature's matchless handiwork, demolished for mere fragments which, as such, were not worth—and often not carried away. Careless use of fire has also destroyed vast groves of timber, seriously increasing the necessity and adding to the cost of constructing roads and bridle-paths.

Owing to the isolation of the park, deep amid snowy mountains, and the superstitious awe of the roaring cataracts, sulphur pools, and spouting geysers over the surrounding pagan Indians, they seldom visit it, and only a few harmless Sheep-eater hermits, armed with bows and arrows, ever resided there, and even they now vanished. Hence in no other portion of the West or of the world was there such an abundance of elk, moose, deer, mountain sheep, and other beautiful and valuable animals, fish and fowl, nor as ignorant, or as fearless of and easily slaughtered by man as in this secluded and unknown park but seven years ago. Most of the larger animals would stupidly gaze at man stalking erect as an added wonder in the "wonder-land" until too often wantonly slaughtered, while the utter want of salary prevented my worthy predecessor, Hon. N. P. Langford, from residing there or seriously checking.

From the unquestioned fact that over 2,000 hides of the huge Rocky Mountain elk, nearly as many each of the big-horn deer and antelope, and scores if not hundreds of moose and bison were taken out of the park in spring of 1875, probably 7,000, or an annual average of 1,000 of them, and hundreds if not thousands of each of these other animals have been thus killed since its discovery in 1870.

As comparatively few of them were slain for food, but mostly for their pelts and tongues, often run down on snow-shoes and tomahawked when their carcasses were least valuable, and merely strychnine-poisoned for wolf or wolverine bait, the amount of most wholesome, nutritious, and delicious food thus wantonly destroyed is simply incalculable.

My appeals to the hunter mountaineers have been quite uniformly met with the frank avowal that while Government provided no one to protect its animals and wonders, nearly all of them alike slaughtered and vandalized; that with a firm business effort of a superintendent and assistants to protect, all will abstain or find it too hot to long remain

ere—and I believe them. For with all their faults and peculiarities is ended an enviable standard of truth, honor, and genuine pride in eir own reputations and that of the matchless wonders of their ountain homes, which, by manly treatment and proper rules uniformly forced, would render them its steadfast protectors instead of ruthless spoilers.

With the best-informed mountaineers, I deem the game in most of e park, especially along the main routes of travel, as too much deciated to justify extra efforts for its protection west of the Yellowstone ake, River, and Grand Cañon. But the wild eastern portion between em and the impassable snowy crests of the Shoshone Sierra, or Yelwstone range, from the base, say thirty miles, along the East Fork of e Yellowstone south, say fifty miles, to apex of a triangle at the head of e lake, contains fewer prominent wonders and more large valuable ame animals than other portion of the park or of the mountains.

Here is still a herd of three hundred or four hundred of the curly, arly black bison, or mountain buffalo, with thousands of elk, deer, oose, antelope, bighorn and woolly sheep, beaver, and other beautiful d rare animals valuable for food, pelts and furs, while, inclosed by imssable natural barriers elsewhere, only during the deep snows of winter casionally visit the deep-sheltered grassy valley of the East Fork—from o to five miles wide.

There two or three spirited, intelligent herdsmen might (in addition profitably rearing domestic animals) also thoroughly protect and, by pture of the young, gradually domesticate any desired number of them. These, by practical rearing, and by sale of the young to zoologists roughout the world, and by judicious slaughter and sale of their flesh, lts, and furs, and also of those still wild, might render them permaently attractive and profitable to the park and to the nation in its anagement. That this is not visionary, but eminently practical, the rds of Major Pease and others, of bison, elk, deer, and woolly sheep, ginly originally captured in the park and now roaming peacefully ith domestic animals without inclosure, fodder, or other care the whole ar, is proof beyond cavil or doubt.

By proper laws and leases the rocky islets of Alaska produce a fair d reliable revenue from the skins of the arctic seal, when elsewhere actically extinct; why not thus utilize a waste corner of our—in size, evation, and wonders unrivalled—National Park by timely protection our rarest animals, our national bird of valor, and our matchless eckeled trout?

Surely they might here prove a perpetual attraction to the eye, under oper regulations, to the chase, and their flesh judiciously slaughtered, the palate of the countless health and pleasure seekers, when elsehere unknown, save in the natural histories of extinct species. 'ithin a decade the buffalo, the bison, and, in fact, the most of these rger animals will be extinct or extremely rare elsewhere in the nited States; and if our people are ever to preserve living specimens our most beautiful, interesting, and valuable animals, *here*, in their tive forests and glens of this lofty cliff and snow encircled "wonderd," is the *place* and *now* the *time* to do it.

A pressing necessity is the construction of a wagon-road from the ammoth Hot-Springs, via the Cañon Falls and cascades of the East rk of the Gardiner River, Tower Falls, Mount Washburn Cascades, ellowstone Falls and Lake, and to the Fire-hole Basins, to where the ez Percés recently entered the park upon the road from Henry's Lake. This, in a distance of something less than a hundred miles would con-

nect nearly all the main points of interest within the park, the two old entrances at their termini, a new one through the Togwatee Pass and Wind River Valley, as proposed by Capt. W. A. Jones and Prof. Theo. B. Comstock in the interesting and valuable report of their explorations of 1873, and also my proposed one from near the forks of the Yellowstone to the Stillwater and navigable portion of the Yellowstone.

There is also necessity for speedy construction of a bridle-path through the pass from the Little Rosebud or Stillwater to the Clark's Fork and Soda Butte Mines, thence through the petrified forests, from Amethyst Mountain to Pelican Creek and foot of Yellowstone Lake, thence around it, with a branch to the Shoshone Lake, Geyser Basin, and old Faithful Geyser in the Upper Fire-hole Basin.

Also a very important bridle-path cut off by the route which I explored in 1875, from the forks of the Firehole via Gibbon's Fork, Cañon, Falls, Red Geyser Basin and Pass, and the falls of the Gardiner River, to the Mammoth Hot Springs. As of these roads and bridle-paths, only the miners (which I hope to arrange with them to construct and repair from the forks of the Yellowstone) cross the main river, no long, but many short, and some tolerably elevated, bridges will be required; but some long causeways, especially in the miry, often nearly impassable, Upper Firehole Valley, much earth and little rock excavation. Timber and rock material usually abundant, and plain but substantial improvements, with the all-important practical selection of routes not necessarily very expensive.

The necessity is evident for an appropriation to survey the boundaries, and continue explorations of the park, construction of these roads and bridle-paths, and salary to insure a superintendent of energy and practical knowledge, and intrusted with discretionary power to under proper restrictions, manage these varied and important interests of the nation in the park.

An ambitious scientific signal-officer at the Mammoth Hot Springs or the Geyser Basin, or both, might, with little additional duty or expense, greatly aid science in solving many interesting and practical questions connected with the origin, character, duration, and decadence of each of these various classes of hot springs, the degree of their connection with the earth's internal fires, and their combined influence upon the climate of the park.

Notwithstanding the unavoidable great length of this first general report of the situation of the park since its legal existence, so important to its development and enjoyment is the opening of the Yellowstone River route, that I add a brief statement of what I deem practical facts in relation thereto.

We are now in the midst of serious and wide-spread Indian difficulties of cost and duration uncertain, but not the pending military necessities or final results, one of the most important of which is the speedy and permanent opening of the great natural Yellowstone route to the settled portions of Montana, and the park, of the feasibility of which I have all confidence, for the following reasons:

The Missouri, as is well known, has been for many years navigated most of the season to Fort Benton, and all of it to Carroll.

From a personal knowledge of these streams many years ago—explorations of most of both of them in 1870 and 1875, boating the whole of the Yellowstone one way, part of it the other, and the balance upon horseback this season, the views of old trappers and bull-boat voyagers and of recent steamboat and military officers, basis for accurate conclusions certainly equaled by few, if any, and excelled by no man living—

I thus view their relative and actual merits for navigation. As compared with the Missouri above their junction, I deem the Yellowstone less crooked and muddy, with a *somewhat* narrower channel and *much* firmer banks, a more uniformly rapid current, but neither falls nor long and heavy rapids as has the Missouri below the gate of the mountains, usually carrying nearly as much water, and often, though not always, (from higher snowy mountains,) boating-stage later in the season; bluff and bar impediments to navigation more rocky and changeless, and hence soon better known, avoided, or permanently improved.

With moderate appropriation for removal of huge bowlders in the Wolf, Buffalo, and a few other rapids, and with the convenient rock and timber obstructing a few side shutes, powerful light draught steamboats, like the Josephine or Far West, can with safety and profit run nearly or quite all of the season to the mouth of the Big Horn.

Boats like the Rosebud could ascend to at least Baker's battle-field, and, with further improvements of the channel, and perhaps a smaller, yet serviceable, class of boats to the mouth of the Stillwater, if not, indeed, to Benson's Landing, at the very gate of the mountains, within sixty miles of the Mammoth Hot Springs in the park. This landing is but twenty-two miles by the open Bozeman Pass and excellent road from Fort Ellis at the head of the fertile Gallatin Valley, extending to the Three Forks of the Missouri and central point of the valuable mines and valleys of Montana. Hence, even liberal appropriations for improvement of the Yellowstone would be annually repaid to the Government in the cost of transportation alone to an entire chain of forts, besides speedily assuring a border of prosperous settlements, (save upon the Crow reservation, and ere long that also,) and permanently solving the Indian question, through the very heart of their most beautiful and valuable game regions.

The permanent opening of this great natural route from the north and east, and the assured extension of the Northern Utah Road into at least the Snake River Valley from the south, will develop rivalry in excursion-tickets from all the important cities of the nation, inviting teeming throngs of tourists to the bracing air, the healing bathing-pools, and matchless beauties of the "wonder-land."

Whether this national heritage of the unique, the beautiful, and the marvelous, somewhat aided by art and judicious management, is to thus become and ever remain the chosen resort of the student, the scientist, and the weary and worn pilgrims for health and pleasure of our own and other lands, or be given up, as heretofore, to the ruthless vandalism of all comers, depends upon the tendering or withholding of the fostering hand of the guardians of our nation's wealth and weal without delay.

P. W. NORRIS,
Superintendent of the Yellowstone National Park.

HON. CARL SCHURZ,
Secretary of the Interior, Washington, D. C.

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Report Upon the Yellowstone National Park to the Secretary of the Interior by P.W. Norris, Superintendent For the Year 1878

REPORT

ON THE

YELLOWSTONE NATIONAL PARK.

NORRIS, MICH., *December* 10, 1878.

SIR: I have the honor to submit the following report of my operations in the field during the season of 1878:

As soon as the appropriation for the Yellowstone National Park became available, I proceeded via Omaha and Ogden direct to Bozeman, Mont.

From Detroit, Mich., Mr. B. F. Bush, an early and enthusiastic member of the scientific association of that city, accompanied me as assistant at a mere nominal salary, purposing to remain in the park during the winter to keep a regular weather record, and explore and sketch its main wonders, at present but little known at that season of the year. In public meetings at both Virginia City and Bozeman I fully explained the boundaries, wonders, and necessities of the park; your rules and regulations and my plans for its protection and improvement; and was by the speeches, the resolutions, and press reports thereof sustained by unanimous pledges of earnest sympathy and support.

Soon I rapidly outfitted for the park and reached it, 70 miles distant, in time to take observations of the *three* total eclipse of the sun, July 29, from a lofty, unexplored basaltic pinnacle of Sepulcher Mountain, as did Messrs. Bush and Bother from the Cinnabar.

As stated in my preliminary report, the increasing probability that the hostile Bannocks would, like the Nez Percés of last year, raid the park from the west, induced me to defer the purposed erection of buildings at the Mammoth Hot Springs and seek to construct a road thence, connecting the entrance from Fort Ellis with that from Henry's Lake at the Lower Firehole Basin, for military as well as other purposes. A prudent regard for the safety of our limited appropriation also induced me to send back our official and other valuables to Bozeman, and to purchase but few animals, mainly living them with their owners at only trifling additional expense and no risk of loss.

I thus quickly organized a party of some 20 well armed, mounted, and equipped, resolute and reliable mountaineer laborers, and, with only one baggage-wagon, rapidly constructed a road three miles up the left Mammoth Hot Springs terraces, and through an excellent pass to the West Gardiner Valley.

From the summit of Sepulcher Mountain I had upon the day of the eclipse, with a heliograss, traced my route of 1875, along connecting branches of the Gardiner and the Gibbon, through a cañon nearly parallel with the Snowy Madison range. More easterly and nearly due south, from my point of observation stretched the long, open, grassy valley of an unexplored branch of the Gardiner issuing from a deep cañon toward the towering cliffs of the Grand Cañon of the Gibbon, and far

away over and beyond the Firehole Basins and continental divide, the serried glistening crest of the Three Tetons high above the clouds.

Subsequent careful and long continued explorations of this route proved it, although difficult and dangerous of construction through several cañons and firehole basins, the most direct and practical one for a wagon road across the park.

As Barronette's party had left and Professor Hayden's not reached the park, we were doubtless for a time the only white men within or near it, requiring constant caution in scouting and labor, as well as in care of animals and making and guarding camp. Despite these annoyances, we crossed the terraces, rapidly bridged the first branch of the Gardiner, forded the next two branches, and ascended the last through a two-mile cañon, and, with nearly a half mile of bridge and causeway, crossed the foot of Beaver Lake.

Obsidian there rises like basalt in vertical columns many hundreds of feet high, and countless huge masses had fallen from this utterly impassable mountain into the hissing hot-spring margin of an equally impassable lake, without either Indian or game trail over the glistering fragments of nature's glass, sure to severely lacerate. As this glass barricade sloped from some 200 or 300 feet high against the cliff at an angle of some 45° to the lake, we—with the slivered fragments of timber thrown from the heights—with huge fires, heated and expanded, and then, men well screened by blankets held by others, by dashing cold water, suddenly cooled and fractured the large masses. Then with huge levers, steel bars, sledge, pick, and shovels, and severe laceration of at least the hands and faces of every member of the party, we rolled, slid, crushed, and shoveled one-fourth of a mile of good wagon-road midway along the slope; it being, so far as I am aware, the only road of native glass upon the continent.

Then, by a full mile of grade, we flanked Beaver Lake, skirted a dashing rivulet of green alum-water, through a fine pass, and beside a fine lake in a forest of dense pines to the lovely valley of an unknown fork of the Gibbon, descended this to, and three miles through, an unexplored but extremely active and interesting firehole region, and skirting another near the second falls and cañon to the wild-flax and clover-covered park bed of an ancient lake, to the head of the Grand Cañon of the Gibbon.

Thence, without the guide of even a game-trail, by immense labor, and twice crossing the stream, we for some four miles traversed its cañon, nearly a half mile deep. We then emerged through an ancient channel, and skirted the very brink of a precipice nearly a thousand feet above the 80-foot falls and foaming rapids, and six miles of open pine-clad terraces to Howard's road from Henry's Lake, an estimated distance of 45 miles from the Mammoth Hot Springs, mainly through a region heretofore totally unexplored; then 15 miles farther through the Lower Firehole and midway to the upper geysers, our wagon being the first to make a track along the Upper Firehole River.

We joyfully met the Gannett and Holmes party of Professor Hayden's geological surveying expedition at the lower geysers—the professor himself at the upper, and between them the various members of his Wilson party straggling in afoot and exhausted after loss of their animals and other outfit by the Indians near Henry's Lake.

It was truly a pleasant and fortunate meeting for all parties, after more than a month of hazardous mountain climbing and isolation from the outside world and each other; and amid abundant evidence of surrounding Indians, we for days pressed our various duties within supporting distance of each other.

A courier from General Brisbin warning me that the hostile Bannocks were pressing through Tyghee's pass, and advising concentration for defense, until relieved by himself or General Miles, delayed us, still laboring upon the roads, at the forks of the Firehole, until getting short of provisions, when we retraced our route to the Mammoth Springs, there finding General Brisbin with a Gatling battery and all the troops available, and that the main band of hostiles had meanwhile crossed our road between us. I there also found that the Bozeman Bank containing my government deposit was closed, requiring the assistance of my Bottler friends to continue the work.

Although the funds were ultimately replaced in Helena without loss to myself or the government, and General Miles met and in a sharp conflict nearly exterminated the Bannocks, yet these circumstances wholly unavoidable and not likely to again occur, were, in the midst of a short season's operations, peculiarly annoying and retarding.

During a tour of the park with General Miles, and in reviewing the old trail routes and exploring new ones, I was enabled to keep a small party actively engaged in improving my road to the geysers, that towards Fort Ellis, and a new one to the forks of the Gardiner on the route to the falls and lake, and several additional bridle-paths and bridges.

Also, in view of the remote, if not immediate, possibility that the sealing off of heavy masses of rock from the famous extinct geyser-cone called Liberty Cap might destroy its equilibrium, causing its fall and lamentable destruction, I erected rough but firm braces of timber under a shoulder of the endangered side.

After the commencement of autumn storms rendered the employment of a large party of laborers unprofitable, I, with one or two reliable scouts, continued the exploration of mountain passes and routes for roads and bridle-paths, learning much of exceeding value in future operations. Lastly, through October snow-storms, explored the crags and canons along the head of the West Gallatin in the northwestern corner of Wyoming, to learn if its boundaries may there be adopted as those of the park, as is for many reasons desirable.

Having thus fortunately closed the very arduous field duties of the season, and, without the loss of a man or an animal, safely left the government property at Bottlers', I crossed the range to Bozeman. Leaving there October 14, I, without special incident or delay, returned via coach, Utah Northern and Union Pacific Railroads.

My assistant, Mr. Bush, kept a regular record of weather observations, and other notes of interest, and greatly assisted in obtaining a large and interesting collection of fossil wood, chalcedony, obsidian, &c. But unfortunately the unexpected hardships of our camp life and season's duties so impaired his health as to compel his return down the Yellowstone, but so late as to endanger being frozen in; and, leaving the Mackinaw at Fort Keogh, he took a mule-train to Bismarck and has but recently returned.

EXPLORATIONS.

While my explorations of the route connecting the wagon-road entrances to the park, and that between the Grand Canon and Mount Washburn are doubtless the most important of the season, still I deem many others of considerable interest and value.

Beaver Lake, at least a half mile wide, of considerable depth, and summer alive with geese, swans, and other water-fowl, is mainly if not wholly artificial. It is evidently formed by a succession of beaver-dams meandering in nearly every graceful curve, each with a fall of from 2 to

ashburn and the Grand Cañon, but utterly failed, and my injury at wer Falls checked my personal efforts of last year. Nor did I find an portunity this season until September 26, when with Adam Miller and B. Rowland, the two most experienced mountaineers of those regions, d five good horses, I started to explore it. From the falls of Tower eek I explored its cañon and the cañon and valley of Antelope eek above it, the timbered plateau between them, and also that beeen the latter and the Grand Cañon. I found the latter very elevated, t open, smooth, and grassy, with a fine lake upon its summit, mainly excellent route, with magnificent scenery along the yawning, sulphurented and stained cañon, for some 6 or 8 miles, and past the ruins of ancient, once loopholed, earth-roofed block-house some 16 by 20 feet diameter and of unknown origin, to a dense forest at the foot of a ld rocky spur of Mount Washburn.

Its tangled timber border, rocky sides, and sharp, serried crest, as seen m Mount Washburn above and the valley below, and its estimated ly 2,000 feet of vertical faces where cut by the Grand Cañon as seen rom it, with others similar nearer the falls, had ever been deemed passable.

A careful exploration of the first one from its towering front in nearly oot of newly fallen snow, through a belt of dense pine, fir, and cedars near the main mountain, resulted in there finding a pass excellent for ridle-path, and practicable for a wagon-road, at a much lower altitude an the old route.

From a rocky, snow-girt peak in this pass I saw others still better in the maining timber-fringed mountain spurs, and became well assured of cess. I camped in a dense clump of pines and balsams in a sheltered sy glade amid the snow, and like Fremont on an island in the Great lt Lake, or Stevenson and Elliot upon one in the Yellowstone beyond reach or fear of Indians, enjoyed the sweet repose of the weary, sucsful and contented.

With increasing premonitions of a gathering mountain storm, my plans re formed and camp in motion with the early dawn. Hastily recorl our visit upon one of the trees of our canopy, I sent my men with animals to seek a route through the remaining spurs and timber to cascade and Great Falls, instructing them to await there a day before rching for me, should I fail to arrive. Then with rifle and hatchet, ot, and alone, I descended a side cañon through all its labyrinth of idings, tangled timber, and crumbling walls, to the pent-up, roaring llowstone in the nearly hidden recesses of the Grand Cañon. Nearly nting me was the mouth of a yawning side cañon soon hidden in its ulings, somewhat above a side cascade nearly lost in spray in its fully 00 feet descent, and about and above me the stifling sulphur fumes of sing fireholes, alike a serious obstacle to my purposed exploration of cañon to the falls, and a warning to leave it without delay. Through at exertion, I breathless and exhausted reached the timbered plateau, d through fast-descending, large, downy snow-flakes ascended to the eat Falls, the thunders of which for miles came in rumbling echoes m the fearful depths. I there, in the gathering twilight, thankfully oyed the greeting shout and blazing camp-fire of my men, just safely ived with the welcome intelligence that they had found a route in all pects preferable to that over the mountain to Cascade Creek.

The day had been without wind, and for a snowy one remarkably ht, and the snow, which was more than a foot deep before night, really nefit, plainly disclosing the various hot springs and sulphur basins, as

well as the clear-cut edge of the Grand and side cañons, and brink of the large yawning land-slides.

As the Grand Cañon is doubtless mainly one of erosion, like that of the Niagara, with a stream much smaller and gorge several times as deep, the hot springs have, by undermining the shelly walls, caused several of these slides of incredible dimensions. One of them extends at least a mile back from the river, a fourth of a mile along it, and fully as deep, with a grove of timber still flourishing upon the portion not yet removed by the river, which, as well as a roaring rapid, and, I think, fall or cascade, are hidden by it. Two or three other smaller but similar ones, with their short, cañoned rivulets, by deeply indenting and lengthening the edge of the cañon, are the main obstacles to a road along its plateau brink. For though the pine, spruce, and fir timber is mainly very dense, yet it is small, only averaging a proper size for railroad cross-ties, easily removed from a road-track, and useful for its small bridges; and as I did not for many miles see a trail, hatchet-mark, or other trace of a human being, I have no doubt of my being the first explorer of the entire brink of the Grand Cañon of the Yellowstone itself still mainly untrodden.

As before stated, portions of any possible route upon either side of the Grand Cañon between the forks and the falls of the Yellowstone will be elevated and expensive, especially for a wagon-road. That upon the eastern side of the cañon is utterly impracticable; that within it, unknown but doubtless mainly so, while of the two remaining, that I explored is the shortest, least elevated, and easiest of construction, in fact, in all respects so preferable that I have no question of its adoption for all purposes other than a lofty, bridle-path lookout, for which purpose a portion of the old route, a branch from the new one near Mount Washburn, or both, will ever be desirable. Not only was the route thus found less rugged and difficult than feared, but also the Grand Cañon was shorter, and especially its lower portion less deep and yawning than had been considered. Still it is, especially from its yellow and crimson geyser to the falls, beautiful and grand beyond conception, a leading wonder of the park and of the world, every way worthy of a route along or as near as possible to its misty and sulphur-tinted walls.

From the falls I ascended the Yellowstone to its lake, but was prevented by deep snows and by Indians from a projected trip around it. Leaving the Steamboat Point, I traced a trail south, via Pelican Creek and Amethyst Mountain, to the forks of the Yellowstone, a new route across the main river, and thence through the cañon of the Black Canyon to the Mammoth Springs.

During these various explorations of routes for roads and bridle-paths various paint pools, fossil forests, and other places of interest were discovered. But as most of them were subsequently visited by some members of Professor Hayden's geological survey, in connection with their own numerous and valuable discoveries and explorations, I leave further description in more appropriate hands.

SUMMARY.

So well are its attractions understood, and so popular is the park in all those regions, that I have been cordially sustained by the civil and military officers, and the leading citizens, in my efforts for its protection and improvement. Still, to properly restrain the lawless crowd of tourist from wanton slaughter of animals, and other acts of vandalism, I deem additional legislation of various kinds indispensable.

That the special rules and regulations, necessarily anomalous and conicting with the roving-hunter habits of the surrounding mountaineers, annot be effectively enforced without the limits of their operations he boundaries of the park) being established and plainly marked, is too ident for controversy. Equally so is the necessity for a thorough knowlge by all parties as to what civil and military officers of those regions e empowered and obligated to assist the superintendent in the prompt forcement of these rules and regulations in every portion of the park, or should leases for any purpose be granted, or permanent occupancy improvement by any parties be allowed, except in conformity with ese necessary rules and regulations, quietly, affably, but uniformly forced.

Complications arising with several parties claiming to have made provements within the park prior to its dedication as such, render eir adjustment so desirable that I urge their consideration at the liest practicable moment. As at least the mining portions of these mplications are probably without the boundaries of Wyoming Terriry, which, as this season's exploration clearly proves, embraces all the onders desired within the park, I earnestly recommend changing its orthern and western boundaries to conform to those of Wyoming and e speedy completion of their survey. This is for many obvious reans very desirable, among which is, that running *one* east and west line ill fix the borders of the Territories of Montana and Wyoming, and so those of the park and the Crow Indian reservation, thus alike avoidg present expense and future complications from the exceedingly diirse judicial and other modes of managing contiguous regions.

As the park adjoins the settled portions of Montana, while wholly olated from those of Wyoming, I suggest the propriety of its being at ast temporarily attached to Montana for judicial purposes.

The few Sheepeaters, Bannocks, or Shoshones who alone once resided thin the park, now belong at their agencies with other annuity Indians. lence, no Indians now visit the park save as a haunt for purposes of lunder, or of concealment after bloody raids upon the ranchmen, pilrims, or tourists. Therefore, I urge the necessity of the agency Indians f all the surrounding tribes being officially notified that they can only sit the park at the peril of a conflict with each other and the civil and ilitary officers of the government; and a rigid accountability for plun er of all kinds taken into any of these agencies. This, with a small ilitary post, or at least a summer camp, at the Yellowstone or Henry's ake, or the Forks of the Firehole between them, would prove alike aluable in protection of the park and the adjacent valleys; and being armly recommended by both the civil and military officers of those gions will, it is hoped, secure it and the future safety of the park, and s routes of access. These are rapidly approaching by railroad, steamat, and coach route up the Yellowstone via the gate of the mountains Bozeman to the Mammoth Hot Springs, and also by the Utah Northn Railroad, now completed from Ogden to near the Snake River, with ir promise of reaching Market Lake and a coach route of some 150 iles via Henry's Fork and Lake, to the Forks of the Firehole within e park. Such prospective coach connection with the park renders ore urgent the necessity of at least a wagon-road through it, not only ong the direct route which I explored and roughly opened this season, t also the much longer, rougher, and more costly route unavoidable along the old trail), to view the great Yellowstone Lake, Falls, and ion, and for the completion of the circuit of the park, and view of its atest wonders.

This season's explorations and careful observations of the bison, elk, bighorn, and other animals within the park, and also of those originally taken from there and now roaming peacefully with our domestic animals in the Bottler Park, the expressed views of their owners and also other mountaineers the best acquainted with the haunts and habits of those still wild—information every way practical and valuable—fully justify my last year's recommendations for their protection and domestication.

I thus still adhere to the views then expressed, that the delta-shaped portion of the park bounded on the west by the Yellowstone Lake, River, and Cañon, the Snowy Range upon the east, and north by the deep-sheltered grassy East Fork Valley, where the most of these animals now are, and where the residue would soon concentrate if there especially protected, is the place, and now is the time, to preserve living specimens of the dwindling remnants of our most beautiful, interesting, and valuable native animals and birds. Hence I again urge the necessity of making leases to responsible parties (some of whom are now ready if protected from Indians) as sub-agents of the government to protect and gradually domesticate a portion of these elsewhere nearly extinct animals, with no other cost to the nation than the exclusive right within certain prescribed districts of raising hardy vegetables and domestic animals for themselves, which are also necessary for the use of future tourists in the wonder-land.

There is an abundance of excellent grass, wood, and water at the Mammoth Hot Springs; and of the several excellent building-sites the accessible oblong grassy butte, commanding a view of the matchless terraces, the cañon of the main Gardiner River and its branches, should doubtless be selected for the headquarters of the superintendent of the park, or for a much needed commodious hotel, baths, and other out buildings. There are several good building-sites, plenty of wood, fair water, and excellent water easily obtainable near the castle and Old Faithful, but a scarcity of pasturage in the upper basin. Building-sites, water, and pasturage are very inferior at the lower geysers; but upon a terrace of the lofty lookout butte, just above the forks of the Firehole Rivers is a site easily approachable from, and commanding a fine view of, the open valleys of both the forks, and the Madison River below their junction, with their boundless pasturage, countless geysers, and other hot springs, including the Lower Geyser Basin some two miles south and directly fronting it. Wood and water are here abundant, the former excellent, the latter very inferior; nor can this only drawback upon an otherwise peculiarly favorable strategic location be remedied except by conveyance of water in pump-logs or otherwise from a distance of several miles. There are several charming sites for a hotel and yacht or steamboat landing near the foot of Yellowstone Lake, and a lofty site with nearly every natural convenience and few disadvantages, commanding a full view of nearly all the concentrations of wonders at the Great Falls.

There are several excellent sites, and necessity for occupancy of at least one of them, among the geysers which I explored this season; a matchless one for grazing and for domestication of the bison, elk, and other wild animals, near the famous Soda Butte; also a route for approach and crossing of the main Yellowstone near the forks, far preferable to that of the Barronette Bridge, now so decayed and burned as to be very dangerous; or to the abutments of the miners' bridge commenced above it.

At any or all of these localities the bison can be at least as easily and reliably reared as domestic cattle, with its flesh fully equal and its nea

lack curly robes far more valuable than those of the buffalo of the plains, nd with the excellent and abundant timber material, inclosures can be heaply made for preservation of a few specimens of the elk, antelope, nd other animals of great interest to future tourists.

With another season's improvement and construction of roads and ridle-paths, the promised routes of access, and protection from Indians, have all confidence of being able to effect leases to responsible parties or the construction of much-needed hotels, and also for a yacht or small teamer upon the mystic Yellowstone Lake.

A plain but comfortable residence with the necessary outbuildings or the use of the superintendent of the park and the safety of the pa-ers and other national property at one of the main entrances to the ark, is so obviously necessary, that their construction has only been de-rred because of the Indian raids now hopefully terminated.

With this view I am having lumber and other material prepared for onstruction of these buildings early next season, mainly with the un-xpended balance of the appropriation for the present fiscal year.

HISTORY OF THE PARK.

Believing that, aside from purely scientific questions already in more ppropriate hands, a brief statement of the location, dedication, and ading features of the Yellowstone National Park, and a reference to its ronminent explorers and route of access, will prove of present and per-nanent interest and value, I devote a few pages of this report for these urposes.

As it will require months to compile Professor Hayden's extensive ex-lorations and surveys of the past season and to issue a doubtless correct nd valuable map of the park, I insert a small and tolerably accurate ke for present use. There can be no doubt that the modern sulphur asins, mud-salses, hissing fumeroles, and spouting geysers are only windling remnants of the ancient volcanoes and vast and long-con-nued eruptions of lava, which in the region of the National Park haracterized the elevation of the great plains and Rocky Mountain anges from the oozy bed of a shallow ancient sea.

It is also evident that at some subsequent, but remote, period of time any of these mountain slopes at an elevation of from 6,000 to 10,000 eet were covered with dense forests of timber, in size fairly rivaling hose now upon the Pacific coast; and that by some eruption, perhaps ke that which covered Pompeii and Herculaneum, these forests were ddenly crushed or covered and encased by a sea of hot ashes, mud, nd slime.

Here erosion of the elements, or the fuse, pick and shovel of the tourist nearths this ancient timber, often petrified entire, a perfect tree or log f stone; others timber in form, opal or chalcedony in fact, with amethyst r other crystallized cavities, matchless in form, color, and beauty, and r cabinet specimens, elsewhere unequaled in nature and unrivaled by rt.

Many hot springs and mineral streams now petrify timber, or coat it ith sparkling lime or silica, build geyser cones, and many beautiful rms of crystallization, but all clearly distinct, and mainly much inferior those of the closing eruptive period.

As can be seen upon any map of the United States, the Snake River rk of the Columbia, and Green River Fork of the Colorado of the Gulf California (Pacific waters), as nearly all the other great rivers of that rtion of the continent, including the Jefferson, Madison, and Gallatin

Forks, and the Yellowstone, Big Horn, and other branches of the Missouri-Mississippi-Atlantic waters, and the longest river upon our globe, radiate (often) from hot springs or spouting geysers within or adjacent to the great National Park, situate mainly in Northwestern Wyoming Territory. This is really less one large park than a group of smaller ones, partially or wholly isolated, upon both sides of the continental divide, here much lower than the nearly unbroken surrounding mountain ranges. Its average altitude probably exceeds that of Yellowstone Lake (some 8,000 feet), or nearly a half mile higher than Mount Washington; its few and yawning, ever difficult, often impassable, cañon-approaches along foaming torrents, and the superstitious awe of the hissing springs, sulphur basins, and spouting geysers, and infrequent visits of the surrounding pagan Indians combined to peculiarly delay the exploration of this truly mystic land.

Although Lewis and Clarke, by ascending the Jefferson instead of the Madison or Gallatin Forks of the Missouri in 1805, crossed the Rocky Mountain Divide some 50 miles west of the park without its discovery, yet it is from a member of that first band of Northwestern explorers that we derive our first knowledge of its existence. Coulter and Potts, after their discharge in 1806, retraced Captain Clarke's return route, via the Yellowstone River and Bozeman Pass, to the three forks of the Missouri. They there continued to trap and hunt until Potts was killed and Coulter captured in a Blackfeet Indian ambuscade below the famous Beaverhead landmark upon the Jefferson. Coulter was allowed to run the gauntlet for his life, and, being remarkably fleet of foot, distanced all but one of his pursuers, whom he pinned to the earth with his own war-lance, and escaped, over 6 miles of prickly-pear plain, to some drift-wood at the head of an island in the Jefferson. Unarmed, naked, and lacerated, he, through untold dangers, hardships, and suffering, reached a trading-post on the Lower Yellowstone, rearmed and returned to his Bannock friends, and for years hunted, trapped, and with relentless vengeance fought the Blackfeet.

The haunt of the main Bannock tribe was at Henry's Lake, west of the park, that of their little Sheepeater Band within, and their main buffalo range upon the Big Horn, east of it, and Coulter certainly visited the Great Falls, Yellowstone Lake, and some of the firehole basins and spouting geysers, and ever after his return to Missouri in 1810 gloried in describing them. Yet so little credence was given his descriptions, that for many years, even long after I was first upon the Lower Yellowstone, "Coulter's Hell" was a standing camp-fire jest upon now well-known realities, and John Coulter is, without a shade of doubt, the first white explorer of any portion of the Yellowstone National Park.

In 1809, the veteran fur-trader Henry, driven from the three forks of the Missouri by the ferocious Blackfeet, constructed and for a time occupied a stockade fort upon the outlet of the lake, which still bears his name.

W. P. Hunt and Ramsey Crooks, in their outward route to the ever ill-fated Astoria, with a strong party in 1810, and also the feeble remnant of the band during their return in 1812, crossed the Wind River Range south of the park.

The famous American mountaineers Henry, Ashley, Sublette, and Jackson, the Scottish Campbells and Stewarts, the French Pierre, Pierre Neuf, and Fontenelle, and other renowned trappers and traders, roamed over the regions surrounding the park until the most of them were killed by the Indians, down to the expedition of Captain Bonneville, in 1832. During that year a sanguinary battle was fought between the ever-bloody

Blackfeet and the combined bands of these fur traders and their Bannock friends at their general rendezvous in the famous "Pierre's Hole," near the Three Tetons, within plain view of mountains within the park; and yet, most strangely, in all the published reports of the various mountaineers, we fail to find a hint of the park or its wonders.

During nearly three years of trapping and trading with the Indians by Captain Bonneville and his detached parties, in all directions from the park, it is evident that he neither visited it nor learned its true location. For although his map of those regions was far more accurate than *any* before and *many* after it, even that shows the largest mountain lake as the head of the Snake River instead of the Yellowstone; hence Pacific instead of Atlantic waters, inaccurate in form, without a name, and no indications of the great falls, canons, or geysers, or any of the firehole basins. In fact, in his only reference to the latter (Irving's Bonneville, page 230) he erroneously places it upon the Stinking River (now Water branch of the Big Horn), where the sulphur fumes from an extinct geyser basin somewhat resemble those of the park, but every way less mountain-girt and important than those which Coulter saw within the park.

I have ever given much credence to a well-endorsed camp-fire legend of a mountaineer named Smith having, prior to the days of Bonneville, written a narrative of his explorations of the firehole regions, and being killed by the Indians before its publication; but have never found written proof thereof. Border legends, although often gross exaggerations, are seldom wholly false, and scores of them indicate that white mountaineers did long ago occasionally visit portions of the park for trapping in concealment, and perhaps both. This is, in fact, proven by ancient camps of large trees cut for breastworks and for foot-logs across the Crevice, Hellroaring and other mountain torrents, which no experienced mountaineer would fail to recognize as those of white men, from being rounded from below in a way never practiced by any known Indians; [illegible] near Amethyst Mountain, and the ruins of an ancient block-house with earth roof and port-holes, clearly the work of unknown white men, near the grand canon below Mount Washburn, and a cache of martin steel-traps of a peculiar form only used by the Hudson Bay trappers some fifty years ago, which were recently found along our road near the Indian arrowhead quarry at Beaver Lake.

In Captain (now General) Fremont's reports of his explorations in those regions in 1842–'44, he describes mountain scenery and harmless hermit Indians similar to those in the park, but no geysers; being probably ignorant of their existence.

In 1844 James Bridger to me personally, and as I now know correctly, described the canons of the Upper Snake River, but had then neither seen nor obtained a correct conception of the geysers, deeming them real volcanoes. His description of the Two Ocean Pass south of the park is now admitted to be mainly correct, and there is more of truth than sport (as per camp-fire custom) in his famous story of a foaming torrent, icy cold at its snowy fountain-head, and seething hot half a mile down the mountain-side, though not caused, as he boasted and perhaps believed, by the velocity of the descent, but by a crag-hidden firehole basin of spouting water and seething brimstone.

So with his famous legend of a lake with millions of beaver nearly impossible to kill because of their superior cuteness, with haunts and houses in inaccessible grottoes in the base of a glistening mountain of glass, which every mountaineer of our party at once recognized as an exaggeration of the artificial lake and obsidian mountain which I this year discovered, as briefly stated in my exploration-chapter of this re-

port. But as its location, as also that of the arrow and lance head quarry, is across a sharp mountain range from where represented, and so long sought by trappers, it is not probable that he ever saw them, but that his information was derived from old Hudson Bay trappers or their Indian allies, alike interested in deceiving him as to their true location. These rumors of a mountain girt land of wonders at the fountain-heads of the Missouri and Yellowstone so impressed Lieutenant (now General) G. K. Warren during his explorations of the Black Hills and great plains up to 1857, that he planned an expedition to explore it. This strong, well equipped party, under the command of Captain (since General) W. F. Reynolds, with Prof. F. V. Hayden as geologist and James Bridger as guide, spent the season of 1859 in exploring the Black Hills and Big Horn regions, and failing to cross the towering Yellowstone Range and reach its mystic lake, wintered upon the North Platte. He renewed his efforts in the spring by sending Lieutenant Maynadier with a party down the Big Horn to again seek a pass from the east, and with the main party himself sought one up Wind River from the south. Both parties failed; Reynolds by encountering a buttressed-based, snow capped mountain wall, to cross which Bridger declared that even a crow would need to carry his grub, or provisions.

Turning to the west and crossing the main Wind River divide, near the head of Green River, and failing in another effort to reach the cliff and snow encircled park from near the Three Tetons, he abandoned the effort, and followed the old traders' route via Henry's Fork and Lake to the Three Forks of the Missouri. He was there joined by Lieutenant Maynadier, who, failing in all his efforts to reach the park from the east, had crossed the Yellowstone in buffalo-hide boats below the gate of the mountains, and through the Bozeman Pass had reached and descended the Gallatin.—(See Ex. Doc. 77, Fortieth Congress, first session.)

The utter failure of a two years' search for the geyser basins by such well-equipped parties and led by the most famous guide of the mountains, proves them mountain-girt, isolated from the surrounding regions, with few and difficult known routes of access.

Thus baffled, the government made no further effort to explore the park until long after gold-seeking pilgrims had visited various portions of it. Prominent among these prospectors were Bart Henderson, Adam Miller, George Houstin, and C. J. Barronette around the Forks of the Yellowstone, and Frederick Bottler and H. Sprague from Henry's Lake to the forks of the Firehole River. All these were prior to 1869, when two hunters, named Cook and Folsom, visited portions of the park, but their verbal report, made to General Washburn and others who sent them from Helena, has never been published.

Having myself, long before the Reynolds expedition, failed, as he did, to reach the park from the east, I, after many years' absence from those regions, sought, in June, 1870, to reach it by ascending the Yellowstone above the gate of the mountains, accompanied by Frederick Bottler. Deep snows baffled our resolute efforts to cross the Madison Range to the geysers, and, when seeking to descend to the Yellowstone Valley below the Mammoth Hot Springs, Bottler was swept away in attempting to cross a mountain torrent above Cinnabar Mountain, losing his rifle, ammunition, most of his clothing, and nearly his life. This mishap compelled our most reluctant return from within the park through the then nearly unknown and impassable second cañon of the Yellowstone to Bottlers', then the only white ranchmen upon any portion of the mighty Yellowstone River. Thence I retraced my route to Fort Ellis, published a brief account of my trip (see No. 3 of my Journal of Ranch-

bles in the Far West, and, under previous engagements, descended the Columbia to the ocean, purposing to return with a party to explore the park the next year.

During the following autumn the Washburn expedition was suddenly organized for exploration of the park. It was composed of H. D. Washburn, N. P. Langford, T. C. Everts, S. T. Houser, C. Hodges, W. Trumbull, B. Stickney, W. C. Gillett, and J. Smith.

General Washburn, in command, was then surveyor-general, at least T. C. Everts and N. P. Langford ex officers, and all prominent and esteemed citizens of Montana Territory, well equipped; and, at Fort Ellis, joined by Lieut. G. C. Doane and seven men, they followed my return route to and up the Yellowstone through its second cañon. They missed the Mammoth Hot Springs, but visited Mount Washburn, the Great Falls and Lake, returning by the Firehole River and Madison route to Virginia City. When among the fingers of the Yellowstone Lake, Everts lost his way, horse, arms, and provisions, and after thirty-seven days of exposure, starvation, and suffering, doubtless unequaled by any other man now living, was found by Barronette and Prichette, barely alive, upon the Black Tail near the Mammoth Hot Springs. This is the first party of really successful explorers of any considerable portion of the park of which we have any public record. (See General Washburn's surveyor-general's report; also that of N. P. Langford, in the May and June, and T. C. Everts's Thirty seven Days of Peril in the November number of the second volume of Scribner's Monthly Magazine, and Lieutenant Doane's report, Senate Ex. Doc. 51, Forty-first Congress, third session.)

The interesting letters, reports, and personal influence of the various members of this party led to Professor Hayden's interesting and valuable explorations in the wonderland in 1871. (See Professor Hayden's geological Surveys of 1871.) Capt. J. W. Barlow and D. P. Heap also made valuable explorations, maps, and report of portions of the park in 1871. (See Senate Ex. Doc. 66, Forty second Congress, second session.)

During the succeeding winter Professor Hayden was with his associates very active in publishing and distributing photograph views, sketches, and other valuable information in reference to the matchless wonderland, and in preparing, and, aided by many leading members of Congress, advocating to its passage a bill dedicating it as a health and pleasure resort for the American people under the name of the Yellowstone National Park. For its boundaries and control by the Secretary of the Interior, see hereinafter copy of the act of dedication.

For report of Professor Hayden's extensive explorations in the park, also including N. P. Langford's report as superintendent, see his report of Geological Surveys for 1872.

Capt. W. A. Jones and Prof. Theodore B. Comstock explored mountain passes to, and a portion of, the park, making valuable reports and maps. (See House Ex. Doc. 285, Forty-third Congress, first session.)

In 1874, the well known Scottish Earl Dunraven made a tour of the park, and published an interesting narrative. (See his Great Divide.)

For Secretary of War Belknap's narrative of a tour of the park, see his report of 1875.

Capt. W. Ludlow made a reconnaissance of the park in 1875. (See Engineer's Report published by War Department.)

For record of P. W. Norris's explorations in the park in 1875, see No. 24 and 25 of his Journal of Rambles in the Far West. Besides Moran, Jackson, Elliott, Gannett, Holmes, and other justly famous artists who have at various times accompanied Professor Hayden's and other expeditions.

J. Crissman, Calfer & Colter, Marshall, Fouche, and other photographers, have at various times visited the park, taking and widely disseminating interesting views of the great falls, geysers, hot spring terraces, and other wonders of the park.

During all these years of exploration and research, so far as I am aware, the wisdom of Congress in promptly dedicating the National Park has never been seriously questioned; nor has its size, or its appropriate control by the Secretary of the Interior, or his rules and regulations for its protection and management, been deemed objectionable. Hence it is not what Congress has done, but what it so long neglected to do; not the dedication of a lofty mountain girt lava region destitute of valuable minerals, isolated and worthless for all else, but matchless and invaluable as a field for scientists and a national health and pleasure resort for our people, but rather the failure to make moderate appropriations for its protection and improvement until leases could be made to assist in rendering it self-sustaining, which compelled its first superintendent, N. P. Langford, to abandon all efforts for its protection, and so long allowed destructive forest fires, the wanton slaughter of its interesting and valuable animals, and constant and nearly irreparable vandalism of many of its prominent wonders. So uniform was the testimony of the civil and military officers of the government, as well as the American and European scientists and tourists who visited the park, and so strong their appeals to the nation for its protection, or at least the sending a commissioner or an agent specially empowered to investigate and report the facts, that among the early acts of the present honorable Secretary of the Interior was my appointment as superintendent of the park and special agent to again visit it and report the facts as I should then find them for the information of himself and Congress. But for want of funds available for my salary or expenses none were furnished or even promised, other than a reliance upon Congress to make provision to properly pay for performance of duties pointed out and positively required of the Secretary of the Interior in the act dedicating the park. This will, I think, appear clearly evident by perusal of the following copy of the act of dedication, the rules and regulations of the Secretary of the Interior, and my appeals to the mountaineers as published in No. 62 of the Norris Suburban, several hundred copies of which were gratuitously distributed throughout the regions adjacent to the park during the spring of 1877.

AN ACT to set apart a certain tract of land lying near the headwaters of the Yellowstone River as a public park.

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's 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's 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. That 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 or 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 purposes of merchandise or profit. He shall also cause all persons trespassing 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.

Approved March 1, 1872.

(See Revised Statutes of the United States, page 453.)

RULES AND REGULATIONS.

1st. All hunting, fishing, or trapping within the limits of the Park, except for purposes of recreation, or to supply food for visitors or actual residents, is strictly prohibited; and no sales of fish or game taken within the park shall be made outside of its boundaries.

2d. Persons residing within the park, or visiting it for any purpose whatever, are required under severe penalties to extinguish all fires which it may be necessary to make, before leaving them. No fires must be made within the park except for necessary purposes.

3d. No timber must be cut in the park without a written permit from the superintendent.

4th. Breaking the siliceous or calcareous borders or deposits surrounding or in the vicinity of the springs or geysers for any purpose, and all removal, carrying away, or sale of specimens found within the park, without the consent of the superintendent, is strictly prohibited.

5th. No person will be permitted to reside permanently within the limit of the park without permission from the Department of the Interior, and any person now living within the park shall vacate the premises occupied by him within thirty days after having been served with a written notice so to do, by the superintendent or his deputy, said notice to be served upon him in person or left at his place of residence.

To whom it may concern:

Under the above laws, rules, and regulations, and my peculiar circumstances of health, long acquaintance, and business interest in those regions, I have accepted the responsible, but as yet neither lucrative nor desirable position of superintendent of the Yellowstone National Park. Have appointed J. C. McCartney, esq., proprietor of the Mammoth Hot Springs Hotel, assistant until my arrival via the Yellowstone River route, I trust in June, unless delayed by the Indians.

Meanwhile, *bona-fide* occupants of buildings, bridges, mines, &c., will, by due regard for the above rules and the future interests of the public in the park, be allowed quietly to remain. The outburst of national enthusiasm at discovery of the matchless wonders of the firehole and geyser basins, amid the Rocky Mountains, secured their prompt dedication as a national park for the weary and worn business man, the tourist, and the scientist forever; also, provision for the appointment of a superintendent under proper rules and instructions, but not the necessary appropriations to reward the one for the enforcement of the other.

My predecessor, Mr. N. P. Langford, did all and more than proper to expect under the circumstances while in Montana, but with his return East all restraint ceased, and for fully two years, careless use of fire, wanton slaughter of rare and valuable animals, and vandalism of matchless wonders have, as so truthfully published in letters of myself and others, been doing irreparable injury in all the explored portions of the park.

Under these peculiar circumstances, in the interest of science and of the tourist now and in the future, the welfare and good fame of the people of Montana, Utah, and Wyoming in general, and especially to my old mountain comrades and friends, do I most earnestly appeal, to abstain, and use all influence in urging others to desist from further vandalism of all kinds in the lofty, romantic "wonder land."

With the closing of the Sioux war, extension of the Northern Pacific Railroad, opening of the Yellowstone natural route, and the Big Horn Mountains for explorations of the vast gold and silver mines, and influx of sturdy miners and herdsmen, will soon pour wealth, build towns, and open safe and convenient routes of access to this now isolated, little known, but matchless national heritage of wonders.

That the spirit in which I write and act in this matter may extend to the press and the people of those mountain regions and the tourists who visit them is my ardent desire.

P. W. NORRIS.
Superintendent of the Yellowstone National Park.

NOTE.—The boundaries of the park have never been surveyed, but they are mainly crests of snow-capped basaltic mountains encircling the wonder-land of cataracts, cañons, firehole basins, geysers, salses, fumeroles, &c., unique and matchless, with entire area from 50 to 75 miles square. N.

These rules and regulations are those adopted by the Hon. C. Delano, Secretary of the Interior, at the dedication of the park.

Under these circumstances I ascended the Yellowstone, visited most of the park and its routes of access, including the exploring of an important cut-off route; and, too seriously injured at Tower Falls to otherwise return, descended the Yellowstone from above the gate of the mountain in a skiff, and reported facts and suggestions which were merged in the honorable Secretary's report of 1877, part first, page 837, and also deemed worth a publication in pamphlet form. (See Report of the Superintendent of the Yellowstone National Park for 1877.)

After a long and careful investigation of the whole subject, and in consideration of the written opinions of the prominent scientists and explorers of our country, this cautious and prudent Congress at its first session, with a flattering unanimity, made an appropriation of $10,000 for the protection and improvement of the park. For an acco[illegible] expenditure thereof reference is respectfully made to the ap[illegible] chapter of this report and attached map of the park.

In addition thereto I may justly add that—unlike General Sh[illegible] his tour of the park just in advance of last year's raid of the ho[illegible] Percés, and General Howard in their pursuit, without roads—[illegible] Miles and Brisbin, in their military operations of this year, a[illegible] the various parties of Professor Hayden's geological survey, [illegible] thold party of engineers in running a line for a branch of t[illegible] Northern Railroad, from Henry's Lake to the upper geysers, a[illegible] many parties of tourists, have utilized my roads and other impro[illegible] as fast as made, thus opportunely rendering them of present a[illegible] future convenience and benefit. With the expeditions of Gener[illegible] and Brisbin were Colonel Baker, Captains Baldwin and Egan, [illegible] ants Douglas, Pope, Long, and other battle-scarred veterans of th[illegible] dian wars; Mrs. General Miles, sister of the wife of Senator Cam[illegible] of Pennsylvania, and other ladies of distinction; the Rev. Dr. Hoy[illegible] Brooklyn, N. Y., and other prominent speakers and journalists.

Besides these, Lord Stanley, English; Colonels Schultz and Ko[illegible] German; and many parties of American tourists, despite the Ban[illegible] raids, safely visited the park during the past season. The unanim[illegible] testimony of this long list of civil and military officers or agents of [illegible] government, and the scientists and tourists of our own and other lan[illegible] proves the Yellowstone National Park one of surpassing interest, a co[illegible] centration of petrified forests and balmy groves, of lovely lakes, mat[illegible] less falls, and yawning cañons; of azure pools and spouting geyse[illegible] unique and unrivaled—truly the peerless cliff and snow encircled wo[illegible] der-land of earth, well worthy the fostering hand of the representative[illegible] of our people, whose priceless heritage it is.

P. W. NORRIS,
Superintendent of Yellowstone National Park.

Hon. CARL SCHURZ,
Secretary of the Interior, Washington, D. C.

APPENDIX.

Weather reports kept in the Yellowstone National Park during the season of 1878.

ration of July which was taken would average, at sunrise, 57°; at midday, at sunset, 74°.

ith of August, the morning average was 41°, and ranging from 32° to 60°; at rage 76°, ranging from 62° to 88°; at sunset, average 64°, ranging from 45°

nth of September, the average at sunrise, 39°, ranging from 24° to 60°; at average 61°, ranging from 38° to 78°; at sunset, average 51°, ranging from

fifteen days in October average, sunrise, 41°, ranging from 24° to 54°; mid- age 57°, ranging from 46° to 70°; and at sunset, average 51°, ranging from

Routes and distances to the Park.

lowing facts and suggestions will be of practical interest to our people in to the only two present or prospective routes of access to their heritage of in the Great National Park. These are the northern or Yellowstone, and ern or railroad, and as Omaha and Bismarck alike possess the advantages of River navigation and direct railroad connection with all portions of our they may be properly deemed starting points upon their respective routes.

rthern route from Bismarck is still the natural one, by steamboat up the 400 miles; the Yellowstone 360, to the mouth of the Big Horn, and prob- 60 further that of Clark's Fork; and by coach 160 miles to Bozeman, the n and outfitting point of those regions. Thence it is by coach 72 miles to moth Hot Springs, within the Park—from Bismarck, distance 1,050 miles; nding, 12 or 14 days; descending, much less; expenses, about $100.

rthern route is by the Union Pacific Railroad from Omaha to Ogden, near e, 1,033 miles; Utah Northern to Port Neuf Cañon, near Snake River, 150 ach via Pleasant Valley and Virginia City, 380 miles to Bozeman, and 72 the Park, or an aggregate of 1,635 miles; time, 10 days; expenses, $200.

g of 30 miles can be made in the Yellowstone route by following it through of the Mountains instead of via Bozeman; and considerable time, distance, ake upon the southern route by entering the Park from Virginia City, 90 n Bozeman. With little doubt both these routes will be materially shortened he coming season; the southern, by extension of the railroad 70 miles to the of Snake River at Eagle Rock, then coach some 150 miles via Henry's Fork to the Lower Geyser Basin within the Park, some 50 miles nearly south by this year constructed from the Mammoth Hot Springs. By the anticipated tion of the Northern Pacific Railroad from Bismarck to the Yellowstone, near h of Powder River, some 600 miles of river route will be exchanged for 250 of the routes then standing approximately: Northern—Bismarck to the Mam- t Springs, distance 700 miles; time, 8 days; expenses, $60. Southern—Omaha wer Geyser Basin, distance 1,100 miles; time, 6 days; expenses, $100; show- , as now, one route requires the most time, and the other the most money; but lly tourists should go one route and return the other.

Routes within the Park.

ROAD TO THE GEYSERS.	Between points.	Total.
	Miles.	*Miles.*
th Hot Springs to summit of the Terraces	3	.....
Obsidian Cañon	14	17
Norris Geyser Plateau	11	28
Falls of the Gibbon	10	38
Howard's road junction with southern route	7	45
Lower Geyser Basin	6	51
Midway Geyser Basin	4	55
end of all road at the Upper Geyser Basin	5	60

ROAD TO THE GEYSERS.

	Between points.	Total.
	Miles.	*Miles.*
MOUNT WASHBURN TRAIL VIA THE GREAT FALLS AND LAKE.		
Mammoth Hot Springs to the Forks of the Gardiner	2	[illegible]
Cañon and Falls of the East Gardiner	2	[illegible]
Black-tail Pond	6	10
Devil's Cut, or Dry Cañon	5	15
Forks of the Yellowstone	5	20
Tower Creek Falls	3	23
Old Ruin	5	28
Pass in east spur of Mount Washburn	2	30
brink of the Grand Cañon	8	38
Great Falls of the Yellowstone	3	41
Sulphur Mountain	6	47
Mud Volcano	4	51
foot of Yellowstone Lake	8	59
return to Mud Volcano	8	67
Mary's Lake	10	77
Lower Fire-Hole Basin	16	93
Upper Fire-Hole Basin	10	103

A trail is greatly needed from the Upper Fire-Hole Basin to those of Shoshone Lewis, and Heart Lakes, and those upon the fingers and eastern shore of the Yellowstone, some 100 miles in length, and the Pelican Creek route of 35 miles to the East Fork of the Yellowstone, at the mouth of the Soda Butte.

As the very limited building accommodations at the Mammoth Hot Springs are all which are likely to be found in or near the Park the coming season, tourists should outfit at Ogden, Bozeman, or Virginia City, or, if reaching the Park by coach, excellent saddle and pack animals will be abundant at $1; guide and packer, $2 each per day.

Time actually necessary for a tour of the main wonders of the Park, ten days; twi that more enjoyable; and August the best month, although July is only marred by flies, which nearly devour the animals; September good, except a severe equinoctial storm; and October, save deep snows in the passes.

The best plan is to make the Park the main object and turning-point in a season rambles, visiting both the Salt Lake and the Yellowstone Valley regions upon the outward or return routes.

There is now all promise of a summer post for protection from Indians, if necessa

ATTACHED MAP / DRAWING

SEE ORIGINAL

[redacted]

REPORT

YELLOWSTONE NATIONAL PARK,

TO THE

SECRETARY OF THE INTERIOR,

BY

P. W. NORRIS,
SUPERINTENDENT.

FOR THE YEAR 1879.

WASHINGTON:
GOVERNMENT PRINTING OFFICE.

REPORT

UPON THE

YELLOWSTONE NATIONAL PARK.

WASHINGTON, *January* 16, 1880.

SIR: I have the honor to submit for your approval, and for publication, my third annual report of operations for the protection, preservation, and improvement of the Yellowstone National Park, during the season of 1879.

Vexatious delays and loss for want of various articles not obtainable near the park prompted my purchasing a steel reversible or side-hill plow, and other tools and implements, mainly in Detroit, and forwarding them to Bismarck for shipment upon the first steamboat to ascend the Yellowstone River, myself following them from Detroit May 12.

At Bismarck, fortunately failing to connect with the steamer Yellowstone (which was lost upon that trip at Buffalo Rapids), I shipped with my outfit up the Missouri River direct to Fort Benton, and thence, after forwarding it by a freighter, pressed on via Helena to Bozeman. Thence organized my field party with C. M. Stephens as assistant, and with wagons and horsemen pressed forward 80 miles, reaching the Mammoth Hot Springs, in a terrific rain and sleet storm, June 12, being just one month in making some 3,000 miles by the various modes of travel and circuitous route necessarily taken.

The purchase of an excellent four-mule team, wagon, harness, &c., complete, some additional saddle and pack animals, and increasing my party to its maximum of thirty men, enabled me to speedily construct a rough log building upon the M'Cartney Creek, for temporary use as storage and cook-room, and provide a corral for our stock for the safety of our animals. In canvas wagon-cover wings to our house, several tents, and a lodge, we made ourselves as comfortable as possible during the remainder of the stormiest June which I ever experienced in the Rocky Mountains. This not only greatly retarded our operations in the park, but also seriously delayed and increased the expense of obtaining supplies, and rendered the roads to Fort Benton so nearly impassable that our outfit forwarded from there June 2 was only obtained by sending on other teams over 100 miles for it in the middle of July.

As shown by the sketch of the Mammoth Hot Springs and vicinity, our headquarters is upon a commanding natural mound, in a deep sheltered park of erosion, at the confluence of the three branches of the Gardiner River. Each of these descends by a succession of rapids, cascades, and cataracts, in a yawning cañon through basaltic terraces, some 2,000 feet within a distance of 4 miles, and discharging through a similar cañon, in a like distance, to the initial point of the boundaries of the park at its confluence with the Yellowstone River just below its third cañon. A portion of the cañon of the main Gardiner, and all of those of the west and middle branches, are utterly impassable for even

a bridle path. The only routes, therefore, to and from our headquarters are, first, a very rough and difficult one, over two dangerous fords—now bridged—near the forks, and past a cascade and two cataracts upon the east branch to the forks of the Yellowstone—distance, 20 miles; second, over my road of last year up the dry pass between the hot-springs terrace and Sepulchre Mountain to the geysers—distance, 60 miles; and, third, by the old road, over the mountain spurs and rugged cañons, 6 miles to the Yellowstone River, and through its second cañon and Bozeman's Pass over the Gallatin Range to Fort Ellis and Bozeman's—distance 80 miles. The summit of a natural mound some 600 feet in length, 300 feet in width, and 150 feet high, smoothly eroded for a carriage-way at each end, and a depression for a reservoir near the summit, after mature deliberation and sustained by the unanimous approval of the experienced mountaineers, I selected as the site for our block-house headquarters, where it fully commands the entire mound, valley, and terrace, within range of rifle or field artillery, and a fair view of the entire balance of the valley and all its approaches.

The water from not only all the upper hot-spring terraces, but also the McCartney, Bluff, and other cold creeks, sinks in the open cone and cavern-dotted geyserite plateau around this mound, only to burst forth a fair-sized mill stream of hissing, hot, medicinal water, just below the surrendered McGuirk block and bath houses upon the main Gardiner, some 2 miles distant, and 1,000 feet below the foot of the active terrace springs. As the rim of towering basaltic cliffs along the main Gardiner and its branches, together with the ancient and active hot-spring terraces, so nearly inclosed our building mound, the McGuirk Springs, the road between them, and 15 or 20 square miles of sheltered pasturage, that some two miles of fencing would complete the inclosure, the plan was unhesitatingly adopted. With pine, fir, and cedar material hauled from the ancient hot-springs terrace, a genuine Montana fence, *i. e.*, with posts sustained at an angle of some 60 degrees by smaller posts or legs through holes near the top, surmounted and faced by poles pinned or spiked horizontally upon them, was, through all obstacles, pressed to completion July 12, and in convenience and safety has not only already repaid cost, but is doubtless the largest and most sheltered, as well as romantic and valuable, pasturage for the cost of its inclosure now or ever owned by the nation in the mountains. Meanwhile we had planted an experimental garden of some half acre of potatoes, turnips, and other hardy vegetables, below the McGuirk Hot Springs, and by an occasional irrigation from them during the continuous dry weather after July 1, and some frosty nights after August 15, were far more successful in production than in protection from vandalism at a place so remote and hidden from our block-house, nearer which I have chosen and am fencing a site for our future hardy vegetable garden.

The old sheep and Sheep-Eater Indian trail from the mouth of the Gardiner River passed around the impassable portion of its cañon, then into and followed it to near the McGuirk Springs, and around the pine and cedar-clad border of the lower dry terrace and geyserite plateau to Liberty Cap; while the old wagon road wound around the basaltic spurs and terraces of Sepulchre Mountain, descending by a rough and dangerous way many hundreds of feet to the same point at the foot of the active hot springs. These were, as before stated, the only routes from Bozeman, and they barely passible, with immense expense unavoidable to ever render either of them passable coach-roads, never convenient or safe ones, and hence I have expended little money upon them, but have

for years been improving every opportunity in exploring, examining, and finally engineering a roadway across countless spurs and gulches along the mountain side midway between them. In this I finally succeeded, and, without sharp curvatures, carried a line of easy grades for some 3 miles, and, with only a moderate amount of bridging, constructed a road much shorter and in all respects superior to what could have ever been made upon either of the other routes at manifold its cost. This greatly facilitated the hauling of supplies and building material from Bozeman, and by hewing the timber and making the shingles upon the mountain terraces and hauling them to the site upon the mound, we had, during July, erected in first-class manner a block-house 40 by 18 feet, two tall stories high, with, for use as well as safety from mountain storms, substantial block-house leantos or wings upon three of the sides, and an 8-foot balcony to both stories of the other fronting the active hot-spring terraces. Upon the main building is an octagon turret or gun-room, 9 feet in diameter and 10 feet high, well loopholed for rifles, and all surmounted by a national flag 53 feet from the ground, upon a fine flag staff or liberty-pole passing from a solid foundation through and sustaining all the stories, turret, and roof thereof. During these operations small parties of horsemen, with pack-animals, had vainly sought for Indians or serious vandalism by tourists; but removed fallen timber and otherwise improved the road and main bridle-paths to the geysers, and in assisting tourists, some of whom had tunneled through huge snow-packs upon the spur of Mount Washburn in June, and in constructing a reservoir fronting our mound; we improved the last day of July in removal to our unfinished house upon it.

Leaving my assistant, C. M. Stephens, with a small force laboring upon our house, I, upon the 1st day of August, with our main party of laborers and animals, and three wagons loaded with tools, tents, provisions, and other outfit, ascended the terrace pass upon our last year's road to the geysers, accompanied by some horsemen and one wagon-load of Idaho tourists. Immense quantities of fallen timber were removed, culverts and bridges repaired, new ones constructed, and grades, especially at Obsidian Cliffs, Norris Plateau, and Gibbon's Cañon, greatly widened and improved to the junction with the road to Henry's Lake and Virginia City, and similar improvements across the Gibbon, and through the upper cañon of the Madison to at least the western borders of the park near Taughees Pass. Through this I alone passed to the summer military post at the head of Henry's Lake and Hickman's camp of Virginia City tourists in the Red Rock Pass. Returning to my party, we improved the roads up the Madison and the Fire Hole Rivers to Mary's Lake and the Upper Geyser Basin; meanwhile the field party of Mr. R. J. Reeves for surveying the border-line of Wyoming and Montana had, under the guidance of a military escort from Fort Washakee in the Wind River Valley, unwisely left the Big Horn and Stinkingwater route as planned, and where I had guides awaiting them, and in attempting the Two Ocean Pass without guides became lost, scattered, and seriously delayed, and, though Messrs. Reeves, Dane, and McCrary, after weeks of toil, privation, and danger, succeeded in reaching the Mammoth Hot Springs via the Yellowstone Lake and Falls, still his escort and outfit became so bewildered and delayed in the swamps and tangled timber gulches near Bridger's Lake, that only the timely assistance of myself and scouts—Yellowstone Kelley, Johnson, and Manning—found and led them via Shoshone Lake to our camp at the Upper Geyser Basin. In this and other scouting expeditions much valuable knowledge was obtained of the precipitous densely timbered regions bordering the Yel-

lowstone, Hart, Lewis, and Shoshone Lakes upon both the Atlantic and Pacific slopes of the main divide, which at this point is peculiarly tortuous, but no direct route across it from the Upper Fire Hole Basin to the Yellowstone Lake. The evident necessity of such a route has, from the commencement of explorations within the park, led to greater efforts and more failures than any other trail seeking within it, and the discovery of such a route was one of the main features of my season's plan. Hence, leaving my party engaged in constructing a loopholed, earth-roofed log-house and other improvements in the Upper Geyser Basin, I, alone, or with only one scout, commenced searching for a route, during which I found the odometer left in 1873 by Captain Jones and Professor Comstock, upon the nearly vertical face of the main divide overlooking Shoshone Lake, where seemingly only Noah's Ark or Bridger's famous foraging crow would have ever left or be likely to remove it, and amid the dense snow-crushed, storm-twisted, knotted and gnarled thickets of the continental divide, traces of Everts, Hayden, and other explorers, but no practicable route across it, and returned to the Fire Holes.

Thus baffled as had been all previous explorers, I, as a last effort, ascended the north bank of the Fire Hole River, past a succession of enchanting rapids, cascades, and cataracts, and after some days of excessive exposure and hardship, and nights of sleepless cold and anxiety, was rewarded by more than hoped-for good fortune in tracing a chain of small mountain and timber-hidden parks, and lovely lakelets, to a narrow timber-hidden, but deep, direct, and excellent pass, which within less than 2 miles crosses, or rather cuts, the main divide from the Fire Hole waters of the Atlantic to a sheltered grassy park near Shoshone Lake, and the spring and rivulet fountain-heads of the Columbia of the Pacific. With buoyant hopes I sought a similar pass in the opposite bend of the divide, but finding none nearer than Lewis Lake, I ascended it by a somewhat zigzag but not difficult route, and within 5 miles reached the summit near one of those crater-like ponds or noted Two Ocean Lakes, without outlet, and by similar grades descended the eastern slope. Reached the Yellowstone Lake at the western end of its great thumb, near the hot spring terraced beach, famous as convenient for catching the large lake trout, and without changing one's position or removal from the hook, thoroughly cooking them in nature's boiling pots within one and a half minutes from the time they were sporting in the crystal waters of the lake, as I have for years by actual experiment demonstrated to the incredulous. Returning, I opened a trail from the cascades to Old Faithful, at the head of the upper Fire Hole Basin, there finding several parties of tourists. One of these, including the wife of Postmaster Taylor, Mr. McAdow, a prominent miller, and several youthful members of the families of General Willson and other leading citizens of Bozeman and the Gallatin Valley, is deemed worthy of special record; as, though many ladies had for years visited the geysers upon horseback, and the Smith and Woodworth party, with ladies, had recently visited them in wagons from Virginia City, these were the first ladies to reach Old Faithful by wagon upon our road from Bozeman, and who upon horseback—August 27—were positively the first ladies who, by any mode or route, ever visited the cascades of the upper Fire Hole River, 3 miles above Old Faithful. Leaving my excellent trainmaster, J. E. Ingersoll, in charge of the main party, with instructions to complete our building and then improve the roads in returning with the wagons to the Mammoth Hot Springs, I, with six picked mountaineers and a small pack-train, opened the recently explored route an estimated distance of 10 miles to Shoshone Lake, and 12 additional, or in the aggregate 22 miles

from the Upper Fire Hole, twice across the continental watershed, to Yellowstone Lake. Thence I opened a trail, much of the way through fallen timber, along or near the western shore of Yellowstone Lake some 26 miles to its outlet, and improved the old one some 60 miles via the Mud Volcano, Sulphur Mountain, Great Falls, Cañon, and Forks of the Yellowstone, Mount Washburn, Tower Falls, and cañon of the East Gardiner, to our headquarters upon the mound September 7, finding our wagon train safely returned. Thus, after an absence for most of the party of 38 days of nearly continuous good weather and active and successful operations, without seeing an Indian or losing a man, and, from experience, using camp and pocket filters for bad or unknown water, but no alcoholic stimulants, all returned in excellent health, with no mishap greater than having some of our men and horses for a time lamed by scalding in the fire-holes, and having one of the latter, when thus crippled, devoured by grizzlies. Aside from a fair supply of bacon, trout from the cold springs, not mineral, the flesh of deer, elk, antelope, bear and other animals, and birds killed with the rifles, were our only, but excellent and ample, supply of animal food.

The limited appropriation under my control not justifying continued employment of so large a party, I regretfully discharged many excellent men to whom, from jointly sharing toil and camp-fire, I had become greatly attached and whom I would gladly and profitably have retained.

SCIENTIFIC SPECIMENS.

During the entire season's operations I had carefully—often with great effort and hazard in cliff and cañon climbing—secured rare and interesting specimens from the various geysers and other hot spring formations, obsidian cliffs, fossil forests, and Sheep-Eater haunts, intended for the Smithsonian Institution and the Anthropological Society of Washington, and other scientific associations. These, after carefully packing in five boxes, were securely bound with rawhide thongs, and in September, sent from the Gate of the Mountains upon the Yellowstone by some men who were returning from my employ to the States in a small Mackinaw boat. But, unfortunately, they were, in the unusual low stage of water, wrecked at the Buffalo Rapids; and, though it was reported that these specimens were landed, I have failed to obtain reliable information regarding them, and greatly fear their total loss to science and the world.

GUIDE-BOARDS.

The original cost of lumber and added heavy freightage, nearly 80 miles from Bozeman, precluded the use of more than was absolutely necessary. But all fragments were carefully preserved, well dressed, painted white, and then black-lettered with the names of the most important streams, passes, geysers, &c., and tables of distances between them. These were carried by wagon, pack-train, or on horseback, and firmly affixed to rocks, trees, or durable posts, proving of great value to tourists throughout the park; but many more are needed.

Leaving a small force building a corral and bridging the Gardiners near their forks, I, with the rest of the party, spent the remainder of September in improving the trail past the forks of the Yellowstone, 35 miles to the Soda Butte, and making a new one across Amethyst Mountain and the Fossil Forest, some 30 miles to Pelican Creek and the foot of Yellowstone Lake. Returned, outfitted, and having completed a very necessary bridge over Tower Creek above the falls, was actively open-

ing a trail between the Grand Cañon and Mount Washburn when the unseasonably severe snow-storm of October 9 compelled suspension of important field operation for the season, and, leaving some of our tools, we gladly pushed, in a terrific storm and through dangerous snow-drifts, to our excellent headquarters at the Mammoth Hot Springs. Although the snow soon melted in the lower valleys, and mainly so around our Hot Springs, still it continued too deep and the weather too stormy in all the mountain passes for profitable or even safe employment of laborers, and few were retained, the remainder of the autumn being spent in exploration of the park, including a thorough reconnoissance of the gold, silver, lead, and copper mines in the Montana portion of the park, in hauling our winter supply of provisions, forage, and fuel, and sketching and mapping our building site—the hot-spring terrace and surroundings.

In exploring routes, and hunting, killing, and packing game into camp, often through dense thickets of fallen timber, fire-hole basins, or yawning cañons, the hardships, dangers, and exposure to broiling sun and biting frost, or lonely camp-fire in unknown snowy regions, were ever chosen as pastime by our mountaineers, and the attendant incidents of such trips, including the nimble dodge from a wounded buck, or hasty tree-climbing from a ferocious grizzly, forms the standing basis for camp-fire stories or legends of the days agone. Such romance and enjoyment this season was, for the first time in the park, unalloyed by Indian raids or serious accidents or mishaps; but, as of little general interest, seldom mentioned in my reports or letters. But, of the animals killed during the past season, were some very large and fine elk, deer, sheep, and antelope, and a mountain lion, shot in the night to prevent his molesting our animals, which measured nearly 9 feet in length from lip whiskers to tip of tail, and the last of the six grizzlies killed by myself during the past season, was a remarkably large and fine one. A fine young horse, somewhat lamed by scalding in the fire holes, having been left near Obsidian Cañon, was killed by a grizzly, that, in devouring the carcass and fragments of game killed in the vicinity, continued to haunt the place. In trailing him in snow nearly knee deep some weeks afterwards, I killed two large antlered elks, but a few yards apart, and, it being nearly night, I only removed their entrails and camped alone near them, confident that bruin would visit them before morning. I then found that he had dragged the elk so near together as to leave only a space for a lair of boughs and grass between them, which he was intently finishing, when I, at a distance of 100 yards, opened fire with a Winchester rifle with fourteen ordinary bullets in the chamber and a dynamite shell—being all which I dared to use at once in the barrel. This I first gave him high in the shoulder, the shell there exploding and severing the main artery beneath the backbone. He fell, but instantly arose with a fearful snort or howl of pain and rage, but got four additional ordinary .44 caliber bullets in the shoulder, and nearly as many falls before discovering me, and then charged. Hastily inserting another dynamite shell, I, at a distance of about 50 yards, as he came in, sent it through his throat into his chest, where it exploded and nearly obliterated his lungs, again felling him; and as he arose, broke his neck with the seventh shot. Either one of these would have stiffened any other animal, and surely have soon proved fatal to him; but deeming delays just then dangerous, I peppered him lively. Finding Stephens across Beaver Lake, we returned with our saddle and pack animals, and after killing a pair of wood martens that were preying upon the carcasses, we dressed the animals, packing all possible of them 20 miles to our block-house at the Mammoth Hot Springs. We there found

the hide of the bear just as spread out, without stretching, to be 8¾ feet long from tip of snout to roots of tail, and 6 feet 7 inches at its widest place; and from his blubber brought in, Stephens tried out 35 gallons of grease or oil. Its extraordinary size is the only reason for at all mentioning the animal in this report.

As the geyser regions are nearly unknown in winter, I had constructed our comfortable log-house in the little grove between the castle and the Beehive Geysers in the Upper Fire-Hole Basin, with a good stone chimney and provided abundance of fuel, proposing to remain there, obtaining much valuable information and sketching them and the lake regions in winter, and during it returning via Henry's Lake to Camas Station upon the Utah Northern Railroad. But finding the sulphur charged condensed steam and fogs of the Geyser Basin were too suffocating to long endure, and that the unusual deep snows had seriously blocked the passes and gorged the Madison and other streams in their cañons, the project was reluctantly abandoned: and, returning to the springs, final arrangements for winter were made. I then left my ever-faithful and efficient assistant, C. M. Stephens; my son, A. F. Norris; and J. Davis to occupy the house upon the mound, finish the upper floors and partitions during bad weather, and, when favorable, prepare for division-fences and bridges for next season, make a snow-shoe trip to the geysers during the winter and carefully protect the game from wanton slaughter.

As no white men have ever spent the entire winter at the Mammoth Hot Springs, it is not certain that more than the saddle animals, for which we have a corral and forage, could safely remain there, and hence the mule team will be partially wintered at Cedar Creek in the second cañon of the Yellowstone, in charge of some reliable men who will, as usual, there winter their own. I then proceeded to Bozeman, closed the season's outfitting business, provided for occasional mails to the men in the park, and thence to Beaver Cañon at the terminus of the Utah Northern Railroad, and via Ogden to Cheyenne. Thence, after pleasant interviews with Governor Hoyt, the present and the ex-Delegate, and other officers of Wyoming Territory, and also prominent railroad officials in Cheyenne and Omaha, in reference to railroad, post, and coach routes and other matters of interest to the park, took the usual railroad route of return.

EXPLORATIONS.

While, by the language of the act appropriating funds, as well as my instructions for its expenditure, protection and improvement of the Yellowstone National Park appear more prominent than its explorations, still, practically, considerable of the latter is indispensable for an intelligent and judicious performance of the former; the real danger, indeed, being a deficiency rather than an excess of knowledge of the local peculiarities of that wonderful region prior to expenditure upons buildings, roads, bridle-paths, and other permanent improvements. Yet with the small amount of funds under my control for the vast improvements necessary to enable the prominent men of our nation to conveniently visit and personally judge of its wonders, its necessities, and its management, I have pushed improvements, devoting less time and funds to exploration than desirable to myself, or, I fear, ultimately the most beneficial to the park. Still, our carefully kept records of weather, long observance of storms, earthquake shocks (of which there was only a slight one, during August of the past season), formations, eruptions, and decadence of geysers and other hot springs, changing terraces and other phenomena, rapidly accumulates valuable information of the local climate and pecu-

liarities, which, with constant vigilance in the management of foraging and other expeditions, steadily adds to our knowledge of the approaches to, and routes of travel throughout, the park. In addition to the exploration of the new route down the Gardiner River, and the Shoshone route to the Yellowstone Lake, heretofore necessarily mentioned, others of interest and value have been made during the past season. As not before suspected, although within 3 miles of our block-house, the lower of the three falls of the East Gardiner has, like the famous Minnehaha, a clear safe passage between the sheet of descending water and the wall rock. In excavating for our cellar, on the mound near the Mammoth Hot Springs, we unearthed a circular deposit of several bushels of beautiful white bead-like shot or pebble specimens, some of which I have brought away to learn if they are the petrified eggs of some ancient reptile, or, as I am inclined to believe, the berries of juniper or cedar, doubtless long antedating those of Solomon, from Lebanon.

RUSTIC FALLS.

Another of the season's discoveries is a rustic fall upon the West Gardiner, near the summit of nature's rocky fence to our pasturage. This small snow-fed stream, from its bridge on our road to the geysers, flows quietly through a grassy margin in an open sage plain nearly a mile to its border, and then glides some 40 or 50 feet down a mossy rock, so smooth, so placid, and so noiselessly as to present to one standing afoot or astride, as can easily and safely be done upon its very margin of mist-nourished ferns and flowers, a contrast unique and matchless, to the succeeding 1,500 feet of its dashing, foaming descent adown a yawning cañon waterway, in magnitude out of all comparison to that now flowing there. In the open valley above are the decaying lodge-poles of an old Sheepeater camp, and upon a timbered ledge overhanging these falls, are decaying poles, driveways for game, and coverts for concealment in using arrows.

CAÑON AND FALLS OF THE MIDDLE GARDINER.

The main falls upon the middle, and far the largest fork of the Gardiner, has a clean vertical descent of near 200 feet, and the basaltic cliffs for miles tower nearly or quite vertically, often in church-like battlements and spires, from 1,000 to 1,500 feet above the foaming white torrent at the cañon's base, scenery second only to that of the Grand Cañon of the Yellowstone within the park, and seldom rivaled elsewhere.

After several failures, I this season succeeded in finding a route along the terraced base of Bunson's Peak, overlooking this cañon. This, with little increase of distance, strikes our road to the geysers, some 7 miles from our block-house, a route well worthy of and, I cannot doubt, destined to soon be occupied by a tourist's carriage-way.

SHEEPEATER HAUNTS.

This cañon, above as well as below the main falls, had been, by us, deemed inaccessible until during the early snows of last autumn, when I, alone, in trailing a wounded bighorn, descended a rocky, dangerous pathway only, in rapt astonishment, to find, by the scattered fire-brands and decaying lodge-poles, that I had thus, unbidden, entered an ancient and but recently deserted, secluded, unknown haunt of the Sheepeater aborigines of the park. It was fully a half mile in length, some 400 feet at

its greatest width, and very much deeper, and so hemmed in and hidden by the rugged timber-fringed basaltic cliffs of a spur of Bunson's Peak, that accident, or the trailing of men, or, as I did, of animals, would have ever led to its discovery. Within it are terraces of ancient hot springs and crumbling cones of extinct pulsating geysers, similar to, only much smaller than, those of the Mammoth Hot Springs and Liberty Cap below; also some active hot springs. But it is mainly carpeted with short grass, dotted, fringed, and overhung by small pines, firs, and cedars, and with the subdued and mingled murmur of the rapids and cataracts above and below it and laughing ripple of the gliding stream is truly an enchanting dell; a wind and storm sheltered refuge for the feeble remnant of a failing race, who, from evident traces, have certainly hidden here since we have occupied the Mammoth Hot Springs in utter ignorance of their proximity, although less than 6 miles distant. As only with difficulty and danger horses can descend into this and similar dells, or, for want of pasturage, long remain in them, as well as from the numerous pole drives for animals and bush screens for silent arrow shooting, often found in the park, it is evident that these harmless hermits, these "wild men of the mountains," were, until very recently, destitute alike of horses and of fire-arms. The nearly as ragged as beaver-gnawing stone or obsidian knife and hatchet marks upon decaying lodge and wickeup poles, as well as upon ancient charred semi-petrified timber, prove they were also destitute of steel or iron tools and implements, and that, as we still do, they often used charcoal for fuel to avoid betrayal of their hidden camps by smoke; and the constantly discovered decaying evidences of lodge and wickeup or cliff-sheltered bush-houses, in the hidden glens and recesses of the mountains, indicate that, even recently, their numbers greatly exceeded the usual estimate of 100 of these peculiar people. Although so timid and harmless, when destitute of horses, fire, and other arms, and vices of white men, they have, with them, developed into as dexterous horse-thieves and dangerous cliff-fighters as any other clan of the Bannocks or Shoshones, from whom they seem to have been ancient offshoots, or occasional refugees. Indeed, it seems probable that some of the guides in Joseph's Nez Perces' raid, and certain that many of the Bannocks of last year, were native hermits of the park, far less anxious for hair than horses, and their tell-tale guns, though more efficient, less safe than their obsidian-headed spears and arrows, not allowing them to remain there in concealment from our frequent and usually fruitless pursuits of them. But they have desperately fought the miners in the Salmon River Mountains during the past season, and only our well-known preparation for their obtaining more lead than horses, and the summer military camp at Henry's Lake, prevented their seriously annoying tourists within the park.

CROW INDIAN RESERVATION OR CONFLICTING BORDERS.

From the foregoing sketch of the Sheepeater Indians, it is evident that they who so silently vanished without a contest for possession or a treaty for the cession of their ancient haunts were ever a harmless race of cliff-climbers, dwellers in caves, in lodges, or in bush-wickeups, in secluded parks and glens of the mountains, and nearly destitute of horses and fire-arms, while even those called Mountain Crows—as distinct from those upon the Missouri—have long been well supplied with both horses and fire-arms; are splendid horsemen, crafty horse-thieves, and able, determined warriors, in defense of their hereditary buffalo

range upon the plains and valleys of the Bighorn and the Yellowstone below the mountains. Hence, the natural and ever-recognized border of these clans was the elevated, remarkably rugged, unbroken snowy range from near Pilot Knob through the great bend of the Yellowstone to its first cañon, or gate of the mountains. This range the Crows seldom crossed, never occupying the slope toward the park or claiming ownership, save as under the conditions of a treaty with them made at Fort Laramie, May 7, 1868, when, doubtless for convenience in an unknown region, the Yellowstone River was followed up to its crossing of the 45th parallel of latitude, and thence eastward along it, between the Territories of Montana and Wyoming as its southern border, and including some of these Sheepeater lands.

Upon this portion of the Crow Reservation were the well-known Emigrant Mines, the owners of which continued to be viewed and treated by the Crows as they were received in 1864, not as intruders, but as welcome friends and allies against their common foes, the Blackfeet, Sioux, and other hostile Indians, and have never been molested.

The miners upon the Bear and Crevice gulches, and subsequently those of Soda Butte and Clark's Fork, also upon the Sheepeater lands, like those of Emigrant, have never been molested by the Crows, and like them, with seeming reason, claim the want of original ownership and continued immunity from molestation by the Crows as acquiescence by them in the miners' rights or claims.

March 1, 1872, or nearly four years after this Crow treaty had been confirmed, the Yellowstone National Park was dedicated, fixing its northern border, not on the 45th parallel or upon the southern line of the Crow Reservation, but, in ignorance of where that line would really prove to be, fixing the confluence of the Yellowstone and the Gardiner Rivers as the initial point. This complication of rights, boundaries, and jurisdiction becoming more evident with occupancy and management of the park, I, after two ineffectual efforts in my annual reports for a remedy (see pages 9 and 10 of my report of 1877, and page 9 of that of 1878), addressed a letter as follows:

WASHINGTON, D. C., *February* 18, 1879.

SIR: I have the honor to respectfully present the following reasons for the speedy survey of the boundary line between the Territories of Wyoming and Montana.

First. Those usual for judicial and other purposes for contiguous regions.

Second. For the protection and management of the Yellowstone National Park, especially at its headquarters and main route of access to adjacent settlements, mining camps, tourists, and trappers, evidently difficult, if not impossible, without its boundaries at that point, and the operations of its necessarily anomalous rules and regulations being known by all parties. Should this Territorial line be found not identical with that of the park as now dedicated, it will be near enough for all practical purposes until further legislation can make it so, thus obviating much present and future complication and expense.

Third, and perhaps most pressingly important, fixing the southern border of the Crow Indian Reservation. As the Crows are, and over have been, our firm friends, as well as valuable allies upon several recent critical military occasions, the necessity is evident and urgent that the proposed border line be soon run, to prevent the threatened incursion of white ranchmen upon the Big Horn and Little Horn Rivers, the finest game, grazing, and agricultural portion of their reservation (where alone they can ever be concentrated and civilized), and for want of which proposed line there is *certainly* of grave and costly complications and *danger* of a future Indian war.

Most respectfully, yours,

P. W. NORRIS,
Superintendent of the Yellowstone National Park.

Hon. J. A. WILLIAMSON,
Commissioner of the General Land Office.

This letter was promptly indorsed by the honorable Commissioner of the General Land Office, of Indian Affairs, and Secretary of the Inte-

rior, submitted by the Speaker of the House of Representatives, an appropriation made for its survey, and the western and most important portion completed by Mr. R. J. Reeves before winter. This survey clearly shows that the park, as dedicated, embraces a 2½-mile strip of Montana, which, from the crossing of the Yellowstone River easterly, had been for nearly four years embraced by the Crow Indian Reservation, and also, as just shown, mainly occupied by miners, who had quietly dispossessed the original Sheepeater owners, and under their claims of possession are steadily proceeding in development of the mines by prospecting, organizing mining districts and companies, sinking shafts, constructing arastras and smelting-works, and purchase and sale of property as openly as in any other mining region of our country, and doubtless interesting distant capitalists who are mainly ignorant of these complications of jurisdiction and ownership.

Unquestionably treaties should be solemnly observed, or by mutual agreement promptly modified, and laws strictly enforced until properly repealed; and in this case, where the real priority of rights and jurisdiction is so evident and rival interests so diverse in character and purposes, it is hoped that an amicable adjustment of them all can in due time be effected upon the following basis:

First. By changing the northern and western boundaries of the park, as recommended in the boundary section, so as to conform to those of Wyoming Territory, thus at once severing an unnecessary 3-mile strip upon the west, and also the 2½-mile strip of mining region upon the north, and leaving the park clear of an antagonistic mining population, questions of jurisdiction, and its two most important boundaries run, well marked, known, and recognized by all parties, without cost to the park.

Second. By honorable treaty with the Crows, obtain a recession of the old Sheepeater mining portion of the Great Bend of the Yellowstone above the Gate of the Mountains, by satisfactory remuneration if necessary; for though, as above shown, not theirs originally, or ever by possession, yet it surely is by honorable treaty, and although less liable to lead to hostilities than where the parties oftener meet along the river, still unrestrained license, even under seeming palliating circumstances, upon one portion of the reservation invites trespass elsewhere, and with the sensitiveness of the Crows from wanton encroachments along the river below, may, from a spark in the mines, kindle a flame only quenched in innocent blood. Hence, for an honorable adjustment of these various conflicting claims of priority of title and of jurisdiction in behalf of private rights and national development, and in the interest of humanity towards the Crows, who, despite isolated individual acts of violence for plunder or revenge, have as a tribe ever been our true friends; for the safety of the industrious pioneers upon the border and their innocent families, who are usually the victims in Indian wars; for the security of government agents and property, as well as of tourists within the park, I feel the necessity of urging the above or other mode of adjustment, and also prudence, forbearance, and conciliation by all parties interested, pending negotiations for its consummation.

ANCIENT AND RECENT MAMMOTH SPRING TERRACES.

Some early scientific visitors of these regions believed that the matchless terraces at the Mammoth Hot Springs were formed by limestone precipitated in the still waters of an ancient lake, and there horizontally stratified. But this theory was soon supplanted by the evidently correct

one, that they are wholly formed by deposits from hot-spring waters issuing from the funnels of long, tortuous escape-vents of a huge, deep-seated fissure in the carboniferous limestone, and thence along its line of contact with the more recent cretaceous, tertiary, and lava deposits, to where their elevated edges are eroded by the forces which carved the yawning cañon of the Gardiner River, as well as those of its three branches, and the eroded park-like valley at their confluence. As this newly-centered and all-powerful internal pressure was mainly through carboniferous limestone, the dissolving of the walls and enlargement of water-clogged vents or orifices, and consequent building up of cavernous terraces, resulted in not only filling up the cañon gorge of the West Gardiner, but actually building a mountain barrier two miles broad, connecting Sepulchre Mountain with Bunsen's Peak, forming an elevated lake, the main outlet of which was for a time around the latter into the Middle Gardiner at the Sheepeater Cliffs. From the plateau summit of this Terrace Mountain the lime-charged hot waters, at the period of their greatest power, descended in pulsating throbs over its rapidly-forming, beautifully-white, calcareous, scollop-bordered bathing-pools, with terraced slopes nearly 1,000 feet to the mountain lake above, and fully 3,000 feet to the cañon of the main Gardiner River below. Along or near the latter are the various McGuirk Springs, certainly the largest in that vicinity, but their waters are not lime-charged and terrace-building, but medicinal—deemed valuable for rheumatism and similar diseases—although a portion of them are perhaps somewhat connected with the sinks of the terrace springs above. But to this accepted, and doubtless mainly correct, theory of the waning power and continuous downward march of the focus of the modern terrace-building springs, there is abundant evidence of secondary or independent agencies at some remote period, heretofore unrecorded, if indeed thoughtfully observed by scientists, to which I invite their candid investigation. For fully one mile along the main Gardiner River, near the McGuirk Springs, always one and often both of its banks are bold terraces or eroded cavernous cliffs of ancient hot-spring deposits, clearly revealing their laminated structure and central orifices or cones, and overlooked by the now pine and cedar fringed lower terraces, aggregating nearly one thousand feet in elevation. The southern portion of these are now shattered or eroded into galleried halls, hidden grottoes, or tottering columns, and balustrades, unique, unrivalled, and incomparable save to the crumbling ruins of an ancient temple.

At a more recent period the geyserite plateau from the head of these lower terraces was a huge pool or shallow lake of foaming hot water, dotted with fumaroles, salses, and pulsating geyser cones like the Devil's Thumb or Liberty Cap. The base of the latter and nearly all of the former, and an unknown portion of the upper end of this plateau, are now covered by the descending upper terraces, through many portions of which the not decaying but semi-petrified steam and storm abraided tops and trunks of pine or cedar forests still protrude. The still visible portion of the geyserite plateau, for fully a mile in length and one-fourth of a mile wide, sounds hollow and cavernous to the tread of men or animals, and is dotted with yawning, often dwarf-timber fringed sink-holes, or crumbling basins of extinct geysers and other hot springs, of all dimensions to one hundred or more feet in diameter and fully half as deep, after exhibiting beautiful stalactite formations. In one of these conical sinks a huge antlered elk sought a covert, probably during a drifting snow-storm during the past winter, and by the sudden settling of the snow-pack became entrapped by its overhanging walls and

perished from the effects of poisonous gases or starvation, and only by the use of ropes were the finest pair of horns which I ever saw obtained. But, unlike all other known extinct geyser or other hot-spring formations, this plateau and the upper portion of its lower terrace borders bear no evidence of waning power or dwindling supply of water or of deposits, and comparatively little of age, crumbling, or erosion, all seeming as though the powerful operating forces or agencies had been brought to a sudden and permanent suspension.

Believing that for effects so evident, so anomalous, and geologically recent, the cause was neither remote or unfathomable, I have for years been upon the alert for a clue, and perhaps obtained it. The once seething, now pine, fir, and cedar fringed platform summit of the Terrace Mountain affords from its near 9,000 feet of elevation a view of not only one of the most beautiful and romantic of earthly landscapes, but also matchless opportunity for tracing the evidences of the successive operations of molten lava, seething, calcareous, hot, and escaping torrents of cold water and the eroding outline-rounding effects of the frosts and storms of a sub-alpine climate. The terraced slope of at least the upper half of the lower or northern and eastern sides of this mountain are now covered with a dense growth of small but beautiful cedar, pine, balsam, and red fir timber, the upturning of which uniformly reveals ancient terraces and bathing pools with scallop borders, in form and coloring as beautiful, and from being purer limestone harder, and often sharper cut outlines than those now forming thousands of feet below them, and thousands of years more recent. The western and equally steep slope shows upon its grassy surface not only the abrading effects of the prevailing storms, but also, upon at least its lower portion as well as upon that of Bunsen's Peak, unmistakable traces of ancient shore lines of the mountain lake. To the south is the yawning cañon of the West Gardiner, torn along the line of contact of Bunsen's Peak and Terrace Mountain by the escaping waters of this mountain lake, which by undermining precipitated enormous land-slides from each. A search for animals upon hundreds of acres of our eroded valley pasturage below this cañon gorge will require sufficient climbing over and among the rocky debris of these enormous mountain slides to convince the most superficial observer of their reality and the clear cut sky-line of the white cliffs, so noted a landmark for many miles, even from the mountains beyond the Yellowstone, are only the nearly 1,000 feet vertical face of the marbleized calcareous hot-spring formations of the Terrace Mountain still remaining. That while this Terrace Mountain was the only barrier between the mighty pressure and lashing waves of the mountain lake, a portion of its waters at an elevation of some 3,000 feet above McGuirk's Springs, less than four miles distant, should, after the focus of internal pressure had in its waning power descended below that of the lake, percolate either through its calcareous formations or along the unconformable line of contact of this Terrace Mountain, with one or both of those abutting it, seems very probable. If this be true we have a ready solution of the question as to the cause of the enormous deposits along Gardiner River, the Geyserite Plateau, Liberty Cap, and other geyser-cones, fumaroles and salses, and in cutting off the supply of water by drainage of the mountain lake, the evident cause of the sudden and final suspension of activity in all of the springs thus supplied. Additional support of this theory is found in the boggy lakelets of the West Gardiner Valley, above this cañon, and notably along our road near the Terrace Pass. This portion of it discharges, not to the West Gardiner, but from very near it in the open val-

stretches of long flowing grass and occasional hot-spring pools in the channels and the actually overhanging turfy banks are usually the main obstacles in crossing these streams; and hence the cutting of a sloping way through the turf usually forms an excellent and permanent ford, thus greatly reducing the necessity for bridges. In fact, long limber poles and foot-logs, only a few inches above the low stage of water in several of these streams along our road to the geysers have thus safely remained during two seasons, and even poles, levers, and hand-spikes by us left last year at the very water's brink are still there undisturbed. Even the Gibbon, in its great cañon, through a snowy range and uniformly very rapid, averaging at least 100 feet wide and knee deep, with two cascades, has the ever interesting feature of countless, huge, often pine and cedar clad mountain bowlders, so eroded at the base by this impetuous, changeless volume of warm mineral water as to appear like inverted sugar loaves or huge fossil eggs, erect upon their smaller ends, tottering, and ultimately overturning into the stream to renew the process—peculiarities never observed elsewhere, and in fact impossible in the ever changing surface of cold-water streams.

FOSSIL FORESTS.

The explorations of each successive year greatly add to our knowledge of the known area, the magnitude and the marvels of the fossil forests of the Amethyst Mountain, East Fork, and Soda Butte regions. There the slow but ceaseless erosion of the frosts and storms of an Alpine clime expose bas-relief views of gigantic trees standing—except the front roots and branches—just as they grew, or lying as crushed and buried in the now towering cliffs of basaltic lava, and the storm-strewn fragments of primeval forests containing opal, onyx, or chalcedony caskets of brilliant amethyst and other crystals, unique and priceless, eagerly sought and carefully preserved in the cabinets and the museums of every civilized land.

NOTABLE RELATIVE POSITION OF VARIOUS HOT SPRING REGIONS.

I have never heard a word or read a sentence upon the subject, but my constantly increasing knowledge of the geyser and other hot spring regions renders more evident the notable relative location of the various basins, terraces, and plateaus. Careful observance of any good map of these regions will show:

1st. That the interesting Geyser Basin at the southwestern extremity of Shoshone Lake, the Lone Basin, 5 miles above Old Faithful, and the Upper, Midway, and Lower Basins upon the Fire Hole rivers, the Gibbon Basin and Norris Plateau upon the Gibbon, the Obsidian Cañon and Mammoth Hot Springs upon the Gardiner, and the immense deposits of early extinct hot springs at its confluence with the Yellowstone and long Bear Gulch, comprising far the largest, most interesting, and important chain of thermal springs in the park, or the world, trend for a distance of fully 60 miles, in one of the roughest of earthly regions, in nearly a perceptible variation from an air line.

2d. That said line is one of longitude, or nearly due north and south.

3d. That the hot springs in the lower two cañons of the Yellowstone, and at Emigrant Gulch between them, Hunter's and other hot springs along or near Shields River, and the famous White Sulphur hot springs on the Mussel Shell, are nearly a direct extension of said line some 150 miles northward.

4th. The numerous active and extinct hot springs along Snake River

and Jackson's Lake, near the Three Tetons, are an extension of the same line 50 miles south of it, making fully 250 miles of mostly continuous and direct line of geysers or other hot springs, with the Oneida salt and the famous soda springs on the old Emigrant road, near Bear River, 100 miles farther, with only a slight deflection southwesterly, passing in all through portions of Montana, Wyoming, Idaho, and near the borders of Utah.

5th. The outlying hot spring regions do not usually diverge, as roots or branches, from the main line, but uniformly in nearly parallel lines therewith and with each other, as those of the Yellowstone, Cañon Falls and Lake, including the Sulphur Mountain, Mud Volcano, and Heart Lake; another forms the Soda Butte, Pelican Creek, Turbid Lake, and Steamboat Point line of hot springs and sulphur basins.

I cannot doubt that a brief examination of maps and candid pondering over these coincidences will, with most thoughtful men, develop the conviction that these were not the effects of mere chance, but the result of some deep-seated cause or influences. But I am not advancing theories, only recording facts deemed well worthy of able scientific investigation. Although there is now no unexplored portion of the park large enough to hope for the discovery or probability of the formation of other extensive geyser basins, still each individual spring and geyser is slowly but surely changing, and countless numbers will yet be found and formed, to long encourage the explorer, and none can foresee a period of time when geyser eruptions will cease, the desire of thoughtful men to view them wane, or the study of their causes and character fail to be of absorbing interest to the scientists of every land.

ROADS AND BRIDLE PATHS.

This season's explorations clearly show an excellent trail and fair wagon-route from the foot of Yellowstone Lake via the east fork of Pelican Creek to the Stinkingwater Pass, towards the Big Horn Valley, doubtless destined to become a summer route of access to the park from all those regions, as soon as occupied by white men, and ultimately for the most of Wyoming Territory, in which the park is mainly situated. Much of interest was this year learned of the region toward the Two Ocean Pass and Wind River Valley; but nothing to justify present expenditures upon a route mostly through impenetrable forests or snowy passes, totally uninhabited and mainly without the park. The Pelican Creek route, from the Soda Butte to the foot of Yellowstone Lake, although passable for a trail, and possessing much interest as traversing the fossil forests and sulphur basins, is still too elevated to anticipate a road in the near future.

Few trails or roads anywhere, for its length and cost, will possess the present or future interest of that past the Great Cañon and falls of the Middle Gardiner River.

Careful and continuous observations from all the surrounding landmarks confirms my conviction that the route which I explored late last year, overlooking the Grand Cañon of the Yellowstone through the eastern spurs of Mount Washburn, instead of over it, near the summit, as at present, is the true one, for either bridle-path or wagon-road, and only untimely snows prevented the completion of a trail there the past season.

It has not been deemed advisable to attempt to open the Great Cut-off Pass, which I explored in 1877, from the east fork to the main Yellowstone, via the Stillwater, until there are fewer Indians and more white men along it.

BOUNDARIES OF THE PARK.

The earnestness with which I have constantly urged the survey of the boundary line between the Territories of Wyoming and Montana is fully justified by its results. As anticipated, it has greatly assisted in restraining lawlessness within and adjacent to the park, and in checking the influx of ranchmen upon the southeastern border of the Crow Indian Reservation and determining the true location of the mining camps across the Yellowstone, from the main portion of the park where the Crow Indians seldom go, never remain long, or molest white men. This boundary survey of Mr. R. J. Reeves also clearly shows, that while the mines and smelting works at the head of Clark's Fork and Soda Butte are within the park (unless east of it), all of them, as well as those of Crevice and Bear Gulches, are wholly in Montana. In fact, it is as anomalous as fortunate that while Montana embraces all the mines of gold, silver, lead, and copper yet prospected or likely to ever be found within the park, so near the territorial boundary is that between the metamorphic mineral-bearing rocks and the igneous or lava and hot spring formations, that Wyoming embraces every geyser or other hot spring, hot spring terrace, cone, or cavern, obsidian mountain, fossil forests, or other wonders or objects of interest for which the park was dedicated, and is or ever will be desirable. With the proverbial uncertainty of mining camps, those which now appear moderately promising may not prove permanently successful; but beyond question there is sufficient mineral of various kinds to encourage continuous prospecting, and a mining population with tastes, habits, and organizations so directly antagonistic to the necessarily peculiar laws, rules, regulations, and management of a national health and pleasure resort, that complications alike unpleasant, unprofitable, and unsafe for all parties will be unavoidable and constant; while the unnatural and unnecessary appendage of a less than 3-mile strip of Montana Territory remains attached to the park, otherwise situate wholly within the Territory of Wyoming. Hence, as in my previous reports, and the conflicting boundary section of this, I again urge the now more evident and urgent necessity of changing the northern and western boundaries of the park so as to conform to those of Wyoming; my thorough explorations clearly showing that there are no wonders adjacent to it upon the west, and hence (as above stated) that it embraces all which is desirable to retain within the park. This would also give us the two most important lines already established, marked, well known, and recognized by all parties, without cost to the park, and by placing it wholly within one Territory simplify its present and future management.

Two brief sections comprising the act dedicating the Yellowstone National Park contain (save two appropriations of $10,000 each for its protection and improvement) all the legislation to be found regarding it. (See Revised Statutes of the United States, p. 453.)

That it was a wise and timely act, conferring enviable fame upon the scientists who planned, the Congress which passed, and the President who ratified it, enduring benefit to the people, and glory to the nation owning this peerless heritage of wonders, few intelligent men of our own or of other lands will now question. But, like other hasty acts of legislation in an emergency, time and experience have revealed its omissions and its defects, rendering evident the necessity for slight changes in the boundaries of a then mainly unexplored region, and also additional legislation to render plain and practical the requisite discretionary powers of the honorable Secretary of the Interior and his superintendent in en-

forcing their necessarily anomalous laws, rules, and regulations for the proper management of the largest, most interesting, and important, doubtless soon the most popular, health and pleasure resort upon our globe.

During the past season Mr. N. W. Comfort and wife safely drove a team with trail wagon and 400 head of cattle from Oregon via Henry's Lake and our road through the park to the Lower Yellowstone Valley, and we had the use of two milch cows at the Mammoth Hot Springs of J. Beatie for the summer pasturage of his herd of some 300 cattle upon the Black Tail.

Vandalism of the inimitable geyser and hot spring formations is greatly checked, and with an active, faithful assistant at our house in the Upper Geyser Basin during the greatest influx of tourists each season and the desired laws and local assistance will, I trust, leave little future cause of complaint.

PROTECTION OF ANIMALS.

So with indigenous animals. I have not allowed the killing of bisons and so checked the wanton slaughter of elk, deer, sheep, and antelope, mainly for their pelts and tongues, by the mountaineers, that, although grown shy of the usually harmless fusilade of tourists along the main routes of travel, I have, save near the Mammoth Hot Springs, seldom failed to find in secluded parks near our roads abundance of game for our largest parties. But as the flesh, if not dragged down and devoured by bear, wolverine, or mountain lion, will keep perfectly, hung up unsalted in the forest, for at least two weeks at any season of the year, there is little wasted, and I am confident these choice animals have increased, rather than diminished, in numbers within the park since my management thereof. But with the rapid influx of tourists and demand for such food this cannot long continue, and hence the more evident and pressing necessity for systematic and permanent protection of all, and domestication of some of the most rare and valuable of animals in the eastern portion of the park by the assistance of the lessees of hotel and ranch sites, as so clearly stated and strongly urged on pages 11, 12, and 13 of my report of 1877, and again on page 10 of that of 1878. In this connection it is gratifying to find that the intelligent members of the legislature of Montana, at its last regular session, enacted the following law:

AN ACT to protect bison in certain counties in Montana Territory.

Be it enacted by the legislative assembly of the Territory of Montana:

SECTION 1. That any person who shall willfully shoot, or otherwise kill, for the period of ten years from and after the passage of this act, any buffalo or bison, within the counties of Madison, Jefferson, Deer Lodge, and Lewis and Clarke, Montana Territory, shall be fined not less than one hundred dollars nor more than two hundred dollars, or imprisoned in the county jail not less two months and not more than six months, or both such fine and imprisonment, at the discretion of the court.

SEC. 2. That the possession of the green hides, or the dead bodies, or any part thereof, of any buffalo or bison, by any person, or persons, within the limits of said counties, shall be taken as *prima facie* evidence that such person, or persons, are guilty of killing the same.

SEC. 3. Any person informing on any person violating the provisions of section one of this act shall, upon the conviction of such person, be entitled to one-fourth of the fine collected.

SEC. 4. It is hereby made the duty of the judges of the district courts held in the respective counties of Deer Lodge, Jefferson, and Lewis and Clarke to give in charge to the grand juries of said counties the provisions of this act.

SEC. 5. This act shall take effect and be in force from and after its approval.

Approved February 21, 1879.

If the sagacious leading gentlemen of that thriving Territory deem it necessary and feasible to thus supplement ordinary stringent game laws to preserve a remnant of the buffalo and bison that so recently grazed in countless millions upon the nutritious pasturage of their plains and valleys, should not we make systematic efforts for their protection in the park? If these legislators rely upon such enactments and enlightened public sentiment to save from extermination the remnant of these animals scattered through their elevated mining camps, surely the strong arm of the government, through the honorable Secretary of the Interior and his superintendent and assistants in the park, backed by the lessees of hotel sites, sustained by the united influence of the leading thoughtful men of our own nation and sympathy of the scientists of other lands, should in the native haunts of the remote lake, cliff and cañon girt fossil forest portion of the people's health and pleasure park, the nation's peerless wonder-land, by protection of all and domestication of a portion, perpetuate specimens of these and our other most beautiful, interesting, and valuable indigenous animals when elsewhere found only in the natural histories of extinct species.

SUMMARY.

From the foregoing statement of the season's operations, it is evident that by making an early start the park was reached by the slow circuitous route necessarily taken, a strong party organized, and improvements commenced in good season.

That the month of June was the stormiest ever known in those regions, all of July, August, and early September continuously beautiful, and so dry as to allow extensive forest fires in all those mountain regions; but owing to the ceaseless vigilance of our men in seeing to their camp-fires as well as those of tourists, less damage was done within the park than around it, or than has there heretofore occurred. During the otherwise beautiful autumn were several severe storms of snow, which during October became too deep in the elevated passes for profitable prosecution of improvements, which were, however, continued in the valleys, as far as the limited appropriation of funds at my command would justify, until late in November, and still continued in favorable weather by the three men left well housed, provisioned, and equipped for winter in our block-house at the Mammoth Hot Springs.

The excessive rains of June were utilized in grading the thus softened mountain spurs down the Gardiner, and the continuous fine weather following improved by continuous prosecution of explorations and improvements with most gratifying results.

TOURISTS.

Tourists, including many ladies and children, from various portions of Montana and Idaho, traveled our roads and bridle paths with their own carriages and wagons or saddle and pack animals. Also, mainly with guides, pack-train, and escort, Generals Sackett and Hazen, Major Brisbin, and many other military gentlemen from our own Army and those of Europe; Messrs. Thompson and Cadwalader, of Pennsylvania; Buckland, of Ohio, and other prominent railroad officials; Professor Geikie, of Scotland, and other noted scientists; Capt. W. S. Johnston and J. J. Broom, of New York; Hobson and Zeigler, of Iowa, and other prominent gentlemen and ladies from various regions, aggregating at least 1,000 persons, safely visited and returned from the park during the past season.

The unanimous opinion of all of those I saw or have learned their views was, they were richly rewarded in novelty, enjoyment, scientific knowledge, and health for their hardships, privations and expenses, and many of them pledged to return with friends upon completion of shorter, cheaper, and more convenient routes of access to the wonderland. These are now rapidly approaching, not only by the extension of the Northern Pacific Railroad westward towards the Yellowstone River and steamboats in ascending it, but more notably by the extension of the Utah Northern Railroad from Ogden, nearly 300 miles, through portions of Utah and Idaho, via Pleasant Valley Pass of the Rocky Mountains, into Montana.

From the nearest approach of this road at Camas Creek, in the Great Snake River lava plain, there is a good, well-traveled road for 60 miles, via Shotgun Pass and Henry's Fork, to its lake, at the head of which the small military summer's camp last season proved, as I have long urged, a perfect protection to the park from Indian raids through this matchless gateway of the mountains. Thence it is some 20 miles of fair road—the five good fords of the Madison in its upper cañon being the main obstacles—to the junction of our roads within the park. It is only 15 miles thence to the Upper Geyser Basin, and present terminus of the road in that direction; but by following the trail this year opened, and which I deem vitally important to complete as a road next year, it is some 100 miles additional, via Shoshone and Yellowstone Lakes, Mud Volcano, Sulphur Mountain, Great Falls, head of Grand Cañon, Mary's Lake, and Lower Geyser Basin, to the junction, and 45 miles additional along our road to the Mammoth Hot Springs. Tourists may thus, in a coach trip of some 250 miles from the railroad, reach and make a circuit of the leading wonders of the park and easily view the remaining objects of interest by short branching roads or bridle-paths. Tourists can then have a choice of returning direct by the junction and Henry's Lake to Camas, or by coach 76 miles to Fort Ellis and Bozeman, and some 200 miles additional coaching to steamboats upon the Yellowstone.

It is also very desirable, for purposes within and without the park, that a road be constructed without delay through the cañon of the East Gardiner and the forks of the Black Tail to that of the Yellowstone, and a heavy and expensive bridge over the main stream, as the old rotten and dangerous Barronette foot-bridge, without approaches for wagons, is the only way for reaching the East Fork, Amethyst Mountain, and Soda Butte portions of the park, or the smelting-works and mining-camps of Soda Butte and Clark's Fork. A road connecting this route via Tower Falls, Grand Cañon, and Great Falls of the Yellowstone, with the Mary's Lake route at Sulphur Mountain is very desirable, but too rough and expensive to hope for more than a bridle-path in the immediate future. With an appropriation sufficient to complete these improvements within the park next season, not only are these railroad and steamboat facilities assured by a line of coaches through the park, connecting them, but also propositions from able and desirable parties for leasing sites and speedy construction of commodious hotels, bath-houses, and other conveniences at the Mammoth Hot Springs, Geyser Basins, and other points of greatest interest.

There are now pending propositions for a hotel site at the Mammoth Hot Springs, foot of Yellowstone Lake, and for a steamboat upon the lake, and also a hotel and bathing-houses at the Cold Soda Butte Medicinal Springs, traditionally famous for marvellous cures of jaded and saddle-galled horses and sick or wounded Indians, and now little less noted among the roving mountaineers as second only to the Arkansas Springs

as a specific for the same diseases. As the lessee of at least the Soda Butte site should also be a keeper of the wild and the domesticated animals indigenous to the park, and several if not all of the other lessee government agents within certain prescribed districts, to check vandalism and assist the superintendent in enforcement of necessary laws and regulations for the proper management of the park, great care and deliberation are requisite to secure parties of known responsibility, integrity, and other qualifications to thus assist in retaining intact the natural scenery, animals, and wonders of the park, properly construct and conduct hotels for the accommodation of tourists, and keeping the property insured against fire, to ultimately revert to the government for releasing. This assures immediate coach connection with civilization, convenience for tourists, and ultimate self sustaining character of the park, in a shorter time and at less expense than ever promised, or even anticipated, by the most enthusiastic friends of the peerless wonder-land.

P. W. NORRIS,
Superintendent of the Yellowstone National Park.

HON. CARL SCHURZ,
Secretary of the Interior, Washington, D. C.

APPENDIX.

Weather record kept in the Yellowstone National Park during the season of 1879, mainly at the Mammoth Hot Springs. Latitude, 44° 59′ north; longitude, 110° 42′ west; elevation, 6,450 feet.

Location.	Date.	Sunrise.	Noon.	Sunset.	Remarks.
	1879.				
Mammoth Hot Springs	June 12	.....	63	54	Rain and sleet storm.
	June 13	50	61	58	Cloudy.
	June 14	52	65	57	Cloudy, and sleet squalls; NW.
	June 15	48	60	55	Cloudy.
	June 16	44	55	50	Fair, but gusts of wind SW.
	June 17	46	60	55	Fair.
	June 18	50	62	58	Rainy.
	June 19	51	65	60	Heavy winds.
	June 20	53	67	53	Clear.
	June 21	53	72	67	Showery from the NW.
	June 22	42	74	60	Clear.
	June 23	48	75	46	Showery from NW.
	June 24	44	62	50	Do.
	June 25	45	65	50	Do.
	June 26	48	68	50	Heavy rain-storm, NE.
	June 27	36	74	50	Clear.
	June 28	40	78	60	Do.
	June 29	60	80	61	Showery; SW.
	June 30	50	54	50	Rainy day; NW.
Average of the 18 days taken in June.	.....	43	70	57	Fair days, 6; prevailing wind NW.
Mean	.....		57		
Mammoth Hot Springs	July 1	32	60	60	Clear; ice in a. m.
	July 2	45	58	50	Clear.
	July 3	48	70	48	Do.
	July 4	62	78	50	Clear; wind SW.
	July 5	62	80	54	Clear.
	July 6	48	74	60	Do.
	July 7	60	82	60	Do.
	July 8	60	84	70	Do.
	July 9	60	80	75	Do.
	July 10	60	80	61	Clear; wind SW.
	July 11	61	78	58	Clear.
	July 12	60	81	65	Cloudy; wind SW.
	July 13	62	80	65	Cloudy.
	July 14	50	80	61	Do.
	July 15	58	84	59	Fair.
	July 16	60	82	60	Showery, thunder; wind SW.

Weather record kept in the Yellowstone National Park, &c.—Continued.

Location.	Date.	Sunrise.	Noon.	Sunset.	Remarks.
	1879.				
Mammoth Hot Springs	July 17	61	82	65	Clear.
	July 18	58	80	60	Do.
	July 19	60	75	70	Do.
	July 20	61	81	60	Do.
	July 21	60	86	70	Clear; wind S.
	July 22	60	81	70	Clear.
	July 23	60	68	60	Showery; NW.; mercury fell 14° in one hour.
	July 24	56	68	60	Clear.
	July 25	54	70	60	Do.
	July 26	54	70	61	Do.
	July 27	55	71	60	Fair.
	July 28	54	86	70	Cloudy; wind SW.
	July 29	58	88	72	Clear; wind SW.
	July 30	57	82	70	Clear.
	July 31	56	87	73	Do.
Average of the month		59	80	63	Fair days, 23; prevailing wind SW.
Mean			67		
Mammoth Hot Springs	Aug. 1	45	73	68	Clear.
	Aug. 2	46	78	68	Do.
	Aug. 3	50	82	70	Do.
	Aug. 4	52	78	65	Do.
	Aug. 5	50	75	62	Cloudy.
	Aug. 6	47	74	65	Cloudy; showers.
	Aug. 7	42	75	68	Showers.
	Aug. 8	45	79	67	Clear.
	Aug. 9	50	82	69	Do.
	Aug. 10	55	86	70	Do.
	Aug. 11	48	84	70	Do.
	Aug. 12	45	66	60	Rain; NW.
	Aug. 13	45	72	65	Clear.
	Aug. 14	50	80	70	Clear; SW.
	Aug. 15	45	76	70	Rain; SW. wind.
	Aug. 16	53	81	70	Rain.
	Aug. 17	53	72	66	Clear.
	Aug. 18	54	78	70	Rain.
	Aug. 19	50	75	70	
	Aug. 20	56	76	68	Clear.
	Aug. 21	53	74	61	Do.
	Aug. 22	54	73	60	Do.
	Aug. 23	55	72	61	Do.
	Aug. 24	52	70	62	
	Aug. 25	45	80	70	Clear.
	Aug. 26	58	82	74	Showery; SW. wind.
	Aug. 27	58	78	70	Showery.
	Aug. 28	52	62	70	Rain; NW.
	Aug. 29	42	50	48	Clear; NW.
	Aug. 30	38	60	50	Clear.
	Aug. 31	42	65	58	Do.
Average of August		49	74	69	Clear days, 24; prevailing wind SW.
Mean			64		
AUGUST—EN ROUTE TO THE GEYSERS.					
Terrace Pass	Aug. 1	45	70	63	Clear; wind SW.
Willow Park	Aug. 2	45	71	62	Do.
	Aug. 3	50	70	60	Do.
	Aug. 4	48	60	60	Showery; NW.
Obsidian Cañon	Aug. 5	50	70	61	Clear; SW.
	Aug. 6	56	70	56	Showers; SW.
Beaver Lake	Aug. 7	56	71	60	Clear; SW.
	Aug. 8	58	80	61	Do.
Lake of the Woods	Aug. 9	40	82	58	Do.
	Aug. 10	40	80	58	SW.
Norris Plateau	Aug. 11	32	80	55	Do.
Mount Norris	Aug. 12	30	80	60	Snow-squalls on mountain; NW.
	Aug. 13	32	81	62	Clear; SW.
Gibbon Cañon	Aug. 14	31	84	50	Do.
	Aug. 15	32	60	50	Fair; SW.
Mount Schurz	Aug. 16	40	61	51	Snow-squalls; NW.
Average of 16 days en route		43	73	54	Clear days, 11; snow, 2; wind SW.
Mean			57		

Weather record kept in the Yellowstone National Park, &c.—Continued.

Location.	Date.	Sunrise.	Noon.	Sunset.	Remarks.
	1879.				
Mammoth Hot Springs	Sept. 1	44	70	55	Clear.
	Sept. 2	45	71	57	Do.
	Sept. 3	48	72	58	Do.
	Sept. 4	43	68	68	Shower; NW. wind.
	Sept. 5	45	64	50	Clear; SW. wind.
	Sept. 6	44	45	70	Snow-squall; NW.
	Sept. 7	42	76	70	Clear; SW.
	Sept. 8	44	78	73	Rain.
	Sept. 9	60	50	50	Snow; frost at night; NW.
	Sept. 10	40	50	45	Frost at night; NW.
	Sept. 11	25	50	50	Severe frost; NW.
	Sept. 12	30	50	50	Do.
	Sept. 13	30	55	45	Severe snow; NW.
	Sept. 14	25	60	50	Clear.
	Sept. 15	40	50	45	Clear; SW.
	Sept. 16	40	70	51	Clear.
	Sept. 17	35	72	50	Do.
	Sept. 18	40	74	42	Do.
	Sept. 19	40	70	51	Do.
	Sept. 20	41	72	52	
	Sept. 21	40	71	60	Not kept.
	Sept. 22	39	69	58	
	Sept. 23	35	70	61	
	Sept. 24	32	60	61	
	Sept. 25	40	60	61	
	Sept. 26	39	61	60	
	Sept. 27	40	61	59	
	Sept. 28	40	60	40	
	Sept. 29	35	40	41	
	Sept. 30	32	45	40	
Average of September		39	60	53	Clear days, 15; prevailing wind SW.
Mean			51		
Mammoth Hot Springs	Oct. 1	32	50	40	Clear; NW. wind.
	Oct. 2	30	50	45	Clear.
	Oct. 3	30	50	50	Snow-squalls.
	Oct. 4	40	50	45	Do.
	Oct. 5	40	51	41	
	Oct. 6	35	45	35	
	Oct. 7	37	47	38	
	Oct. 8	37	48	37	Snow 2 feet deep.
	Oct. 9	40	49	39	
	Oct. 10	32	40	30	
	Oct. 11	33	50	31	Snow-squalls.
	Oct. 12	32	45	30	
	Oct. 13	34	47	30	
	Oct. 14	30	46	32	
	Oct. 15	31	45	30	
Willow Park	Oct. 16	34	47	31	
Norris Plateau	Oct. 17	30	55	30	
Gibbon Cañon	Oct. 18	32	70	30	
Geyser Basin	Oct. 19	30	50	31	
	Oct. 20	34	40	35	
East Fire Hole	Oct. 21	30	55	30	
	Oct. 22	28	50	31	
	Oct. 23	26	60	30	Severe snow squalls.
Mud Volcano	Oct. 24	22	45	32	
Sulphur Mountain	Oct. 25	30	50	31	
	Oct. 26	25	60	29	
Cañon Creek	Oct. 27	28	65	30	Clear.
Obsidian Cañon	Oct. 28	30	68	34	Do.
Willow Park	Oct. 29	27	65	40	Do.
Mammoth Hot Springs	Oct. 30	32	60	41	Do.
	Oct. 31	32	61	41	
Average of the month		22	52	30	Prevailing wind W.; cloudy and snowy most of the month.
Mean			35		
Mammoth Hot Springs	Nov. 1	20	65	41	Clear; wind SW.
	Nov. 2	21	58	40	Clear; SE.
	Nov. 3	32	58	48	Do.
	Nov. 4	33	50	40	Clear; E. gale.
	Nov. 5	40	48	49	Snow; SE.
	Nov. 6	48	34	32	Do.

Weather record kept in the Yellowstone National Park, &c.—Continued.

Location.	Date.	Sunrise.	Noon.	Sunset.	Remarks.
	1879.				
Mammoth Hot Springs	Nov. 7	20	35	22	Clear; SE.
	Nov. 8	9	30	21	Snow; SE.
	Nov. 9	21	32	21	Clear; SE.
	Nov. 10	20	30	35	Snow-squalls and SE. gale.
	Nov. 11	30	38	21	Snow; SW. gale.
	Nov. 12	20	38	26	Snow; SW.
	Nov. 13	21	24	21	Snow-squalls; gale in p. m.; SE.
	Nov. 14	21	33	28	Snow; gale SW.
	Nov. 15	21	28	26	Snow-squalls SE.
	Nov. 16	21	34	22	Clear; wind SW.
	Nov. 17	8	36	22	Clear; W.
	Nov. 18	20	34	40	Clear; wind SE.
	Nov. 19	20	50	40	Clear; SE.
	Nov. 20	21	54	41	Clear; wind SE.
	Nov. 21	22	58	40	Clear; SE.
	Nov. 22	24	64	40	Clear; wind SW.
	Nov. 23	26	43	41	Clear; W.
	Nov. 24	27	46	36	Clear; wind SE.
	Nov. 25	32	32	30	Snow; SW. gale.
	Nov. 26	12	28	6	Snow-squalls; SW. gale.
	Nov. 27	—2	33	12	Do.
	Nov. 28	18	28	24	Do.
	Nov. 29	26	34	33	Do.
	Nov. 30	34	36	36	Snow squalls; SE.
Average of the month		23	40	31	Clear days, 13; balance of month mainly gales; wind SE.
Mean			31		
Mammoth Hot Springs	Dec. 1	25	40	32	Direction of wind, E.
	Dec. 2	34	38	34	Snow; SE.
	Dec. 3	34	40	34	2 inches snow; SE. and NW.
	Dec. 4	18	46	24	1 inch snow; SE.
	Dec. 5	17	40	20	Do.
	Dec. 6	16	28	18	2 inches snow; ESE. gale.
	Dec. 7	19	34	22	3 inches snow; ESE. gale.
	Dec. 8	10	14	6	3 inches snow; NW. gale.
	Dec. 9	3	16	8	Clear; south.
	Dec. 10	6	38	8	Do.
	Dec. 11	8	12	10	4½ inches snow; SW. gale.
	Dec. 12	9	14	8	5½ inches snow; gale.
	Dec. 13	10	14	16	4 inches snow; NW. gale.
	Dec. 14	15	20	9	3 inches snow; NW.
	Dec. 15	8	16	12	Clear; NW. gale.
	Dec. 16	6	12	9	Clear; SE. gale.
	Dec. 17	6	8	6	1 inch snow; SE. gale.
	Dec. 18	4	12	9	Clear; SE.
	Dec. 19	6	10	9	SW. gale.
	Dec. 20	14	26	18	Clear, SW. gale.
	Dec. 21	16	25	14	Do.
	Dec. 22	18	24	16	12 inches snow; SE.
	Dec. 23	19	6	15	15 inches snow; SE. gale.
	Dec. 24	32	2	11	14 inches snow; SE.
	Dec. 25	18	0	0	Cloudy; SW.
	Dec. 26	12	30	20	SE. gale.
Average of the month		12	18	12	66 inches snow; clear days, 6; prevailing wind SE.; gale, 11 days.
Mean			14		

The above records strengthen my previous impressions that the park is for its elevation less a severely cold than a moist and stormy portion of those mountain regions, save during a short but beautiful summer. But with the hoped-for instruments and assistance from the Signal Service, we may safely rely upon a greater knowledge and more satisfactory showing of the climate of the park in the next annual report.

ROUTES AND DISTANCES TO THE YELLOWSTONE NATIONAL PARK.

Assuming Chicago to be the general point of divergence for the great Northwest, routes and distances are properly estimated therefrom.

The main routes of access to the park are still the southern, or railroad, and the

northern, or river routes, both of which, as indicated in my report of last year, have been materially improved and shortened during the past season.

As no route within the park or any of its trail or wagon-road approaches have ever been measured, the distances, as given of them, are only careful estimates.

SOUTHERN ROUTE.

	Between points.	Total.
	Miles.	*Miles.*
Chicago via various railroad lines to Omaha	493	.....
Union Pacific Railroad to Ogden	1,031	1,524
Utah Northern Railroad to Camas	241	1,765
Wagon road and perhaps coach line during the season:		
Camas to—		
Shotgun Pass	20	.....
Henry's Fork	20	40
Livermore's Camp	10	50
Henry's Lake	15	65
Targhee's Pass of main divide	4	69
South Fork of the Madison	4	73
West line of the park	7	80
Cañon of the Madison to mouth of the Gibbon	8	88
Junction of road to Mammoth Hot Springs	5	93

NORTHERN ROUTE.

Chicago via various railroad lines to Saint Paul	409	.....
North Pacific Railroad to Bismarck	469	878
North Pacific Railroad to the terminus	125	1,003
Coach to Yellowstone River	125	1,128
Steamboat to mouth of Big Horn	130	1,258
Coach to Bozeman	205	1,463
Coach to Bottler's	40	1,507
Coach to north line of the park	30	1,537
Coach to Mammoth Hot Springs	6	1,573

ROUTES WHOLLY WITHIN THE PARK.

ROAD TO THE GEYSERS.

Headquarters at Mammoth Hot Springs to—		
Terrace Pass	3	.....
Rustic Falls on the West Gardiner	3	6
Indian Creek	3	9
Willow Park	6	15
Obsidian Cliffs	2	17
Lake of the Woods	4	21
Norris Geyser Plateau	7	28
Geyser Creek	4	32
Monument, Geyser Basin	2	34
Lower cañon and falls of the Gibbon	4	38
Cañon Creek	1	39
Junction with the southern route	6	45
Forks of the Five Hole Rivers	5	50
Lower Geyser Basin	1	51
Midway Geyser Basin	4	55
House in Upper Geyser Basin	5	60

TRAIL AND PROPOSED ROAD TO THE YELLOWSTONE LAKE AND FALLS.

	Between points.	Total.
	Miles.	*Miles.*
House in Upper Geyser Basin to—		
Cascades of the Fire Hole Rivers	3	
Norris Pass of the main divide	5	8
Shoshone Creek, 2 miles from the lake	2	10
Columbia River and Pacific waters	5	15
Two Ocean Pond	7	22
Hot Springs on Yellowstone Lake	8	30
Cliffs on lake	12	42
Bridge Creek Bay	5	47
Foot of Yellowstone Lake	8	55
Mud Volcano	4	59
Sulphur Mountain	3	62
Alum Creek	3	65
Great Falls of the Yellowstone	3	68
Return to Alum Creek	11	79
Hot Sulphur Springs	3	82
Mary's Lake	9	91
Cold Spring Creek	7	98
Forks of the Fire Hole River		

MIDDLE GARDINER TRAIL.

Mammoth Hot Springs to—		
The West Gardiner	2	
Falls of the Middle Gardiner	2	4
Sheepeater Cliffs	2	6
Road to the Geysers	1	7

TRAIL TO FORKS OF THE YELLOWSTONE.

Mammoth Hot Springs to—		
Forks of the Gardiner	2	
Lower Falls of the east fork of the Gardiner	1	3
Upper Falls of the Gardiner	1	4
Cascades of the Gardiner	1	5
Black Tail Creek	3	8
Dry Cañon or Devil's Cut	7	15
Pleasant Valley	3	18
Forks of the Yellowstone	2	20

MOUNT WASHBURN TRAIL.

Forks of the Yellowstone to—		
Tower Falls	3	
Snowy spur of Mount Washburn	6	9
Dunraven's Pass	3	12
Cascade Creek	4	16
Great Falls of the Yellowstone	4	20

GRAND CAÑON TRAIL.

Tower Falls to—		
Bell's Lake	3	
Old Ruin	2	5
Grizzly Pass	2	7
Grand Slide	3	10
Brink of the Grand Cañon	4	14
Great Falls of the Yellowstone	3	17

MINERS' TRAIL TO THE CLARK'S FORK MINES.

	Between points.	Total.
	Miles.	*Miles.*
Forks of the Yellowstone to—		
Crystal Creek	4	
Amethyst Creek	4	8
Ford of East Fork of the Yellowstone	3	11
Soda Butte Medicinal Springs	2	13
Pebble Creek	3	16
Silver Smelter, Clark's Forks Mines, Index Peak	10	26
Index Peak	5	31

FOSSIL FOREST TRAIL.

Ford of East Fork of the Yellowstone to—		
Hot Spring Camp	2	
Fossil Terrace	3	5
Bison Summit	3	8
Mirror Pond	4	12
Brimstone Basin	8	20
Forks of Pelican Creek	4	24
Yellowstone Lake	6	30

STINKINGWATER TRAIL.

Forks of the Pelican to—		
Entrance to pass	6	
Cañon and pass through the first range	5	11

RECAPITULATION OF ROADS AND TRAILS OPENED WITHIN THE PARK.

Roads.

	Miles.
Mammoth Hot Springs to north line of the park, near the Yellowstone	6
Mammoth Hot Springs to the Forks of the Gardiner	2
Mammoth Hot Springs to West Gardiner	2
Mammoth Hot Springs to junction with Henry's Lake road	45
Junction on Henry's Lake road to western line of the park	13
Junction to house in Upper Geyser Basin	15
Forks of the Fire Hole Rivers to Cold Spring Creek	7
	90

Trails.

	Miles.
1st. Middle Gardiner	7
2d. Forks of the Yellowstone	20
3d. Clark's Fork Mines	31
4th. Fossil Forrests	30
5th. Stinkingwater	11
6th. Yellowstone Lake and Falls	98
7th. Mount Washburn	20
8th. Grand Cañon	17
	234

To the southern route the Central Pacific Railroad to California, as well as the Denver Pacific and other railroads to Saint Louis, afford great facilities for the Southern and Southwestern States and Territories, and for the increasing class of scientists and retired military and naval officers, or those upon leave of absence who, while making the grand trip of the world, now annually visit the park.

The northern route has the advantages of cool summer travel upon the great lakes, the Missouri and Yellowstone Rivers, and railroad connections with Manitoba and

other British possessions, and erelong with Oregon, Washington Territory, and the northern route to Asia via the Northern Pacific Railroad.

One of these routes presents the greatest variety of scenery, modes of travel, and somewhat shortest distance; the other the most direct continuous railroad connection, least coach or horseback travel, and consequently requiring the least time, but practically both are convenient and necessary, as most persons with time and means will prefer going one route and returning the other, and no effort will be spared upon my part to prepare the roads within the park and urging others to prepare its approaches, as also to perfect arrangements with the various railroad, steamboat, and coach lines for trip tickets to and throughout the park, probably during the latter portion of the coming season, and certainly the next.

Camp outfit and provisions can be purchased without extortion at Bozeman, Virginia City, Ogden, and elsewhere, and trusty guides with saddle and pack animals at the Mammoth Hot Springs and other points within and adjacent to the park.

Time really necessary to view the leading wonders of the park, ten days, and many more may be enjoyed with benefit; season of the year for a visit, July, August, and early September; cost of trip, although one of the most important considerations with most persons, is, from their divers positions, tastes, and modes of travel, the most difficult to state, even approximately, but will range from $400 to $1,000 for the entire expenses of a visit to the mystic wonder-land. The best plan is, as recommended in my last year's report, to make the park the main object and turning point of a season's rambles, visiting at least the Salt Lake and the Yellowstone regions upon the outward or return routes.

There was no annoyance by Indians during the past season within or near the park, and no present prospect of any during the next.

ATTACHED MAP / DRAWING

SEE ORIGINAL

PHILETUS W. NORRIS.

ANNUAL REPORT

OF THE

SUPERINTENDENT

OF THE

YELLOWSTONE NATIONAL PARK

TO THE

SECRETARY OF THE INTERIOR

FOR

THE YEAR 1880.

351

WASHINGTON:
GOVERNMENT PRINTING OFFICE.
1881.

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LIST OF PLATES.

ANNUAL REPORT

OF THE

SUPERINTENDENT OF THE YELLOWSTONE NATIONAL PARK.

HEADQUARTERS MAMMOTH HOT SPRINGS,
YELLOWSTONE NATIONAL PARK, WYOMING,
November 30, 1880.

Hon. CARL SCHURZ,
Secretary of the Interior:

SIR: I have the honor to submit the following report of operations during the year 1880 for the preservation, protection, and improvement of the Yellowstone National Park (the fourth which I have submitted to the department), and to respectfully request that if approved it may be printed.

Soon after the negotiation in Washington of treaties with the Crow, Shoshone, Bannack, and Sheepeater Indians, who had been either aboriginal owners of, or occasional troublesome ramblers in portions of the Park, I proceeded, via Omaha and Ogden, to the agency of a part of the Shoshone and all the Bannock and Sheepeater Indians on the Boise Fork of Snake River, in Idaho Territory. Here and at a mountain camp twenty miles distant I obtained, partly through the assistance of the affable and efficient agent of these tribes, Major Wright, and subsequently by my own personal efforts with Major Jim's band of Bannocks, at Ruby Valley, Montana Territory, a solemn promise from all these Indians to abide by the terms of their treaty in Washington, and also that thereafter they would not enter the Park beyond Heart Lake, thus averting in future all danger of conflict between these tribes and laborers or tourists. To this agreement I am gratified to report their faithful adherence.

Proceeding on the Utah Northern Railroad to its terminus at Red Rock, and thence by coach through Virginia City to Bozeman, I there met my competent assistant, Mr. C. M. Stephens, with teams and an escort. His report of the snows and streams within and adjacent to the Park, corroborated as it was by persons at Bozeman and my own experience in crossing the chilly waters of swollen streams, induced me to inform the Chief Signal Officer at Washington, by telegram, of the backwardness and unusual coldness of the season, and also of the unprecedented depth of snow in the mountain passes and the floods in the valley streams, so that a warning might be given to any who contemplated a visit to the Park the present year, to defer the same until at least late in July. Ignorance of or inattention to this timely warning, by a number of tourists, resulted in many otherwise needless hardships, privations, and delays to themselves, and much unjust criticism and censure to myself.

Quickly procuring an outfit, arranging field parties, and leaving the train to follow, I left Bozeman, with the horsemen, on the 1st day of July, reaching here, eighty miles distant, on the evening of the 2d, our

wagons being delayed by terrific hailstorms on the 5th. On this day Mr. O. J. Salesbury, with five horsemen, arrived by the Geyser route, on a tour of inspection of the road from the Utah Northern Railway for a coach and mail route; and being desirous of my assistance in selecting and reopening the same across the Park, before deciding to close a mail contract, I returned, in company with him and Mr. James Goodwin, one of my old scouts, over the Geyser road to the falls of the Gibbon. Having effected one crossing of this stream by swimming its swollen, icy-cold waters, and in the same manner having made five crossings (within a distance of six miles) of the waters of the Madison in its cañon, we reached the open valley below. The members of the party were unanimously of the opinion that this Cañon route was dangerous, if not indeed, impassable during a large part of each year, and that it was liable to continue so during 1880, and there was neither time nor means to construct bridges or grades this season for a coach and load route for a railroad direct to the headquarters of the Park. We were therefore compelled to seek a new route of entrance to the Madison end of the Park, and an arduous effort was immediately made to discover some favorable approach. The rugged mountains to the south were evidently impassable, while we were ignorant as to whether the rocky cliffs of the southern elevated timber plateau had ever been scaled by a hunter, ranger or mountaineer. Scattering in parties of two, we traversed the country, and, though some were baffled by cliffs or cañons, within two hours a route was discovered so unexpectedly favorable that its adoption and opening were immediately determined upon. Mr. Salesbury, leaving his men to construct a mail station where the cut-off would strike the Madison at Riverside, returned East to close his mail contract, while I returned to headquarters, remaining there until I had built an excellent blacksmith shop and barn, and repaired the bridges, fences, and grades in the vicinity. Subsequently, with some thirty men, two wagons, and a pack train, I started upon the Geyser road for the Fire Holes.

No one, lacking practical experience with unusually severe snow and floods, can form an adequate conception of the difficulties of repairing or constructing grades, culverts, or bridges, over fifty miles of mountain roads of the character of those in this region. All difficulties were, however, finally surmounted, and after fording both the Fire Hole Rivers near their forks with my party, I ascended a stream from the west, seeking camp where [illegible] descended from the plateau to a cold-spring creek in the [illegible] grassy valley, which, before [illegible] cold spring [illegible] springs, [illegible] called Geyser Meadows.

As our proposed road was to descend from the plateau on a long, natural, winding turnpike between two cañons near the Forks of the Fire Holes, three miles distant, we opened the short trail for the cattle and pack animals to the line of road, cut clear and working all ways. The cold-water streams of the valleys were still swollen, and numerous old snow-drifts remained upon the plateau; yet there were neither springs, streams, nor even lakes, the porous lava rocks and loose gravel of the soil having speedily absorbed all the melted snow, while during the last five days of July the temperature was so low that a sufficient supply of water was obtainable only by throwing snow on the great fires, timber being heaped upon them and burned for that purpose. The air was strongly flavored with smoke, pitch, and sulphurous vapors, but the water was tolerably potable, and satisfied our needs. The [illegible] was discovered just above its sink at the west foot of the [illegible] Three miles from here we made the trail [illegible] miles by that route and turned in the new road over the plateau [illegible]

Forks of the Fire Holes. We reached this point, where the Riverside mail station is now established, on the 7th of August, subsequently improving somewhat the northern ascent to the Terrace. This route possesses the advantage of being always dry; it is also well shaded by beautiful pine forests, and is six miles shorter than the Cañon route; besides, by this road, while there would be the expense for two long and somewhat steep grades, the necessity of building four long bridges and several expensive grades, exposed to snow-drifts and floods, on the old road would be obviated; and it is more than probable the new route would never be abandoned, although if necessary the old one could be used for a brief period each summer.

While on a tour of the more important portions of the Park, in August, with the honorable Secretary of the Interior and his party, the main force of laborers continued improving the Geyser road and other routes in that portion of the Park. Soon afterwards, with a small party and pack train, I proceeded from our headquarters to the Great Falls of the Yellowstone.

Having bridged several streams, including Cascade Creek at Crystal Falls, opened trails, and rendered safe the lookouts at main points of interest, as at Great Falls and the upper portion of the Grand Cañon, I left most of the party to open a trail along its brink, and, in company with Messrs. Jack Davis and W. H. Parker, both excellent navigators, ascended the Yellowstone River to its lake, and in a small, unsafe craft, called the Explorer, made the tour of the latter and its islands. We also ascended Pelican Creek and the Upper Yellowstone River to their rapids. After encountering several heavy gales, one severe snow-storm, and a shipwreck, I ascended Mount Chittenden and other peaks of the range, crossed two passes to the Passamaria or Stinking Water branch of the Big Horn River, and returned to the foot of the lake and falls. Thence, while the main force was opening a trail between Mount Washburn and the Grand Cañon, with a small party I opened a route of ascent to the former, and also one of descent to the latter, where, at a depth of 1,300 feet, was found a beautiful and unique geyser basin, whence, by exceedingly toilsome and dangerous sheep-paths, we descended (mainly within) and explored the Grand Cañon to Tower Falls. This trail is much shorter and better than the old one over Mount Washburn, and opens up such matchless scenery along the Grand Cañon that it will doubtless soon supplant it.

Finding at the Forks of the Yellowstone the noted guides Rowland and Miller, with the famous photographer of the Park, Mr. H. B. Calfee, my assistant, Mr. W. H. Parker, and myself joined them, and with them constituted the first party of visitors to the famous and exceedingly interesting medicinal springs, Hoodoo Basin, the matchless dikes and other unique marvels of the East Fork regions.

During this trip I ascended several snowy peaks of the broken and elevated Sierra Shoshone Range, which extends from Pilot Knob to the Wind River range, and from a monument which I erected on Hoodoo Mountain took bearings of Mounts Washburn, Chittenden, Doane, Stevenson, and Pilot Knob, and of the Yellowstone and other lakes.

My return was via the petrified forests at the head of Pleasant Valley, headquarters being reached on the 4th of October.

While absent, my trusty gamekeeper, Harry Yount, who had left us at the foot of Yellowstone Lake, explored alone its western borders, the Shoshone, Lewis, Heart, and other lakes, and the basins of Barlow and Upper Snake Rivers, and, after tracing some excellent trail routes, and obtaining much useful and valuable information, returned just in advance of our party.

The season for labor in the Park continued, as it had begun, later than usual, permitting work upon the various bridle-paths and on the road up the Gardiner River. A good and well-located house was also constructed for the gamekeeper at the mouth of Soda Butte, a branch of the East Fork of the Yellowstone, and a favorite winter haunt of elk and bison. This, and my own explorations of the Gallatin Range, kept the entire party active until well into October, when most of the laborers were discharged. With the remainder, buildings and fences were repaired, tools and implements gathered and secured, and other preparations made for winter just in time to escape its severity amid the snowy peaks and passes. Elk, deer, and other game being driven by storms into the sheltered glens and valley, we were enabled to secure an abundant winter's supply of fresh meat, and also fine hides of the bear, wolf, and wolverine. Although severe and dangerous, hunting in the Park was excellent sport, and the only recreation I enjoyed during the season.

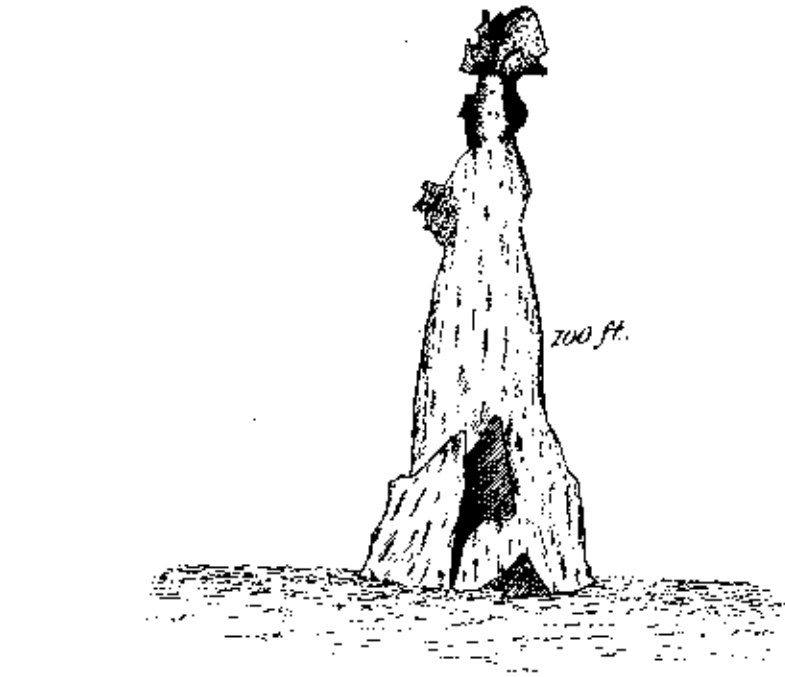
During the autumn, observations, and visits to Gamekeeper Yount's house, thirty-five miles distant one way, and to neighbor Marshall's, at the Forks of the Fire Holes, fifty miles the other; closing up business and preparing this report, including accompanying maps, tables of elevations of mountains ascended, and records of weather regularly entered, kept me actively employed until my departure late in November. At that time I left Harry Yount with one man at the gamekeeper's cabin on the East Fork of the Yellowstone, and my assistant, Stephens, with three men and the animals, at the Mammoth Hot Springs, and returned to Bozeman to liquidate my remaining indebtedness for outfit and supplies for the season. Thence, by coach, I went to Dillon, the present terminus of the Utah Northern Railroad, and by that road to Ogden, where I took the usual railroad route and returned to the East.

EXPLORATIONS.

As stated in my report of 1879, the want of funds adequate to such protection and improvements as are absolutely required in the Park has constantly prevented explorations not only desirable in the interest of science, but also necessary to an intelligent and judicious expenditure of the funds actually appropriated. The appropriation for the past season, however ($15,000), was a sufficient increase over that of the previous year to admit of the employment of an active and reliable gamekeeper, who, besides attending to his regular duties, made, during the season, interesting explorations (see his appended report), and also to enable me during the favorable autumn to make extensive and valuable explorations in the known as well as in the hitherto unknown portions of the Park, accounts of which will be found throughout this report.

HOODOO REGION.

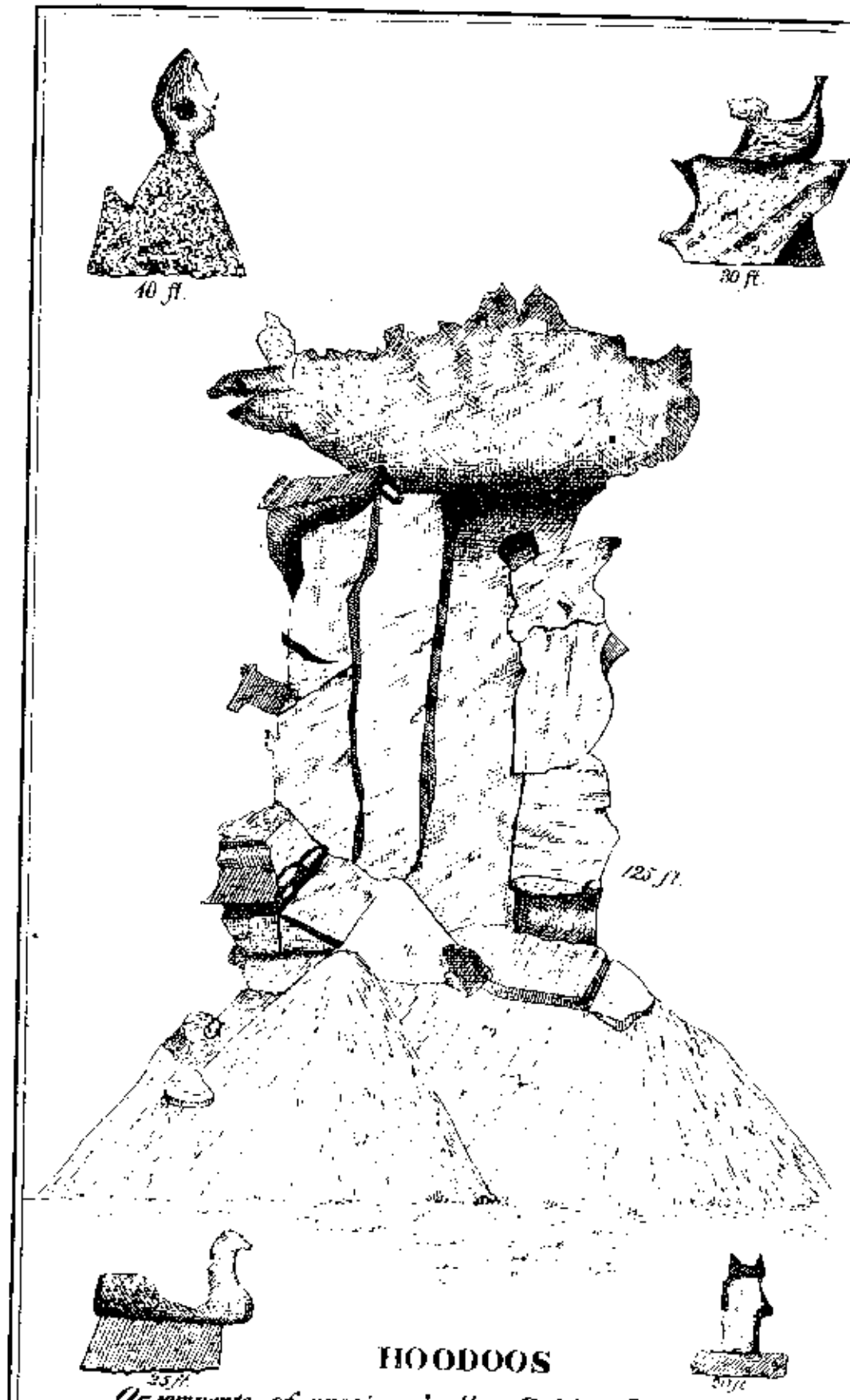
This is a mountain phrase which for years has been applied to a terribly broken and eroded portion of the Sierra-Shoshone Range around a portion of the head branches of the East Fork of the Yellowstone and the Passamaria or Stinking Water Fork of the Big Horn, and which, until my own visit of this season, had never been visited by any of the scientific tourists or government explorers of the National Park. In fact nearly all that was previously known of this region was from information derived from a small party of prospecting miners, two of whom,



HOODOOS

Or remnants of erosion in the Goblin Labyrinths

F. E. O.



HOODOOS

Or remnants of erosion in the Goblin Labyrinths

Crandall and Adams, were killed by Indians, while three others, Adam Miller and his two companions, narrowly escaped, after losing their horses and camp outfit, and were compelled to make a long and terribly trying retreat to the Old Crow Indian Agency in the fall of 1870. It was this party which discovered the Clark's Fork mines, and this region of countless remnants of erosion, so wild, weird, and spectral that they named it the "Hoodoo" or "Goblin Land." Few white men have visited it, and fewer still who have ventured there returned. Miller, Rowland, and myself narrowly escaped from the Indians during our effort to visit it in the fall of 1878; but seeing no Indians in the Park this year, and deeming it important to ascertain the true character of this region before fixing the permanent boundaries of the Park, with Miller, Rowland, and others, late this season, I made another effort to explore it. Ascending the deep, narrow valley of the East Fork of the Yellowstone, I visited a sulphur basin near the mouth of Cache Creek, and found upon it, two miles from its mouth, an important basin of medicinal springs, some of which are evidently similar to those of the Soda Butte, while others are of alum or sulphur; and in the channel of the stream several huge, hissing caldrons of hot water of unknown properties. Some seven miles above Cache Creek we passed the mouth of another stream in a deep, narrow, timbered valley which we named Calfee Creek, after the famous photographer of the Park. Five miles farther on we reached the creek which Miller recognized as the one he descended in retreating from the Indians in 1870, and which, on this account, we called Miller's Creek. Some miles from the mouth on a southern branch of this stream we found another basin of mineral springs similar to, and in a nearly direct line south of, those upon the Soda Butte and Cache Creek.

Ascending Miller's Creek to its forks, and, by long and severe effort, scaling the elevated plateau between them, within forty miles from the mouth of the Soda Butte we found the decaying brands of Miller's old camp-fire. Just above were still standing the poles of one Indian lodge, while there were more than forty others that had fallen, but which evidently had been used the previous year; many still older also remain to mark this habitat of the red man. These poles are near the summit of an open, grassy pass between Hoodoo and Miller Creeks, close by a dwarf-timber-fringed pond at the foot of an old snow-field on the side of Parker's Peak, and within sight and easy striking distance of rough, elevated passes to Crandall's Creek (a branch of Clark's Fork), and other passes to the Stinking Water. Hidden upon the flanks by snowy mountains, and in the pass by a screen of dwarf pines and balsams, and with a precipitous descent over the snow-fields to Hoodoo Creek, this Indian perch commands a fair view of all approaches. Abundant pasturage for game and domestic animals was had in the notches of the numerous adjacent cañons. This position, therefore, formed one of the most secure lairs and admirable lookouts for hostile Indians that I have ever met with, and also bears ample evidence of its frequent summer occupancy. Fragments of china-ware, blankets, bed-clothing, and costly male and female wearing-apparel here found, were mute but mournful witnessess of border raids and massacres.

Convinced that there were at that time no Indians in the vicinity, and leaving Handford with our animals at Miller's old camp, I pushed on some three miles to explore the Hoodoo Mountain and its labyrinths. While Miller with Calfee and Parker explored and obtained sketches and views of many of the weird wonders of erosion, with Rowland I ascended and took the elevations of the adjacent peaks, including the Hoodoo Mountain. The latter was found to be 10,700 feet high ane-

roid-barometer measurement) at the western end, where we erected a monument.

This mountain is about one mile in length, with a horizontal ridge-like crest, trending nearly northeast and southwest, and is the real water-shed of the various fountain-heads of the East and Clark's Forks of the Yellowstone, and nearly that of the Stinking Water branch of the Big Horn River; and though Saddle Mountain and some other adjacent peaks are somewhat higher, none of them are so isolated and prominent as a landmark. While probably never itself a crater, Hoodoo Mountain is evidently of volcanic origin, and was eroded into its present form. Upon its southern face it is still changing. Here, extending from 500 to 1,500 feet below the summit, the frosts and storms of untold ages in an Alpine climate have worn about a dozen labyrinths of countless deep, narrow, tortuous channels amid the long, slender, tottering pillars, shafts, and spires of the conglomerate breccia and other remaining volcanic rocks. In shape they are unlike any elsewhere known, being a cross between the usual spire and steeple form, and the slender-based, and flat, tottering, table-topped sandstone monuments near the Garden of the Gods, in Colorado; and while lacking the symmetry and beauty of these, surpass both in wild, weird fascination. Here the sharp-cornered fragments of rocks of nearly every size, form, formation, and shade of coloring, by a peculiar volcanic cement attached sidewise, endwise, and upon the tops, sides, and, apparently, unsupported, upon each other, represent every form, garb, and posture of gigantic human beings, as well as of birds, beasts, and reptiles. In fact, nearly every form, animate or inanimate, real or chimerical, ever actually seen or conjured by the imagination, may here be observed. Language does not suffice to properly describe these peculiar formations; sketches may probably do something, and photographs more, to convey a conception of their remarkable character, but actual observation is absolutely necessary to adequately impress the mind with the wild unearthly appearance of these eroded Hoodoos of the Goblin Land. These monuments are from fifty to two or three hundred feet in height, with narrow, tortuous passages between them, which sometimes are tunnels through permanent snow or ice fields where the big-horn sheep hide in safety; while the ceaseless but ever-changing moans of the wild winds seem to chant fitting requiems to these gnome like monuments of the legendary Indian gods.

Another feature of the Hoodoo region is worthy of more attention than it is here possible to give. I refer to the numerous huge dikes which trend uniformly in parallel lines nearly north and south, unaffected in course, size, or character by yawning cañons or the thousands of feet of craggy mountain sides, to their snowy summits, ever standing high above the softer and deeper disintegrating volcanic formations between them. While all basalt, obsidian, and other columnar formations observed within the Park, when found "in place," are uniformly vertical or radiating, these dikes, although as clearly columnar, are, in every observed instance, positively horizontal, very hard, and not friable, and part, in columns entire, across the dikes, thus appearing like gigantic steps ascending the cañon and mountain sides.

GALLATIN RANGE.

This range, so noted for its ragged basaltic formation, and sharp, unbroken crest north of Electric Peak upon the borders of the National Park, exhibits therein some novel peculiarities. Although retaining its

Or remnants of erosion in the Goblin Labyrinths

orth and south trend and character as a divide of the waters of the Yel-
owstone and Missouri, where it is severed by the yawning cañon of the
Iadison Fork of the latter, still on much of the intervening distance it
resents not only a double line of peaks, but also a clearly distinct
ormation, outline, trend, color, and weathering of each. The western
ange, as viewed from the deep valleys of the West Gallatin and the
Upper Madison Rivers, presents a nearly continuous outline of reddish
ocks of a friable formation, like coarse grained sandstone or crumbling
ranite, and serrated by the peaks of the somewhat higher eastern
ange. The eastern range, from the valleys of the Gardiner and the
ibbon, shows the sharp outlines of a light gray Carboniferous limestone
pheaved to the vertical in cross-sections to the trend of the mountain,
e intervening yawning cañon clearly revealing the contiguous western
ange. Thus not only have Mounts Holmes and Quadrant and Bell's
eak each a sharp, naked crest of nearly equal height, but also several
ther peaks somewhat less elevated, but with outlines equally clear-cut;
nd where these cross-cañons reach the depression between the two
anges there are a number of small but beautiful Alpine lakes, notably
igh up on Mount Holmes, where at least three of them, in their deep,
ltramarine waters, mirror in perfect but inverted beauty their dark fir
nd cedar borders, and the rocky crags, snowy sides, and naked crests
f the surrounding peaks. To these interesting features of this prominent
ange add the great probability of finding more valuable minerals than in
ny other part of the Wyoming portion of the Park, and we have an in-
iting field for scientific research.

Between Mount Holmes and Bell's Peak is the pass through which
e hostile Bannocks entered the Park in 1870. There is also another
ass north of Quadrant Mountain, and still a third south of Mount
Iolmes, all direct and of easy ascent through the main range from the
ast, but steep, precipitous, and difficult down the slopes of the western
ange. The main range, rising from the east in long, graceful, and well-
mbered terraces to an altitude of about 9,000 feet, then separating into
harply-outlined peaks, naked but for patches of permanent snow-fields,
resents a beautiful appearance, particularly from the Terrace Pass and
ardiner Valleys. The western range, however, is more abrupt, contin-
ous, and naked; but, serrated as it is by the three sharp crests of the
astern range, its outline is, perhaps, as interesting as that of the main
ange, as seen from the deep valleys of the West Gallatin and East
Iadison; while, seen from several of the peaks, the view in either direc-
on is extended and charming. It is also an excellent as well as an
ccessible region for game, the presence of big-horn upon its crests,
rizzlies in its deep timber-bordered gulches, countless water-fowl in
e emerald lakes of its terraced foot-hills, elk, deer, antelope, and occa-
onally bison, in its charming parks, glens, and lovely open valleys,
onstituting it a most prolific field for sport.

MADISON PLATEAU.

This mountain barrier, hitherto deemed inaccessible, was when I was
rced to explore it, found to be a dry, undulating, but beautifully timbered
lateau, allowing a judiciously located line of wagon-road with nowhere
n elevation much in excess of 1,500 feet above the Forks of the Fire
ole River, and which is so much shorter, safer, and cheaper of con-
ruction and preservation than the old Cañon route that it will doubt-
ss supersede it. It also affords approaches to several interesting
ottled obsidian cliffs and cañons, and to exceedingly favorable points

for observation of the Fire Hole Basins above, and the Upper Madison Valley, Tyghee's Pass, Henry's Lake region, and the Snowy Mountain borders below it.

MOUNT STEPHENS TRAIL ROUTE.

The great saving in distance by a trail from the Mammoth Hot Springs direct to the Great Falls of the Yellowstone, induced me to explore a route from the Cascades of the East Gardiner, through a pass in the Stephens Range east of Thompson's Peak, and through another pass of the Washburn Range, at the head of a fork of Cascade Creek some miles west of Dunraven Peak. These passes, though elevated, are both practicable; but the numerous deep yawning cañons on the head fountains of Tower Creek, and continuous miles of dense fallen timber there and upon the west fork of Cascade Creek below the mountain lake will doubtless delay the opening of a trail upon this route until other trails more pressingly necessary shall have been completed; but the saving in distance, the romantic scenery, and the unexplored fossil forests on the head of Tower Creek will eventually render its construction justifiable.

GRAND CAÑON OF THE YELLOWSTONE.

There are several interesting cañons upon the Yellowstone, both within and without the National Park, but that uniformly called the Grand Cañon of the Yellowstone extends from its Great Falls to those of Tower Creek, a distance of something more than twenty miles. It had been entered and explored by several parties at both ends, but, before this season, nowhere else, except by myself near the spur of Mount Washburn, as mentioned in my report of 1878. Deep snows and high waters rendered this season unfavorable for the exploration, but by long, arduous, and dangerous cliff-climbing I succeeded in exploring the most of the cañon from within, and the remainder by following its western brink.

Leaving to future scientists the tracing of the geological periods and formation of this interesting region, I may in a general way state that, like the Niagara and other great cataracts, the cataracts of the Yellowstone have eroded a deep channel up-stream, far above their original location at the severed spur of Mount Washburn and the rim of the then and elevated Yellowstone Lake, at which time the fall of one, or that large of a succession of these cataracts, was far greater than at present.

It is neither certain nor practically material whether this cañon follows an ancient earthquake rift or is wholly one of erosion, as it evidently cuts through various formations to one of hot springs, often soft, shelly, and so easily eroded as, in connection with the remaining countless active ones, to occasionally undermine portions of the towering cañon walls, and thus precipitate enormous slides, especially of the western wall. These slides and the short but deep and narrow cañons entering them, compelled me to make a portion of the trail upon the slopes of Mount Washburn. There are many of these slides, of all dimensions up to at least a mile in length along the cañon, and half that distance from its brink; and the entire depth at each locality ranges from one to two thousand feet, thus damming the river until removed or cut asunder by its all-eroding power. Remnants of these, remaining as timbered terraces within the cañon, afforded the main routes of descent to the rapid, roaring river, which from above appeared like a thread of sil-

Great Falls, pour over the eastern wall where it is about 1,300 feet high. It is not, however, like the Fairy or other falls, a clear leap; nor is it like a cascade dashing from projecting rocks, but a gliding fall down a flume-like groove, self-worn in the nearly vertical wall, and which, though a good-sized rivulet at the brink, in autumn is nearly if not quite lost in spray before reaching the river. Some of these streams descend by beautiful cascades or in dark narrow cañons, and others, as the Twin Falls, by cañons to the remnants of old slides, and thence, by a clear, beautiful leap of some two hundred feet, reach the river nearly opposite; while there is a similar fall from the eastern terrace less than a mile below. Between these, after making a descent of 1,300 vertical feet, past the noisy Safety-Valve and countless other geysers and brimstone basins within two miles, the Twin Falls trail reaches the river amidst rocky walls whose cornice-like formation possesses a variety and brilliancy of tint and coloring, matchless and enchanting, which it is impossible to describe, and which to be understood and appreciated must be seen. Indeed, in many portions of the cañons the coloring of the walls is the principal charm. The Grand Cañon of the Colorado is longer and deeper than this; the Yosemite more accessible, and to some, perhaps, more attractive, while other cañons are more ragged, weird, and yawning; but no known cañon so combines magnitude, meanderings; foamy, emerald waters; hissing hot springs, spouting geysers and inimitably beautiful tinting of its walls as the peerless Cañon of the Yellowstone.

YELLOWSTONE LAKE.

This doubtless mere fragment of an ancient inland sea, or great lake, of perhaps hot or tepid water, surrounded and dotted by active volcanoes, has been so long and yet so imperfectly known, and in trapper legends has been presented in so many different localities, shapes, dimensions, elevations, &c., that it appropriately merits its designation of "Mystic Lake." It has, however, been found to be one of the largest, most elevated, and peculiarly formed of all the mountain lakes of North America, and yet is comparatively so little known as to offer a most inviting field for romantic and interesting exploration.

The earliest published reports of this lake are those of Doane, Langford, Everts, and others of the Washburn expedition, who visited it in the fall of 1870. The first white men, however, known to navigate its blue waters were Messrs. James Stevenson, W. H. Holmes, and others of the Hayden expedition of 1871; their craft was the Anna, a small but well-constructed canvas boat. With the Explorer, made of green, whipsawed lumber, and which soon proved unseaworthy, my own navigation of this lake was made with two companions, Capt. Jack Davis and Mr. W. H. Parker. Suffice it to say, that after a voyage of ten or twelve days, and after encountering many mishaps and dangers, being o ice beached and fairly frozen in, we succeeded in circumnavigating the main lake and most of its bays and fingers; and with the first craft navigated by white men I ascended Pelican Creek, the Upper Yellowstone, and other streams to their rapids. While this exploration developed nothing to cause an essential change in my views of the general contour of the lake, as given in my last year's map, it furnished strong evidence to sustain my previous opinion that the length of the lake from the upper river inlet to the outlet is nearer thirty than twenty miles, and but little less across the palm and thumb, and also established Stevenson's soundings (published in Hayden's map of 1871) as approximately correct, since I seldom found soundings any distance off shore with a 255-foot line.

Interesting information of a varied character and data of much value were obtained relative to contours of bays, coves, and islands; sizes, number, and nature of tributaries; climate, prevailing winds and storms, &c.; while uniquely interesting evidences were encountered of erosion upon its wave-lashed shores, some of which will be given on an accompanying map, and others particularized in their proper connection in this report.

Although the Upper Yellowstone is navigable for three miles for small sail and steam boats, and without doubt is a fair-sized mountain river; and although the enormous quantities of huge pine, spruce, and fir timber piled for miles along its banks and the lake shore below its mouth, indicate that it is a boisterous and foaming stream during spring and summer floods, still its inlet as compared with the outlet is too insignificant to satisfy me that the combined tributaries of the lake more than equal its discharge; the immense quantities of water lost by evaporation remain, therefore, to be accounted for. True there is probably much less evaporation from water at its temperature and great height than is usual from a less elevated water surface of equal extent; and it is also true that the two or three feet of autumn drainage from the high spring or summer surface of the lake must be considered; in addition great subterranean feeders or countless large springs beneath its surface remain to balance this evaporation. That so large a body of water, with a vertical elevation one and a half miles higher than many of the principal cities of the East, and half a mile higher than the highest mountain peaks of that region; itself begirt with snowy mountains thousands of feet higher; its shore-lines dotted, and doubtless its depths modified by deposits of scorching sulphur, seething geysers, and boiling hot springs—that this body of water should possess many rare and interesting features is not unreasonable. Among these is one now admitted, viz, that while there is usually, in summer, a calm during the latter part of the night, and a slight breeze up the lake in the early morning hours, by eight or nine o'clock a. m. the breeze is down the lake; it is first upon the mountain and island crests, high above the lake; then, suddenly striking the water, it uniformly soon becomes a strong, continuous wind, and not infrequently a tearing gale. But any time in the warm season (and nothing is known of it in any other) this lake is subject to sudden changes of atmospheric temperature and direction and force of the wind. This is the case when passing not only into range of each separate finger and the thumb, but also into the draft of the palm or main lake, where in autumn, within half an hour, I have experienced the change from a stiff regular breeze from one quarter to sudden, shifting puffs from nearly every direction, which soon culminated in a terrific gale with wind diagonally downwards, so lifting the sail and chopping the waves as to threaten my craft with instantaneous swamping. On this account, and because of narrow deep seas, rocky shores, and sparse anchorage, this lake, while one of the most beautiful and interesting, is one of the most dangerous for sailing craft. I am confident, however, that with even a small steamer, well built and managed, there would be little danger attending regular trips around the fingers, thumb, and palm of the lake, and for at least seven miles down the river to the Nez Percé Ford at the Mud Volcanoes. Indeed it is probable that ultimately this lake and its river will be navigated much farther, and near to the Great Falls. This point is distant some thirty or forty miles by the meanderings of the river, which, bordered by enchanting landscapes, is one of the loveliest of streams. With a suitable steamer making regular excursions of, say, three hundred miles, it is safe to predict that a hotel on

a. Mouth of the Upper Yellowstone River. b. Locality of Bridger Lake. c. Trail Creek Cove.

Southeastern extremity of Yellowstone Lake.

one one of the many charming terraces near the foot of the lake would ultimately prove a profitable investment in this region of wonders.

ROADS, BRIDGES, AND TRAILS.

The time and funds spent in constructing the road over the Madison Terrace, on the route of entrance from Henry's Lake, and the numerous repairs to bridges, culverts, and grades, many in number and great in size, which were rendered necessary by the deepest winter snows, highest spring floods, and the latest-opening summer ever known in these mountain regions, compelled me to abandon for this season my cherished desire to construct a very important line of road from the Upper Fire Hole Basin via Shoshone Lake, thence down the Yellowstone to its foot and falls, via Mary's Lake, down the East Fork of the Fire Hole River to its forks. But the entire trail of last year was somewhat, and portions of it greatly, improved and prepared for a road. As just stated, great improvement was made in the road up Fire Hole River, while a road valuable to tourists was opened across a bend of the river by way of the terrace of the great midway spring, which developed many mineral springs and geysers of great interest and beauty, and hitherto unknown.

After abandoning the Madison Cañon road I opened a direct and excellent route from near the Forks of the Fire Hole through a corner of the earthquake-shaken region into the old road along the Gibbon, bridged the Norris Fork and other branches, and constructed long and expensive causeways, turnpikes, and grades there and along Obsidian Creek and Cañon, as well as along the cañon of the Gibbon.

The expensive grades and bridges along the mountain side below the Mammoth Hot Springs required little repair, but the grades up the Terrace Mountain considerable.

The road to the Forks of Gardiner River has been extended across both its branches, and up the eastern branch nearly half-way through its terrible cañon, necessitating a grade of over 1,000 feet within two miles. The trail and bridge at Tower Falls have been somewhat improved, but require much additional attention.

Little was done on the old trail over Mount Washburn, since, in my opinion, it will soon be practically superseded for general travel by the new one between it and the Grand Cañon.

Routes are explored, and trails will be needed next season, to the newly-developed Hoodoo regions, as well as from Shoshone Lake, via Lewis and Heart Lakes, and Red, Sheridan, and Flat Mountains, to the Yellowstone Lake.

TRAIL AND PROPOSED ROAD ALONG THE CAÑON OF THE MIDDLE GARDINER RIVER.

As fully demonstrated, with a moderate outlay on a long steep grade on this trail an excellent road will be afforded, and as between it and the present road over Terrace Mountain a choice of routes may be had. An easy day's ride will then enable the tourist to obtain a view of the Mammoth Hot Springs, both from below and above; of the eroded valleys of all the Gardiner Rivers; of the falls of the Middle Gardiner, nearly two hundred feet high; and of its cañon, twelve or fifteen hundred feet deep, with its basaltic columns, spires, and steeples towering amid scenery second only in wild, majestic beauty to that of the Grand Cañon of the Yellowstone. He will then also be easily able to visit the

Rustic Falls of the West Gardiner, with its yawning cañon water-way below and the decaying wickeups and game drive-ways of the Sheep-eaters above it, and their ancient but not remote haunts at the cliffs; also, by easy ascent from the summit of Bunsen's Peak and the Terrace Mountain, to enjoy the enchanting view of the adjacent smiling valleys and snowy mountains, and the sharp peaks of the Tetons, dim amid the clouds, fully a hundred miles away.

GUIDE-BOARDS AND MILE-POSTS.

As stated in my report of last year, I made use of fragments of lumber which had been hauled nearly one hundred miles to our headquarters, for making a large number of sign-boards, which were well painted, and lettered with the names of prominent geysers, salses, paint-pots, and other hot springs, and falls, cañons, roads, and other natural and artificial points of interest. These, after difficult conveyance, often over long distances, were firmly affixed to posts, rocks, and trees, and proved, as was anticipated, of great value to all persons visiting the Park; but the result of this experiment has neither justified the expectation that they would remain where affixed, nor proved their usefulness, nor the propriety, under present circumstances, of an increase in their number. It is found that posts placed near enough to prominent geysers to properly designate them, unless unusually well set, are liable to be washed away; also, that the lettering upon the boards in such localities, as well as near important salses and other hot springs, is, from chemical action or the direct effect of hot water and steam, liable to be rapidly obliterated. Ordinary iron would probably oxidize or corrode, and stone crumble; and it is therefore important to ascertain some mode of making and affixing guide posts or boards that will render them of permanent service. Some of the sign-boards I erected were destroyed by forest fires, and others crushed by falling timbers or swept away by floods; but the greatest havoc among them has not been wrought by time nor by the elements, but, on account of their usefulness, by wantonness and vandalism.

While the leading men of intelligence of all classes and stations in life in these regions, as elsewhere, have mainly been the warm and reliable friends of the National Park, of all efforts for improvements therein, and of the persons most active in making them, there have ever been among the many honest and reliable guides and mountain-ramblers within and adjacent to the Park a few of a widely opposite disposition. The latter usually divide their time between acting as guides and pillaging, plundering game, valuable natural specimens, and often the outfit of those employing them, their ill-gotten gains being squandered in the vilest haunts of the neighboring towns, while they there lie in wait to entrap fresh tourists. These men, usually having neither ability, principle, nor habits suited to honorable employment, prefer to continue on in the lawless manner mentioned. Hence, like the ignorant, selfish, short-sighted, and often short-lived opponents of improvement elsewhere, they have constantly proved the greatest enemies of the Park and its visitors. They have been active, unscrupulous opponents of its exploration, and blatant slanderers, personally, and in the press when available, of those earnestly and honestly engaged in the improvement of this region. It is this small but despicable class of prowlers who, in addition to kindling devastating fires, slaughtering game, despoiling geyser-cones and other interesting formations, have, by extortionate de-

mands, robbed tourists, and who, to prevent the latter from following plain roads or trails, and from ascertaining routes and names of objects visited, have destroyed the boards designating the same. Hence I feel that the voice of all the better class of guides and mountaineer residents of the adjacent regions, as well as that of intelligent visitors from our own and other lands to this peerless region of wonders, will sustain me in urging the speedy enactment of laws to properly protect the Park, its contents, officers, and visitors, and the enforcement of the same by a body of determined police.

OBJECTS OF SCIENTIFIC INTEREST.

Well aware of their interest to the thinking portion of our people and their value to scientists everywhere, I secured many unique and valuable specimens of chalcedony, onyx, opal, and jasper, as well as various forms of silicified or crystallized ancient timber also petrified fish-eggs (so called), obsidian of various kinds and colors, &c., which, well boxed, are on the way to Washington via Bozeman and the southern or railroad route. Most of these were secured with great difficulty, often attended with danger, especially while exploring on rocky crags, in scorching sulphur basins, or on snowy mountain sides. None of the specimens mentioned in my last year's report, as sent in a small boat down the Yellowstone, and reported lost by wrecking at Buffalo Rapids, have been recovered, which is a serious loss to science.

Besides the deposits of obsidian, or volcanic glass, at the cliffs of Beaver Lake, which are unrivaled in quantity, beauty, and variety of color, there are large deposits of black and mottled obsidian at the Cascade or Crystal Falls, near the Falls of the Yellowstone, on the Continental Divide near Shoshone Lake, at the Lookout Cliffs, upon the new road over the Madison Plateau, and in other localities, while immense quantities of scattered fragments are found in the valleys, and minute particles sparkle like diamonds along the beautiful shore-lines of the Yellowstone, Shoshone, and other lakes.

Eroded fragments of fossil wood abound along the streams and lakes of the Park, while in many of these are beautifully-rounded fragments of geyser-cones and various kinds of hot-spring formations, and beautiful concretions from ancient or recent salses and paint-pools. The cones, branches, and even trunks of trees, are often found semi-petrified in the hot waters of the geysers, salses, and other hot springs and their outlets. Indeed there are but few of these springs whose waters will not, within a few months, so change any woody fiber, even the peculiarly light pine and cedar, as to cause it to sink. These fossilized woods retain their forms, but are clearly distinct in degree and character from the ancient fossil forests high up amid the basaltic terraces.

Along the mountain sides east of Yellowstone Lake are ancient terraces, shore-lines, and other indisputable and indelible evidences that at no remote geological period the surface of this lake was at least five or six hundred feet higher than at the present time; and that, like Shoshone and other lakes, which are being drained into opposite oceans, it is only a fragment of an ancient elevated inland sea or lake, bordered and dotted by active volcanoes, which have vomited into its perhaps tepid waters streams of lava, which have cooled into basalt, breccia, and other forms of more or less horizontally stratified rocks, beds, or deposits. With the intervening periods of time, and changes in the lake's surface, much of these deposits has crumbled or been broken or eroded away, and redis

tributed in less elevated deposits, which the Alpine climate and lashing waves of the lake are now rapidly undermining, as evinced by the countless specimens of the hardest and heaviest portions of the mingled débris of all the preceding formations and erosions which strew the beach. A notable locality for these uniquely interesting specimens is upon the northeastern shore of the lake between the mouth of Pelican Creek and Steamboat Point, where the shore, the valley of Pelican Creek, and the plateau between, are still dotted with the dwindling geyser and other hot spring remnants of ancient subterranean fires.

At Steamboat as well as at Storm Point the deposits or other effects of continuous hot springs have better withstood the action of the waves than the six or eight miles of intervening shore, which, somewhat less elevated and with fewer hot springs, has been shaped by erosion into the beautiful Saint Mary's Bay, an extension of which, reaching nearly to Indian Pond, I named Concretion Cove.

At Steamboat Point the contest, for ages, of hissing hot springs and lashing cold surf to adjust their respective boundaries, has left interesting monuments of the diverse powers and operations of each combatant, and also furnished a rare field for obtaining a peculiar class of specimens, including much sulphur. Storm Point offers specimens somewhat similar, but less sulphur and also more beautifully banded and colored indurated clays, shales, and other formations, notable alike for the beauty of their variegated stripes and their tendency to crumble. Here I obtained a number of specimens, the brightness and variety of coloring of which are seldom found in nature or equaled by art. But it is along the surf lashed shore of Concretion Cove that are profusely strewn the most peculiarly interesting specimens of their class that I have found in this region of wonders, and which rival any natural curiosities I have met with from other parts of the United States or from foreign lands.

Pelican Creek, in its twelve or fifteen miles of meanderings from the mountains to its mouth, some three miles south of the foot of the Yellowstone Lake, divides a beautifully undulating plateau of alternating grassy plains and parks, where lovely groves of branched pines are flanked upon the north by elevated sulphur hills with forest-clad base, sulphur-scorched sides, bald, snow-white, and terraced crests (a noted landmark across the Yellowstone Lake), and on the south by the Turbid Creek spur of Mount Chittenden. This plateau is evidently a comparatively recent formation of the crushed, eroded, mingled, and redistributed débris of all the preceding formations of this mystic lake. It is usually found heavily banded or stratified with pudding-stone, conglomerate, or breccia. Other specimens exhibit thin, wavy laminæ, all greatly disturbed, and often curiously banded and colored in circular formations, while firmly cemented by silica or deposits from the seething funnels of countless deep-seated subterranean hot springs, which continue to dwindle in number and power. Hence the immense quantities and varieties of interesting specimens of concretion and erosion plainly visible in nature's tracings along the steep cliffs, and the innumerable specimens strewn along the rocky strand of the ever lashing and eroding waters at their base.

Abruptly changing in character with the cliffs whence they were eroded, here are found, now variously-colored cobble-stones, with mingled and adhering fragments of the cement of the pudding stones; now the eroded fragments of various forms of fossil wood, quartz, and crystals; and now a shingle beach of hard, fine-grained, oval-edged, gray, and probably concretionary clay formations, from one-half to an inch in thick-

ness, six to eighteen inches long, and of various widths. In form these concretions vary from a shoe-sole to a pot-lid, from a rolling-pin to a pestle; in fact, ladles and platters of every description and size are among these formations. Perhaps, however, the most unique and rare patterns are the cups, pitchers, and lather-boxes, the last-mentioned being notably uniform in color, size, banding, and form, and many of which so closely resemble lathe-work as on first sight to deceive. Although uniformly concave on one side and originally convex on the other, many of them, by splitting along some of their well-defined lines of stratification, show a perfectly flat bottom, thus presenting a miniature lather box or cup, suitable for use or ornament. I have at various times deposited examples of these in the National Museum at Washington, and in other museums and cabinets of natural curiosities.

There are several of these remarkable beaches in the immense shore-line of the main lake and its thumb and fingers, but the most extensive and interesting yet explored is at the head of Concretion Cove, on both sides of the outlet of Indian Pond, the shoe sole and pot-lid forms being found in front and below, and the lather-boxes, ladles, and skimmers about half a mile above it. The first varieties are countless; the latter extremely rare. I have heretofore, in both official and unofficial publications, referred to these curiosities, at one time advancing a query as to their origin and formation, but which query I am not aware has as yet been satisfactorily answered. I now only state the facts, in the hope of inducing scientific investigation.

During the past season I made and traveled a fine trail from the open valley of Pelican Creek, first between long sloping hills, then through grove-dotted elevations, to Indian Pond, skirting its southern shore, amid the decaying brush, corrals, wickeups, and lodge-poles, to my camp on the bluffs; thence across the outlet to Indian Pond, about midway its half mile of length, and on by a fine trail route through mingled parks and groves to the first bluff on the south bank of Pelican Creek, and from there to Yellowstone Lake, about half a mile above its outlet.

From the open valley of the Pelican to my camp, some three miles, is a fine natural carriage-way, while the trail, a like distance to the head of the bluffs of the Pelican, is an excellent one; but the remainder of the route, owing to steep bluffs, a miry stream, and a valley of dense and fallen timber, appears a much greater distance than it really is. A bridge and other improvements are necessary to render the lower portion of the road good, and at some seasons of the year even passable. The usual route still is to cross the Yellowstone at Nez Percé Ford, seven miles down the Yellowstone River from its head; thence, following its eastern bank as closely as the cañons and fallen timbers will permit, to strike the Pelican above its first bluffs; from here to ascend the northern bank to its forks, and thence the North Fork for the trail to Amethyst Mountain and Soda Butte, the Middle to the East Fork of the Yellowstone, and the Southern to the various rough timber-obstructed passes to the Pasaria or Stinking Water. My favorite camp on the Yellowstone Lake (and it has evidently been a favorite one for the Indian) has ever been on the grove-dotted bluff, elevated thirty or forty feet above the lake, directly fronting Indian Pond, where I left my boat while exploring Pelican Valley and Stinking Water Passes. This cove, so landlocked as to be safe except during southern gales, and the bluffs at its head will doubtless remain a chosen haunt for the scientist and tourist long after the now abundant evidence of its frequent occupancy by the Sheepeater aborigines shall have vanished: the rude stone-heaps of their

wickeup sweat-houses being their most enduring monument, unless, indeed, at this most choice location in the Park an Indian cemetery may yet be found.

GEYSERS AND OTHER SPRINGS.

There are found within the Park a variety of both cold and hot water springs. Treating these springs in inverse ratio to the popular interest in the varieties, they are: the cold pure-water springs; the cold medicinal springs; the warm mineral, often poisonous, springs; the warm medicinal springs; the foaming or laundry springs; the terrace-building springs, and the pulsating and the spouting geysers.

COLD PURE-WATER SPRINGS.

Cold pure-water springs are countless, excellent, and usually permanent, similar to those of other elevated mountains, and often large enough to supply a fine rivulet, such as the Big Spring Creek, near the Great Falls of the Yellowstone.

COLD MEDICINAL SPRINGS.

These are not numerous, the most important being those of the Soda Butte, Cache, and Miller branches of the East Fork of the Yellowstone, in the northeastern portion of the Park. The interesting ruins near these springs indicate that they were once hot, cone, or terrace-building, as, indeed, some of them still remain upon Cache Creek. The Soda Butte Springs are traditionally valuable for the cure of saddle-galled horses, and probably but little less beneficial than the Arkansas springs in treating rheumatism and some other diseases. In fact, I deem a leasehold of these springs, in a lovely sheltered valley, with matchless trout-fishing, amid the Fossil Forests and enchanting mountain scenery, as one of the most valuable of those within the Park.

WARM MINERAL SPRINGS.

Warm mineral or poisonous springs are found at a noxious sulphur basin at the head of Green Creek, and other localities near Beaver Lake; they are also numerous along Norris Fork, the main Gibbon River, Pelican Creek, Turbid Lake, and Brimstone Basin, and also in the Grand Cañon of the Yellowstone, and elsewhere. The gases arising from these springs, as well as their waters, are usually injurious to health, and many of them are really poisonous, some of which I have so designated upon guide-boards along our roads, as a warning to tourists.

WARM MEDICINAL SPRINGS.

These springs seem to differ little from the cold ones, with which they are frequently intermingled, but their heat and vapors render them more convenient and valuable for bathing purposes. Examples of these springs are found at Cache Creek, the various Fire Hole Basins, and to a limited degree even among those of the Mammoth Hot Springs.

HOT FOAMING OR LAUNDRY SPRINGS.

These are found in the cañon of the Gibbon as well as that of the Yellowstone, in all of the Fire Hole Basins, and notably in the Geyser Meadows, west of the Forks of the Fire Hole Rivers. Although really hot

springs, the temperature of the water is far less than the casual observer would suppose, because much of the furious ebullition is caused by escaping gases. A careful analysis of these waters will alone demonstrate their properties, but many of them surpass any other water, either naturally or artificially prepared, for cleansing the skin, as well as blankets or clothing of any fabric.

TERRACE-BUILDING SPRINGS.

The description of the Mammoth Hot Springs as a typical representative of this class, in my report of 1879, is so full and complete as to require but little additional attention from those who have perused it. For those who have not I will briefly state that tortuous escape vents of deep-seated internal fire, in passing through the underlying cretaceous limestone, become charged with dissolving portions of the wall rock, and upon reaching the surface the water is discharged in pulsating throbs, each of which deposits a thin corrugated lamina of the calcareous substance held in solution.

This apparently slow but ceaseless process has resulted in building up beautiful scallop-bordered bathing-pools along the thousands of feet of terraced slopes adown the mountain side. Traces of iron and other minerals, held in solution, tint these formations with their own peculiar coloring, in vertical banding, presenting a view at once grand, unique, and inimitably beautiful. These Mammoth Hot Springs, although far the most important of the kind now active in the Park or perhaps the world, are insignificant to what they were when building the Terrace Mountain, or what other springs were at perhaps the same period when they built the enormous cliffs along the Yellowstone, at Bear Gulch, at Sheepeater Cliff, upon the Cache, Tower, Pelican, and many other localities where these enormous deposits, destitute of active springs are now crumbling to ruins and eroding away.

PULSATING GEYSERS.

While these springs are frequently intermingled with those of the bathing-pools, and possess many features in common, they are in other respects very dissimilar. The bathing-pools or terrace-building springs are usually large pools of various forms upon a mountain slope, down which their escaping waters build the above-described bathing-pools and terraces; while the pulsating geysers are uniformly along a continuous fissure, building a steep ridge directly over it of nearly uniform horizontal elevation, sloping alike each side, or else a circular cone, which in height frequently exceeds the diameter or even the circumference at the base. The long or ridge form appears to have been more common formerly than at this time; indeed, the prevailing circular or cone formations over small escape vents from the internal forces is one of the many indications of their waning power. Peculiarly interesting views of these ridges are found in most of the Fire Hole Basins, where, as well as in the cañons of the Norris Fork and main Gibbon, and the elevated Monument Geyser basin, and other localities, the cones of both active and extinct pulsating geysers are frequently found commingled. Among the largest and most interesting of both the cone and the ridge varieties are those amid the terraces at the Mammoth Hot Springs.

The Devil's Grotto is only one of countless huge cavities in the ridges which are from ten to fifty or more feet high above the encasing terrace formations, and from one-eighth to one-fourth of a mile long. Many of them are extinct and crumbling to ruins, but others, as that through

the end of which we cut our road upon the main terrace, are still active. Some of the circular cones are also active, but a large one upon the upper terrace, which was surmounted by several miniature cones, some of which Professor Hayden (I learn) removed to the Smithsonian in 1872, as I did one other in 1875, is now in the dying throes of extinction.

Two large and interesting cones of extinct geysers are found near where our road from the Fire Holes descends the terraces at the Mammoth Hot Springs, as shown in the frontispiece of this report. As there shown, the Devil's Thumb is mainly concealed by the terrace above the road and the Liberty Cap below it, near a group of ever-changing terrace-building springs, which are fully two hundred feet below the main Mammoth Hot Springs upon the terrace next above.

LIBERTY CAP.

To visitors to the Park or attentive observers of the published descriptions and sketches of its wonders, the famous monument called Liberty Cap requires no further description, but for the information of others it may be said that it is an extinct, pulsating geyser-cone, some fifty feet in circumference, which rises forty-five feet vertically above the present surface of the hot-spring formations, which hide an unknown but perhaps equally great, if not greater, portion of its base. Not only is this encasing support shelly and cavernous, but, like the much harder and more durable circular lamine of the cone itself, it is crumbling away, and, as may be seen in a correct sketch of it, is greatly eroded near the base by time and the elements and is so deeply seamed and fractured as to continually threaten the dislodgment of masses sufficient to change its center of gravity and precipitate the fall and irreparable destruction of one of the most unique and interesting specimens of nature's handiwork as yet anywhere discovered. The settling of the encasing terrace deposits sufficiently to dislodge the timber which I inserted in 1878 to support the cone, proves that it lacks the firmness to properly sustain stone or iron supports, and it therefore becomes a question of scientific as well as practical interest whether a sufficient quantity of water from the much more elevated Mammoth Hot Springs cannot be cheaply conveyed into the ancient supply-pipe of the cone, if, as seems probable, it is still open, or, if not, alongside of it, in order to throw an ornamental column of water to any desired height. As my observations accord with Bunsen's theory, that these waters do not materially deposit within channels, conductors, or pipes, but only by evaporation at their termination, or edge, it is believed that the terrace-building properties of the water would soon encase this interesting cone with the inimitably beautiful-bordered pools of the terrace formation, and also ultimately surround it with an effective and permanent support. So strong is my conviction of the perfect feasibility of this plan, that nothing but absolute necessity for the use of all available funds for buildings and opening roads and bridle-paths has prevented my expending a moderate sum upon the experiment.

SPOUTING OR INTERMITTENT GEYSERS.

Without attempting to decide a mooted question among savants as to the true origin of these prominent wonders of the Park, I venture to state that successive years of careful observation tend toward the theory that, like pulsating geysers, salses, fumeroles, and most of the other kinds of hot springs, they are primarily escape vents for the earth's pent-up internal fires. In these vents the chemical action of escaping gas and

high-pressure steam produced by contact of this escaping gas-heat with the permeating surface-water, by dissolving the wall rock increases the heat and enlarges the orifice of these small, tortuous, and otherwise cooling fissure vents.

Slow, but sure and constant, change attends them all, and many, though probably not all of them, at the proper stage become true intermittent spouting geysers. This can occur only when the orifice is so nicely adjusted in height, size, and form to the power of the escaping steam and gas in the self-formed chamber beneath that the pressure of accumulating water for a time nearly or quite prevents its escape except through sympathetic fumeroles or natural safety-valves. But the constantly-increasing force from beneath ultimately overpowers the pressure of the water, when, after more or less subterranean rumbling, earth trembling, and sundry kinds of bubbling, gurgling, and spluttering, the aqueous monster seems fairly aroused, and then occurs the grand eruption. This is usually through one, but occasionally through several circular or oblong vents, cones, or craters with diverse kinds of throttlings and pulsations in the different geysers, each having its own peculiarities in color and size, and in the shape of the orifices, as also in the height, power, and direction of the column or columns of water and the length of the periods of eruption and of repose; and even these, as above stated, are doubtless slowly changing.

While the foregoing theory seemingly accounts for the usual manifestations of geyser eruptions, still the rending of huge geyser cones and the hurling of tons of rock, as have occurred at the Giant and New Crater Geysers and elsewhere, seem to indicate an occasional outburst of some greater power. Explosions of superheated steam or of gas; misplacement of the safety-valve upon escape vents of internal fires; infernal regions, or other places of pent-up power are occasionally suggested by phenomena otherwise inexplicable.

To the Upper, Lower and Midway Geyser basins upon the Fire Hole Rivers, and others less important upon the shores of the Yellowstone, Heart, and Shoshone Lakes, early discovered by others, my own explorations have added the Monument, the Norris, and the Paint Pool basins upon the Gibbon or its branches, the Safety Valve in the Grand Cañon of the Yellowstone, and several others, less important, in other portions of the Park, which is now so well explored that there seems little probability of additional basins of importance being hereafter discovered. Still, as my own explorations have mainly been made in connection with the ever-urgent duties of exploring or opening roads or trail routes, and the scientific explorers of the Park have labored under many and grave disadvantages during brief periods of summer sauntering, amid hostile Indians, doubtless interesting isolated geysers, or perhaps small groups of them, may yet be discovered. In fact so little, comparatively, is yet known of the number, size, and peculiarities of the various geysers or other springs of these regions that I deem it one of the most inviting fields for further scientific investigation, and recommend that provisions be made accordingly.

FOSSIL FORESTS.

As explorations of the fossil forests of the Park have each succeeding year greatly added to our knowledge of their area, magnitude, and wonders, during the past year I explored the hitherto unknown forests on Cañon Creek and other localities of the Yellowstone Range, Mount Washburn, and the basaltic range between the fingers of the Yellowstone

Lake; also those in the mountains east of it, in the Hoodoo region, and on the Stephens Range, besides many additional localities on the Pelican and Warm Springs Creeks, as well as other well-known forests.

It is now evident that the basins of the East Fork of the Yellowstone, Pelican, Tower, and Black Tail Creeks constitute a region of fossil forests where an excavation or erosion at an elevation of from 7,000 to 10,000 feet would most likely unearth the fossilized branches, trunks, and roots of the giant trees of some primeval forest. Whether the successive deposits now encasing these forests in some portions of the Park to a vertical depth of at least 4,000 feet are subaqueous or subaërial, or, as is probable, partly both, it is evident that great and long-continued oscillation of the surface and periods of submergence and elevation have occurred, as the roots of the fossil trees of these forests, little inferior in size to the "big trees" of California, often penetrate nearly, if not quite, through the horizontal stratum or layer of earth and rock upon which they grew, into the broken, shattered, and eroded trunks of the fossil trees beneath them. It is also evident, from the uniform character of the successive forests in vertical layers that the agents or influences for fossilization were for an immense period of time uniform and abundant, while those for crystallizing, though long continued, were at no period so abundant or uniformly distributed. In fact, it is not usually the largest trees, or forests of them, which are other than simply fossilized in the original forms of the timber, but, rather, limited areas of usually smaller and more scattering timber, originally concealed in the peculiar cement which fills every crack and cavity, not only of the wood but also of the encasing rocks and their interstices, with the most beautiful chalcedony, which, probably, after long-continued processes of cooling, has produced the famous caskets of brilliant amethysts and other crystals here found, and which, while elsewhere unequaled in nature, are considered inimitable by art.

NATURAL BRIDGE.

Although at various points in the Park, as on the plains, there are temporary bridges of shale or of indurated clays, formed by the undermining action of small, transient water-courses; and although in many of the basaltic cliffs and peaks within and adjacent to the Park (notably in the newly-explored Hoodoo region of the East Fork of the Yellowstone) there are natural fissures and rough-galleried passages through the crumbling peaks and turrets of the breccia or conglomerate formations, and also amid the immense débris of the fractured cliffs of the Mammoth Hot Springs; and while there are wind and storm worn tunnels through the sharp cliffs of crumbling sandstone, there is, as yet known, within the Park, but one substantial natural bridge of stone over a permanent stream. Upon the map accompanying this report Bridge Bay is shown for the first time. It has two small tributaries entering near its head some six miles up the west shore from the foot of Yellowstone Lake. At the entrance of the northern one is a shallow, marsh-bordered pond, perhaps a mile long and half a mile wide, which discharges but little water, and which is evidently the sand spit-severed extremity of the bay. The southern one is a small creek, with a deep, narrow valley of alternating grassy glades and beaver-meadows, bordered by burned and fallen timber, and, within a distance of five or six miles, heading, in several branches, in the basaltic hills. This is Bridge Creek, appropriately named from a natural bridge over the north branch, about one and a half miles from the bay. From a remark in Dr. Hayden's report for 1871, it would appear that some members of his expedition had visited

this bridge, but this is all the evidence I have been able to find that any explorer of the Park, excepting myself, had discovered it before the season just passed. I first observed it in 1877, but, an immense mass of tangled and fallen timber intervening, I could not readily reach it, and hence made no attempt at its description. The north or bridge fork of the creek, though evidently a foaming torrent at the annual period of melting snows, in early autumn is a barely continuous rivulet amid the craggy bluffs above the bridge, where it is much enlarged by drippings from the overhanging walls of the chasm and the numerous springs of noxious-looking and nauseous-smelling water. What is now the bridge was once the brink of a cataract nearly one hundred feet high, over a ledge of peculiarly hard, durable, variegated trachyte upheaved to the vertical across the stream. Directly across this ledge countless ages of erosion have formed first a shallow, trough-like channel; then, or simultaneously with this channel, a vertical orifice, several feet long by one foot wide, between the strata, some two feet from the brink. There is a similar orifice eight or ten feet further up stream, so large and deep as to undermine the intervening brink of the falls, where the impetuous water and rocky débris, by first cutting a circular channel and ultimately greatly deepening it, have eroded one of the finest archways I have ever seen, which has about ten feet of stone support for a carriage-way above, and about thirty feet of water-way beneath. The chasm is fully spanned by the bridge, which, by measurement, I found to be twenty-nine feet long, and, including the above-mentioned vertical orifice, ten feet high above the top of the arch, and forty-one feet to the bed-rock of the chasm, which, at this point, is a rapidly-deepening cascade. As the two outside layers of the vertical strata are, on an average, considerably higher than the roadway between them, they form a rude but permanent railing. The vertical orifice, as well as the ancient channel, can readily be filled or floored with timbers. Moreover, this natural bridge is on a route which avoids the sand-spits, ponds, and gullies near the bay; and I cannot, therefore, doubt that as soon as funds are available for the necessary repairs to the bridge, and for the removal of the vast quantity of fallen timber upon the road, this route will be the one most traveled, and this natural bridge one day be crossed by thousands of eager pilgrims to this wonder-land. The well-worn game-trails over the bridge are evidence of its long and constant use as a crossing for elk, deer, and antelope: while from the actions of a huge grizzly, which I shot while rearing from his lair in a fallen tree-top, upon the western abutment, it is, I judge, used by bears as an ambuscade.

GOLD AND SILVER MINES.

While the volcanic and ancient hot-springs formation, or lake deposit, so characterizes the surface of the Park as to render improbable the existence of valuable mines in nearly if not quite all the Wyoming portion thereof, the mining operations of the past year have developed the presence of promising mines of gold, copper, silver, and lead in Bear Gulch, Crevice, Hellroaring, Soda Butte, and Clark's Forks regions, either within or adjacent to the Montana portion of the Park. Anticipating this, and believing, as has now been proved, that the three-mile strip of the Park in Montana was embraced in a treaty with the Crow Indians years in advance of the dedication of the National Park, I have not only abstained from any attempt to control it, but have openly pressed its recession, since it possesses no objects of interest, and hence, though it may be of value to others, it is utterly valueless to the Park. The ratification of

the Crow treaty for the cession to the government of all these mining regions unquestionably places this strip within the Park, and as its recession is pressingly necessary, it is hoped it will be made without delay.

The existence of granite and limestone nuclei in some lava-capped mountains along other boundaries of the Park renders possible the future discovery of valuable mines, but, if so, they can be re-ceded without cutting off any objects of interest, the retention of which may be desired.

SULPHUR, ALUM, AND OTHER VALUABLE DEPOSITS.

Unlike those mentioned under the last caption, the deposits of sulphur, alum, and other minerals, found in great quantities and possessing considerable scientific interest and commercial worth, are always found associated with hot springs or other wonders, and are inseparable from the Park. Of these, sulphur is perhaps the most widely distributed, as well as the most valuable.

The Terrace Mountain, at the Mammoth Hot Springs; Sulphur Mountain, near the Great Falls; Sulphur Hills, near the Pelican; the elevated, bald, and crumbling hills of the Norris, and, to some extent, other geyser basins and countless localities throughout the Park contain vast deposits of sulphur, and most of them alum, copperas, and other mineral substances in greater or less quantity, and together afford a vast field for chemical investigation, if not commercial enterprise. Some of the crystallized sulphur, apparently produced by vaporization, is almost pure enough for immediate use for pharmaceutical purposes.

HEADQUARTERS OF THE PARK.

MAMMOTH HOT SPRINGS.

In consideration of its isolation from the world, and of danger at the time from Indians, it is now fully conceded, if it was ever seriously doubted, that the location of the headquarters of the Park at the Mammoth Hot Springs, and the sites chosen for the buildings and for pasturage, are admirable for defense, convenience, and beauty; while the buildings, fences, and other necessary improvements, are well planned, constructed, and preserved. Hence, although the relative slower progress of the Northern Pacific to that of the Utah Northern Railroad in approaching their respective natural gateways to the Park may temporarily tend towards changing headquarters to the Forks of the Fire Holes and centering point of roads and places of interest at that end of the Park, still it is questionable, in the event of the ultimate opening of a railroad route up the Yellowstone, whether the relative superiority of the location for health, beauty, comfort of wintering, and grading purposes, as well as for great herding, farming, and mineral developments in the vicinity, may not render their continuation at the present site desirable and wise. But even should a change be necessary, the present buildings will be required for a long time, and are adequate as the residence of an assistant. The principal improvement necessary is the introduction into headquarters of hot and cold water, of which there is an ample supply at a proper elevation, and the routes for the carrying-pipes for which have been located, and estimates furnished of the cost of the work.

The observations of this season confirm those expressed in my last year's report upon the origin, former enormous terrace-building properties, and their present dwindling remnants, and the propriety of testing the effect of an increased supply of water from the West Gardiner River above the ancient terraces. If Bunsen's theory be true, as now appears

will not seriously coat nor fill internally, then a vast field is opened for the most unique, inimitably grand, beautiful, and permanent ornamentation of headquarters and surroundings of the Park that can be imagined by the most visionary dreamer of the beautiful and marvelous.

To these features may be added the leasehold value of hotel or other sites for a boundless display of portable ornamental work for sale to tourists or for display or preservation in the leading cabinets and museums of the civilized world.

BOUNDARIES OF THE PARK.

That the dedication in 1872 of the Yellowstone National Park as a heritage of wonders for the enjoyment of our people was a wise and timely act few will now question. Fortunately its boundaries as originally dedicated were approximately correct; but as the real object was to dedicate in the best possible form a mountain-girt park of unique and matchless marvels, priceless as a health and pleasure resort, and embracing as little as possible of value for other purposes, to fully accomplish this it is necessary to change somewhat the boundaries and restrict rather than extend them. I am still of the opinion, therefore, as expressed in my previous reports, and for the many and evident reasons therein stated, that the northern and western boundaries of the Park should be speedily changed so as to conform to those of Wyoming Territory. This will necessitate taking off a strip some three miles wide from the borders of Montana and Idaho Territories, which, while valueless to the Park, is valuable for other purposes. I also deem it quite likely that careful exploration will render evident the propriety of severing a like strip from the entire southern border.

While these changes will greatly reduce the area of the Park where there is nothing of value to retain, my explorations of the past season of the Sierra-Shoshone Range east of Yellowstone Lake and in the Hoodoo or Goblin regions, lead me to conclude that it is very probable the extreme drainage of the East Fork of the Yellowstone, including at least the Hoodoo regions, is outside of the present boundaries of the Park. This entire region south of Crandall Creek is probably destitute of all rich minerals, while it is one of the wildest, most precipitous, impassable, and worthless mountain ranges on the continent, valueless except for scientific exploration or as an attachment to the National Park. Hence I deem it practically important that a thorough exploration of this region be made before running the eastern boundary of the Park, with a view to learning whether it may not properly be modified or changed, if necessary, to embrace these newly-explored wonders. But if this be done the policy which has been uniformly pursued in regard to tolls on roads or bridges within the Park should be extended to that expensive and valuable portion of the road down the Gardiner, which would revert to the control of Montana, and the act of recession should contain a provision that all roads previously made within the Park or public lands of the nation shall remain forever free from toll.

CROW INDIAN TREATY.

A treaty with the friendly Crow Indians, for the cession of the mining regions within and adjacent to the present northern boundaries of the Park, prevented anticipated annoyance from that quarter during the past season, and trouble in this direction will be obviated hereafter by

the early ratification of the treaty and permanent legal occupation of the mines. These measures will, I trust, be speedily accomplished for these reasons, as well as for other reasons fully stated in my last year's report.

SHEEPEATER AND BANNOCK INDIANS.

The feeble and harmless Sheepeater Indians were the aboriginal owners and formerly the only permanent occupants of the Park, and being somewhat allied to their Shoshone and Bannock neighbors, these latter were occasional ramblers therein. Excepting Washakie's band of Shoshones on Wind River, they are all now united in the agency at Ross Fork of Snake River, in Idaho. Having faithfully adhered to the obligations of their treaty of cession, made in Washington during last winter, as well as to their promises made to me at their agency in the Ruby Valley in the spring, no trouble has arisen with them in the Park during the past season, nor is any looked for in the future; and with the adoption of the measures mentioned above, there need be little fear of Indian depredations hereafter within its confines.

REPORT OF THE GAMEKEEPER.

It is with pleasure that I refer to the report of the active and efficient gamekeeper of the Park (which will be found in the Appendix, marked A), and indorse his suggestions for the protection of the interesting and valuable animals within it. The explorations this season in the Hoodoo and other eastern portions of this region will prove so inviting to tourists that game will soon be as much exposed there as elsewhere in the Park, and unwilling to abandon these animals to speedy extermination, I cordially commend Mr. Yount's suggestion for their protection in all its confines.

While the Park remained a haunt of hostile savages, and was without roads, hotel, or other conveniences of civilization, tourists necessarily went fully armed for self-protection as well as to secure food; but with the disappearance of the necessity for carrying heavy long-range rifles, their use should be discontinued, except by agents or employés of the government, and by them only upon specified conditions. It may require years of judicious management to accomplish this to the satisfaction of border-men ever fully armed; but habits speedily change with circumstances, and mountaineers and tourists will, it is believed, soon prefer unmolested enjoyment with the rod and fly, in the splendid opportunities for trout-fishing, or perhaps with the fowling-piece rather than the heavy, cumbersome, expensive, and often dangerous long-range rifle now in use. It is believed that few of the mountaineers would long resist appeals to their national pride for the preservation and protection of the noble animals that roam through this great National Park. For my constant and urgent appeals for protection for these animals and for methods of accomplishing it, I refer to pages 11, 12, and 13 of my Report of 1877, page 10 of Report of 1878, and pages 21 and 22 of Report of 1879, but in connection with the subject I would add that there are now in the Park abundance of bison, moose, elk, deer, antelope, and big-horn sheep; besides fine summer pasturage, there are winter haunts for these animals, where, with little care or expense other than protection from wanton slaughter, they would rapidly multiply. Many of them would become domesticated and thus an interesting feature of this great domain of nature would exist, when these animals become, as will ere long be the case, extinct elsewhere on this continent. Some would,

of course be slaughtered, but judiciously, and when both their pelts and flesh were most valuable.

HISTORY OF THE PARK.

On account of the evidently increasing interest of the public in the great Yellowstone National Park, and believing that a carefully-prepared and accurate statement of its location, dedication, and routes of access, as well as reference to its aboriginal inhabitants, prominent explorers, and first buildings may prove of present and permanent interest and be of lasting value, a few pages of the report are devoted to this subject.

As partly shown by the accompanying map of the Park, and much more fully by the excellent Land Office map of the United States, the Snake River Fork of the Columbia, and Green River Fork of the Colorado of the Gulf of California (Pacific waters), and nearly all the other great rivers of that portion of the continent, including the Jefferson, Madison, and Gallatin Forks, and the Yellowstone, Big Horn, and other branches of the Missouri-Mississippi Atlantic waters, to a great extent radiate from hot springs or spouting geysers within or adjacent to the great National Park, situated mainly in Northwestern Wyoming Territory and also embracing portions of Idaho and Montana. There can be no doubt that the modern sulphur basins, salses, hissing fumeroles, and spouting geysers are only dwindled remnants of the ancient volcanoes and vast and long-continued eruptions of lava, which, in the region of the National Park, characterized the elevation of the Great Plains and Rocky Mountain ranges from the oozy bed of a shallow ancient sea.

It is also evident that at some subsequent but remote period of time many of these mountain slopes were at an elevation of from 6,000 to 10,000 feet, covered with dense forests of timber, in size fairly rivaling those upon the Pacific coast, and that by some oscillation in the elevation of these regions, by eruptions of hot ashes, mud, and slime, like those which covered Pompeii and Herculaneum, or other all-powerful and long-recurring agencies, forests have been crushed or covered, often many hundred feet deep, by conglomerate breccias or other volcanic material.

Here erosion of the elements, or the blast, or pick and shovel of the tourist, unearth this ancient timber, which is often petrified entire into a perfect tree or log of stone; other timbers, while retaining their form, into opal or chalcedony, with amethyst or other crystallized cavities, matchless in shape, color, and beauty, which, for cabinet specimens, are unequaled elsewhere in nature and unrivaled by art.

Many hot springs and mineral streams now petrify timber or coat it with sparkling lime or silica, build geyser-cones, and many beautiful forms of crystallization, but they are all clearly distinct, and mainly much inferior to those of the closing eruptive period.

This wonderful region is really less one large park than a group of smaller ones, partially or wholly isolated, upon both sides of the Continental Divide, much lower in the Park than the nearly unbroken surrounding mountain ranges. Its average altitude probably exceeds that of Yellowstone Lake, which is some 8,000 feet, or nearly a half mile higher than Mount Washington. Its few yawning, ever difficult, often impassable, cañon-approaches along foaming torrents; the superstitious awe inspired by the hissing springs, sulphur basins, and spouting geysers; and the infrequent visits of the surrounding pagan Indians have combined to singularly delay the exploration of this truly mystic land.

Although Lewis and Clarke, by ascending the Jefferson instead of the Madison or Gallatin Fork of the Missouri in 1805, crossed the Rocky Mountain divide some seventy miles west of the Park without its discovery, yet it is from a member of that early band of Northwestern explorers that we derive our first knowledge of its existence. Coulter and Potts, after their discharge in 1806, retraced Captain Clarke's return route, via the Yellowstone River and Bozeman Pass, to the Three Forks of the Missouri. They there continued to trap and hunt until Potts was killed and Coulter captured in a Blackfeet Indian ambuscade below the famous Beaverhead landmark upon the Jefferson. Coulter was allowed to run the gauntlet for his life, and, being remarkably fleet of foot, distanced all but one of his pursuers, whom he pinned to the earth with his own war-lance, escaping over six miles of prickly-pear plain to some drift-wood at the head of an island in the Jefferson. Unarmed, naked, and lacerated, he, through untold dangers, hardships, and suffering, reached a trading-post on the Lower Yellowstone, rearmed himself, and returning to his Bannock friends, for years hunted, trapped, and, with relentless vengeance, fought the Blackfeet Indians.

The haunt of the main Bannock tribe was at Henry's Lake, west of the Park; that of their little Sheepeater band within it; their main buffalo range being upon the Big Horn, east of it, and doubtless with them Coulter visited the Great Falls, Yellowstone Lake, and some of the fire-hole basins and spouting geysers, and after his return to Missouri in 1810 gloried in describing them; yet, so little credence was given to his descriptions, that for many years, even long after I was first upon the Lower Yellowstone, "Coulter's Hell" was a standing camp fire jest upon now well-known realities; but John Coulter was, without a shade of doubt, the first white explorer of any portion of the Yellowstone National Park.

In 1809 the veteran fur-trader, Henry, driven from the Three Forks of the Missouri by the ferocious Blackfeet, constructed and for a time occupied a stockade fort upon the outlet of the lake which still bears his name.

W. P. Hunt and Ramsey Crooks, in their outward route to the ill-fated Astoria, with a strong party in 1810, and also the feeble remnant of the band during their return in 1812, crossed the Wind River Range south of the Park.

The famous American mountaineers, Henry, Ashley, Sublette, and Jackson; the Scottish Campbells and Stewarts; the French Pierre, Port Neuf, and Fontenelle, and other renowned trappers and traders roamed over the regions surrounding the Park until most of them were killed by the Indians, prior to the expedition of Captain Bonneville in 1832. During that year a sanguinary battle was fought between the bloody Blackfeet and the combined bands of these fur-traders and their Bannock friends at their general rendezvous in the famous "Pierre's Hole," near the Three Tetons, and with the mountains of the Park in plain view; and yet, most strangely, in all the published reports of these famous mountaineers we fail to find a hint of the Park or its wonders.

During nearly three years of trapping and trading with the Indians by Captain Bonneville and his detached parties, in all directions from the Park, it is evident that he neither visited it nor learned its true location; for although his map of these regions is far more accurate than *any* before and *many* since, even that shows the largest mountain lake as the head of the Snake River, and hence Pacific waters, instead of the Yellowstone, which really discharges into the Atlantic; Bonneville's representation of this lake is also inaccurate in form, and is without

name or indications of the great falls, cañons, or geysers, or any of the fire-hole basins in the Park. In fact, in his only reference to the latter (Irving's Bonneville, page 236) he erroneously locates it upon the Stinking River (now Water) branch of the Big Horn, where the sulphur fumes from an extinct geyser basin somewhat resemble those of the Park, the basin itself, however, every way less mountain-girt and less important than any which Coulter saw within the Park.

While I have given much credence to a well-indorsed camp-fire story that one Smith, a trapper, prior to the days of Bonneville, had written a narrative of his explorations of these regions, and who was killed shortly thereafter by Indians, I have never as yet met with any published record of the same.*

Border legends, although often gross exaggerations, are seldom wholly false, and scores of them indicate that white mountaineers did occasionally long ago visit portions of the Park for trapping or concealment, and perhaps for both purposes. This, in fact, is proven by ancient stumps of large trees cut for breastworks and for foot-logs across the Crevice, Hellroaring, and other mountain torrents, which no experienced mountaineer would fail to recognize as the work of white men, being rounded from below in a way never practiced by any known Indians; also by a corral near Amethyst Mountain, and ruins of an ancient block-house with earth roof and loop-holes, near the grand cañon below Mount Washburn, clearly the work of unknown white men, and a cache of marten steel traps, of a peculiar form only used by the Hudson Bay trappers some fifty years ago, which were recently found along our road near the Indian arrowhead-quarry at Beaver Lake.

In Frémont's reports of his explorations in those regions in 1842–'44, he describes mountain scenery and harmless hermit Indians similar to those in the Park, but makes no mention of geysers, being probably at that time ignorant of their existence.

In 1844 James Bridger described to me personally, and as I now know correctly, the cañons of the Upper Snake River, but he had then neither seen nor obtained a correct conception of the geysers, deeming them real volcanoes. His description of the Two Ocean Pass south of the Park is now admitted to be mainly correct, and there is "more truth than poetry" in the camp-fire story of a foaming torrent, icy cold at its snowy fountain-head, and seething hot half a mile down the mountain-side, though not caused, as he boasted and perhaps believed, by the velocity of the descent, but by a crag-hidden fire-hole basin of spouting water and seething brimstone. So, also, with his famous legend of the lake with millions of beaver, nearly impossible to kill because of their superior cuteness, with haunts and houses in inaccessible grottoes in the base of a glistening mountain of glass, which every mountaineer of our party at once recognized as an exaggeration of the artificial lake and obsidian mountain which I discovered, as stated in the chapter on explorations in my report of 1878. So as this locality and that of the arrow and lance head quarry are

* Since the publication of the facts already narrated in my report of 1878, learning that the late Mr. George Gibbs was supposed to have obtained a copy of the manuscript of this narrative of the trapper named Smith, and failing, after diligent search among valuable papers (now with the ethnological bureau, under Maj. J. W. Powell) to find it, I last year addressed a letter of inquiry on the subject to his brother and representative, Prof. Wolcott Gibbs, of Cambridge, Mass. From his reply, learning he failed to find the manuscript, cordially assisted by Mr. George H. Boehmer, in charge of the international exchange office of the Smithsonian, I examined the Gibbs origin that institution. Again disappointed, I reluctantly abandoned the search, hoping that if found they would impart much interesting information relative to the Hudson Bay and other early trappers of those regions, and I leave this record of circumstances to stimulate research for this missing manuscript.

across a sharp mountain range from where represented by Bridger and so long sought by trappers, it is not probable that he ever saw them, but that his information was derived from old Hudson Bay trappers or their Indian allies, who were, perhaps, alike interested in deceiving him as to their true location. These rumors of a mountain-girt land of wonders at the fountain-heads of the Missouri and Yellowstone so impressed Lieutenant (now General) G. K. Warren during his explorations of the Black Hills and Great Plains up to 1857, that he planned an expedition to verify them. A strong, well-equipped party, under the command of Captain (since General) W. F. Raynolds, with Prof. F. V. Hayden as geologist, and James Bridger as guide, were sent upon this expedition and spent the season of 1859 in exploring the Black Hills and Big Horn regions, but failing to cross the towering Yellowstone Range and reach its mystic lake, they wintered upon the North Platte. Efforts were renewed in the spring by sending Lieutenant Maynadier with a party down the Big Horn to again seek a pass from the east, while the chief of the expedition with the main party sought one up the Wind River from the south. Both parties failed; Raynolds by encountering a buttress-based, snow-capped mountain wall, to cross which, Bridger declared that even a crow would need to carry his grub.

Turning to the west and crossing the main Wind River divide, near the head of Green River, and failing in another effort to reach the cliff and snow encircled Park from near the Three Tetons, Raynolds abandoned the effort, and followed the old traders' route via Henry's Fork and Lake to the Three Forks of the Missouri. He was here joined by Lieutenant Maynadier, who, baffled in all attempts to reach the Park from the east, had crossed the Yellowstone in bull-boats below the Gate of the Mountains, and through the Bozeman Pass had reached and descended the Gallatin. (See Ex. Doc. 77, Fortieth Congress, first session.)

The utter failure of a two years' search for the geyser basins by such well-equipped parties, led by the most famous mountaineer guide, proves them mountain-girt and isolated from the surrounding regions, with few and difficult routes of access.

Thus baffled, the government made no further effort to explore the Park until long after gold-seeking pilgrims had visited various portions of it. Prominent among these prospectors were Bart Henderson, Adam Miller, George Houstin, and C. J. Barronette around the Forks of the Yellowstone, and Frederick Bottler and H. Sprague from Henry's Lake to the Forks of the Fire Hole River. All these visits were prior to 1869, when two hunters, Cook and Folsom, explored portions of the Park, but their oral report, made to General Washburn and to others who sent them from Helena, has never been published.

Having myself, long before the Raynolds expedition, failed, as he did, to reach the Park from the east, in June, 1870, I again sought, after many years' absence from those regions, to reach it by ascending the Yellowstone above the Gate of the Mountains, accompanied by Frederick Bottler, from the Bottler ranch. Deep snows baffled our resolute efforts to cross the Madison Range to the geysers, and, when seeking to descend to the Yellowstone Valley below the Mammoth Hot Springs, Bottler was swept away in attempting to cross a mountain torrent above Cinnabar Mountain, losing his rifle, ammunition, most of his clothing, and nearly his life. This mishap compelled our unwilling return from within the Park through the then nearly unknown and impassable second canon of the Yellowstone to Bottler's, the only white ranchman at that time upon any portion of the mighty Yellowstone River. Thence I retraced

my route to Fort Ellis, published a brief account of my trip (see No. 3 of my Journal of Rambles in the Far West), and, under previous engagements, descended the Columbia to the ocean, purposing to return to the exploration the next year.

During the following autumn the Washburn expedition was suddenly organized for Park exploration. It was composed of H. D. Washburn, N. P. Langford, T. C. Everts, S. T. Houser, C. Hedges, W. Trumbull, B. Stickney, W. C. Gillett, and J. Smith. General Washburn, in command, was then surveyor-general, T. C. Everts and N. P. Langford ex-officers and all prominent and esteemed citizens of Montana Territory. They were well equipped, and at Fort Ellis were joined by Lieut. G. C. Doane and seven men; from here they followed my return route to and up the Yellowstone through its second cañon. They missed the Mammoth Hot Springs, but visited Mount Washburn, the Great Falls and Lake, returning by the Fire Hole River and Madison route to Virginia City. When among the fingers of the Yellowstone Lake, Everts lost his way, horse, arms, and provisions, and after thirty-seven days of exposure, starvation, and suffering, doubtless unequaled by any other man now living, was found by Barronette and Prichette, barely alive, upon the Black Tail, near the Mammoth Hot Springs. This is the first party of really successful explorers of any considerable portion of the Park of which we have any public record. (See General Washburn's surveyor-general's report; also that of N. P. Langford, in the May and June, and T. C. Everts's Thirty-seven Days of Peril, in the November number of the second volume of Scribner's Monthly Magazine, and Lieutenant Doane's report, Senate Ex. Doc. 51, Forty-first Congress, third session.)

The interesting letters, reports, and personal influence of the various members of this party led to Professor Hayden's interesting and valuable explorations in the wonder-land in 1871. (See Professor Hayden's Geological Surveys of 1871.) Capts. J. W. Barlow and D. P. Heap also made valuable explorations, maps, and report of portions of the Park in the same year. (See Senate Ex. Doc. 66, Forty-second Congress, second session.)

During the succeeding winter Professor Hayden and his associates were very active in publishing and distributing photographic views, sketches, and other valuable information in reference to this splendid region; and in preparing, and, aided by many leading members of Congress—notably Representative (now Senator) Dawes—advocating to its passage a bill dedicating it as a health and pleasure resort for the American people under the name of the Yellowstone National Park. (For its boundaries and control by the Secretary of the Interior, see copy of the act of dedication in Appendix, marked E.)

For report of Professor Hayden's extensive explorations in the Park, see his report of Geological Surveys for 1872.

Capt. W. A. Jones and Prof. Theodore B. Comstock explored mountain passes to, and a portion of, the Park, making valuable reports and maps. (See House Ex. Doc. 285, Forty-third Congress, first session.)

In 1874, the well-known Scottish Earl Dunraven made a tour of the Park, and published an interesting narrative of the same. (See his Great Divide.)

For the Rev. E. J. Stanley's visit to the Park, see his interesting narrative called Rambles in Wonder Land in (I think) 1874.

The Secretary of War Belknap's narrative of a tour of the Park, see report of 1875.

Capt. W. Ludlow made a reconnaissance of the Park in 1875. (See Engineer's Report published by War Department.)

For record of P. W. Norris's explorations in the Park in 1875, see Nos. 24 and 25 of his Journal of Rambles in the Far West.

Besides Moran, Jackson, Elliott, Gannett, Holmes, and other justly famous artists who have at various times accompanied Professor Hayden's and other expeditions, J. Crissman, H. B. Calfee, Marshall, Fouche, and other photographers have at various times visited the Park, making and widely disseminating interesting views of the great falls, geysers, hot-spring terraces, and other wonders of the Park.

During all these years of exploration and research, so far as I am aware, the wisdom of Congress in promptly dedicating the National Park has never been seriously questioned; nor has its size, appropriate control by the Secretary of the Interior, and his rules and regulations for its protection and management, been deemed objectionable. Hence it is not what Congress has done, but what it so long neglected to do; not the dedication of a lofty mountain-girt lava region destitute of valuable minerals, isolated and worthless for all else, but matchless and invaluable as a field for scientists and a national health and pleasure resort for our people; but rather the failure to make moderate appropriations for its protection and improvement until leases could be made to assist in rendering it self-sustaining, which compelled its first superintendent, N. P. Langford, to abandon all efforts for its protection against long-allowed destructive forest fires, wanton slaughter of its interesting and valuable animals, and constant and nearly irreparable vandalism of many of its prominent wonders. So uniform was the testimony of the civil and military officers of the government, as well as of the American and European scientists and tourists who visited the Park, and so strong their appeals to the nation for its protection, or at least the sending of a commissioner or an agent specially empowered to investigate and report the facts, that among the early acts of the present honorable Secretary of the Interior was my appointment as superintendent of the Park, specially instructed to again visit it and report the facts as I should then find them for the information of Congress. But as to funds for salary, or even expenses, none were furnished or promised; but I was left to rely upon Congress to make provision to properly pay for the performance of duties pointed out and positively required of the Secretary of the Interior in the act dedicating the Park. This will, I think, appear clearly evident by perusal of the act of dedication, the rules and regulations of the Secretary of the Interior, and my appeal to the mountaineers as published in No. 62 of the Norris Suburban, several hundred copies of which were gratuitously distributed throughout the regions adjacent to the Park during the spring of 1877. (These documents will be found in the Appendix, marked A, B, and C.)

Under these circumstances, and without pecuniary aid from any department, association, or individual, I proceeded, via Bismarck, Forts Buford and Keogh, the Custer battle-field, and Gate of the Mountains upon the Yellowstone to the Park. After visiting the most important of its known wonders, and exploring others, as well as an important cut-off trail route of approach to the Park (which from being through a portion of the Crow Indian Reservation is still unopened), I started to descend the Yellowstone, but meeting General Sherman I returned with him to Tower Falls. Here, by the breaking of a saddle-girth, I was unhorsed and too seriously injured to proceed with the General or even to return home, except by descending the Yellowstone in a skiff from above the Gate of the Mountains, which course I adopted.

During my return home the hostile Nez Percés made a raid in the Park, which was so sudden and unexpected that General Sherman and his slender escort narrowly escaped capture. Several tourists, however, then in the Park, were killed, wounded, or captured. Among these was Professor Dietrich, whose body was riddled with bullets while he was standing in the doorway of the McCartney cabin at the Mammoth Hot Springs. In addition to the tourists known to have been in the Park at this time, there were also many miners from the Black Hills region, some of whom no doubt met death at the hands of these savages, as evinced by a number of skeletons of men and horses, and fragments of blankets and other camp outfit found by myself and others near the Indian line of retreat. This was by way of the best ford upon the Yellowstone River, at the Mud Volcano, thence by the East Fork and Cache and Crandall Creeks.

The selection of their camp sites, and their rude but effective fortifications, their valor in conflict, and their omission to scalp the dead or maltreat the living who fell into their hands, indeed, their conduct in all respects, proves that the Nez Percés are not wanting in courage, chivalry, or capacity, and that they are foemen not unworthy of the noted military officers, Howard, Miles, Sturgis, and others, who have battled against them.

The facts and suggestions in reference to the Park, as submitted by myself to the honorable Secretary of the Interior, were incorporated in his Report of 1877 (part first, page 837), and also deemed by him worthy of publication in pamphlet form. (See Report of the Superintendent of the Yellowstone National Park for 1877.)

After a long and careful investigation of the whole subject, and in consideration of the written opinions of prominent scientists and explorers of our country, the cautious and prudent Congress of this period, at its first session, with flattering unanimity, made an appropriation of $10,000 for the protection and improvement of the Park.

For a detailed statement of the improvements made with a portion of these funds, during the Bannack Indian raid in the summer of 1878, see the superintendent's report for that year.

For accounts of the explorations and researches, in the Park, in 1878, of the assistants of Professor Hayden, Messrs. Stevenson, Holmes, Gannet, Wilson, and Peale, see Hayden's Geological Report for that year. During the year just mentioned, among other visitors to the Park, were General Nelson Miles, who, after a bloody and decisive conflict with the Bannacks, made its tour, with Colonel Baker and other officers, and Mrs. Miles and a party of ladies. Besides these, there were, as visitors to this wonder-land, Lord Stanley, the German Colonels Shutz and Kaster, Colonel Berthold, with a party of Utah Northern Railroad engineers, and Rev. Dr. Wayland Hoyt, of Brooklyn, N. Y.

During the season of 1879 there were no geological or scientific explorations within the Park. It was visited, however, by Generals Sackett and Hazen, and other American, as well as by several European, military officers; and also by Messrs. Thomson and Cadwalader, of Philadelphia, Buckland of Ohio, and other prominent railroad officials, and Professor Geike, of Scotland.

During this year (1879) there were no Indian raids, but the resident Sheepeaters, with small bands of horse-stealing Bannacks and Shoshones, rendered such caution necessary in selecting and guarding camps and animals as seriously to retard as well as to increase the expense of improvements in the Park.

Besides substantial buildings for headquarters of the Mammoth Hot

Springs and a small house in the Upper Fire Hole Basin, several important roads and trails were constructed. (For details of these improvements as well as for an exhibit of expenditures under the appropriation of $10,000 for Park purposes for that year, see superintendent's report of 1879.)

At the pressing recommendation of the honorable Secretary of the Interior, the appropriation for the Park for the fiscal year 1880–'81 was increased to $15,000, thus justifying the employment of a gamekeeper, whose report has been previously referred to.

Notwithstanding the very unfavorable season and consequent bad state of the roads and trails within and adjacent to the Park, nearly 2,000 tourists visited and safely returned therefrom during the past season. Of these, prominent in position and reputation, were Secretary Schurz, General Crook, Colonel Staunton, Hon. Jacob M. Thornburgh of Tennessee, and others, who accompanied the honorable Secretary to the Park via the Henry's Lake route from the Utah Northern Railroad. General Crook, Webb Hayes (son of the President), and others, after viewing the geysers of the Fire Hole Rivers and the Yellowstone Lake and Falls, returned as they came. The honorable Secretary, his nephew, and others of his party, after making a rapid but thorough tour of the leading points of interest within the Park, left it by the elevated and difficult trail-route to Clark's Fork just in time to escape a severe mountain snow storm. Among other prominent personages who visited the Park during the past season were General Davidson and lady, of Fort Custer, Colonel Alexander, of Fort Ellis, with their escorts and retinue of friends. Among the civilians were the Hon. John McNulta and lady, of Illinois; the famous traveler and guide-writer, Mr. Robert Strahorne, and lady, of Omaha; Captain John Burns, the mountain trailer and journalist, from the Black Hills; Mr. Majors, of Utah; Mr. Butler and other members of the Crook party; a brother and nephew of General Nelson A. Miles, and doubtless many others whom I regret to have failed to meet because of my long absence in the exploration of the Yellowstone Lake and Cañon and the Hoodoo region.

Doubtless many were somewhat disappointed in the state of the roads and trails, finding, as I have ever sought to inform the public, that, while the National Park is truly the peerless wonder-land of earth, it is also one of the largest, most elevated, and mountainous, as well as far the most humid, densely timbered, and difficult in which to construct or maintain roads or trails, of all our great mountain parks. Since the first dollar ever furnished by the nation for the protection or improvement of this heritage of wonders was expended, in August, 1878, I have deemed it more important to construct buildings for defense of the government property from the frequently recurring and ever-threatened Indian raids, and to explore the proper routes for permanent use and open all possible of them as well as the limited time and means at my command would allow for immediate use, than to hazard the loss of government animals, outfit, and probably valuable lives by Indians, or the construction of a few miles of fine coach-road, leaving the remainder of the Park as I found it—mainly an unexplored pathless region, crags and forests. I deem the roads and trails as I have represented them—passable, most of them convenient, and portions of them excellent. Few residents of those regions find difficulty in traversing any of the roads with the teams and vehicles in common use there, but many of the grades and causeways neither are nor are claimed to be yet prepared for the use of heavy broad-track military wagons for mule-trains such as were used upon several of them during the past season.

ABORIGINES OF THE PARK.

Although the Crow Indians upon the north, the Shoshones upon the east and south, and the Bannocks upon the west might have, during the brief summers, traversed the few difficult passes to the Park, there is little evidence to show that they did so. It is probable that they were deterred less by these natural obstacles than by a superstitious awe concerning the rumbling and hissing sulphur fumes of the spouting geysers and other hot springs, which they imagined to be the wails and groans of departed Indian warriors who were suffering punishment for their earthly sins.

The only real occupants of the Park were the pigmy tribe of three or four hundred timid and harmless Sheepeater Indians, who seem to have won this appellation on account of their use of the flesh and skin of the big-horn sheep for food and clothing, and their skill in hunting these animals amid the cliffs, crags, and cañons of the snowy mountains.

Whether these people are the remnant of some former race, as the legendary wild men of the mountains, or are descendants of refugees from the neighboring Bannock and Shoshone Indians, is not known, although their own traditions and the similarity of their languages and signals indicate a common origin, or, at least, occasional intermingling.

These Sheepeaters were very poor, nearly destitute of horses and fire-arms, and, until recently, even of steel or iron hatchets, knives, or other weapons or implements. The stumps and the ends of the poles for lodges, wickeups, and coverts for arrow-shooting, from having been cut by their rude obsidian or volcanic-glass axes, appear not unlike beaver-gnawings.

On account of this lack of tools they constructed no permanent habitations, but as evinced by traces of smoke and fire-brands they dwelt in caves and nearly inaccessible niches in the cliffs, or in skin-covered lodges, or circular upright brush-heaps called wickeups, decaying evidences of which are abundant near the Mammoth Hot Springs, the various fire-hole basins, the shores of Yellowstone Lake, the newly explored Hoodoo region, and in nearly all of the sheltered glens and valleys of the Park.

Within or near these haunts, and notably at a great hot spring upon the Gardiner River, at and below the Sheepeater Cliffs, which are above the Mammoth Hot Springs, and also in the Hoodoo, Pelican Creek, and Yellowstone Lake regions are found rude stone or decaying timber breastworks for temporary defense from man or animals, but all the substantial bulwarks found are those made by the Nez Percé and Bannock Indians during their recent raids.

To these latter Indians may be attributed the recent graves as well as burial cairns within the Park; but as the Sheepeater Indians did not place their dead upon branched trees, or upon scaffolds, like the brown Indians of the Great Plains, graves or cemeteries of this people may yet be found.

Other traces of this tribe are found in the rude, decaying, and often extensive pole or brush fences for drive ways of the deer, bison, and other animals to the arrow-coverts, in the cañons or in the narrow passes between them, for slaughter with their rude lances and obsidian-headed arrows.

For want of proper tools, but little timber was cut, and these drive-ways were mainly constructed of the over-abundant dead and fallen saplings, with the roots attached, which, from their pitchy properties, long outlast the trunks and branches, thus enabling an experienced mountain-

cer to trace these drive-ways a long distance, even in groves of thrifty timber.

One of the most accessible of these drive-ways is upon the southern cliff of the impassable cañon of the West Gardiner, having its evidently more recent arrow-covert within point-blank range of its verge overlooking Rustic Falls.

From this covert there are traces of one wing that skirted the valley toward Swan Lake, and of another that wound through groves of pine at the base of Bunsen's Peak, far toward the Sheepeater Cliffs, upon the Middle Gardiner, nearly two miles distant.

Countless drive-ways and coverts in every stage of decay are still found in favorable localities throughout the Park, and are often crossed unobserved by ordinary tourists. In fact, these Indians have left fewer enduring evidences of their occupancy than the beaver, badger, and other animals on which they subsisted.

HABITATIONS OF WHITE MEN WITHIN THE PARK.

A list of the habitations of the early white rovers or explorers of these regions is here given, as well as those constructed in more recent times.

1. An earth-roofed, loop-holed cabin, 16 by 20 feet in diameter, discovered by Frederick Bottler, and visited and described by me in 1878, was almost entirely destroyed by the great fire of 1879. It was situated between Antelope Creek and the Grand Cañon, below Mount Washburn. Nothing is certainly known of its age, or of the character of its builders, but the advanced decay of the timber of which it is constructed, its fallen roof and generally dilapidated condition, indicate that it was the work of HudsonBay or other trappers forty or fifty years ago. In corroboration of this theory is the absence of port-holes opening alike each way, as usual and proper in the now general use of fire-arms by Indians. This arrangement would have allowed a warrior armed with bow and arrows, by stealthy maneuvering in darkness through the timber, to use his weapons in silence and within point-blank range in front with terrible effect, but which was in trapper days prevented by using loop-holes, each open but one way, but alternating in direction, thus preventing a bowman from reaching a dangerous position before exposed to loop-holed cross-fire.

2. A log house upon the point just above the Forks of the Yellowstone, built by C. J. Baronette in the spring of 1871. This was soon burned, presumably by Indians, and a second one, now in ruins, constructed on its site.

3. Earth-roofed log house in the ravine flanking the Mammoth Hot Springs, built by J. C. McCartney and Henry Hor in the summer of 1871, with which have been subsequently associated other houses, as well as bath-houses, some of which are shingle-roofed.

4. An earth-roofed log house, and also a cabin bath-house, built by M. McGuirk in 1871–72, near the Mammoth Hot Springs, and which still bear his name.

5. Earth-roofed cabin at Toppin's Point, near the foot of Yellowstone Lake, built by Captain Toppin in 1875.

6. Fine shingle-roof block-house of hewn timber, with a balcony and three wings, and surmounted by a gun-turret upon a commanding natural mound fronting the Mammoth Hot Springs, built by the superintendent of the Park for use as headquarters in the summer of 1879. (See frontispiece.)

7. Earth-roofed cabin in a small grove upon the bank of the Fire Hole

River, between the Castle and Bee Hive Geysers in the Upper Fire Hole Basin, built by the superintendent of the Park in the fall of 1879.

8. Block-house, barn, blacksmith shop, and bath-house at the Mammoth Hot Springs, built by the superintendent of the Park during the summer of 1880.

9. Earth-roofed log house and barn, for the Riverside mail-station at the forks of the old cañon, and the terrace roads below the cañon of the Madison, upon the road to Henry's Lake, built by Marshall and Goff during the summer of 1880.

10. Fine-shingle roofed mail-station and hotel, with barn and out-buildings, upon a cold rivulet at the foot of the cliffs just west of the Forks of the Fire Hole Rivers, built by Marshall and Goff during the summer and fall of 1880.

11. Rude, earth-roofed cabin and barn at the Norris Fork mail-station, built by Marshall and Goff in the fall of 1880.

12. Earth-roofed cabin for gamekeeper, upon the foot-hill terrace south of the confluence of the East Fork of the Yellowstone and Soda Butte Rivers, built by the superintendent of the Park and its gamekeeper late in the fall of 1880.

These, with several miners' cabins, and perhaps a Chilian arrastra upon the Montana and Crow Indian Reservation portion of the Park are all the buildings that have been constructed by white men within the Yellowstone National Park, of which I have any knowledge, down to the close of the year 1880.

WATER-CRAFT OF WHITE MEN.

1. The Anna (so named by the members of the Hayden expedition, in honor of Miss Anna Dawes, the accomplished daughter of Senator Dawes, of Massachusetts, who had been one of the most zealous and efficient advocates of the dedication of the Park to national purposes, and who has since proved his interest in all efforts for its protection and improvement) was a small but serviceable canvas boat, and, under the skillful management of Messrs. Holmes, Stevenson, and others of the Hayden expedition, proved valuable in the exploration of the Yellowstone and Shoshone Lakes during the season of 1871.

2. The Toppin, a small sail-boat of green, whipsawed timber, built by Captain Toppin at his cabin, near the foot of Yellowstone Lake, in the summer of 1875, and which, after perilous service during a small portion of the seasons of 1875 and 1876, was dismantled, abandoned, and finally lost.

3. The Explorer, so called by my own party, was built by the Hoffer Brothers, at Toppin's Point, during the summer of 1880, and was some 20 feet long, 6 feet wide, and 2½ feet deep. Loggy and clumsy, it required skillful management and ceaseless labor to keep her in order; but with her I succeeded in exploring the lake and its near tributaries to the rapids. Finally, however, she was wrecked, and I left her battered hulk near the point where she was built.

I saw a rude canoe at the lower rapids of the Upper Yellowstone, and probably others have been used by both Indians and white men, but the above list embraces all the boats that, to my knowledge, have buffeted the blue waters of this mystic lake.

BRIDGES.

The one constructed in the spring of 1871, by C. J. Baronette across the main Yellowstone River, just above the forks, and over a dangerous

rapid and cañon, and one that cannot be avoided, was dismantled and partially burned by the Nez Percé Indians in 1877. It was repaired, however, by Baronette, myself, and others in 1878, but was always considered unsafe, and in the spring of 1880 was replaced by a substantial structure upon the old site. The necessity of reaching this, their only route of access in the absence of a safe ford upon the Yellowstone, led C. J. Baronette and J. W. Ponsford to construct the latter, which can be purchased by the government at less than its cost or value.

These are the only bridges that are known to have been constructed across the Yellowstone River in its course of many hundreds of miles.

In connection with road and trail building, I have constructed bridges upon all the branches of the Gardiner River, most of those of the Gibbon, also Tower Creek, Cascade, and other creeks, near the Great Falls of the Yellowstone and other localities, deemed unnecessary to here mention.

ANIMALS OF THE PARK.

BISON OR MOUNTAIN BUFFALO.

Bison, so called, in the Park, are somewhat smaller, of lighter color, less curly, and with horns smaller and less spreading than those of the bison that formerly inhabited the great parks of Colorado. They have also smaller shoulder humps, and larger, darker brisket wattles. They differ materially from the buffalo of the Great Plains, being more hardy, fleet, and intelligent; their hides also are more valuable for robes, as they are darker, finer, and more curly; and these animals are, in all probability, a cross between the two varieties just mentioned.

There are about three distinct or separate herds of bison within or adjacent to the Park.

The first, numbering about two hundred, pasture in summer in the valleys of the Crevice, Hellroaring, and Slough Creeks, and the mountain spurs between them, descending, with the increasing snows, to winter in the deep, sheltered grassy valleys of the East Fork of the Yellowstone and Soda Butte, and as the snows melt, accompanied by their young, returning to their old haunts.

The second, numbering over one hundred, summer in the elevated and abruptly-broken, little-known section of the Park, extending from the Hoodoo region to the Grand Cañon, and from Amethyst Mountain to Pelican Creek, near the foot of the Yellowstone Lake, and winter occasionally upon the East Fork of the Yellowstone and on Pelican Creek. Their other winter haunts are unknown.

The third herd, numbering about three hundred, roams in scattering bands. This season they were discovered upon the Madison Plateau and Little Madison River. Their winter haunts are unknown, though it is probable they are on the Pacific side of the Continental Divide, and, if so, they are not permanent occupants of the Park, and are therefore likely to be slaughtered by advancing settlers.

These animals, but little smaller than our common cattle, and with flesh quite as palatable, are easily domesticated. I have always carefully protected them from wanton slaughter during the deep snows of winter and when with their young in the spring, at which times alone they require such protection, being at other seasons the most keen of scent and difficult of approach of all mountain animals.

MOOSE.

Three of these animals were seen during the past season near the Lake of the Woods, and a few others in the various Fire Hole Basins. Their main haunts are in the densely timbered, swampy region around the various fingers and the thumb of the Yellowstone Lake. They also frequent the boggy inlets of Shoshone, Lewis, and Heart Lakes and the Snake River regions to the Tetons without the Park, but nowhere are they numerous. The boggy and inaccessible nature of their haunts renders these large and majestic animals difficult of capture, and on account of its scarcity their flesh is the more highly prized. Any attempt at their domestication must begin with inclosing them in some secure place.

ELK.

This animal is one of the largest, most beautiful, interesting, and valuable of those that inhabit this continent, and, so far as I have any knowledge, in no part of the United States were they ever found of greater size, symmetry of form, stateliness of antlers, or in greater number than in the great National Park at the period of its discovery in 1870.

As stated in my first report, at least 7,000 of these valuable animals were slaughtered between 1875 and 1877 for their hides, or perhaps for their carcasses, which were stripped and poisoned for bear, wolf, or wolverine bait. Since the first appropriation, however, for protection of the Park in 1878, notwithstanding the numbers since killed by our laborers, as well as by numerous tourists and raiding Indians, they have not seriously diminished, and but for the unprecedented severity of the past winter would have greatly increased; their increase hereafter, however, is assured if properly protected. They are inoffensive and harmless, and frequent all portions of the Park, often high up amid the mountain snows in summer, and in the most sheltered valleys in winter, in herds of a hundred or more. While the horns of these animals in the Park are, as elsewhere, unusually long, spreading, and symmetrically branched, there are many and remarkable exceptions. Some have lobed branches extending downwards, caribou-like, in front of the face; the horns of others are short, flat, and lobed, similar to those of the moose, while still others have horns both lobed and branched.

A specimen pair of horns, which I brought from the Park in 1878, is doubtless the heaviest ever seen in Washington. They are not only lobed and branched, but otherwise so notably peculiar in form as to lead me to inquire (1) are the animals to which this characteristic belongs a cross between the moose and the elk, though there is nothing else in the appearance of the animal to indicate this? or (2) is this phenomenon only a freak of nature? or (3) are the animals producing these wide horns really a subspecies of the elk? The careful consideration of naturalists is invited to this subject.

WHITE-TAILED DEER.

These animals do not differ essentially from those of the Atlantic States in size, color, horns, or habits. They usually frequent the densely timbered valleys and foot-hills, are more shy, sharp-eyed, and fleet, and less migratory than the black-tailed variety.

BLACK TAILED DEER.

This is essentially a mountain animal, choosing the broken foot-hills or terraced slopes for pasturage and rest, and is difficult of approach ex-

cepting from above. It is frequently called mule-deer by tourists, and is so named in museums, though incorrectly, I think, since, while there are no two varieties of the deer family, in my opinion, more dissimilar, none of the latter inhabit the Park.

PRONG-HORNED ANTELOPE.

The National Park is, as a rule, too moist and thickly timbered to be a favorite resort of antelope, but they were once numerous in the open valleys of the Upper Gardiner River the open grassy region thence to the Forks of the Yellowstone, and up its East Fork to the Soda Butte, as well as on the main stream between the Great Falls, around the Sulphur Mountain westward to Mary's Lake, and in the Madison Valley. No other animal has suffered such severe slaughter, not alone within the Park, but upon the great plains, below the Gate of the Mountains, and upon the Yellowstone, where in their migrations they were wont to winter.

BIG-HORN SHEEP.

Although the web-footed, snow-loving white sheep, or Rocky Mountain goats are numerous in many of the adjacent snowy regions, I have never seen one within the Park, but the true big-horn sheep are abundant on all the mountain crests, as well as on their craggy spurs and foot-hills throughout the Park, which they never leave. Their habits and habitats tend to their preservation, which can, however, be better assured by a little effort and a small outlay.

BEARS.

The mountain men of this region believe that in the Park there are at least six varieties of the bear tribe, besides the long-tailed mud bear, or wolverine.

Grizzly bear.—The hog-back, or real California grizzly, with a mane upon the shoulders, is one of the largest, most powerful, ferocious, and dangerous animals upon the continent, but is less numerous than some other varieties within the Park. Specimens often occur of incredible size. At times one is met with which, when erect on its haunches—the customary position when looking for an enemy—will overtop in height a man on horseback. With one blow of its fearful fore paw and claws this animal is able to disembowel and kill any other animal of this region. One which I shot near Beaver Lake in the fall of 1879, after he had killed a valuable horse, was certainly heavier than any one of the more than fifty horses in our band. From his carcass thirty-five gallons of oil were obtained, and his skin, now in Washington, after being trimmed and dressed is still 8 feet 6 inches long (exclusive of the tail) and 6 feet 6 inches wide. Though but few larger than this have been taken, many but little inferior in size have been killed by different members of our parties. They seldom fail to cover with decaying logs, rubbish, or stones an elk or other animal they may kill, remaining near the body or returning nightly to it, as though a tempting dessert to their meal of grasshoppers, roots, and berries; for, human-like, they enjoy a mixed diet, though not so dainty as man in regard to its kind or quality. Although, save in defense of these carcasses or of its young, this bear seldom provokes attack upon man, it invariably resists one, and if wounded usually charges furiously, either to its own death or that of its foe, and not infrequently both. Indeed, it may truly be said to be the mountaineer's most dreaded foe.

Silver-tipped bear.—This animal is nearly destitute of a mane, and is somewhat smaller, less powerful and ferocious than the true grizzly;

moreover its coat of hair is much longer than the latter's, and is tipped at the ends with a glistening, silvery white; hence the name.

Cinnamon bear.—This is so called from its reddish-brown color. It is somewhat longer and more slender than the smut-faced bear, and nearly his equal in audacious ferocity.

Smut-faced bear.—This is a still smaller animal, with a brockled, impish-looking face—a true indicator of the character of the beast. It is the most meddlesome and pugnacious of the bear family.

Black bear.—This animal in the Park only differs from those of the East in his greater size and the greater length and fineness of his fur, and is as elsewhere, either wild or domesticated, uniformly a less ferocious animal than any of the above-described species.

"*Silk bear.*"—This provincialism is the only designation I have heard applied to this smallest and rarest variety of the bear family. The few of which I have personal knowledge were found near the upper limit of timber, engaged in biting, in order to more easily break off for food, the cone-laden boughs of the piñon pines. They were all very fat, and had a coat of glistening black fur, fine and of extra length, rendering them more valuable than any of the species of the bear family.

All of these short-tailed varieties of bear hibernate in hollow trees, in caves, or more frequently in rude wickeups, amid the dense evergreen declivities of the mountains, to which they retire early in winter, and remain until the accumulated snows thaw in spring, when they scramble out, often very lean, and always tender-footed, but soon recruit strength by devouring roots and mountain moles at the nearest slopes clear of snow. Few mountain scenes are more ludicrously interesting than that of half a dozen bears, of assorted colors and sizes, engaged in the sport of catching the burrowing mole just below some melting snow-drift upon the steep and slippery mountain side. In ignorance of their mode of making details for duty, I can only say that it seems to be the especial task of one of each party to pull up the sage-brush, thereby unearthing the moles; the rest of them, in their efforts to catch and eat them, often falling pell-mell over each other, like Chippewa Indians engaged in a game of Lacrosse. A variation of this sport is occasionally caused by a shower of explosive bullets from the repeating rifle of a grim mountaineer, perched unseen upon some overlooking snow-field, cliff, or tree-top.

Wolverine, or long-tailed mud bear.—This animal, although considered a variety of the bear family, does not hibernate. It has a long tail, differing in this and other marked characteristics from other varieties; in fact, this audacious trap and camp plunderer seems in size and form, as well as in color, a strange blending of the black bear, the badger, and the coyote. In character, also, it combines the rapacious greed and pugnacity of all these animals with the Asiatic jackal's craving for carrion. His chosen haunts are the most densely timbered foot-hills of the mountains, where he is ever ready to steal what the bear, wolf, or lion slaughters. His extremely heavy fur, long outer hair, and thick, firm, and badger-like skin, seemingly much too large for him, allow him to squirm his body out of the jaws of nearly every other animal; and to these peculiar advantages for defense are added teeth and claws unrivaled for attack. Unlike other carnivora, their teeth do not puncture but lacerate, and, chisel-like in their powerful jaws, smoothly sever skin, bone, and tendon, inflicting such fearful wounds that most animals prefer relinquishing their game to hazarding combat.

MOUNTAIN LION OR COUGAR.

These animals are much larger, coarser-haired, and more ferocious than the animal known as the eastern panther, and during my first

explorations in the Park were exceedingly numerous and troublesome, less, however, from actual attacks upon our men or animals than by their sudden terribly sharp and prolonged screams, which reverberated in frightful intensity around our evening camp-fires in the deep and crag-hidden mountain defiles. This tantalizing tendency to start false Indian alarms and stampede the animals has led to persistent efforts of the mountaineers, with rifle, trap, and poison, to exterminate them, and so successful have their efforts proved that now the comparatively few survivors usually content themselves with slaughter of deer, antelope, and perhaps elk, at a respectful distance from camp.

WOLVES.

The large, ferocious gray or buffalo wolf, the sneaking, snarling coyote, and a species apparently between the two, of a dark-brown or black color, were once exceedingly numerous in all portions of the Park, but the value of their hides and their easy slaughter with strychnine-poisoned carcasses of animals have nearly led to their extermination.

FOXES.

Foxes are numerous and of various colors, the red, grey, black and the cross varieties (most valuable of all) predominating in the order named.

SKUNK.

In no region have I found these animals more numerous, audacious, or odoriferous than in the Park, and though I have no proof of their tendency to rabies, as is the case with those of Kansas and the Indian Territory, I have an instinctive dread of them. Hundreds of them were slaughtered before we could sleep peacefully at the Mammoth Hot Springs, and they are such an intolerable nuisance around old camping-places that tourists often slaughter several of them, and thoroughly permeate the atmosphere with their abominable stench, before they are able to secure repose.

BADGER.

These animals are similar, if not, indeed, identical, with those of the East in appearance and habits, and are numerous in most of the valleys and terraces of the Park, but are less abundant than is indicated by their countless burrows, which are annoyingly evident to horsemen long after their abandonment.

ROCK DOG.

The animal thus called, somewhat abounding in the Park, is similar in appearance and habits to the Eastern woodchuck or ground-hog, but much smaller, and utters a different cry of alarm while disappearing in its burrows amid the rocks.

PORCUPINE.

This animal is of an extraordinary size, and is occasionally found in the timbered portions of the Park.

RABBITS.

The jack rabbit of the sage-brush plains is only found in the limited areas of that pestiferous shrub, but the large, web-footed, slit lipped hare, gray in summer and white in winter, is simply numberless in the tangled thickets throughout the Park. Another variety, similar to the

cotton-tail, or common rabbit of the East, is also but only occasionally seen; while the plaintive notes of a smaller variety, called the cony, are often heard amid the débris of snow-slides or avalanches around the elevated timbered foot-hills of the mountains.

RATS.

There are no prairie-dogs within the Park, but the barking sedge-rat, which is somewhat similar in appearance to the prairie-dog, and burrows extensively, though not in towns, is numerous. So also is a species of long-eared and hairy-tailed mountain rat.

MICE.

Long-eared mice are here countless, and exceedingly troublesome around the camp and in the cabin.

BURROWING MOLES.

But few of the tourists who have traversed much of the Park on horseback will soon forget the annoyance caused them by the countless loose hillocks and hidden burrows of this seldom-seen but ever-industrious animal, in the fertile valleys as well as in the sage-brush-covered foothills and on the terraced slopes of the mountain sides.

SQUIRRELS.

The only squirrel at all plentiful in this section is of a dark-brown or nearly black color, but not otherwise different from the red squirrel of the East.

CHIPMUNKS.

These are very plentiful, but in size and spotted color resemble the young of this animal in the East.

BEAVER.

Few regions, even less elevated, are so favorable as a haunt for the sagacious beaver or are so fully occupied by it as the National Park, which is one of the largest, as well as one of the most densely timbered regions of North America. Well supplied with rivulets invariably bordered with willows, and having numerous creeks of cold water, it also has countless geyser and other hot-spring outlets with a flow of tepid water as well as a surface elevation alike remarkably uniform. These outlets, relatively clear of ice, afford unusual advantages for burrow habitations in their banks, or for the construction, in their sloughs, of the ordinary two-story brush-and-turf houses of these animals; the sloughs and streams being used as canals for floating their winter food supplies of brush and small timber, dams being far fewer and smaller here than are usually necessary elsewhere. Unmolested by man, who is ever their most dangerous enemy, the conditions here mentioned are so favorable to their safety that soon they would construct dams upon so many of the cold-water streams as literally to flood the narrow valleys, terraced slopes, and passes, and thus render the Park uninhabitable for men as well as for many of the animals now within its confines. In consideration of this I have not seriously interfered with the trappers who have annually taken from the Park hundreds, if not thousands, of the valuable skins of these animals, without payment for the same—a custom, however, which should not be permitted to continue, since some

revenue should be derived by the government from these furs. A law should therefore be enacted or some regulation prescribed with a view to this end; but without a small police force it would be difficult to enforce any restriction in this respect.

OTTER, MINK, MUSKRAT, ETC.

Neither otter, mink, nor muskrat are numerous in the Park; nor are marten, sable, or ermine plentiful. The skins, however, of these animals, as well as those of the beaver and other animals that are obtained, are generally among the most valuable of their kinds, and, owing to the isolation and rigorous climate of the Park, are never out of season.

BIRDS OF THE PARK.

Eagles, of the usual mountain varieties, are common throughout the Park, and especially about the Yellowstone and other lakes. A very large black variety haunts and raises its young upon the inaccessible and tottering pinnacles of the eroded cliffs along the Grand, Gardiner, and other cañons, and is particularly numerous and audacious in the Hoodoo labyrinths.

This bird hovers about and terribly annoys the big-horn sheep to pick up the lame or wounded. In one instance it caused a lamb to fall from a towering cliff and thus secured a repast below; but from my position I was unable to observe whether the lamb was frightened from its place on the cliff, or hurled off after being crippled by the eagle's talons, breast, or wing. I incline, however, to think the latter was the case. It is also the opinion of Mr. Adam Miller, a most experienced mountaineer. On another occasion, when in company with this mountaineer, I experienced quite a lively time in saving from a flock of these eagles an antelope which we had shot on the East Fork, the birds only leaving the game after we had killed several of their number.

The great bald-headed turkey-buzzard or North American vulture will soon find a carcass in any portion of the Park, aided by their smaller, more numerous, and audacious friends, the raven.

The latter bird is here often called the crow, but erroneously, as there are few if any crows inhabiting these regions.

Blackbirds are countless in summer on the borders of lakes and streams.

Swan, pelican, geese, and brant are plentiful in all the streams and lakes of the Park, and hatch their young in vast numbers, notably near the mouths of the Upper Yellowstone trail and Pelican Creek tributaries of the Yellowstone Lake.

Ducks of several species are also found and in countless numbers, and hatch around the resorts of geese and swan as well as in the Fire Hole Basins. In these last-mentioned localities some of them remain late in autumn, if not indeed during the winter, as I saw them amid the dense fogs of the Norris Geyser Basin late in November of 1879, and on the 16th of November of this year I shot a fine one in the warm reservoir, at the Mammoth Hot Springs, when the thermometer ranged 10 degrees below zero.

Sage-hens or cock of the plains are sparingly found in the open portions of the park.

Pheasants, somewhat smaller and of a darker plumage than the drumming-partridge of the East, frequent the densely-timbered foot-hills of the mountain ranges.

The fool-hen variety of the grouse are numerous around the margins of hot springs, near the permanent snow-fields, and other varieties are abundant in lower elevations throughout the Park, affording fine sport and delicious food for the health and pleasure-seeking tourist.

Sand-hill cranes sound their morning reveillé in trumpet-tones from the Fire Hole Basins and marsh-bordered tepid-water ponds.

Hawks of various kinds by day and owls by night, prey upon the rabbits, moles, and grouse, as well as upon the chattering jack-daw and the gaudy blue-jay, the camp-pest of the mountains, there called whistling-bob.

FISHES OF THE PARK.

No peculiarity of these regions is better established than that of the presence of long, slender white worms in the intestines and flesh of the countless large and beautiful trout of the Yellowstone Lake, named by Professor Cope *Salmo pleuriticus*. All the trout of its cold-water tributaries below contain them, but not those above the first rapids; also the main Yellowstone above, but not below its first falls, as I have established by frequent examination of specimens of this fish. This clearly indicates that the cause of the presence of these worms exists in the lake; further than this, nothing has been established with regard to this phenomenon. My own theory of some years ago, as to the larvæ of the innumerable flies from the warm-stream tributaries (and well known to be devoured by the trout) hatching in the stomach of this fish, and the numerous other theories that have been advanced, have none of them proved to be correct. Can the cause be due to quantities of minute vegetable fragments which adulterate and discolor these otherwise clear, pure, cold waters, and, often thrown by the waves into windrows along the rocky shores, temporarily discolor them? I think not, since Lake Abundance, Trout Lake, and many other waters proverbial for excellent trout, are also enormously weedy, or impregnated with minerals of which there is comparatively little evidence in the Yellowstone Lake; while nowhere is this fish more abundant or excellent than in the main Yellowstone at Tower Falls, and thence on to its junction with the East Fork, and up the latter where the sulphur and other fumes arising from the water are so powerful as to be scarcely endurable. Nor have I in any region found trout more numerous or better than in the Soda Butte and Cache Creek branches of the East Fork, immediately below their famous mineral springs, notably in the latter, within the half mile below where the stream bubbles with hissing hot sulphur which impregnates and covers with a beautiful white and orange coating the rocky bed of the channel far below, and which this fish frequents.

Professor Leidy states that this worm is *Dibothrium cordiceps*, and is found in little sacks imbedded in fragments of flesh. He considers it as entirely different from the worms found in the European salmon. Owing, however, to the abundance of trout not affected with parasites, it may never be necessary for tourists to use those in question as an article of food. Still, no danger to health or life need be apprehended from eating the latter, as cooking absolutely destroys the worm; and in my opinion those epicures whose stomachs yearn for the trail of the woodcock or the intestinal contents of the snipe, need not hesitate at the insignificant parasites of the trout of Yellowstone Lake. This worm is not believed to be a constant parasite of this fish, however, since speci-

mens in good health are often taken, but showing scars or marks of outlets for them.

That in the Yellowstone Lake alone trout are infested with worms, notably where the Shoshone Lake trail strikes it; that they are here countless in number, in water bubbling with hot gases; that they voraciously take the bait, and that the angler can, without changing his position or removing the fish from the hook, rapidly boil them in seething pools, are not *statements* but *facts* capable of demonstration.

In addition to trout in the cool waters of the Yellowstone Creek and the Gallatin Fork of the Missouri, there may be found the mountain herring, one of the most delicious of fish. This, with the grayling, affords excellent sport for the fisherman; while the student of ichthyology will find numerous species of smaller fry to reward his collecting ardor.

REPTILES.

The large, yellowish spotted rattlesnake has been observed only in the Yellowstone Valley, below the Mammoth Hot Springs, and few reptiles of any variety have been found elsewhere in the Park.

INSECTS.

The indigenous and the migratory grasshoppers are found in vast numbers throughout the Park, and are useful for fish bait, as the trout of these regions do not usually take the artificial fly as well as those of the East. There are found extensive horizontal layers of these in some of the ancient snow and ice fields of the mountains, probably of the migratory species, chilled in their lofty flight, some of which, at least, do not revive to pestiferous activity in thawing, as is frequent with these insects.

The yellow gad-fly and several other varieties, aided by the musical mosquito, for a brief period of each summer, drive nearly all animals into "smudges" of smoke, or else high upon the snowy mountains to escape them.

There are no honey bees, and few if any of the other varieties of the insect, but wasps and a small but vindictive hornet abound in the valleys.

TIMBER OF THE PARK.

Much of interest and practical importance in reference to the forests of this proverbially timbered mountain park, is necessarily omitted from this report.

As stated in its proper connection, the ancient timber now found fossilized upon the mountain slopes, is evidently much larger and many of different varieties from that now growing in the Park, probably embracing a smaller proportion of the coniferæ.

Black or bastard fir is far the largest variety of timber now growing in the Park, and usually found scattered through forests of smaller timber near the Mammoth Hot Springs, Tower Falls, Upper Yellowstone, and other elevated terraces. It is often found from three to five feet in diameter and one hundred and fifty feet in height, and is not unlike the eastern hemlock in the irregular form of its branched-top, as well as the coarse-grained, shaky, and inferior quality of its timber.

Black spruce, growing on the moist, sheltered slopes of the mountains near the snow, though having a smaller trunk, is fully as tall as the black fir, and is a statelier tree and more valuable for timber or lumber.

Red fir is the next in size (which nearly equals that of the Norway pine of Michigan) and the first in value of any tree in the Park for hewn-timber for building bridges, &c., for which purposes it is admirably adapted. It is abundant in all except the very elevated regions.

White pine, rivaling in symmetrical beauty the white pine of the East, but much inferior in size, and somewhat in quality, is the prevailing timber of most of the elevated terrace groves, and occasionally of the narrow valleys and cañon passes of the mountains. It grows very densely, often rendering traveling among it upon horseback exceedingly difficult when standing and utterly impossible when burned and fallen, as it is over large areas of the Park, proving one of the greatest impediment to exploring as well as to improvment by roads and bridle-paths. It is the best material found in the Park for lumber, shingles, small timber, rafters, fence poles, &c.

Balsam fir, somewhat different from that of the Alleghanies, is abundant and very beautiful, singly or in dense groves or isolated clumps scattered over the grassy slopes, just below the mountain snow-fields.

Cedar of a red or spotted variety, growing low and very branched, but with timber valuable for fence-posts, is abundant.

Poplar or aspen is found in dense thickets among the sheltered foothills. Dwarf maple, with leaves often scarlet with fungus, is sparingly found, and innumerable dense thickets of willow; the main value of all these last named varieties being for the food use of beaver or for bait.

CLIMATE OF THE PARK.

I greatly regret the breakage of our thermometers and consequent want of weather records until they were replaced, but the records given in the Appendix have been kept with great care and are deemed accurate and reliable.

As stated in my last year's report the records strengthen my previous impressions that the Park is less a severely cold than a peculiarly moist and stormy portion of these mountain regions, save during a brief but beautiful summer. The cause or causes of these peculiarities of temperature and moisture in the Park appear to be neither remote or difficult to comprehend. The anomalous heat and humidity of the atmosphere in all of the Fire Hole Basins is evident and traditional during the warm seasons of the year, when they are the best known. In fact all known of them in cold weather is my own experience during the early part of last winter, which tends to the belief that these geyser regions are relatively warm and moist in winter also. The terraces of the Mammoth Hot Springs and the cones to the various geyser and geyserite rims to other hot springs and sulphur pits are certainly much warmer than other rocky formations; and the adjacent areas of surface, if not indeed much of that of the Park, is at least somewhat warmer than that of other regions, for the snow in much of the Park seldom remains long even during moderately cold weather, nor is the earth often long or deeply frozen. For these reasons the terrible winter storms which cross the Sierra-Shoshone Range become much modified before crossing the Park, which observation and experience alike indicate is much warmer in winter than the less elevated surrounding regions.

ROUTES TO THE PARK.

The northern route has the advantages of cool summer travel upon the great lakes and the Missouri and Yellowstone Rivers, and railroad con-

nections with Manitoba and other British possessions, and ere long with Oregon, Washington Territory, and the northern route to Asia via the Northern Pacific Railroad. This latter railroad has recently been extended into Montana, and probably will reach the Yellowstone River in time for the coming season's tourists to enjoy a steamboat trip upon that romantic stream to at least the mouth of the Big Horn, and thence a coach trip via Bozeman to the Mammoth Hot Springs within the Park.

The southern route via the Central Pacific Railroad to California, as well as the Denver Pacific and other railroads to Saint Louis, affords great facilities for the Southern and Southwestern States and Territories, and for the increasing class of scientists and retired military and naval officers, or those upon leave of absence, who, while making the grand tour of the world, now annually visit the Park. The Utah Northern Railroad has entered Montana, and doubtless will deliver the coming season's tourists to where a thirty-mile coach ride upon the line of Gilmer & Salesbury will land them in Virginia City. Thence the coach line of Marshall & Goff will (upon a good road, mainly constructed by the public-spirited citizens of Virginia City) carry passengers via Henry's Lake direct to their hotel at the forks of the Fire Hole Rivers within the Park.

One of these routes presents the greatest variety of scenery, modes of travel, and somewhat shortest distance; the other the most direct continuous railroad connection, least coach or horseback travel, and consequently requires the least time; but practically both are convenient and necessary, as most persons with time and means will prefer going one route and returning the other.

Camp outfit and provisions can be purchased without extortion at Bozeman and Virginia City. At these places also, as well as at the Mammoth Hot Springs and at the Forks of the Fire Hole, reliable guides, with saddle outfit complete, will always be obtainable.

There will doubtless be regular mail communications from both Virginia City and Bozeman.

Time really necessary to view the leading wonders of the Park, ten days, but many more may be enjoyed with benefit; season of the year for a visit, July, August, and early September; cost of trip, although one of the most important considerations with most persons, is, from their diverse positions, tastes, and modes of travel, the most difficult to state, even approximately, but will range from $400 to $800 for the entire expenses of a visit to the mystic wonder-land. The best plan is, as recommended in last year's report, to make the Park the main object and turning-point of a season's rambles, visiting at least the Salt Lake and the Yellowstone regions upon the outward or return route.

It is expected that terms of leaseholds for hotel sites in the Park will be extended from ten to thirty years, and that leases will be effected to responsible parties, and at least some hotels at prominent points of interest will be erected; also, that a small steamboat upon the Yellowstone Lake will be constructed during the coming season.

Tabular statements concerning routes and trails will be found in the Appendix, marked F.

CONCLUSION.

In closing this report I beg to state that my assistants, Messrs. Stephens and Yount, have efficiently and faithfully discharged their respective duties, and cheerfully rendered every assistance in their power in my endeavors to carry into effect the wise policy of the Department of the Interior with regard to the National Park.

I also have to thank Mr. Chittenden, formerly of the Hayden survey, and Dr. W. J. Hoffman, of Washington, for elaborating some of the Hoodoo sketches made by Mr. W. H. Parker, who accompanied me in the exploration of the Goblin land. I am also indebted to Mr. W. H. Holmes for assistance in the preparation of the eastern portion of the map accompanying this report.

Finally, I would be derelict in duty did I omit to express my thanks for, and high appreciation of, the unvarying kindness I have ever received at your hands and those of other officers of the department over which you preside.

I am, very respectfully, your obedient servant,

P. W. NORRIS,
Superintendent Yellowstone National Park.

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APPENDIX.

A.

REPORT OF GAMEKEEPER.

GAMEKEEPER'S CABIN,
YELLOWSTONE NATIONAL PARK,
November 25, 1880.

SIR: The notice of my appointment by the Hon. Carl Schurz, Secretary of the Interior, as gamekeeper of the Yellowstone National Park, with instructions to report to you as its superintendent for duty, reached me at Cheyenne, Wyoming Territory.

I at once accepted, but as the unusually deep snows and floods in the mountains prevented my crossing them from that direction, I proceeded by the railroad and coach-route, via Ogden and Bozeman, reporting at the headquarters of the Park July 6, and entering at once upon my duties.

My previous experience in the Park proved materially beneficial, as I knew the haunts and habits of the various animals and how to protect them from wanton slaughter by the numerous tourists.

Meeting the honorable Secretary of the Interior at the South Madison, near the southwestern corner of the Park, I accompanied him in his tour of its leading points of interest to the northeast corner at the cañon of Clark's Fork, where he left this region.

Returning to the Mammoth Hot Springs I outfitted and proceeded, via the Great Falls, to the foot and thumb of the Yellowstone Lake, and thence in a nearly direct route past Lake Biddle and a flat, open country, to Heart Lake at the foot of Mount Sheridan, some twenty-five miles from the Shoshone trail at the thumb of the Yellowstone Lake. From Heart Lake I crossed over to Barlow Valley at the foot of the Red Mountain range near the southern border of the Park, finding deer and elk in abundance, and some moose, and Heart Lake as well as all the cold streams teeming with extra fine trout and countless water-fowl.

Upon my return trip I explored the region around Lewis and Shoshone Lakes, finding along their northern terrace an excellent route for a trail of easy construction. I also found an excellent gravelly ford of Snake River, some two miles below Shoshone Lake.

Returning via the Yellowstone Lake and Falls to the Mammoth Hot Springs, I proceeded with men and animals to construct a cabin for my winter quarters at a good spring on the terrace commanding a fine view of both the East Fork and the Soda Butte Valleys. Here I purpose wintering so as to protect the game, especially elk and bison, in their sheltered chosen winter haunts, from the Clark's Fork and other miners.

I have, during the season, found elk, deer, and bear in all portions of the Park, antelope in most of the open regions, and moose in the willow beaver-swamps of the southern portion, and excellent trout in abundance in all the cold-water streams, excepting the Yellowstone, where, as well as in the lakes, this fish is infested with worms, and the Lewis and Shoshone, the waters of which, although remarkably cold and clear, are not inhabited by any species of the finny tribe.

Much of the game in the Park occasionally ranges over some of the adjacent regions, endangering their slaughter in the constantly advancing border settlements. Hence I would strongly recommend that all portions of the Park be well protected, that the game may remain, increase, and much of it soon become domesticated. But this cannot be done by any one man, and I would respectfully urge for the purpose the appointment of a small, active, reliable police force, to receive regular pay during the spring and summer at least, when animals are liable to be slaughtered by tourists and mountaineers. It is evident that such a force could, in addition to the protection of game, assist the superintendent of the Park in enforcing the laws, rules, and regulations for protection of guide-boards and bridges, and the preservation of the countless and widely scattered geyser-cones and other matchless wonders of the Park.

Most respectfully yours,

HARRY YOUNT,
Gamekeeper of the Yellowstone National Park.

Col. P. W. NORRIS,
Superintendent of the Yellowstone National Park.

B.

ACT OF DEDICATION.

AN ACT to set apart a certain tract of land lying near the headwaters of the Yellowstone River as a public park.

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's 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's 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. That 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 or 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 trespassing 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.

Approved March 1, 1872.

NOTE.—The boundaries of the Park have never been surveyed, but they are mainly crests of snow-capped basaltic mountains encircling the wonder-land of cataracts, cañons, fire-hole basins, geysers, salses, fumeroles, &c., unique and matchless, with an entire area from fifty to seventy-five miles square.

C.

RULES AND REGULATIONS.

1st. All hunting, fishing, or trapping within the limits of the Park, except for purposes of recreation, or to supply food for visitors or actual residents, is strictly prohibited; and no sales of fish or game taken within the Park shall be made outside of its boundaries.

2d. Persons residing within the Park, or visiting it for any purpose whatever, are required under severe penalties to extinguish all fires which it may be necessary to make, before leaving them. No fires must be made within the Park except for necessary purposes.

3d. No timber must be cut in the Park without a written permit from the superintendent.

4th. Breaking the siliceous or calcareous borders or deposits surrounding or in the vicinity of the springs or geysers for any purpose, and all removal, carrying away, or sale of specimens found within the Park, without the consent of the superintendent, is strictly prohibited.

5th. No person will be permitted to reside permanently within the limits of the Park without permission from the Department of the Interior, and any person now living

within the Park shall vacate the premises occupied by him within thirty days after having been served with a written notice so to do, by the superintendent or his deputy, said notice to be served upon him in person or left at his place of residence.

NOTE.—These rules and regulations are those adopted by the Hon. C. Delano, Secretary of the Interior, at the dedication of the Park.

D.

APPEAL.

To whom it may concern:

Under the above law, rules and regulations, and my peculiar circumstances of health, long acquaintance, and business interest in those regions, I have accepted the responsible, but as yet neither lucrative nor desirable position of superintendent of the Yellowstone National Park. Have appointed J. C. McCartney, esq., proprietor of the Mammoth Hot Springs Hotel, assistant until my arrival via the Yellowstone River route, which, I trust, will be in June, unless delayed by the Indians.

Meanwhile, *bona-fide* occupants of buildings, bridges, mines, &c., will, by due regard for the above rules and the future interests of the public in the Park, be allowed quietly to remain. The outburst of national enthusiasm at discovery of the matchless wonders of the fire-hole and geyser basins, amid the Rocky Mountains, secured their prompt dedication as a national park for the weary and worn business man, the tourist, and the scientist forever; also, provision for the appointment of a superintendent under proper rules and instructions, but not the necessary appropriations to reward the one for the enforcement of the other.

My predecessor, Mr. N. P. Langford, did all that was proper to expect under the circumstances while in Montana, but with his return East all restraint ceased, and for fully two years, careless use of fire, wanton slaughter of rare and valuable animals, and vandalism of matchless wonders have, as so truthfully published in letters of myself and others, been doing irreparable injury in all the explored portions of the Park.

Under these peculiar circumstances, in the interest of science and of the tourist now and in the future, the welfare and good fame of the people of Montana, Utah, and Wyoming in general, and especially to my old mountain comrades and friends, do I most earnestly appeal, to abstain, and use all influence in urging others to desist from future vandalism of all kinds in the lofty, romantic "wonder-land."

With the closing of the Sioux war, the extension of the Northern Pacific Railroad, the opening of the Yellowstone natural route and the Big Horn Mountains for exploration of their vast gold and silver mines, an influx of sturdy miners and herdsmen will soon gather wealth, build towns, and open safe and convenient routes of access to this now isolated, little known, but matchless national heritage of wonders.

That the spirit in which I write and act in this matter may extend to the press and the people of those mountain regions and the tourists who visit them is my ardent desire.

P. W. NORRIS,
Superintendent of the Yellowstone National Park.

E.

Weather record kept in the Yellowstone National Park during the season of 1880, at the Mammoth Hot Springs.

[Latitude, 44° 59' north; longitude 110° 42' west; elevation, 6,450 feet.]

Date.	Temperature.			Sky.	Snow.	Wind.			Remarks.
	Sunrise.	Noon.	Sunset.			Sunrise.	Noon.	Sunset.	
1880.					*Ins.*				
January 1	25	28	26	Cloudy		SE.	SE.	SE.	Gale.
January 2	30	32	30	do	2	SE.	SE.	SE.	Do.
January 3	26	30	28	do		SE.	SE.	SE.	Do.
January 4	26	44	30	Clear		SE.	SE.	SE.	Do.
January 5	30	30	28	Cloudy		SE.	SE.	SE.	Do.
January 6	30	30	30	do		SE.	SE.	SE.	Do.
January 7	28	46	30	do		SE.	SE.	SE.	Intermittent.

Weather record kept in the Yellowstone National Park, &c.—Continued.

Date.	Temperature. Sunrise.	Temperature. Noon.	Temperature. Sunset.	Sky.	Snow.	Wind. Sunrise.	Wind. Noon.	Wind. Sunset.	Remarks.
1880.					*Ins.*				
January 8	30	26	25	Cloudy	1	SE.	SE.	N.	
January 9	20	22	20	do	4	SE.	SE.	SE.	
January 10	14	16	10	Clear		SE.	SE.	SE.	
January 11	6	10	10	do		N.	SE.	SE.	
January 12	10	16	14	do		SE.	SE.	SE.	Gale.
January 13	22	30	28	do		SE.	SE.	SE.	
January 14	22	30	28	do			SE.	SE.	
January 15	30	32	30	do		E.	SE.	SE.	
January 16	28	32	32	do			W.	SW.	
January 17	30	50	32	do			SE.	S.	
January 18	30	44	38	do		SE.	SE.	SE.	
January 19	30	34	29	do		SE.	SE.	SE.	
January 20	20	32	28	do		SE.	SE.	SE.	
January 21	18	35	23	do		SE.	SE.	SE.	
January 22	22	34	23	do		SE.	SE.	SE.	
January 23	22	38	20	do		SE.	SE.	SE.	
January 24	22	26	20	do		SE.	SE.	SE.	
January 25	20	23	18	do		SE.	SE.	SE.	
January 26	8	29	18	Cloudy	6	N.	N.	N.	
January 27	— 8	18	— 4	Clear		N.	N.	N.	
January 28	— 4	26	6	Cloudy	6	N.	N.	N.	
January 29	—16	—36	0	Clear		N.	N.	N.	Very little wind; Thermometer fell 26° in ½ hour.
January 30	—16	15	4	do		N.	N.	N.	
January 31	4	40	12	do					Calm.
Average of January	18	27	21						
Mean		22							
February 1	2	38	18	Cloudy	2		SE.	SE.	
February 2	2	28	20	do		SE.			
February 3	10	22	18	do	1	SE.	SE.	SE.	
February 4	12	18	10	do	1	N.	N.	N.	Gale.
February 5	12	24	16	do		SW.	SW.	SW.	
February 6	14	48	22	Clear		SE.	SE.	SE.	
February 7	14	48	18	do		SE.	SE.	SE.	
February 8	18	35	22	do		S.	S.	S.	
February 9	19	36	24	do		SW.	SW.	SW.	Gale.
February 10	17	36	28	do		SW.	SW.	SW.	
February 11	22	28	13	Cloudy	1	NW.	NW.	NW.	Gale.
February 12	2	24	10	Clear		S.	S.	S.	
February 13	12	21	11	Cloudy	3	N.	N.	N.	
February 14	14	24	22	do	3	SW.	SW.	SW.	Gale.
February 15	24	25	20	do	2	SW.	SW.	SW.	
February 16	10	14	1	do	1	SW.	SW.	SW.	
February 17	2	30	4	Clear		SW.	SW.	SW.	
February 18	4	30	18	do		SE.	SE.	SE.	
February 19	20	32	26	Cloudy	4	SE.	SE.	SE.	
February 20	20	42	30	Clear		SE.	SE.	SE.	
February 21	26	42	24	do		SE.	SE.	SE.	
February 22	26	62	36	do		SE.			
February 23	22	42	30	do			SE.	SE.	
February 24	22	37	24	Cloudy		SE.	SE.	SE.	Flying snow.
February 25	24	22	26	do	1	SE.	SE.	SE.	
February 26	18	20	18	do	1	NW.	NW.	NW.	
February 27	—16	6	— 6	Clear		NE.			
February 28	— 2	14	6	Cloudy		SW.	SW.	SW.	
February 29	6	12	17	do	1	SE.	SE.	SE.	
Average of February	12	28	18						
Mean		20							

Considerable snow on the ground; all the hollows full, with a very hard crust, sufficient to bear a horse up; heavy drifts on north side of hills; the pass on Geysers road almost level with snow.

Weather record kept in the Yellowstone National Park, &c.—Continued.

Date.	Temperature. Sunrise.	Noon.	Sunset.	Sky.	Snow.	Wind. Sunrise.	Noon.	Sunset.	Remarks.
1880.					*Ins.*				
March 1	22	32	33	Cloudy	.....	S.	SE.	SE.	Flying snow.
March 2	36	34	34	...do	2	SE.	SE.	SE.	
March 3	20	28	26	...do	1	SE.	SE.	SE.	
March 4	18	18	14	...do	.....	SW.	NW.	SE.	
March 5	12	24	18	...do	1½	NE.	SE.	SE.	Gale.
March 6	22	34	21	...do	2	S.	NW.	N.	
March 7	14	26	22	...do	½	SE.	S.	SE.	
March 8	22	34	18	Clear	.....	N.	NW.	W.	
March 9	6	30	20	...do	.....	SE.	.....	W.	
March 10	18	26	28	Cloudy	6	SW.	SW.	SW.	
March 11	6	— 2	— 8	...do	.....	NW.	NW.	NW.	
March 12	—30	— 2	—10	Clear	.....	N.	N.	SE.	
March 13	—40	— 0	—20	...do	.....	.....	S.	S.	Mercury frozen.
March 14	14	20	18	...do	.....	.....	.....	.....	
March 15	— 4	20	8	...do	.....	.....	.....	SE.	
March 16	— 2	20	14	...do	.....	SE.	SE.	SE.	
March 17	0	40	22	...do	.....	.....	.....	.....	
March 18	14	30	23	Cloudy	.....	.....	.....	.....	
March 19	20	50	28	Clear	.....	.....	.....	SW.	
March 20	18	32	24	...do	.....	SE.	SE.	SE.	
March 21	20	50	28	...do	.....	SE.	SE.	SE.	
March 22	22	48	36	...do	.....	SE.	SE.	SE.	
March 23	21	*71	*48	...do	.....	SE.	SE.	SE.	
March 24	28	50	40	...do	.....	.....	SW.	E.	
March 25	36	43	34	...do	1	.....	E.	E.	
March 26	20	36	24	...do	½	.....	E.	E.	
March 27	19	34	30	...do	½	SE.	SE.	SE.	
March 28	26	46	35	...do	½	.....	SE.	SE.	
March 29	23	38	26	...do	½	.....	.....	SE.	
March 30	18	22	22	...do	½	.....	.....	SE.	
March 31	18	22	30	...do	.....	S.	S.	S.	
Average of March	13	30	22						
Mean	.....	22	.....						

* In sun.

Weather record kept in the Yellowstone National Park, &c.—Continued.

Date.	Temperature. Sunrise.	Noon.	Sunset.	Remarks.
1880.				
July 1	42	50	46	Clear.
July 2	41	48	44	Do.
July 3	50	56	54	Do.
July 4	47	58	51	Do.
July 5	50	61	54	Do.
July 6	49	70	61	Do.
July 7	58	75	64	Do.
July 8	58	64	58	Do.
July 9	54	67	60	Do.
July 10	51	58	54	Do.
July 11	46	58	50	Do.
July 12	40	48	46	Do.
July 13	47	59	50	Do.
July 14	50	61	58	Do.
July 15	51	72	68	Do.
July 16	54	80	72	Do.
July 17	52	84	71	Rain.
July 18	58	85	66	Do.
July 19	61	86	68	Windy.

Weather record kept in the Yellowstone National Park, &c.—Continued.

Date.	Temperature. Sunrise.	Noon.	Sunset.	Remarks.
1880.				
July 20	50	88	70	Clear.
July 21	58	92	71	Do.
July 22	54	84	69	Do.
July 23	55	80	60	Rain and hail.
July 24	55	70	65	Clear.
July 25	52	73	58	Showers.
July 26	48	72	60	Clear.
July 27	51	58	50	Rain.
July 28	41	52	50	Showers.
July 29	38	51	49	Do.
July 30	48	65	64	Clear.
July 31	57	68	63	Do.
Average of July	50	68	62	
Mean		60		
August 1	50	76	68	Rain.
August 2	48	73	64	Rain and hail.
August 3	48	74	68	Clear.
August 4	50	85	76	Do.
August 5	60	76	70	Do.
August 6	52	72	70	Do.
August 7	48	82	74	Do.
August 8	58	84	70	Do.
August 9	52	80	72	Do.
August 10	60	75	70	Do.
August 11	58	76	72	Do.
August 12	52	80	68	Rain.
August 13	53	62	67	Do.
August 14	48	80	54	Do.
August 15	50	74	67	Clear.
August 16	48	75	67	Do.
August 17	52	78	75	Do.
August 18	57	60	55	Rain.
August 19	46	64	58	Showers.
August 20	48	76	70	Clear.
August 21	48	76	68	Do.
August 22	50	76	67	Do.
August 23	50	84	74	Do.
August 24	52	76	62	Do.
August 25	44	55	80	Do.
August 26	50	65	60	Do.
August 27	45	65	60	Do.
August 28	46	68	66	Do.
August 29	48	50	44	Rain and hail.
August 30	38	52	42	
August 31	35	56	46	
Average of August	50	68	64	
Mean		61		

Weather record kept in the Yellowstone National Park, &c.—Continued.

Date.	Temperature.			Remarks.
	Sunrise.	Noon.	Sunset.	
1880.				
September 1	40	66	62	Clear.
September 2	43	63	60	Do.
September 3	44	64	62	Do.
September 4	50	75	70	Do.
September 5	48	80	68	Do.
September 6	48	76	68	Do.
September 7	48	78	68	Do.
September 8	50	74	66	Do.
September 9	48	69	67	Do.
September 10	48	66	62	Do.
September 11	32	56	45	Do.
September 12	30	68	46	Do.
September 13	40	68	58	Do.
September 14	46	65	56	Do.
September 15	42	68	62	Do.
September 16	44	76	62	Do.
September 17	49	72	62	Do.
September 18	44	42	42	Rain.
September 19	30	56	46	Clear.
September 20	31	65	56	Do.
September 21	38	68	55	Do.
September 22	34	67	66	Do.
September 23	34	60	54	Do.
September 24	36	62	54	Do.
September 25	42	58	42	Do.
September 26	30	67	42	Do.
September 27	42	62	58	Do.
September 28	42	62	59	Do.
September 29	38	73	60	Do.
September 30	50	75	66	Do.
Average of September	41	66	58	
Mean		55		
October 1	45	76	54	Clear.
October 2	40	76	60	Do.
October 3	39	78	67	Do.
October 4	40	80	66	Do.
October 5	40	76	62	Partly cloudy.
October 6	44	78	60	Do.
October 7	40	64	58	Do.
October 8	40	60	38	Rain.
October 9	42	58	32	Snow.
October 10	26	32	26	Clear.
October 11	14	46	34	Do.
October 12	22	56	36	Do.
October 13	34	44	36	Snow.
October 14	30	34	28	Do.
October 15	22	36	28	Do.
October 16	29	34	26	Do.
October 17	42	50	36	Misty.
October 18	30	62	48	Clear.
October 19	27	60	41	Do.
October 20	28	62	40	Do.
October 21	30	70	47	Do.
October 22	32	72	48	Do.
October 23	30	68	46	Do.
October 24	30	66	43	Cloudy.
October 25	42	55	43	Rain.
October 26	39	55	44	Clear.
October 27	35	55	49	Cloudy.
October 28	48	55	42	Cloudy; snow in north.
October 29	26	42	32	Clear.
October 30	14	30	26	Do.
October 31	15	43	32	Do.
Average of October	32	57	42	
Mean		44		

Weather record kept in the Yellowstone National Park, &c.—Continued

Date.	Sunrise.	Noon.	Sunset.	Remarks.
November 1	28	56	40	Clear; wind southeast.
November 2	32	40	40	Do.
November 3	30	29	24	Cloudy; wind southeast.
November 4	10	28	26	Clear; wind southeast.
November 5	14	28	26	Do.
November 6	30	36	40	Clear; wind southwest.
November 7	32	36	36	Do.
November 8	16	38	32	Cloudy; wind southwest.
November 9	16	36	34	Cloudy.
November 10	20	34	32	Cloudy; breeze southeast.
November 11	7	33	15	Clear; breeze southeast.
November 12	10	41	16	Do.
November 13	10	41	32	Clear; wind southwest.
November 14	20	50	38	Do.
November 15	26	34	14	Cloudy; wind southwest.
November 16	−3	−8	−10	Cloudy; wind northwest.
November 17	−21	−10	−12	Do.
November 18	−8	−12	−18	Clear; wind northwest.
November 19	−14	−18	−22	Snow, heavy; wind northwest.
November 20	−10	−12	−8	Snow-squalls; wind northwest.
November 21	−2	14	12	Clear; wind south.
November 22	−8	12	16	Do.
November 23	−10	16	14	Do.
November 24	−10	20	16	Clear; wind northwest.
November 25	−0	24	22	Do.
November 26	−18	2	20	Do.
November 27	−2	24	22	Clear; wind southeast.
November 28	−4	26	20	Do.
November 29	−12	30	18	Clear; wind northwest.
November 30	−14	−16	−18	Snow squalls; wind northwest.
Average of the month	5	24	17	Clear days, 20.
Mean	.....	15	.....	Heavy winds most of the month.

Date.	Sunrise.	Noon.	Sunset.	Remarks.		
				Snowfall.	Sky.	Wind.	
December 1	−16	−26	−22	12 inches	Cloudy	NW.	Gale.
December 2	−12	−6	−8	18 inches	do	NW.	Gale.
December 3	−14	−18	−19	18 inches	do	NW.	Gale.
December 4	−6	18	16	8 inches	do	W.	
December 5	14	34	20		Clear	W.	
December 6	22	36	28		do	S.	
December 7	20	42	25		do	S.	
December 8	30	49	37		Partly cloudy	S.	
December 9	20	48	36		Clear	S.	
December 10	24	32	34		do	S.	
December 11	38	44	38		do	S.	
December 12	28	50	30		do	S.	
December 13	30	44	38		do	S.	
December 14	32	38	38	½ inch	Cloudy	W.	
December 15	28	28	20		do	SE.	
December 16	19	27	20		Clear	SE.	
December 17	0	27	16		do	SE.	
December 18	19	36	26		do	SE.	
December 19	22	32	30		do	SE.	
December 20	26	32	32	1½ inch	Cloudy	SW.	Gale.
December 21	18	24	22	½ inch	do	NW.	Gale.
December 22	22	30	29	1 inch	do	SE.	
December 23	27	32	30	2 inches	do	SE.	
December 24	24	28	20	3 inches	do	SE.	
December 25	30	36	36	2 inches	do	SE.	
December 26	30	37	30		do	SE.	
December 27	26	11	−6		do	NW.	Gale.
December 28	−6	−12	−4	4 inches	do	NW.	Gale.
December 29	−20	−6	−6	3 inches	do	NW.	Gale.
December 30	−8	−10	−11	3 inches	do	SE.	
December 31	14	20	28	2 inches	do	SE.	
Average of the month	16	25	20	78½ inches, or 6½ feet.	19 cloudy days and 3 heavy gales.		
Mean	.....	20	.....				

F.

ROUTES IN THE YELLOWSTONE NATIONAL PARK.

HENRY'S LAKE ROAD.

Route.	Between points.	Total.
	Miles.	*Miles.*
Henry's Lake Mail Station to—		
South Madison Station	10	
South Madison to—		
Riverside Station	10	20
Lookout Cliffs	3	23
Marshall's Park	5	28
Forks of the Fire Holes Station	7	35

MAMMOTH HOT SPRINGS ROAD.

Forks of the Fire Holes to—		
Lookout Terrace	3	
Forks of road	2	5
Earthquake Cliffs	2	7
Cañon Creek	4	11
Falls of the Gibbon	1	12
Cañon of the Gibbon	1	13
Head of Gibbon Cañon	3	16
Monument Geysers and return	2	18
Geyser Creek	2	20
Norris Geyser Basin	3	23
Norris Fork Station	1	24
Lake of the Woods	6	30
Obsidian Cliffs	4	34
Willow Park	2	36
Indian Creek	5	41
Swan Lake	2	43
Rustic Falls	2	45
Terrace Pass	2	47
Mammoth Hot Springs Station	3	50

ROAD TO BOZEMAN.

Mammoth Hot Springs to—		
Mouth of Gardiner River	5	
Second Cañon of the Yellowstone	13	18
Cañon Gap	4	22
Bottler's Ranch	12	34
Bozeman	40	74

MADISON CANON ROAD.

Forks of the Fire Holes to—		
Lookout Terrace	3	
Falls of the Madison	3	6
Mouth of the Gibbon	4	10
Gibbon, Fire Hole Basin, and return	2	12
Foot of Madison Cañon	6	18
Riverside Station	3	21

ROAD TO THE UPPER GEYSER BASIN.

Forks of the Fire Holes to—		
Prospect Point	1	
Lower Geyser Basin	1	[illegible]
Midway Geyser Basin	3	[illegible]
Upper Geyser Basin	5	10

NEZ PERCÉ FORD TRAIL.

Route.	Between points.	Total.
Indian Pond to—		
Pelican Valley	3	6
Ford of Pelican Creek	3	12
Nez Percé Ford of the Yellowstone	6	

GRAND CAÑON TRAIL.

Route.	Between points.	Total.
Tower Falls to—		
Forks of Washburn Trail	3	6
Rowland's Pass	3	9
Sulphur Basin	3	11
Meadow Camp	2	13
Brink of Grand Cañon	2	15
Lookout Point	1	16
Great Falls of Yellowstone	1	

TWIN FALLS TRAIL.

Route.	Between points.	Total.
Meadow Camp to—		
Head of Grand Cañon	2	3
Safety-Valve Geyser	1	4
Twin Falls on Yellowstone River	1	

SPRING CREEK TRAIL.

Route.	Between points.	Total.
Great Falls of Yellowstone to—		
Spring Creek	2	3
Great Spring	1	5
Cascade Creek	2	

FOSSIL FOREST TRAIL.

Route.	Between points.	Total.
Gamekeeper's Cabin to—		
Foot of mountain	3	6
Summit of Amethyst Mountain	3	11
Orange Creek	5	15
Sulphur Hills	4	23
Forks of Pelican Creek	8	28
Indian Pond	5	31
Lower ford, Pelican Creek	3	34
Foot of Yellowstone Lake	3	

STINKING WATER TRAIL.

Route.	Between points.	Total.
Forks of the Pelican to—		
Summit of pass	4	10
Cañon through first range	6	

TRAIL AND PROPOSED ROAD TO THE YELLOWSTONE LAKE AND FALLS.

Route.	Between points.	Total.
House in Upper Geyser Basin to—		
Cascades of the Five Hole Rivers	3	[illegible]
Norris Pass of the main divide	5	[illegible]
Shoshone Creek, 2 miles from the lake	2	1
Columbia River and Pacific waters	5	1
Two Ocean Pond	7	2
Hot Springs on Yellowstone Lake	8	[illegible]
Cliffs on lake	12	[illegible]
Bridge Creek Bay	5	[illegible]
Foot of Yellowstone Lake		

Routes in the Yellowstone National Park—Continued.

TRAIL AND PROPOSED ROAD TO THE YELLOWSTONE LAKE AND FALLS—Continued.

Route.	Between points.	Total.
Mud Volcano	8	56
Sulphur Mountain	4	59
Alum Creek	3	62
Great Falls of the Yellowstone	3	65
Return to Alum Creek	3	68
Hot Sulphur Springs	11	79
Mary's Lake	3	82
Cold Spring Creek	9	91
Forks of the Fire Hole River	7	98

MIDDLE GARDINER TRAIL.

Mammoth Hot Springs to—		
The West Gardiner	2	
Falls of the Middle Gardiner	2	4
Sheepeater Cliffs	2	6
Road to the Geysers	1	7

TRAIL TO FORKS OF THE YELLOWSTONE.

Mammoth Hot Springs to—		
Forks of the Gardiner	2	
Lower Falls of the East Fork of the Gardiner	1	3
Upper Falls of the Gardiner	1	4
Cascades of the Gardiner	1	5
Black Tail Creek	3	8
Dry Canon or Devil's Cut	7	15
Pleasant Valley	3	18
Forks of the Yellowstone	2	20

MOUNT WASHBURN TRAIL.

Forks of the Yellowstone to—		
Tower Falls	3	
Snowy spur of Mount Washburn	6	9
Dunraven's Pass	3	12
Cascade Creek	4	16
Great Falls of the Yellowstone	4	20

MINERS' TRAIL TO CLARK'S FORK MINES.

Forks of Yellowstone to—		
Crystal Creek	5	
Amethyst Creek	5	10
Gamekeeper's Cabin	5	15
Sulla Butte Medicinal Springs	3	18
Trout Lake	2	20
Smelter at mines (Cook City)	11	31
Index Peak	5	36

ROUTE TO HOODOO BASIN.

Gamekeeper's Cabin to—		
Sulphur Springs	2	
Ford of Cache Creek	1	3
Alum Springs and return	4	7
Calfee Creek	7	14
Miller's Creek	5	19
Forks of Miller's Creek	10	29
Miller's Camp	6	35
Hoodoo Mountain	3	38

RECAPITULATION OF ROADS AND TRAILS WITHIN THE PARK.

Roads.

	Miles.
Mammoth Hot Springs to northern line of the Park	6
Mammoth Hot Springs to Cañon of East Gardiner	3
Mammoth Hot Springs to Cañon of West Gardiner	2
Mammoth Hot Springs to Forks of the Fire Holes	50
Madison Cañon Road	18
Forks of the Fire Holes to west line of the Park	20
Forks of the Fire Holes to house in Upper Geysers	10
Total length of roads	109

Trails.

Nez Percé Ford Trail	13
Grand Cañon Trail	16
Twin Falls Trail	4
Spring Creek Trail	5
Clark's Fork Mines	36
Hoodoo Basin	38
Fossil Forests	34
Stinking Water	10
Shoshone and Yellowstone Lake	96
Middle Gardiner	7
Forks of the Yellowstone	20
Mount Washburn	20
Nez Percé Ford	12
Total length of trails	312

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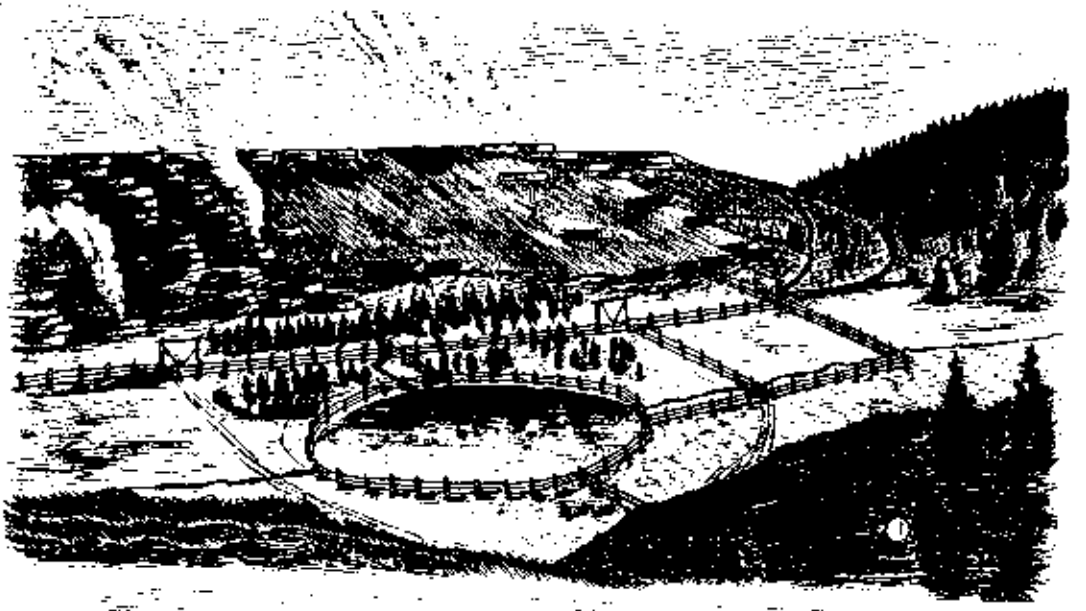
ATTACHED MAP / DRAWING

SEE ORIGINAL



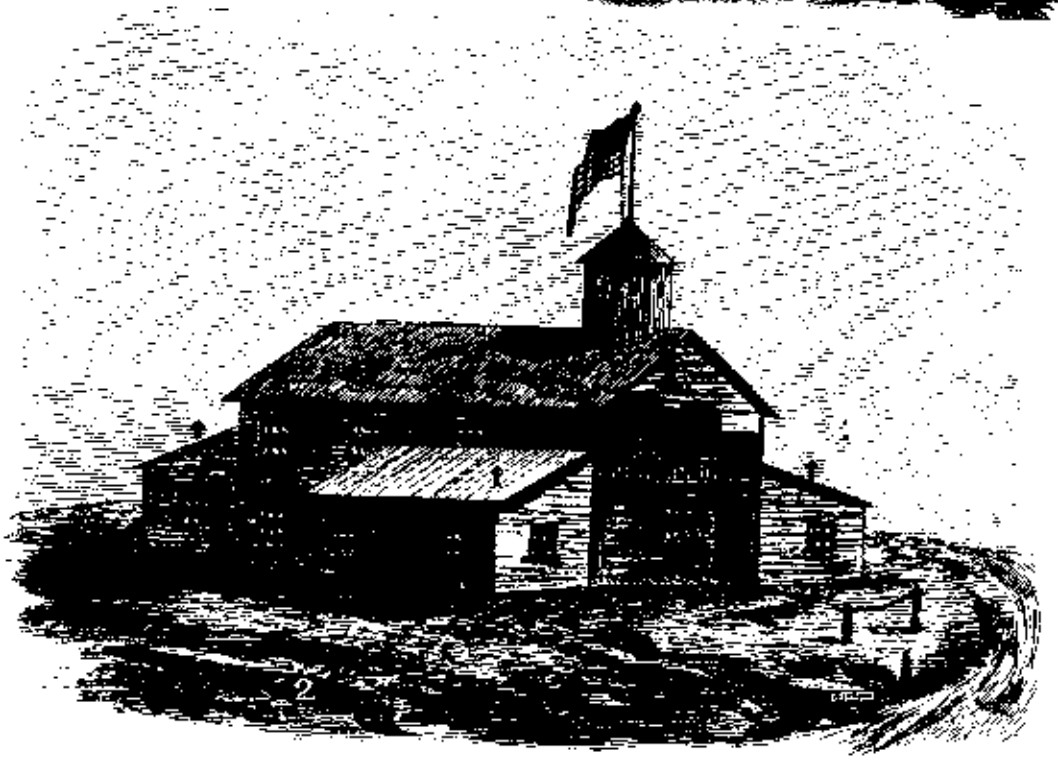


FIG. 1.—Mammoth Hot Springs. Liberty Cap, Reservoir, and Garden. FIG. 2.—Headquarters Building. FIG. 3.—Barn and Corral.

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FIFTH ANNUAL REPORT

OF THE

SUPERINTENDENT

OF THE

YELLOWSTONE NATIONAL PARK.

BY

P. W. NORRIS,
SUPERINTENDENT.

CONDUCTED UNDER THE AUTHORITY OF THE SECRETARY OF THE INTERIOR.

WASHINGTON:
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1881.

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LIST OF ILLUSTRATIONS.

FIFTH ANNUAL REPORT

OF THE

SUPERINTENDENT OF THE YELLOWSTONE NATIONAL PARK.

By P. W. Norris, Superintendent.

Office of the Superintendent of
the Yellowstone National Park,
Mammoth Hot Springs, December 1, 1881.

Sir: I herewith submit my report of operations for the protection and improvement of the Yellowstone National Park during the year 1881, with the request that, if approved, it may be printed.

Very respectfully,

P. W. NORRIS,
Superintendent of the Yellowstone National Park.

Hon. S. J. Kirkwood,
Secretary of the Interior, Washington, D. C.

Sir: As you are doubtless aware, the winter of 1880–'81 commenced very early, with unusual severity, and with attendant heavy snows throughout the United States, and continued so in those portions east of the Rocky Mountains. Such was not the case in the regions amid and beyond them, in which localities the latter part of the winter was very mild, followed by a continuously pleasant early spring. This condition of affairs resulted in a prematurely heavy rise in many western rivers, notably the Bighorn, Yellowstone, and Missouri, whose united waters, swept a resistless, devastating flood over a great agricultural valley, still robed in winter's mantle of snow. From these floods the elevation of the National Park preserved it, and allowed the mild but continuous daily rays of an unclouded sun to render the deep sheltered glens and valleys luxuriant with herbage and fragrant with brilliant flowers, while the winter snows still rested low and chill, upon the mountain slopes above and around them. Rarely has man witnessed scenes more strangely mingling the weird and repellent with the charmingly beautiful, than these borders to fire hole basins, or the sheen of the slanting sunbeams from ice-clad cliffs begirting geyser basins of spouting hot water, or the sulphur lined fumerole escape vents of smothered fires. These were among the scenes which greeted my return to the Park. In the East I had left the frugal farmer, with shelter, grain and care, nursing his starveling animals, hoping for the scanty herbage of a tardy spring; upon the Platte and the Great Plains I had seen the carcasses of thousands of animals claimed by the princely-improvident, fortune-trusting herdsman of the border, decaying where they starved,

or frozen, fell; and, in the valleys of the Madison, the Gallatin, and the Upper Yellowstone, witnessed animals in only passable heart and flesh; while in the Park, at an elevation of 6,450 feet, in our little cliff-and-snow-girt valley, with its matchless hot springs, I found all our animals sleek, fat, and able, engaged in grading a road up the cañon of the east fork of the Gardiner River. In fact, the season in the valleys was as advanced by the middle of April, this year, as it was upon the 1st of July of last, and the roads in better condition; so that the limited amount of funds under my control available before the 1st of July alone prevented me from at once organizing my force and pushing improvements. Finding that, with the utmost prudence, I could keep only my assistant, C. M. Stephens, gamekeeper Harry Yount, and two additional men, I employed them in duties deemed most advantageous at this time. As Yount was no longer needed at the gamekeeper's cabin on the Soda Butte, and was a trusty person as well as an excellent hunter and scout, he was stationed at our headquarters (the gun-turret of which is a commanding lookout station) with instructions to daily scan, with a field-glass, our surroundings, visiting so much thereof as was convenient, paying attention to the repairing of roads and bridle-paths, and returning each night, with game when needed, to the proper care of our buildings and other property. With the remaining men, one wagon, team, necessary tents and other outfit, I moved to our grade in the cañon of the East Gardiner, about four miles distant. By this plan we daily saved an eight-mile trip; in addition to which, I, being weary of city life, books and writing, the men of a winter's confinement to the house, and all longing for the freedom of camp life and blanket, these longings were thus gratified.

This cañon of the East Fork of the Gardiner is 3 miles long, 2,000 feet deep, with no egress from its vertical basaltic-capped cliffs, save by our bridges over the East and the Middle Forks, near their confluence, towards our headquarters, or past the falls and cascades to the Blacktail plateau. At this point we made our camp, moving it to little sheltered grassy nooks or glades, as we pushed forward our grade between the roaring torrent and the craggy cliffs. Here, beneath cloudless skies, the stately bighorn, the ferocious grizzly, and the royal eagle watched us from the cliffs, while grouse, deer, and elk were ever in sight and often within pistol-shot of our camp fire; there were countless speckled trout in the dashing snow fed stream beside it, and our quiet animals were half-hidden in pasturage and flowers. These scenes, with nights of refreshing sleep and days of cheering progress upon our new route from the cañons of the Gardiner—in short, our sports, our labors, and surroundings, all combined to render these bright camp-fire days among the most pleasant of those which I have ever spent in the mountains.

Late in May, with Harry Yount, I visited the Fire Hole regions, and besides noting geyser eruptions and removing fallen timber from the roads, planned and marked out much of our season's work in that direction, and thence alone proceeded to our gamekeeper's cabin on the Soda Butte. Meeting Rowland there, we together explored and marked a bridle-path to where checked by snow-fields upon the slopes of the Hoodoo Mountain; and on the route of return made interesting discoveries of Indian fortifications and fossil forests. A succession of long hot days early in June were telling rapidly upon the elevated snow-fields of the Sierra Shoshone range; each little rill joining its fellow, that another, thus deeply furrowing and undermining the softening ice-field or tottering crag, until launched a resistless snow-slide or avalanche of ice, rock, and crushed and tangled timber, with roar of thunder, crashing into the streams, rendering them for a time as turbid as the Missouri of the plains, and from

their velocity and floating timber therein, far more dangerous to cross. I apprehend that three days of such experience as mine in crossing these mountain torrents while returning from the Soda Butte, would convey a more adequate conception of the resistless power of the mountain floods and their all-eroding effect upon the contour of mountains during countless ages, than the perusal of any work which has ever been written upon the subject.

Leaving the men to complete the cañon grade, I followed, noted, and sketched traces of the Indians, and of some unknown earlier occupants of these regions, from the Sheepeater Cliffs and Sepulcher Mountain, above the Mammoth Hot Springs, to the borders of the Park in the Yellowstone Valley. Then, while en route to Bozeman, for the purpose of selecting and forwarding our season's supplies, I improved my first leisure from urgent duty since 1875, in tracing and sketching such remains through the second cañon and Gate of the Mountains, upon the Yellowstone, together with the first terrace below, and the Bottler Park between the first and second cañons, a distance of fully 60 miles; and thence proceeded along the Trail Pass to Bozeman. These explorations are a continuation of those reported in my communication of 1877, as may be found under the head of "Prehistoric Remains in Montana," pages 327 and 328 of the Smithsonian Report of 1879. As it is my purpose (should there be no official objection) to furnish a fully illustrated report of these, and other traces, tools, weapons, and utensils of a supposed prehistoric people, to the Bureau of Ethnology, Smithsonian Institution, under the charge of Maj. J. W. Powell, I will here only state that they are deemed of peculiar historic interest and value. For the purpose of economizing valuable time, the latter part of June was devoted to hiring men, and the selection and forwarding by government teams of our supplies of tools, provisions and other outfit, for use after the 1st of July, and to be paid for with funds then available. From experience, I considered it best to work simultaneously upon both the Yellowstone and the Fire Hole routes from the headquarters, keeping up our communication there by weekly couriers. The men, wagons, teams, tools, and provisions were divided, and in readiness for an early start upon the morning of the 1st day of July, when, as before stated, our season's funds for improvement of the Park first became available. At dawn of that day the members of each detail were in harmonious but spirited rivalry for the start, anterior to which I read the names and duties of the various members of each, as well as the following address and instructions, furnishing a copy to the foreman of each party:

OFFICE OF THE SUPERINTENDENT, MAMMOTH HOT SPRINGS,
Yellowstone National Park, July 1, 1881.

MOUNTAIN COMRADES: Organized as we are for the protection and improvement of the Park, every member is expected to faithfully obey all the recently published rules and regulations for its management, and to vigilantly assist in enforcing their observance by all persons visiting it.

While labor in the construction of roads and bridle-paths will be our main object, still, with trifling care and effort, much valuable knowledge may be obtained of the regions visited, especially by the hunters and scouts, all of which, including the discovery of mountain passes, geysers, and other hot springs, falls, and fossil forests, are to be promptly reported to the leader of each party.

As all civilized nations are now actively pushing explorations and researches for evidences of prehistoric peoples, careful scrutiny is required of all material handled in excavations; and all arrow, spear, or lance heads, stone axes and knives, or other weapons, utensils or ornaments: in short, all such objects of interest are to be regularly retained and turned over daily to the officer in charge of each party, for transmittal to the National Museum in Washington.

P. W. NORRIS,
Superintendent of Yellowstone National Park.

FIRST PARTY, YELLOWSTONE ROUTE.

P. W. NORRIS, *in charge.*

Thomas Scott, foreman and wagon-master; George H. Phelps, hunter and scout; Julius Beltezar, packmaster; Clement Ward, cook; N. D. Johnson, Andy Johnson, Patrick Kennedy, R. E. Cutler, and Philip Lynch.

Supplied by one government wagon, four-mule team, and pack-train, the saddle animal of each man, and a good outfit of tents, tools, and provisions.

SECOND PARTY.—FIRE HOLE ROUTE.

C. M. STEPHENS, *Assistant, in charge.*

James E. Ingersoll, foreman and wagon-master; Harry Yount, gamekeeper, hunter and scout; John W. Davis, packmaster; George W. Graham, blacksmith; Robert Clayton, cook; George Rowland, Frank Roy, Andrew Hanson, James Jessen, John Cunningham, Henry Klamer, Samuel S. Mather, Thomas H. Smith, George R. Dow, William Jump.

Supplied by one heavy wagon and a four-horse team, hired for the season. One medium-sized government wagon and two-horse team, with the blacksmith's forge, tools, and also pack-train, tents, and supplies; besides, as usual, each man with his own saddle animal, outfit, and weapons.

C. H. Wyman, my comrade of 1875, in the Soda Butte region, was left sole occupant of our headquarters save when George Arnhold, as for the past three years, made his weekly visits with the mails and supplies of articles as needed, and our couriers, who then received them for each party, and kept up a regular communication between them. As nearly all these men had shared the toils, privations, and dangers of the snowy pass, the weary watch, and the welcome camp-fire, and had been employed for their known worth and fidelity, either continuously, or during each season of labor, for from one to four or five, and one of them for eighteen years, they were truly comrades, treated and trusted as such, and are believed to be worthy of the above record of their names and respective duties. Although thus organized upon this occasion, such is now their knowledge of the routes which we have traversed, of each other, and of the various duties, that, aside from the assistant, blacksmith, and wagon-master, they could be reorganized in nearly any desired manner (and in fact were during the season with some addition to their numbers), without seriously impairing their efficiency; and I confidently challenge the mountain regions to furnish an equal number of men who, in the situation, circumstances, and peculiar difficulties under which we have labored, ever have shown, or are capable of showing, a better record of caring for public property or of making public improvements than is theirs.

Our day of starting being upon Friday, that day and the next, July 1 and 2, were spent by Stephens and party in repairing the grades and bridges to and beyond Willow Park, where they camped, spending the Sabbath and the national anniversary of the fourth in welcome rest and successful hunting; and as there were no intoxicating stimulants in camp, there was neither wrangling then, nor head nor heart aches when, with an ardent spirit of emulation in the performance of duty, they commenced the labors of the next morning. Important repairs and improvements were rapidly made at Obsidian Cliffs and the Lake of the Woods, and again repaired after a terrific water-spout (here called cloud-bursts), as well as at the Norris Geyser Basin and Gibbon Meadows; and the beautiful cone of a pulsating geyser, and some scalloped borders to adjacent pools, was, with

ach labor and difficulty, got out of a secluded defile two miles above the int Pots, for conveyance to the National Museum in Washington. Improvements were also made at Cañon Creek and other localities to and roughout the Fire Hole Basin. Thence, Stephens with his pack train opened the great bridle-path, via the Shoshone and Yellowstone Lakes, the Natural Bridge and Great Falls of the Yellowstone, returning by ay of Mary's Lake to his wagons, and commenced pushing a road up e East Fork of the Fire Hole River toward the Great Falls. Meanhile, I had with my party built a bridge over the East Fork of the ardiner, at the head of its middle falls, another at the forks of the lacktail Creek, there camping, with no other stimulants than the exitement of the use of rod and gun in securing a good supply of trout nd elk meat, during the Sabbath and Independence Day.

We had ascended fully 2,000 feet by the only route possible for a agon road from the cañon of the Gardiner to the open, beautiful plaeau of the Blacktail, whence a greater and more abrupt descent was equisite to reach the Yellowstone River, where Baronette's Bridge spans from its East Fork to Pleasant Valley, this being the only place of aproach through its terrible cañons, from 2,000 to 3,000 feet deep, between he Great Falls and the confluence of the Gardiner River, a distance of ore than 40 miles. Previous long and careful research having failed o reveal a satisfactory route for a road, the 3d and 4th days of July were pent by Baronette, builder of the first house within the Park and the irst bridge upon the Yellowstone River, and myself in a terribly trying nd fruitless and final effort for a roadway through the yawning fissure egion. Adopting a route which I had previously explored through an pen pass in the Blacktail divide, we constructed a road with only a noderate amount of grade and bridging in passing between the vertical basaltic walls of a very modern lava overflow, and an impassable fissure-vent fully 1,000 feet deep, to Elk Creek, and through a geode basin to the famous "Devil's Cut," or Dry Cañon (as I more politely if less appropriately call it), to the stream skirting Pleasant Valley. While grading down the terribly broken banks of this stream we unfortunately broke our plow beyond repair by any person nearer than our blacksmith with Stephens, to whom our energetic wagonmaster, Scott, with a four-mule team and heavy wagon, took our broken plow and the fragments of another from our shop at headquarters to Stephens at Cañon Creek, exchanged it for the one with his party and returned, making the round trip of 100 miles within four days.

We were compelled to scale a sharp hill to escape an impassable cañon in reaching Pleasant Valley, and to traverse a boggy cañon to avoid a craggy cliff in leaving it, near the forks of the Yellowstone, and by steep grading and climbing reached the cliffs overlooking Tower Falls. Without sufficient time or means to construct a road into the yawning cañon of Tower Creek, we left our wagon and carried our plow into and across it above the falls; then attaching a span of mules, we plowed a furrow for a present bridle-path and one track of a proposed wagon-road over the lovely terraces, the grassy glades, and up the long foot-hill slopes of Mount Washburn to the snowy line within a mile of Rowland's Pass, which, in distance and elevation, is about midway between the foaming river, in the yawning cañon, and the storm-swept summit of the mountain crest. From this place Scott returned with the team, wagon, and two men to the Mammoth Hot Springs, where he quickly repaired the fences, filled our barn, besides securing a rick of excellent hay. They then hoed and irrigated our garden, and, with a supply of potatoes and other delicious vegetables therefrom, and sup-

plies from Bozeman, proceeded to join Stephens in the Fire Hole regions. In the mean time, with the pack-train and the remainder of my party, I proceeded to greatly improve the bridle-path through Rowland's Pass, opened a new one two miles through timber, crags, and snowfields, to the summit of Mount Washburn, and, leaving the party to repair the bridle-path down the mountain and along the Grand Cañon to the Great Falls, I made a visit to Stephens and party, near the forks of the Fire Holes. Finding them energetically pushing the construction of a road towards Mary's Lake, I returned to my party, making ladders and various other improvements at and near the Great Falls, including a good bridle-path 5 miles below the falls to the roaring Yellowstone River in the Grand Cañon, where it is nearly 2,000 feet deep; and after planning and marking out a line of road, skirting Sulphur Mountain and the Mud Volcano, to the foot of Yellowstone Lake, united my party with that of Stephens.

After failing in a long-continued exploration for the discovery of a practicable pass through the Madison divide, towards the Yellowstone, we engineered a line of grade along its nearly vertical face, where little less than 1,000 feet high, and then through the cañon and along the route of General Howard in the Nez Percé campaign of 1877, to Mary's Lake. During the progress of this work, I embraced the first leisure of the season to visit the party of Justice Strong, Senators Sherman and Harrison, Governor Potts, the artist Bierstadt, and other gentlemen of prominence, accompanying them through the Fire Hole Basins, and with some of them—including Lieutenant Swigert, of Fort Ellis, in charge of their escort—to the Great Falls.

Prominent among the parties of visitors who were swarming to the Park early in August was that of Governor Hoyt and Col. J. W. Mason, the civil and military officers of regions embracing the Park, who were united in an expedition in search of a practicable pass for a wagon road from the inhabited portions of Wyoming to the National Park, of which they have a full appreciation and a pardonable pride. Having failed in a determined effort for the discovery of a pass at the head of the North Fork of the Wind River, after nearly a month of dauntless mountain climbing, they had just arrived at our camp, guided from the Two Ocean Pass by Harry Yount, whom I had sent to meet them.

Having been informed from Washington that want of funds would prevent the United States Geological Survey from making an exploration of these regions during this season, and deeming it very desirable to learn all possible regarding them in time for important legislation next winter concerning the Park and its boundaries, I accompanied Governor Hoyt, Colonel Mason, and party through the Sierra Shoshone Mountains to the head of the Great Cañon of the Stinkingwater, which they descended, while I completed the exploration, making important discoveries, and returned over the Soda Butte and Baronette's bridge from fearful snow-storms in the Goblin land, as will be shown under the head of explorations. While personally thus employed, and making but one brief visit to my men at the Mud Volcano, they, with highly commendable energy, completed a good road upon the line which I had laid out to the Yellowstone River, with a branch ascending it past the Mud Volcano to the foot of the lake, and another around the Sulphur Mountain to the mouth of Alum Creek, 4 miles above the Great Falls. They then returned through severe snow-storms, bringing in teams and outfit in good order to headquarters; and judging the employment of so large a force in autumn storms injudicious, most of the men were discharged, but provisionally engaged for next season if desired.

The remaining field operations with small parties were as follows: One with Davis, securing a fine collection of natural objects of interest and Indian relics from the fossil forests of the Soda Butte and Amethyst Mountain regions. Another was made, through severe snow-storms, to check vandalism and note geyser irruptions in the Fire Hole region, which was completed by Wyman and Rowland; another, by Stephens and Miller, in planning bridge sites and grades for next season upon the East Fork of the Yellowstone. My faithful gamekeeper, Harry Yount, having made his final tour and report, tendered his resignation; records of all of which will be found in their proper order.

The final trip of the season was made with the teams in October, hauling out to Fort Ellis, Montana, a large and valuable collection of natural and anthropological objects of interest for the National Museum in Washington; and then to Bozeman, 4 miles distant, for the purpose of closing the business affairs of the season, and the purchasing and forwarding of our winter's supplies.

Our buildings are well repaired, and wagons, tools, and other outfit secured for winter; during which it is my purpose to retain only my trusted assistant, Stephens, and Packmaster Davis, for the care and protection of the building, animals, and other public property.

The season for profitable labor in the Park closed, as it had commenced, unusually early; but the practical knowledge which has been acquired of the climate and peculiarities of these regions, the careful protection of teams, tools, and provisions, the excellent character and organization of my men, enabled me to make large and substantial improvements, and win the approbation of the candid, practical portion of the numerous and prominent tourists to the wonder-land. Neither myself nor others are as well satisfied with the season's protection of the forests from fire, or the geyser cones or other objects of natural interest from vandalism; all of which, with my suggestions as to a practical remedy, will be found in appropriate sections of this report.

The unavoidable failure of all my aneroid barometers to register correctly is a source of deep regret and a serious loss; but the thermometer readings, which have been regularly and carefully noted and preserved at the Mammoth Hot Springs during the entire season, as well as during my explorations of the Rocky and Sierra Shoshone Mountains, and those of Wyman in the Geyser basins, it is believed will be perused with interest, as greatly increasing our meager knowledge of the peculiar climate of those regions.

AREA OF THE PARK.

Two matters in connection with the Yellowstone National Park tend to great and general misapprehension regarding it. These are, first, its name, and second its area; or, as are perhaps best treated, inversely.

The large, beautiful, and (so far as then explored) correct map by Henry Gannet, M. E., topographer of the United States Geological Survey of the said Park during 1878, now in press, shows it to be an oblong square, 62 miles in length from north to south and 54 miles in width from east to west, containing 3,348 square miles. The extra census bulletin, by Mr. Gannet, now geographer of the tenth census of the United States, under date of September 30, 1881, page 4, shows that the area of the State of Delaware is 1,960 square miles; State of Rhode Island, 1,085 square miles; District of Columbia, 60 square miles; and page 17 of said bulletin shows the aggregate area of the counties of New York, King's, and Richmond, of the State of New York, is 150, equal

to 3,255 square miles. Thus the most recent and reliable authorities extant show that this great national land of wonders contains 93 square miles in excess of the aggregate area of two of the original thirteen States of the Union, the District of Columbia, containing the capital, and the three counties of the State of New York, which embrace the commercial emporium of the first and third cities of the nation, having an aggregate population of about 2,500,000. Nor is this a full statement of the case; as, if to this account were added the actual excess of surface measurements of this peculiarly broken region, over those relatively level eastern ones, it would (see bulletin, page 4) certainly exceed that of Connecticut, 4,845 miles, and, with the adjacent Goblin Land and other regions which I have explored during the past two seasons, fully equal that of New Jersey (bulletin, page 4)—7,455, or Massachusetts (same page)—8,040 square miles, or several other of the original States of the Union.

Prominent among the bordering points of observation of this vast region is Electric Peak, near the northwestern border, elevation 11,775 feet; Mount Norris in the northeast, 10,019; Mounts Chittenden, Hoyt, Langford, Stephenson, and others in the eastern Sierra Shoshone border, and Mounts Holmes and Bell's Peak upon the western, ranging between 10,000 and 11,000 feet high, and Mount Sheridan, near the southern border, 10,385 feet high, still backed by the Grand Teton, landmark of all those mountain regions, which is over 13,000 feet in height. But Mount Washburn, towering upon the brink of the yawning Grand Cañon waterway of the Yellowstone Falls and Lake, 10,340 feet high, is the most central, accessible, and commanding for a general view of the park and its surroundings. From its isolated summit can be plainly seen on a fair day, as upon an open map, not only this lake and cañon but many others also; countless flowery parks and valleys, misty sulphur and steaming geyser basins, dark pine and fir-clad slopes, broken foot-hills, craggy cliffs, and snowy summits of the sundering and surrounding mountains. No tourist should fail in securing this enchanting view, the best plan of obtaining which is, upon reaching the meandering rivulet fed lawns of the Cascade, the Glade or the Antelope Creeks, to go into camp, and await the dawn of a cloudless summer's morning. Then, to the scientist, the artist, or the poet, and to the weary and worn pilgrims of health and pleasure, from our own and other lands, ardent to secure the acme of mountain-climbing enjoyment, or in viewing the lovely parks and yawning cañons, the crests of glistening ice and vales of blistering brimstone, the records of fire and flood, the evidences of marvelous eruptions and erosions of the present and the past, and day-dreams of the future in the commingling purgatory and paradise of the peerless Wonder Land of earth, I would say, leisurely ascend the terraced slopes of Mount Washburn, and from its oval summit, with throbbing heart but fearless eye and soul expanding, look around you. One day thus spent would more adequately impress the mind with the magnitude and marvels of the Park, and the vast amount of exploration and research necessary in finding routes, and the enormous amount of labor and hardship unavoidable in the construction of buildings, roads, bridle-paths, trails, and other improvements, even when unmolested by hostile Indians—as during the past two years only—than a perusal of all the reports and maps of the Park which have ever been published.

Owing to the lack of natural curiosities worth retaining, in the three-mile strip of the Crow reservation in Montana, upon the north, or the four-mile strip in Montana and Idaho upon the west, the desirability of having the entire Park under one jurisdiction, as well as for other and weighty reasons fully set forth in my report of 1880, I again earnestly

recommend re-ceding to the jurisdiction of those Territories all of the Park not embraced by the now surveyed northern and western boundaries of Wyoming, leaving to future explorations and development the fixing and surveying of the remaining borders. It is hoped this may be done next season by the United States Geological Survey.

This necessarily lengthy explanation of the first question as to the magnitude of the Park so nearly disposes of the second, as to the name, that I only add that although it is so vast and broken by mountains and cañons into countless partially or wholly isolated parks and valleys, still the whole of it is nearly encircled by snowy mountains with few passes, being thus park like in character, and the name correct, or at least difficult to substitute by one more appropriate.

THE TWO MAIN APPROACHES TO THE PARK.

The explorations of myself and others, previous to my assuming the superintendency of the National Park, led to the correct conclusion that there were only two natural valley routes of access for wagon or railroads thereto, viz: the one up the Yellowstone River to the initial point on the northern boundaries of the Park, at the confluence of the Yellowstone and the Gardiner Rivers, some five miles below the Mammoth Hot Springs; and the other from the West via Henry's Lake and the Upper Madison River to its head at the confluence of the Fire Hole Rivers. The elevated passes over the Rocky and Sierra Shoshone ranges will be noted in their proper connections.

EASTERN APPROACHES TO THE PARK—THE VALLEY OF THE UPPER YELLOWSTONE AND THE TWO OCEAN PASS.

There are many and important indications that the towering lava cliffs which border the Yellowstone Valley above the lake were once lashed by the waves of its then extended little finger, fed by mountain torrents in yawning gulches, and drained through Two Ocean Pass into Snake River and to the Pacific Ocean, much as the ancient lake Bonneville (of which Salt Lake is a dwindled remnant) once drained through the Porte Neuf Cañon; and that the present Yellowstone and Bridger's Lakes, as well as the deep blue alpine-like appearing waters of the Upper River between them, are only remnants of this matchless mountain lake, since a less elevated outlet was elsewhere worn. Two Ocean Pass is either a natural gap or a broadly and smoothly eroded pass directly through the continental divide, trending from Bridger's Lake, near the head of the ancient one, southwesterly towards Jackson's Lake, at the foot of the Grand Tetons. Some 4 miles from the main valley this becomes a smooth open marshy meadow, fully half a mile wide; for the first 6 miles of which the waters creep sluggishly towards the Yellowstone, and then, in like manner, towards the Snake River. From these circumstances, the first slope is called the Atlantic, and the last the Pacific Creek; and are both fed along their courses by torrents from the snowy mountains upon each side as usual, the only novel feature heretofore known of this, being that one of these streams from the south enters the pass so near the summit that portions of its snow-fed waters discharge through these creeks towards both the Atlantic and Pacific Oceans, and hence the names of those creeks, the side creek, and the pass. Our camp of this year was made upon the left-hand side of the Pacific Creek, where a comparatively modern overflow of lava has not only pushed encroaching basaltic walls far into the pass from the north, but a narrow stream, of the same material 20 or 30 feet in thickness, entirely across, and for a time severing it and form-

ing the summit and divide of the pass. Through this, from erosion or other causes, two openings have been formed. I had never, from record or narrative, heard of a creek upon the north side, nor had I specially observed it until in crossing the mountain towards Barlow's Fork of Snake River I found that while the small but permanent and uniformly flowing Two Ocean Creek drained a snowy basin high above, but within a mile or two of the pass, a much larger one, in fact a fair-sized mill-stream, cuts a yawning gorge in descending over 2,000 feet within 4 miles from the snowy summit of the Rocky Mountains to the north of the pass. This enters directly opposite the other creek, a knowledge of which at once solves the whole mystery which has always shrouded this pass; for with but one feeder, no matter what its angle of entrance to the pass, it would have, as is commonly the case, cut and followed a channel to one ocean, not both, but, with both torrents cutting their gorges and depositing the débris directly opposite, a broad dam has slowly but steadily accumulated entirely across the pass (there less than a mile wide) from the convex or sloping ends and sides of which the streams, broken into smaller channels by the ever descending and changing masses of rock and timber, actually does divide the waters, and portions of each flow through thousands of miles of yawning cañons and mighty rivers to opposite oceans. Although, during this year, a somewhat larger portion of these waters drained into the Atlantic, there is a liability to fluctuation naturally, and little labor would be necessary each season to throw all of these waters, from off this sloping divide, into their former course to the Yellowstone, or through these two openings in the former lava divide, 200 yards upon the Pacific side of it.

In search, not of a better pass or approaches than that at the matchless "Two Ocean," but rather a shorter and better route than the one through dense, and, for the most part, fallen timber, through Trail Pass and by the fingers of the Yellowstone Lake, we scaled the main divide, and, shivering in the snow among the clouds, searched our maps and scanned the surroundings, especially those upon the desired route northwesterly. The scene was grand and inspiring, but the practical part of it was that we could distinctly trace the Grand Tetons, Mounts Sheridan, Hancock, and other familiar snowy peaks, with traces of the numerous fountain heads of the Snake River, and their valleys or cañons, and notably the main one, the Barlow Fork, apparently to our feet, and the desired pass in the main range to Pacific Creek, some miles below us. Buoyant with hope of a warmer region, we frightened scores of big-horn elk and grizzlies, in an impetuous descent of over 2,000 feet into a deep, narrow valley, connecting the Falls Fork of the Yellowstone with a stream which we were rapidly descending, hopeful of a nooning in the lovely Barlow Valley, when, with a sudden turn to the left, it cut directly through the mountain to the Pacific Creek, leaving us to follow the Barlow when we could find it. This we did by way of a pass and mountain spur, which certainly could not have been visited by Jones or Hayden, as neither these nor other portions of a region 6 or 8 miles in width are represented upon the maps of either of these gentlemen. But, as elsewhere stated, the pass to Fall Creek is evidently that traversed by Phelps in 1864, and hence given his name.

A thorough exploration of the region between the Barlow Valley, Mount Sheridan, and Heart Lake to Riddle Lake and the fingers and thumb of the Yellowstone, renders it evident that the route as proposed by Captain Jones and Professor Comstock, in 1873, and by Governor Hoyt and Colonel Mason this season, from Wind River over Tog-wa-tee Pass to the Buffalo Fork and Pacific Creek, waters of the Snake River,

can utilize the old Two Ocean and Upper Yellowstone route, or a new one through the lower end of Phelps Pass, and a side one from it through which we reached the magnificent timber and charming valleys of the Barlow and the Heart Rivers, and the low timbered plateau summit of the Continental divide where there is no mountain, past Lake Riddle, to connect with our bridle-path from the Fire Holes and Shoshone Lake at the western end of the Thumb of the Yellowstone.

I may here add as an objection to the adoption of a water-shed as a boundary of the park, that in this exploration between Phelps Pass and Heart Lake, I traversed the main continental divide, following a tolerably direct course, no less than eleven times in one day.

The interlocking fountain-heads of stream in the Sierra Shoshone range render its water-shed equally tortuous and objectional.

NEW PASS OF THE SIERRA SHOSHONE RANGE.

The narrow elevated pass discovered by Captain Jones in 1873, south of Mount Chittenden, several similar ones explored by myself at various times north of it, and Sylvan Lake, discovered, named, and sketched, together with its supposed drainage, as correctly as possible in a snow storm, by members of the Hayden expedition of 1878, was all known of passes in the entire Sierra Shoshone range prior to this season. From mountains at a distance I had often observed a deep depression in the serried crest of this range which could not be seen when among its broken foot hills. The length of time expended by Governor Hoyt and Colonel Mason in their outward route from Wind River would not allow of the search for a pass there, in our crossing to the Stinkingwater, or while following it to its great cañon, which they descended, leaving me to prosecute the exploration. This I did, ascending several creeks, and from lofty peaks viewing all the others, as well as passes of the range above the cañon, finding few trails and no practical passes until on the north bank of the second creek below Jones's I found an ancient but very heavy lodge pole trail, which I traced eight miles to the forks of the creek, and camped in a grove of cottonwood and other timber—indicating a sheltered and warmer location than is common at that elevation—and some pine trees 150 feet in height. Phelps caught trout, Roy kept camp and cooked supper, while Yount ascended the south and I the north fork of the creek. He reported impassable, snowy barriers; myself, indications of a pass some 5 miles distant; and the evening with the glistening of a glorious sunset and the halos of the harvest moon of other lands upon the Giants' Castle, towering athwart the glittering stars, was spent in plans, preparation, and hopes of a morrow's crossing of the divide.

Pressing ahead of the packs in the morning, I was blazing the trail along the steep acclivity, when it dwindled, and, in Shoshone guttural, *kaywut*; or, according to border provincialism, "played out," and a sharp turn to the right at once revealed the cause to be the branching of the trail for various elevations in ascending to a low, clear-cut, but very narrow pass directly through the range, unlike all others, which are elevated, with very steep, rocky climbing from one or both approaches to the sharp, narrow crest. We reached the summit in time for a romantic noon camp on a velvet lawn of grass and frost flowers, beside an Alpine lake supplied by a snow-fed rivulet, skipping in several fifty feet leaps from the cliffs; and as meat was wanting, Yount killed a blacktail, myself an elk, the surplus of which, and want of other provisions, caused the return of Phelps and Roy, with the most of it and all the pack animals save one

each for Yount and myself, to our main camp at the Mud Volcano, they not returning to us. This pass has more the appearance of a natural gap, not quite closed by two mountains of eruption, than by the erosion of a narrow pass; but whatever the cause, it is a very low, direct one, with good approaches for a trail or wagon road, the only drawback being several heavy mountain slides, some very ancient, and others of comparatively recent occurrence, the latter with immense masses of angular rocks filling it for at least a mile from fifty to two hundred feet deep, and the former causing a chain of three lakes, the most western of which is evidently the Sylvan Lake of Hayden's map of the explorations of 1878. This is shown correctly, but not its drainage, which I did not find; but, as the next lake in the pass drains toward this, its outlet cannot be to the Stinkingwater—as the one at the cascade probably is—but even this only by percolating through these modern rock-slides. As this pass is nearly abreast the eastern side of the Yellowstone Lake, affording a fine route *via* Clear Creek to and a route each way around it, and there appears to have been comparatively little recent rock-sliding in the pass, it seems to promise its old pre-eminence as such of the range, by the making of a rocky road, as I did at the Obsidian Cliffs in 1878, over that portion of the pass which doubtless caused its abandonment by the Indians for at least a generation. In reply to my pressing inquiry of We-saw regarding a pass in that direction, while upon the range going out, his only answer was a French-like shrugging of the shoulders and ejaculation, "*Me no go there; maybe Bannock Indian, long time 'go.*"

DIRECT CONNECTING ROAD.

One of the early and important plans of the park was the exploration and opening of a line of wagon road, upon the most direct practicable route, from the headquarters across the park to and through the other entrance thereto, thus connecting them for the convenience of our laborers, the public, and the military for their protection.

Important explorations were made in 1877 upon my route of 1875, and were completed and a rough road opened during the Bannock raid of 1878. This was somewhat changed and shortened through the earthquake region, in order to meet the new entrance over the Plateau of the Madison instead of through its cañon, in 1880, and with the improvements since made at Cañon Creek and elsewhere only requires important grades to save crossing the Gibbon in its cañon, and opening of the routes through the Middle Gardiner Cañon, to render it a direct and permanent route connecting the two main entrances.

CIRCUIT OF ROADS.

Another improvement contemplated in the first general plan of developing the park, and which, though often delayed, has never been abandoned nor forgotten, but persistently pushed at every opportunity each year, has been the construction of a bridle-path upon a route to be mainly followed by a wagon road connecting these two main entrances, from the Mammoth Hot Springs via the Forks, Great Falls, and Lake of the Yellowstone, to the Forks of the Fire Holes, so that tourists could ultimately enter the park by one of these main approaches, visit the principal points of interest with wagons; those of less importance by branching bridle-paths, leaving it by either. Bridle-paths were early opened, and important changes made, with exploration and opportunity, until the whole line was planned, and although the greater part

of 1880 was unavoidably devoted to opening the new route over the Madison Plateau instead of its cañon, still, a good start was made in the cañon of the East Gardiner River, from the Mammoth Hot Springs at one end, and up the East Fire Hole River from their forks at the other, during 1880; and the main improvements of this season have been in the construction of this line of road from both ends. As elsewhere stated, the remarkably favorable spring of this season would have permitted the advantageous use of a much larger appropriation than was at my command, but what I had was promptly and prudently expended in the warm sheltered cañon of the East Gardiner.

After July 1, when this year's appropriation became available, until the untimely heavy snows of September rendered such field-work injudicious, the construction of this road was pushed with a vigor, skill, and success, resulting from thorough previous exploration, preparation, and experience, aided by a reliable and active assistant and force of veteran laborers, well understanding their duties and emulous in surmounting the attendant difficulties of climate and surroundings.

The proposition of responsible parties to introduce a portable steam saw-mill for the purpose of sawing lumber for a steamboat upon the Yellowstone Lake, hotels at its foot, and falls of the river, as well as for the government in the construction of bridges, added to the necessity of reaching the foot of the lake this season. After the construction of bridges, culverts, and grades in the open valley of the East Fire Hole, much of which was boggy, and the failure of long and laborious exploration to reveal a practicable pass through the precipitous Madison Divide, it was crossed by a long and uniformly excellent grade along its nearly vertical face to the narrow, dry cañon outlet of the ancient Mary's Lake, along the grove-girt border of its clear but brackish waters, uninhabited by any kind of fish, through the adjacent noisome sulphur basin to the deep valley and grassy lawns of Alum Creek. Thence, winding amid the bald, eroded, and still eroding hills of a short divide, down the open meadows of Sage Creek to the old trail near the Yellowstone River, midway between Sulphur Mountain and the Mud Volcano. From there, one branch was pushed up the river past the Mud Volcano, Nez Percé Ford, and a succession of enchanting groves and flowery lawns, beside the broad, placid, blue waters of the peerless Yellowstone, to Toppin's Point and miniature harbor at the foot of its lake. The other branch was constructed by winding ways, amid verdant hills, passing the stifling fumes of Sulphur Mountain, to the mouth of Alum Creek, four miles up the Yellowstone, above its Great Falls. The other end of this circling line of road was forced through the cliff-walled cañon of the East Gardiner, the grassy plateaus and lava beds of the Blacktail, beside the yawning, impassable fissure vents fronting Hellroaring Creek, through the Devil's Cut (which I am trying to rechristen Dry Cañon), and down the mountain slopes fully 2,000 feet to Pleasant Valley and the Forks of the Yellowstone, in this only practicable gap of the Grand Cañon for a distance of more than 40 miles. By careful research, we carried our road to the summit of the cliffs overlooking alike one of the finest views of the Grand Cañon, the Tower Falls, and the meeting of the foaming blue waters between them. This leaves a gap of less than 20 miles in distance between the Tower Falls and the terminus of the other end of our road at the mouth of Alum Creek, and hence the completion of our much-desired circuitous line of road to the main points of interest in the Park, situate west of the Yellowstone Lake and its Grand Cañon. As before shown, the two main routes of access, as well as the direct or Norris Geyser Basin route, being open, this little gap is all re-

maining to complete the plan of roads originally adopted and persistently adhered to through vexatious difficulties, and delays, and annoying public misapprehensions.

Although this gap is so short and some portions of it an excellent natural roadway, yet the yawning cañon of Tower Creek, with its vast amount of rock-work, culvert, and bridging above the Falls, the scaling of Mount Washburn through Rowland's Pass, extensive bridging, timber cutting, and grading along the Grand Cañon and near the Triple Great Falls, together with the absolute necessity of several small bridges and extensive grading, or twice bridging the Yellowstone above the Falls, to connect with the other road at Alum Creek, renders it incomparably the most expensive of any equal portion of the route, and hence it was left until the last; and $10,000 is deemed necessary, and is specifically recommended to be appropriated, for these purposes during the coming fiscal year. This sum, in addition to the amount annually appropriated, might perhaps complete this road, were all others neglected. But this would appear injudicious, as, although the road over the Madison Plateau is deemed an excellent one, save the grades at each end, and *they* as good as are possible to have been made there, with the limited time and means at my command when this was done, still, they are very steep for hauling heavy boilers or mill or steamboat machinery, and need extensive change of grade, or else of the entire line, and returning to the circuitous Cañon route, with its unavoidably long and expensive grades, or bridging, or both, and which cannot properly be longer delayed. With nearly equal force, this necessity pertains to the extension of the road up the East Fork of the Yellowstone and Soda Butte, as the only route to the gamekeeper's cabin, the fossil forests, medicinal springs, and extension to the borders of the park, of a very important at least bridle-path route via the Clark's Fork mines to the Big Horn Valley and Fort Custer.

There is also a necessity for important bridle-paths up the East Fork Valley to the Goblin Land, and by a newly-discovered pass to Pelican Creek and Steamboat Point, on the Yellowstone Lake. This route also necessitates the purchase of the Baronette Bridge, recognition of it as a toll bridge, or building another, with better approaches, near it. The great desirability of constructing a road via the Middle Gardiner Cañon is believed to be rendered evident in the section devoted to that subject. Nor should the views of the governor, the military officers, and leading citizens of Wyoming Territory, in which the park is mainly situated, their explorations for a route to this Wonder Land, and their efforts to open it, as elsewhere explained, be ignored, but at least a substantial bridle-path route should be opened from some of ours to the borders of the park near the Two Ocean Pass, or via the new one which I explored during the past season through the Sierra Shoshone Range to the Great Cañon of the Passamaria, or both of them. In this connection I may state that my former knowledge and this season's explorations alike sustain the views of Governor Hoyt and Colonel Mason as to the practicability and necessity of a wagon-road from the Wind River and Two Ocean or the Stinkingwater (Passamaria) route to the park; and, as such, I do most cordially indorse their report favoring the appropriation of a sum sufficient to open a good wagon-road from the Wind River Valley or from the Stinkingwater to the borders of the park.

CAÑON OF THE GARDINER RIVER.

In addition to long, yawning, and interesting cañons upon all of the forks of the Gardiner River, high in the snowy ranges not traversed by

any of our roads or trails and hence not necessarily mentioned here, there are four of great interest and importance within five miles distance and in plain view of our headquarters at the Mammoth Hot Springs, viz: One upon each of the three forks, or branches, cut in their precipitous descent of nearly 2,000 feet down the basaltic cliffs to our deep sheltered valley, by them eroded in some remote period, and another carved fully 1,000 feet deep by their united waters in escaping to the Yellowstone. Winding along the western terraces above the latter cañon, we have constructed our road to the main Yellowstone Valley, also one over the elevated Terrace Pass, around that portion of the cañon of the West Gardiner—which is utterly impassable for even a game trail—on our road towards the Fire Holes and through the beautiful cañon of the East Gardiner, ornamented by basaltic column-capped cliffs above and around the falls and cascades, on our road of this season to the Forks of the Yellowstone. The remaining cañon of the middle, and far the largest, fork is utterly impassable, but a bridle-path was made in 1879 along the precipitous face of Bunsen's Peak above it as preliminary to a road line. This bridle-path, as stated in some preceding report, has been in practical use and has demonstrated the feasibility of the route for a road to connect with that to the Fire Holes near Swan Lake. With no increase of distance this route will save several hundred feet in elevation, afford a picturesque view of the Mammoth Hot Springs, government buildings, and sheltered cliff-girt valley from one end of the pass, the upper valley with its rim of snow-capped mountains from the other, and within it the Sheepeater Glen, the vertical walls and uniquely interesting rotatory or fan shaped basaltic columns, the roaring falls and splashing cascades of the Middle Gardiner, in wild, majestic beauty second only to those of the Grand Cañon of the Yellowstone, in the Wonder Land. Long and careful search and engineering resulted in the selection of a route along our timber road to a terrace overlooking the lower cascades of the West Fork of the Gardiner, which is to be crossed upon a short but very high timber bridge, and thence by a moderate and uniform grade along the pine clad face of Bunsen's Peak to the summit of the pass, amid the spray and thunder of a cataract nearly 200 feet high, in an eroded cañon more than 1,000 feet deep—a route combining so much of surpassing interest and practical value that only the want of means to divert from the pressing necessity of opening new routes to the Great Falls and other leading points of attraction has prevented its construction, and will insure it, with the first means at my command to properly thus expend.

MOUNT WASHBURN BRIDLE-PATH.

Successive seasons of exploration and research have resulted in the partial abandonment of the old route, with its several steep ascents upon the cold snowy side of Mount Washburn, the gulches of Dunraven's Peak, and the beautiful, but, in places, boggy valley of Cascade Creek, for the bridle-path route of a road ascending by long, easy grades from the pleasant meadows of Antelope Creek to the elevated but only summit of the route, in Rowland's Pass, and thence in like manner down its warm sheltered face to the grassy glades and sulphur basin, between it and the Grand Cañon, and skirting the latter, with its matchless scenery, to the Great Falls. An easily accessible peak upon the very brink of the Grand Cañon, about half a mile east of Rowland's Pass, affords a commanding view of it in all its windings and yawning side cañons, from the Forks to the Great Falls of the Yellowstone, and the terribly

eroded, gashed, and repellant-looking unexplored region beyond it. By a short moderate ascent west from the summit of the pass, an open spur is reached, which, in less than two miles of gradual ascent, scales the highest peak of Mount Washburn if desired, although it is but little more elevated and commanding than portions of the snowy crest before reaching it.

PAINTED CLIFFS—BRIDLE PATH INTO THE GRAND CAÑON.

This path leaves the main one, from Mount Washburn, at the eastern end of an open marsh, about 5 miles below the Great Falls, and, passing fully a mile through an open pine forest, reaches the head of the cañon, and winds along the face of a mountain slide to the small, but beautiful and noisy, Safety Valve pulsating geyser, situated in the narrow valley between this slide and the mountain face. For a proper understanding of this location it is necessary to explain that, evidently at a comparatively recent period, the eroding river and the erupting fire-holes along it have undermined portions of the nearly vertical walls, some of which are fully a mile along it and nearly half as wide and high, precipitating them into and damming it until cut asunder by the resistless current of the foaming river, often leaving long portions of these enormous mountain-slides with the timber undisturbed upon them. It thus presents the appearance of a lower bank, or terrace, with a nearly vertical face of the peculiar ancient lake formations of this region, above and below it. Along the line of contact above this mountain slide, skirting the river below, and at the terribly ragged ends of it, is a line of noisy escape vents of smothered fire, of which one is the "Safety Valve," thus named at its discovery last year, from its powerful and distinct reverberations along the cliff, which were then much more audible than during this season. This is nearly a mile in distance, and 1,000 feet in descent, below the summit of the cliffs, or one half of the entire distance and descent in the cañon, the lower half of which was made through a line of mingled active and extinct and crumbling geyser and other hot-spring formations, along the ragged edge of the lower end of the mountain slide to the foaming river drainage of the mountain snows. This stream we found literally filled with delicious trout of rare size and beauty, and so gamy that all desired of them were caught at each of our visits of this year, during our brief nooning, using as bait some of the countless salmon flies which were crawling upon the rocks or on our clothing, upon hooks fastened to one end of a line, the other being merely held in the hand or attached to some chance fragment of driftwood; but the sport seemed harder upon the hooks and lines than upon the trout, which were abundant, both in the river and out of it, after the loss of all our lines. Although this is strictly true in our experience, it is but just to state that some other persons who were there at a later hour of the day or period of the season, while seeing countless trout, found them less voracious.

The beautiful tinting of the cliffs in this locality, not unlike beauty elsewhere, seems only skin-deep; *i. e.*, the material beneath is often nearly white, and the brilliant coloring only brought out by surface oxidation of the various mineral constituents; and, although not deeming our path dangerous, I would suggest that anglers who may visit this place should not become so engaged with the beautiful speckled trout as to forget that their charming lady companions may need their nerve and assistance in the horseback ascent of the cliffs. Here, only, between Tower Creek and the Great Falls of the Yellowstone, does a

Crystal Falls and Grotto Pool with Bridge and Ladders.

bridle path reach the foaming, white surfaced, ultramarine blue waters of the "Mystic River," and the long, horizontal, cornice-like grooving of its clearly banded and rainbow-tinted walls and tottering cliffs; in short, the seclusion, the scenery, and the surroundings of this hidden glen of the Wonder Land render it one of the most uniquely attractive so that the few tourists who fail to visit it will never cease to regret their neglect.

THE TRIPLE OR GREAT FALLS OF THE YELLOWSTONE, AND THE BRIDLE PATH AND TRAILS THERETO.

These, as is well known, are the Upper Falls, of 150 feet, or about the same height as those of Niagara; the Lower Falls, nearly one half mile below, of about 350 feet; and upon the west side of the river, midway between them, the Crystal Falls, or Cascades of Cascade Creek, near its mouth, in height about equaling the Upper Falls. Upon the very brink of the latter the main bridle path to the lake passes, affording a fine view of them—the foaming rapids above and the rippling river below them—to the head of the Lower Falls, which is reached by the 500-feet descent of a good trail from the main one, or bridle-path, which crosses the creek upon a good bridge constructed last year from two projecting trachite rocks, nearly 40 feet above the famous Grotto Pool, between the upper fall, of 21 feet, and the lower, of more than 50 feet, beside a leaping cascade below it. This pool is caused by the sheet of water in the upper fall being at right angles with the stream, thus facing and undermining the eastern wall, and beneath it forming a broad, deep pool of placid water, nearly hidden under the narrow shelf of rocks between the two leaps of the cataract, and from its peculiarities named by me, in 1875, Grotto Pool. From a pole railing to the cliff between the bridge and the brink of the cliff overlooking the lower leap I this year placed a substantial, well-supported ladder to a projection of the cliff, and from there another to the foot of the Grotto Pool, and also some benches, for the convenience of tourists, beneath an overhanging rock and the lofty bridge along the narrow way between the wall and the water beside it. (See Fig. 1.) A sudden but violent hail and thunder shower, peculiar to mountain regions, compelled us to utilize this newly-reached shelter before leaving it, and for a brief period the flood gates of heaven and the torrents of earth, with their mingled thunders, combined in a carnival of surging elements and waters above, beneath, and beside us.

Near the rustic bridge spanning Spring Creek a long, rough, and dangerous trail descends to the foaming river, and a bridle path ascends to the Point Lookout Cliff, 1,000 feet above it, about one mile below and directly fronting the lower fall, inviting, within its barricade border of poles, the finest safe view of them from any quarter. From here the great notch near the northern and two smaller ones near the southern edge of the clear cut and formerly smooth water-line of the fall are evident, at a glance, to any person familiar with the falls or photographs or correct sketches of them prior to this season. The detachment of great masses of the rocky face of the falls is the cause, but only the commencement of what will in time follow, and ultimately change the appearance of these falls, but probably not their aggregate height.

NATURAL BRIDGE AND BRIDLE-PATH TO IT.

Since the first description of this interesting freak of nature, which is situated near the Yellowstone Lake, was published on pages 22 and 23

of my report of 1880, I have so changed the route of the bridle-path as to invite an excellent view of the archway at several points of observation within the distance of a mile below or fronting it, and then, after crossing a warm creek near some beaver ponds, ascend by a winding way to and across it. Thence the trail, within a distance of two miles, descends through a beautiful pine forest, meanders along the shore of the nearly severed extension of Bridge Bay, and across some lovely grove-girt lawns to the old route upon the shore of the lake. The danger of a general conflagration alone deterred me from burning out several miles of nearly impassable fallen timber, thereby materially shortening the trail to the thumb of the lake. No other substantial natural bridges over a permanent water-course have been discovered, but several wind and storm-worn tunnels, high amid the tottering crests of the Sierra Shoshone Range, were found and sketched; also one between the first and second peaks from the southwestern slopes of Mount Norris, nearly fronting the famous extinct geyser cone of Soda Butte, although high above and scarcely perceptible from it, but showing a clear cut outline of blue sky directly through the craggy crest, from the great terrace of Cache Creek. At that distance, and even nearer, this opening so closely resembles the adjacent snow-drifts that Rowland, who was with me at the time of its discovery, wagered me a new hat that it was one.

EXPLORATIONS.

Successive years of active exploration, hunting, and road or trail making in the park, have rendered the most of it, west of Yellowstone Lake and its Grand Cañon, so familiar that *research* is perhaps now more appropriate than exploration, for our observations therein. Still, there are now many localities of considerable area, as much of Mounts Stephens and Dunraven ranges, as little known as before Washburn scaled the peak which bears his name. Traversing such regions are truly explorations, prominent among which, of this season, is that of the Madison Divide, in search of a pass to avoid the cliffs near Mary's Lake. Those to the south were explored last year and found utterly impracticable, although a depression observed this year in the crest of the range to the north afforded a hope that a pass might be discovered there. The long, open, but unsafe valley of hot springs and sulphur vents on the head of Alum Creek was traced to its connection with a branch of the Rocky Fork of the East Fire Hole River, and one mountain feeder of this, through an elevated divide, to the seething brimstone basin of Violet Creek, and another to a similar repellent sulphur region overlooking the Norris Geyser Basin and Fork of the Gibbon, and thence down the Rocky Fork to our camp on the East Fire Hole, and the effort there abandoned. Although this exploration failed in its main object, it led to the discovery and opening of a fine bridle-path route from above the mouth of Rocky Fork, through the earthquake region to the Paint Pots on the main road, which proved a good 20 miles saving of distance for our couriers and pack-trains from the headquarters to our camp on the Mary's Lake route. It also greatly extended our knowledge of the fire holes in those regions and afforded proof positive that a band of bison wintered there, at an elevation of nearly 9,000 feet. Much was also learned of the broad elevated timbered plateau of Elephant's Back, and its extension above the Natural Bridge; and exceedingly interesting knowledge was obtained of the apparently most recent shattering of the earth's crust, with still yawning impassable vents and lava overflow in this region of the Park upon the various branches of the Blacktail, skirting the Great Cañon

of the Yellowstone between the mouth of Crevice Gulch, via the head of Pleasant Valley to Tower Creek. By far the most extensive, interesting and valuable exploration of the season is that in connection with, or continuation of, that of Governor Hoyt and Colonel Mason, in the Sierra Shoshone and main Rocky Ranges, during twenty-six days of continuous and arduous cliff and cañon climbing among the snowy lava capped crests of a region of as wild chaotic grandeur, and as little known or understood as any other in the United States, if not indeed in North America. A journal of the transactions of each day was regularly kept, water-courses mapped, prominent mountain peaks sketched, passes noted, and the weather and elevations recorded at least three times a day. Only the size and purposes of this report preclude its publication entire herein, but the preceding descriptions of the Two Ocean and other passes, the subjoined record of weather and elevations (the former incomplete, and the latter, for want of reliability in the readings of the aneroid barometer, approximate only), the mountains and streams as shown upon the map, will be found tolerably correct, and it is hoped will prove of sufficient interest to encourage the attention of scientists better prepared and outfitted than myself to do this wonderful region justice.

HEADQUARTERS OF THE PARK.

One of my first and most important official duties in the Park was the search for a location for its headquarters, which should combine, in the fullest degree, neatness and accessibility throughout the year, through one of the two main entrances to the park, to the nearest permanent settlements of whites and a military post, remoteness from routes inviting Indian raids, and a proper site for defense therefrom, for ourselves, saddle and other animals, good pasturage, water, and timber, as well as accessibility to the other prominent points of interest in the Park. The want of any public funds in 1877 prevented other than exploration of routes to and throughout portions of the park (cut short by a severe injury at Tower Falls, just in advance of Chief Joseph's Nez Percé Indian raid), and the publication of a report.

The Bannock Indian raid of 1878 rendered unsafe the construction of public buildings or the retention of public property in the Park during the following winter, but the road constructed that year, connecting the two entrances from the Mammoth Hot Springs to the Forks of the Fire Holes, together with its value to myself in making other improvements, to the Hayden geological explorations, and to Generals Miles and Brisbin, in their military operations, confirmed my opinion, in which these gentlemen concurred, that the Mammoth Hot Springs was then, beyond question, the proper location for the headquarters of the Park. The buildings of hewn timber were mainly constructed in 1879, upon a commanding site for outlook and safety, the main one being surmounted by a loopholed gun turret for defense from Indians. Subsequent explorations and improvements in the Park have justified the selection, alike of the location and of the building site. These are well shown, with the adjacent cliff fences to our large and valuable pasturage, in the frontispiece of the Park Reports of 1879 and of 1880; and the buildings as they now are in the frontispiece of this report.

As explained in my report of 1879, there was found at the Mammoth Hot Springs only one building site not overlooked by others, which one, besides its position commanding every locality within rifle range, was desirable from its gradual slopes and accessibility from the Upper Terraces, as well as direct connection with the matchless pastures and

meadows beside and below it. The elevation of this building site fi
actual measurements is found to be: Above the Cedar Grove toward
Great Terraces southwesterly, 84 feet; above the Liberty Cap northw
erly, 152 feet; above the Little Meadows southeasterly, 226 feet; wl
towards the northeast the descent by terraces is nearly continuous
over a mile in distance, and fully 1,000 feet in descent, to the Gr
Medicinal Springs in the cañon of the Gardiner. Although so eleva
and commanding a site for observation or defense, a depression de
its least elevated side affords an excellent roadway upon each side of
and between them a convenient location for a reservoir of warm wa
which has proved alike useful for ourselves, for our animals, and for
purpose of irrigating our garden, especially for its protection dur
frosty nights. This hill was originally a sage-brush dotted, grassy mon
having a few dwarf firs and cedars upon it, and with a regular supply
cold water in a natural depression for a reservoir near the house, wh
might, with little expense, soon be shaded and screened by an ev
green grove, and with a supply of the terrace building water, furn
bathing rooms and ornament any desired portion of the slopes with pe
less bathing pools like the ancient ones fronting it. For convenien
for symmetry, as well as for safety from gales, the main building, 40 by
feet, was built upon a stone foundation embracing our cellar, with a
lean-to wing, 22 by 13 feet, for office and small bedroom, another, 25
13, for family sitting-room and bedroom, and a rear kitchen, 18 by
(see cut of ground plan, Fig. 2).

All these, together with the main edifice, are built of well-hewn l
notched and spiked or pinned together log by log as laid up, the attic p
tion of the wings thus sustaining the upper story of the main buildi
which is surmounted by an octagon turret 9 feet in diameter and 10 f
high from a solid foundation of timbers upon the plates, the upper en
of the well hewn and fitted timbers of which, extending above the ro
are loop-holed for rifles. From the evident infrequency of injury
lightning in the park, I ventured upon an additional mode of sustaini
the building during wind-storms, as well as for providing a substant
flag-staff. This was done by planting a fine liberty-pole firmly in t
rocky foundation of the building around which it was constructed, a
to which it was firmly attached by several heavy iron bands, whi
allowed for the natural settling of the building, and thence extend
through the center of the shingle-roofed octagon turret, above whic
53 feet from the main floor of the building, are the globe and flag-pull
Altogether it is a sightly, substantial, and commodious building for
headquarters, only needing ceilings in the lower and partitions and ce
ings in the upper story—both of which are high and airy—for its co
pletion. The other buildings are an earth-roofed barn of hewn timb
32 by 18, one end of the lower story of which is for a stable, and the oth
is an open front room for our wagons, &c. From the adjoining lar
and substantial corral, one gateway leads to the lane in front, and t
other to the pasture in the rear.

A large, warm, and convenient hennery in the hillside near the ba
has proved less valuable than was anticipated from the ceaseless d
struction of our domestic fowls by the ever pestiferous mountain skunk
In the cedar grove near the old corral and reservoir is our round-lo
earth-roofed blacksmith shop, 20 by 14. Amid the cedars at the foot
the cliffs is our rude partitioned bath-house, and at a proper distance
the rear of our main building is a commodious out-house. A large wir
screened box in the cool, sheltered nook at the north angles of the buil

ing is found valuable as a protection from blow-flies upon the elk meat and venison, which seldom taints at any season of the year.

All these buildings are detached and isolated beyond danger of ordinary fires, the constant fear of which induced the recent construction of a fire, frost, and burglar-proof vault, 12 by 16 feet, in the face of the dug-

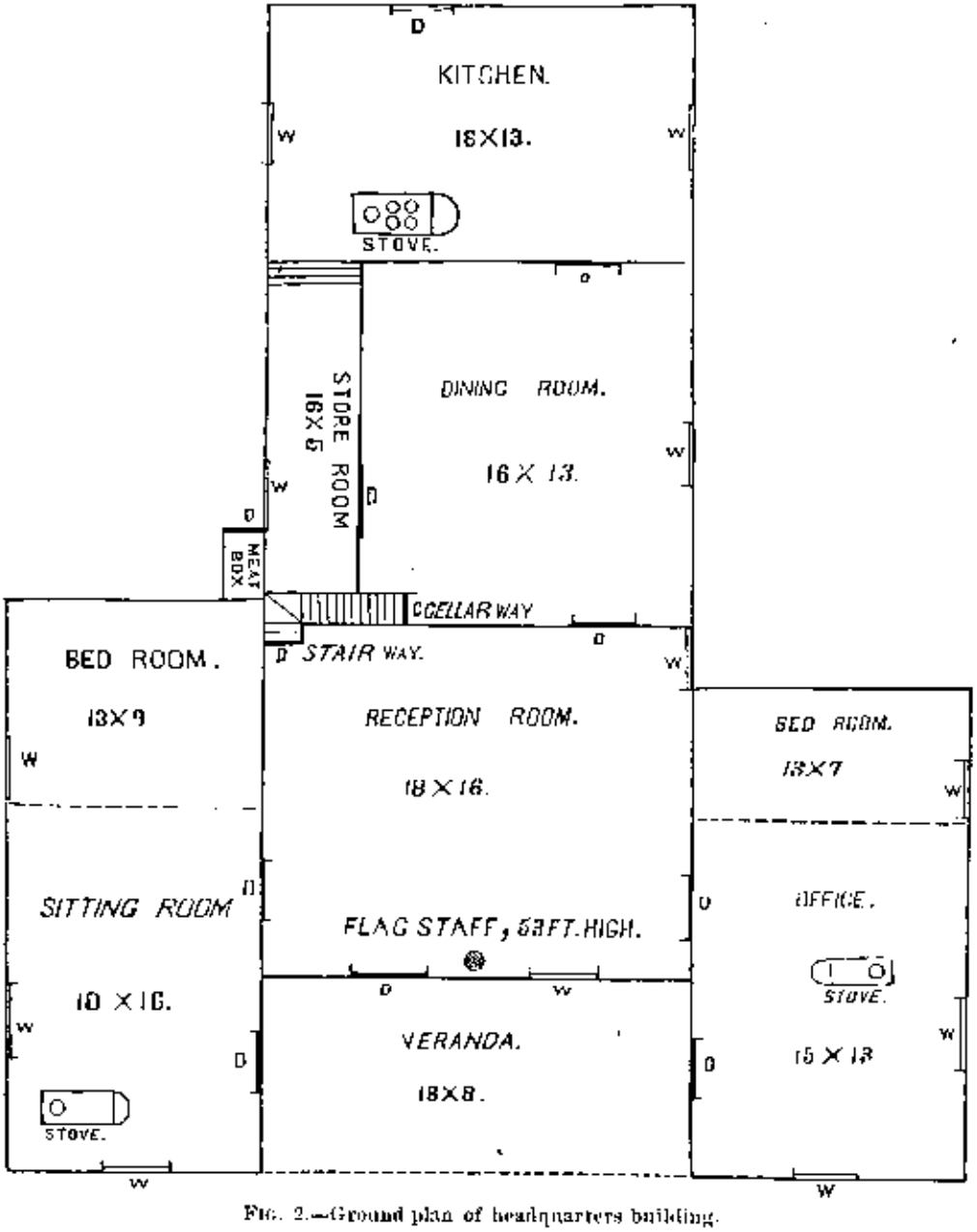

FIG. 2.—Ground plan of headquarters building.

way in rear of the main building, as a provision, tool, and outfit storehouse. These buildings have proved convenient, well adapted for the public purposes, and, saving improvement in a supply of good cold water, which is still more difficult to obtain in the Fire Hole regions, ample and substantial enough for headquarters, until the rapidly-approaching railroads demonstrate the necessity of others, and the proper location for them. This will admit of all the funds which may be appropriated for the park being expended for its protection, and the construction of roads, bridges, and other necessary improvements. Meanwhile some of the finest loca-

tions in the Fire Hole regions should be reserved from sale or leasehold to persons or railroad companies, from which to select a site for the headquarters of the superintendent or his assistant, as may then be deemed best; it being evident that after the completion of railroads to the Mammoth Hot Springs, and to the forks of the Fire Holes, a leading officer of the park, with adequate buildings, will be a necessity at each of these places.

MAMMOTH HOT SPRINGS.

The characteristic tendency of these springs to dwindle or fail in one place and burst forth in another not remote has been very marked during this season in both location and power. We have been compelled to culvert the outlet of a hot spring which burst forth in our road at the foot of the Devil's Thumb during the past winter, and which is still active, while the springs near McCartney's Hotel dwindled until it was necessary to remove his bath-houses, and then burst forth anew in full power. The water, which has heretofore been too hot for comfort at our bath-house, was this year too cold for that purpose, or to properly protect our garden by irrigation during frosty nights, while a new pool, too far below it for use, is a veritable boiling caldron, and similar changes are observable on all of the terraces. Not only this, but the aggregate quantity of water upon these terraces is evidently diminishing, while that of the Hot Creek, which is fully 1,000 feet below, near the McGuirk Spring, on the Gardiner River, is surely increasing, but is not now of the terrace building, but of the medicinal class of springs.

LIBERTY CAP.

The suggestions contained in my report of 1880, in reference to recoating this famous extinct geyser cone by a jet of water from the terrace building, Mammoth Hot Springs, having been approved, I decided to practically test whether these waters deposit at the orifice of a tube by evaporation only, or by deposition its whole length. For this purpose the open-ended double-barrels of a shot gun were placed where a current of the hot water in a boiling spring passed steadily through them to the muzzle end, which alone protruded from the scalloped border. Repeated trials, resulting in filling the barrels within a week, demonstrated that *these* springs do certainly fill a tube by deposition the whole length, and not by evaporation at its exposed extremity, as had been believed. Hence the negotiation for the purchase of gas-pipe was abandoned and water conveyed in troughs made for the purpose to the Devil's Thumb, and with perfect success, it having been covered and enlarged by a coating of beautiful white geyserite. The flow of water is now discontinued for the purpose of learning if this coating will endure the frosts of winter; and if so, it only requires about 300 feet of scaffolding from 25 to 45 feet high to conduct the water from the Devil's Thumb to the Liberty Cap, and by building around the base, filling the fractures and recoating it to thus preserve and beautify one of the unique marvels of the Park.

LAWS RELATING TO THE PARK.

All the enactments by Congress in reference to the vast regions included in the Yellowstone National Park may be found, first, in the brief sections approved March 1, 1872, dedicating it as a national health and pleasure resort, and placing it absolutely under the appropriate control of the Department of the Interior; and, second, by virtue of

annual appropriations during the past four years, aggregating up to July 1, 1882, the sum of $50,000, to enable the honorable Secretary of the Interior to protect, preserve, and improve it. For a knowledge of the enactment, see appendix marked A and regarding the second, or a proper showing of the management of these funds, and the manner and results of the expenditure, reference is made to the annual reports of the honorable Secretary, containing those of the superintendent thereof. The park has been wholly managed without the aid of the civil or military authorities of those regions, (save occasional assistance by the latter in repelling hostile Indians) under rules and regulations as prescribed by the honorable Secretary of the Interior, somewhat modified by experience. Those now in force will be found in appendix marked B. While under these rules and management, as fully shown in these reports, and included in maps, plates, &c., much has been peacefully accomplished (so far as the whites are concerned), in both protection and improvement of the park, it is believed that additional provisions by Congress, by the council of Wyoming Territory, or by both of them, are necessary, as well as the proposed organization of a county of Wyoming, with a seat of justice near enough to insure legal co-operation and assistance in the management of the park, as it is neither desirable nor in accordance with the spirit of our institutions, or of our people, to continue the control of so vast a region, teeming with people from nearly every land, by mere moral suasion, occasionally sustained by more potent appeals from the muzzles of Winchester rifles.

GUIDES OF THE PARK.

From the statements and letters of persons who visited or attempted to visit the park, I have no more doubt that many persons have been deceived, and have suffered from the greed, ignorance, or inefficiency of persons in the adjacent regions professing to be able to properly convey or guide tourists to and throughout the park, than of my utter inability or power to prevent such impositions. In addition to my present purpose of publishing a complete and accurate map and guide book of the park, for use during the coming season, I may add that I know of many good, honorable men, thoroughly acquainted with the park, its approaches, and its wonders, who will neither deface nor destroy guide-boards or represent that the park is destitute of roads, and that valiant guides and an arsenal of arms are indispensable to reach or safely visit its marvels or swindle or neglect those employing and confiding in them. If, in compliance with the earnest request of such persons now pending, I should adopt the policy of granting licenses, operative during good behavior, each season, which should cost such persons only the expense of badges, license, and record, holding each in a degree interested and responsible for the prevention of fires and acts of vandalism, and observance of the other rules and regulations for the management of the park, by the parties in their charge, I cannot doubt the result would be far more beneficial to the park, and its visitors, than pleasant to the superintendent, from the machinations of those whom he might deem unworthy to receive or retain such a license.

SUGGESTIONS REGARDING A POLICE FORCE FOR THE PARK.

As will be found in the interesting report of the gamekeeper, his experience and observations, as such, leads to the conclusion that an officer especially for the protection of game is not necessary in the park, but

rather that there should be a small force of men, hired by the superintendent for their known worth, and subject to discharge for cause, or some of them, at the close of each season, in which opinion, from years of experience, I heartily concur. Selected as these men would be, from those hired as laborers, the hope of winning promotion to this more attractive and responsible duty would prove alike an incentive to win and faithfulness to retain it; and I am unaware of any other plan promising such efficient assistants in the indispensable protection of game, prevention of fire and vandalism, keeping regular records of the weather, and geyser eruptions, and in general asisting the worthy, and restraining the unworthy visitors of the various geyser basins, as well as for patrol for like purposes and for seeing to the roads and bridle-paths. There has not occurred a serious fire in the park since the Bannock raid from the camp fire of any of our laborers or of the mountaineers; but such is the inexcusable carelessness of many tourists, that without great watchfulness disastrous conflagrations, utterly impossible to check when once started, may yet destroy the matchless evergreen groves, and cover much of the park with impassable fallen timber.

Since writing the above, I am in receipt of a synopsis of Lieutenant-General Sheridan's report to the Adjutant-General of the Army, of his recent tour through the National Park, and his views and suggestions in reference thereto. Owing to his entrance to the Park from Fort Custer and and Clarke's Fork pass, he crossed the Yellowstone River at its forks, while Governor Hoyt, Colonel Mason, and myself were crossing it at the foot of the lake, some 40 miles above, en route to the Stinking-water, and hence I failed in a desired interview with him, but it is with great pleasure that I acknowledge, in behalf of the park, my obligations to him for authorizing the reconnaissance of Colonel Mason, Captain Stanton, and Lieutenant Steever, and also to the first of these gentlemen for the courtesy (and assistance when needed) which has ever characterized the military officers with whom I have met in the park, as well as for a manuscript synopsis of his past season's explorations; and to the last two officers for their tables of odometer measurements—the first ever made of any of our roads or bridle-paths within the park. From the route taken by General Sheridan, *via* Mount Washburn bridle-path, he was unable to visit our headquarters or main line of improvements then completed in the park, but the tone of his remarks upon the magnitude of the National Park, the difficulties of its protection and improvement, the inadequacy of the means heretofore provided therefor, and his views as to a remedy, evince alike his intuitive comprehension of a subject or a region, and his military stand-point of view in the management of them.

REGISTERING THE NAMES OF TOURISTS.

The register of the names of tourists at the headquarters, is so incomplete regarding those known to have been there as not to justify publication; that of Job's Hotel, at the Mammoth Hot Springs, has not been received, but that of the Marshall House at the Forks of the Fire Holes, the remaining residence within the Park, although very incomplete, is published, hoping that it may prompt more attention to the matter hereafter by all parties. Various suggestions have been made as to the best mode of obtaining the names of all visitors to the park, one of which is the establishment of a gate and keeper at each of the two main entrances to the Park to compel registration of names, residence, and dates, which, besides the cost of the gates and keepers, would, I fear, prove unreliable

to intercept or prevent false registration by those desirous of avoiding it, and which certainly would be incomplete, as the mountaineer tourists will hereafter enter the Park from nearly all quarters. Besides it may appear to many so like unjustifiable annoyance, that I incline to leave to time, the approaching railroads, increase of hotels, and wishes of the constantly multiplying number of tourists, for a solution of this matter.

REGISTER OF VISITORS.

Copy of the register of the Marshall Hotel at the forks of the Fire Hole rivers, Yellowstone National Park, from June 27 to August 25, 1881.

Date.	Name.	Residence.
1881.		
June 27	Charles R. Brodix	Bloomington, Ill.
July 14	Patrick Walsh	Virginia City, Mont.
25	James R. Johnson	Prickley Pear, Mont.
25	C. L. Dahler	Virginia City, Mont
25	N. I. Davis	Do.
25	John McManus	Do.
25	E. Panabacker	Kirkville, Mont.
26	James R. Johnson	Do.
26	Francis Collins	Prickley Pear, Mont.
26	R. K. Cooper	Pittsburgh, Pa.
28	William Collins and wife	Silver City, Mont.
29	I. W. Thorne	Glasgow, Scotland.
29	I. L. Mears	Helena, Mont.
29	E. H. Metcalf	Wicks, Mont.
Aug. 3	George Huston and two men	Do.
3	E. Panabacker	Clarke's Fork, Mont.
3	R. Pearsall Smith	Do.
3	Hannah Whithall Smith	Philadelphia, Pa.
3	Mary W. Smith	Do.
3	Alys W. Smith	Do.
3	David Scull, jr	Do.
3	Edward L. Scull	Do.
3	William E. Scull	Do.
3	I. Tucker Burr	Do.
3	Winthrop M. Burr	Boston, Mass.
3	William S. Mills	Do.
3	Bond V. Thomas	Wilmington, Del.
6	Justice W. Strong	Baltimore, Md.
6	Senator John Sherman	Washington, D. C.
6	Senator Benjamin Harrison	Ohio.
6	Gov. B. T. Potts	Indiana.
6	Albert Bierstadt, artist	Helena, Mont.
6	P. W. Norris, superintendent	New York.
6	Judge W. H. Miller	National Park.
6	Gen. Thomas A. Sharpe	Indiana.
6	E. Sharpe	Do.
6	Alfred M. Hoyt	Do.
6	E. W. Knight	New York.
8	Dr. D. S. Shively	Helena, Mont.
8	Lieut. W. D. Huntington	U. S. Army.
8	Miss H. D. Huntington	Do.
8	Miss A. J. McKay	Fort Ellis, Mont.
8	Z. H. Daniels	New York.
9	Judge William Gaslin	Bozeman, Mont.
9	Com. T. T. Oakes	Kearney, Neb.
9	James Gamble	New York.
9	I. H. Hammond	San Francisco, Cal.
9	Edward Stone	Evanston, Ind.
9	Gen. L. S. Willson	Walla Walla, Wash. Ter.
9	L. W. Langhorne	Bozeman, Mont.
9	E. L. Fridley	Do.
9	George Ashe	Do.
9	R. McDonald	Do.
9	I. V. Bogart	Do.
9	Fred. de Gamga	Do.
9	Commodore Bell	Senegambia.
13	Wm. F. Bowers	Do.
14	Gov. John Hoyt	Boston, Mass.
14	Col. J. W. Mason	Cheyenne, Wyo.
14	Capt. John Cummings	Fort Washakie, Wyo.
14	P. W. Norris, superintendent	Do.
14	Keppler Hoyt	National Park.
14	J. A. Mason	Cheyenne, Wyo.
14	Harry Yount, gamekeeper	Fort Washakie, Wyo.
14	G. W. Watkins	National Park.
		Towanda, Pa.

Copy of the register of the Marshall Hotel, &c.—Continued.

Date.	Name.	Residence.
1881.		
Aug. 14	Frank Grounds	Bozeman, Mont.
15	W. H. Young, sr	Butte, Mont.
15	W. H. Young, jr., and wife	Do.
15	H. Romsbush	Do.
15	I. G. Corrie	Do.
15	Miss Lizzie Astde	Do.
15	Francis Frances	England.
15	V. W. Benzing	New York.
15	Lieut. Edgar Z. Steever	U. S. Army.
20	John F. Forbes	Butte, Mont.
20	W. T. Hawley	Do.
	J. V. Long	Do.
	John Furwell	Do.
	Geo. N. Givin	Do.
	I. F. Rumsey	Chicago, Ill.
	Prof. W. I. Marshall	Fitchburg, Mass.
20	C. R. Hormon	Saint Louis, Mo.
20	W. R. Larcey	Bozeman, Mont.
24	Walter Cooper	Do.
24	Geo. W. Wakefield	Do.
24	R. Koch	Do.
24	Fred. La Haro	Do.
25	Thomas Dennison	Cold Bluff, Pa.
25	W. C. Caly	New London, Ct.
25	P. W. Lytle	Oakdale, Pa.
25	A. J. Fisk	Helena, Mont.
25	Henry Cannon	Do.
25	G. R. Melten	Do.
25	W. E. Sanders	Do.
25	John Porter	Do.
25	C. A. Brown	Virginia City, Mont.

FISHES OF THE PARK.

Suckers, catfish, and the bony white mountain herring, abound in tl Yellowstone River and some of the lakes, but far the larger portic of all the fishes found in the known waters of the Park are trout. Thes appear to me to be of many different varieties. Several of these ar peculiar to a certain lake, as the red-gilled and red-finned trout of th famous Lake Abundance, at the head of Slough Creek, which has a area of less than a square mile. These trout are very beautiful as we as palatable when in flesh—then weighing nearly a pound each—but the often so overstock the lake as to become as voracious as sharks an too poor for food.

TROUT LAKE.

This noted lake or pond is situated about two miles above the famoc Soda Butte, and is wholly supplied by a snow-fed rivulet less than mile in length and only a good pace in width, and drained by anothe of similar dimensions, each having impassible cascades within one-fourt of that distance from it; and yet in this little isolated pond are foun incredible numbers of one of the largest, most beautiful, and delicio trout of the entire mountain regions. In the spawning season of eac year they literally fill the inlet, and can be caught in countless nun bers. From my journal of June 3, 1881, I quote as follows:

Wishing a supply of trout for our men in the Gardiner Cañon, Rowland, Cutler, an myself rode to Trout Lake, and, after pacing around and sketching it, with brush an sods I slightly obstructed its inlet near the mouth. Within eight minutes thereafte the boys had driven down so many trout that we had upon the bank all that we desired, and the obstruction was removed, allowing the water to run off, and withi three minutes thereafter we counted out 82 of them from 10 to 26 inches in length Of these, 42 of the larger ones, aggregating over 100 pounds, were retained for use, 3 of the smaller ones returned to the lake unharmed, and the remaining 10 wer

together with a fine supply of spawn, distributed in Longfellow's and other adjacent ponds, which, although as large, and some of them apparently as favorable for fish as the Trout Lake, are wholly destitute of them.

Although the boys declared this was not a favorable morning for trout, and they do doubtless often make greater hauls, still this is as large a fish story as I dare publish, and qualify even this with the statement that the pond is unusually full of weeds and grass, and the food supply of insects so abundant that the fish are not reduced in numbers by the rod as in many other ponds, and hence the incredible number in its small inlet during the spawning season. Trout varying greatly in size and appearance are found in the snow-fed rivulet branches of Alum Creek and other streams, whose waters are too hot and too full of minerals to sustain ordinary life.

FISHES OF THE YELLOWSTONE LAKE.

The only variety of fishes known to inhabit this great lake is the yellowish speckled salmon trout, which are usually found of from 15 to 25 inches in length. These are proverbial alike for their taking the hook so near boiling pools at various localities along the shore line that they may with ease be cooked in them upon the line without the fisherman changing his position, and for the large number of them being infested with long slender white worms. The proportion of them thus diseased has increased from something over one half in 1870 until all are apparently infested, as I have neither seen nor heard of one of the countless numbers caught this season which was clear of these parasites; and so many were dying along the shores, and so great the quantity of weeds with adherent sacks of yellowish-green jelly, that they drift in lines—sometimes in small windrows—along the shore. Not only this, but it is the opinion of those the best acquainted with this lake that its waters are more discolored with these weeds and less pure than formerly. What degree of connection, if any, these various peculiarities hold to each other, is only conjectural, but to assist in an investigation I have sent the skin, a portion of the meat, entrails, and worms of one of these trout in a bottle of alcohol, and some of the sprigs of this weed and sacks, as well as porous yellowish stone tubes of some worm or insect which are found in abundance along the bank of the lake, to Prof. S. F. Baird, director of the Smithsonian and National Museum, and United States Commissioner of Fish and Fisheries. It has been suggested that some other more voracious fish might exterminate the trout and stock the lake, but whether the latter would prove any more exempt from the parasites, evidently depends upon whether the disease is peculiar to the trout, or to the lake; the evidence now known favoring the latter theory, as trout thus diseased are found only in this lake, or in waters so connected with it as to indicate that they frequent it. Thus, I have no knowledge of a worm-infested trout having been found in the Yellowstone River below the Great Falls; although many of the trout there are apparently of the same species with those of the lake, and presumably some of them may, at some period of their growth, have safely passed the falls; or, waiving this theory, trout of the same variety are never, as I am aware, found thus infested in the numerous mountain feeders of the Snake branch of the Columbia, which so interlock in the Two Ocean and other passes, that there is strong probability that the trout, like the waters, do actually intermingle, and would become diseased also did the cause pertain to the fish and not to the lake. These are the facts so far as now known, and the subject being one of both

scientific and practical importance, in connection with a lake of ab 200 miles shore line, and far the largest of its elevation upon the glo I earnestly invite a thorough investigation and pledge all the assista in my power to render it as complete as possible.

Sufficient time has not elapsed as yet to determine the results of experiments in stocking various lakes this season with trout, but I p pose to extend the effort in larger lakes, like Shoshone and Lewis, a shall report progress from time to time.

In view of the paucity of species of fishes in the Park, it is my ca est intention during my next season's explorations to endeavor to fi suitable waters in which to attempt the culture of carp, a subject whi is now engrossing quite a large share of the attention of those int ested in cheap and nutritious food fishes.

HISTORY OF THE PARK.

Since embracing in this chapter of my report of 1880 my previous p vate and official publications regarding the aboriginal inhabitants a early white rovers of the park, the accumulation of material from c ploration, research, and the narratives of trappers and miners in the regions, as well as the perusal of rare publications in the east, is deem sufficient to justify a synopsis of them herein. This material, for brevi and clearness, is arranged as follows:

First. Traces of a people who inhabited these regions prior to the occupancy by the present race of Indians.

Second. Remains of Indians.

Third. Evidence of early white trappers.

Fourth. Narrations of prospecting white men before the Washbur exploring expedition of 1870.

Fifth. Explorations of this year.

TRACES OF A SUPPOSED PREHISTORIC PEOPLE.

These consist mainly of utensils, weapons, and implements not now known to have ever been used by the present race of Indians in or a jacent to the park. Also, rude stone-heap drive-ways for game, whic I have recently found therein, or adjacent thereto, some of which a here represented.

Notes regarding ollas, vessels of stone, &c., found in the Yellowstone N tional Park in 1881.

Fig. 3. Fragment of steatite vessel, size restored about as follows: Inche

Greatest diameter	1
Height externally	1
Depth of vessel inside	
Breadth of rim	

Much thicker in the bottom, pecked into oval shape outside. No ev dence of fire, but some pestle marks in the bottom of the cavity. Foun upon the surface in the Upper Madison Cañon.

Fig. 4. Fragment of steatite vessel, size restored: Inche

Greatest diameter	
Height externally	
Depth of vessel inside	
Breadth of rim	

Very uniform throughout and finely finished, but not polished o ornamented; showing very evident *fire marks*. Found outside up, near

covered with washings from the volcanic cliffs, together with various rude stone lance-heads, knives, and scrapers, in the remains of ancient

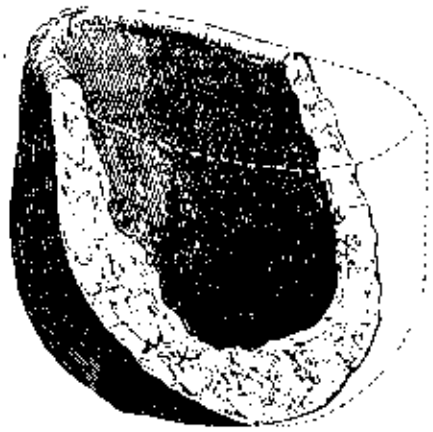

FIG. 3.

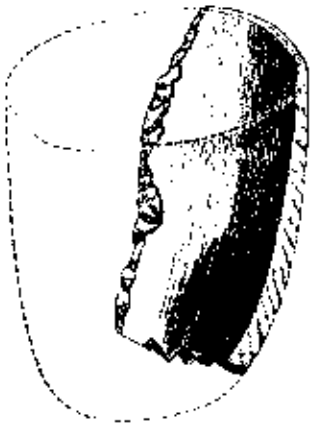

FIG. 4.

camp-fires disclosed by the recent burning of the forest border of the upper end of Pleasant Valley, on the right of where our road enters it from the cliffs.

FIG. 5.

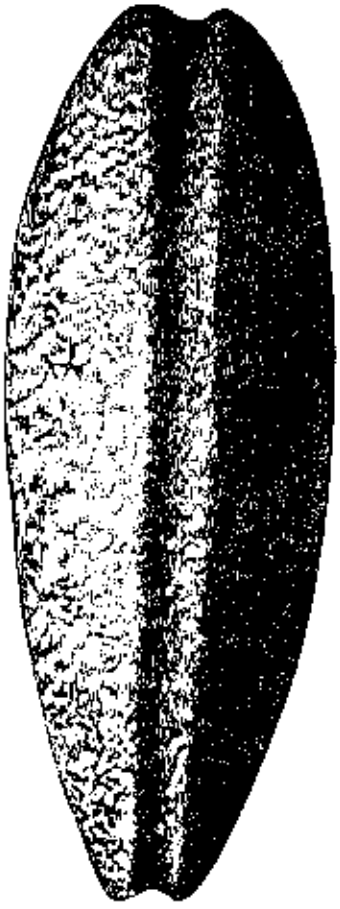

FIG. 7.

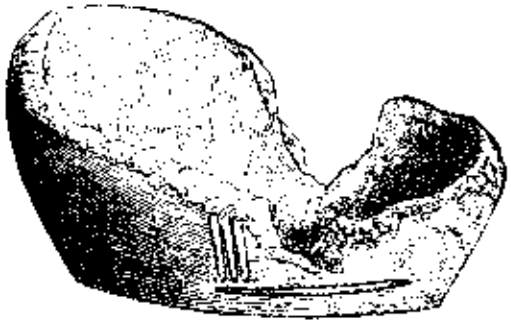

FIG. 6.

Fig. 5. Fragment of a steatite vessel, size restored:

	Inches.
Greatest diameter	7
Height externally	12
Depth of vessel inside	10
Breadth of rim	1

Very uniform, well finished outside, but showing much evidence of fine tool-marks inside. Found upon the surface of the mines at the head of Soda Butte.

Fig. 6. Soapstone or very soft steatite vessel, fragment:

	Inches.
Greatest diameter	5
Smallest diameter	3½
Height externally	2¾
Depth of vessel inside	2
Breadth of rim	½

Well finished inside and out, with flat bottom. No evidence of fire; found with fragments of pottery and rude lance-heads at an ancient camp on the eroding bank of the Blacktail Creek.

Fig. 8.

It may be mentioned that these steatite ves are the first found between the Atlantic and Pa. cific coasts, and are entirely different in form from those found in either direction.

Fig. 7. Sinker: natural size.

	Inches.
Length	3¾
Greatest thickness	1¼
Narrowest at ends	1

Grooved entirely around it, endwise; made of rough, volcanic sandstone.

Fig. 8. Sinker: natural size.

	Inches.
Length	3
Greatest diameter	1

Hole, ⅝ of an inch from one end; made of coarse, green-veined marble.

There is abundant evidence that the Sheep eater Indians habitually made brush and timber driveways and arrow coverts to secure game, and little to show that their progenitors or predecessors ever found timber so scarce in the park as to require driveways to be made of long lines of small stone-heaps such as are found; and this year I traced and sketched from the commencement of the open valley of the Yellowstone, upon the borders of the park below the mouth of Gardiner River, through the Bottler Park and the Gate of the Mountains to the open plains, a distance of fully 60 miles. As this is mainly outside of the park, and the exploration exhausted none of the funds appropriated therefor, the report and numerous sketches of these stone heaps, the cliffs over which at least the buffalo were driven, traces of bone-heaps, rude stone foundations of dwellings, together with the burial cairns, mining-shafts, and the tools, ornaments, and weapons obtained from them, will be published elsewhere in due time.

Fig. 9 is a representation of a line of rude stone heaps, probably intended as a driveway for game over the cliffs upon the banks of the Yellowstone. The stone circles shown are evidently the foundations of very ancient dwellings, as the stones like those of the driveway are about one-half covered with accumulated débris. This sketch may be considered as typical of others, many of which are much larger.

I will only here add that there is proof positive of the early and long occupancy of these mountain parks and valleys by a people whose tools, weapons, burial cairns, and habits were very unlike those of the red Indians, and who were the makers of the steatite vessels, &c.,

discovered; but whether they were a branch of the cliff-dwellers of the cañons of the Colorado, progenitors of the Sheepeaters, or both or

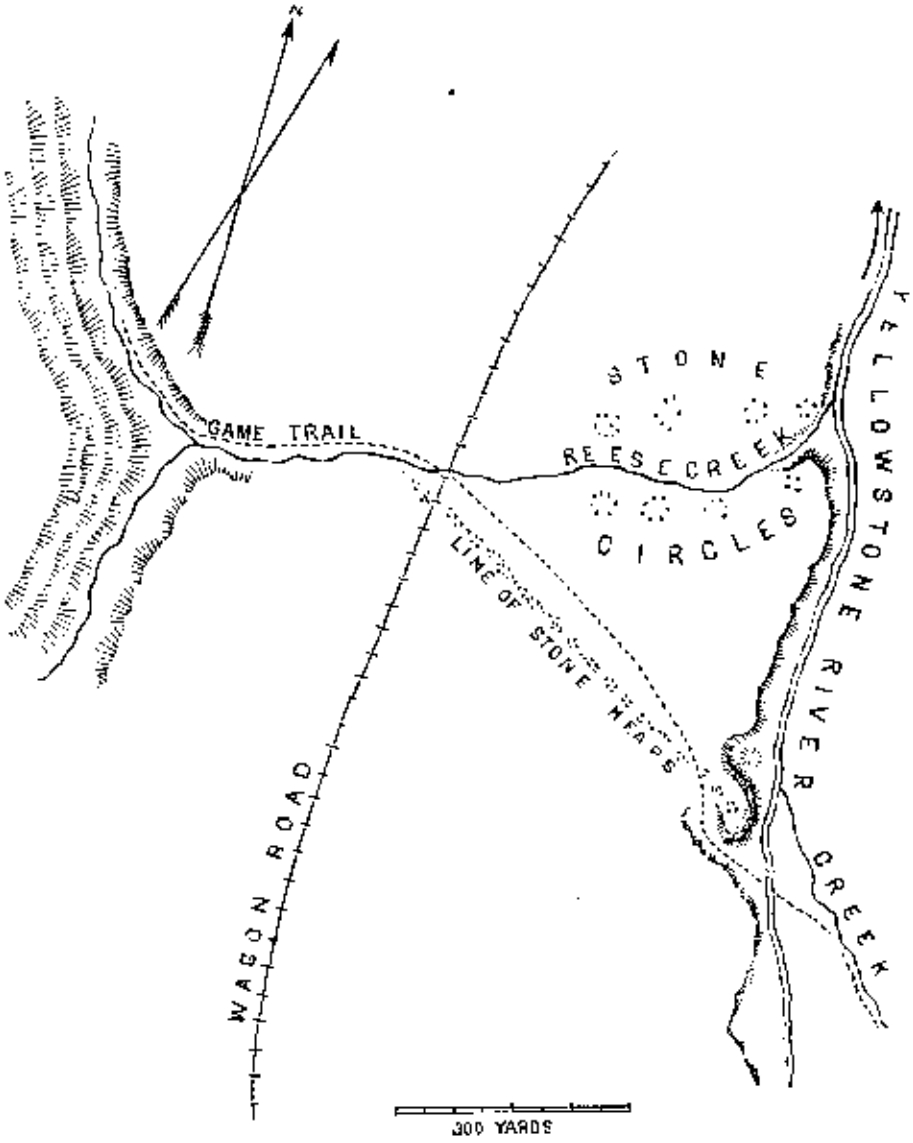

FIG. 9.—Driveway for game.

neither, are questions better understood with exploration and research in that direction, which I have commenced and hope may be continued.

INDIAN REMAINS.

These are, first, of the various kinds usually found in regions until recently only occasionally visited rather than inhabited by the nomadic hunter tribes, such as trails, lodge-poles, brush wick-e-ups, peeling of timber, and rude storm or timber wind-brakes upon commanding sites or narrow passes, for observation, ambush, or for protection from their enemies or the elements, as well as rude stone axes, or flint or obsidian knives, lance and arrow heads and scrapers; and, second, those pertaining to the timid Sheepeater occupants, such as remains of camp-fires in the secluded glens or cañons, and occasionally in caves or niches in

the cliffs, for shelter from the storms, or seclusion or defense from their enemies; timber driveways for animals to some well-chosen place for arrow-covert ambush and slaughter, and notably an occasional circular breastwork of timber or stone, or, as is common, partly of each, as to the real builders of which, and the purposes for which constructed, opinions differ. Four of these were discovered during this season, viz, one beside our camp, in a grove north of the crossing of Willow Creek, some three miles below Mary's Lake, which was seen by Hon. John Sherman and party, including the artist Bierstadt, who sketched it. It is about thirty feet long by twenty wide, and constructed of fragments of logs, stumps, poles, and stones, with ingenuity and skill proverbial

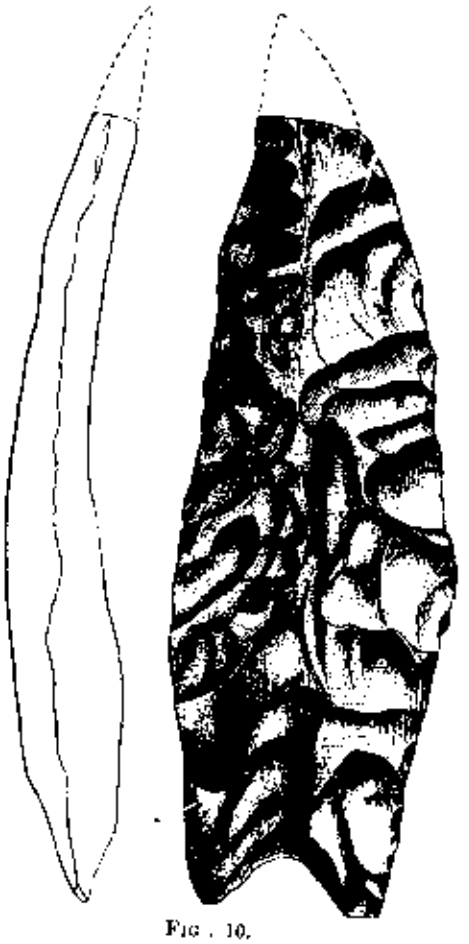

FIG. 10.

FIG. 11.

to the beaver; nearly weather, wind, and bullet proof; about bre high, which is certainly less than when built, and situated, as usual, a wind-fall then screened by a thicket of small pines, which are no large enough for bridge or building timber. A similar one was fou upon the Stinkingwater side of the pass, which I discovered this seas in the Sierra Shoshone range, east of the Yellowstone Lake; anoth near Bridger's Lake, and the newest one on a small branch of Barl Fork of Snake River. Although these and some of those previous found do not appear older than some of the evidences of white m others certainly do, but none of them in any part of their construction yet known show an iron ax or hatchet hack upon them, and very f and faint marks of even stone tools or weapons. There is usually lit

evidence of a door or gateway, and none of a roof, but abundant proof of a central fire, and usually of bones fractured lengthwise for the extraction of the marrow, as practiced by many barbaric peoples.

While these constructions much resemble a Blackfoot Indian fort, the infrequency of the visits of these Indians to a region of few horses, the utter lack of marks of hatchets, which they have long possessed and always use, dispels this theory, and, as Sheepeater wick-e-ups and pole coverts under low and heavily branched trees are common for summer use, and on cliffs for winter, the only remaining and most probable theory is that these are really winter lodges of the Sheepeaters in the thicket borders of warm, sheltered valleys, where the abundant timber of the decaying wind-falls, in which they are always found, could be liberally used in an inclosure so large as to not take fire, while it was a great protection against the cold, even if, without being wholly or in part covered with the skins of animals, and as necessary against the prowling wolf and wolverine in winter, the ferocious grizzly in spring, or human foes on occasions. Two Shoshone Indian scouts and guides accompanied the exploring expedition of Governor Hoyt and Colonel Mason during the past season, one of whom, We-saw, had accompanied Captain Jones in his explorations of 1873. As arranged with Governor Hoyt at Mary's Lake, I en route tried the Nez Percé ford, and deeming it then barely passible for those well acquainted with the channel both sides of the island, posted a notice so informing him at the Mud Volcano, and then ascended the river to its head, laid out some work for my laborers, constructed a raft, and crossed in time to intercept the governor and party, who, after visiting the Great Falls, had crossed at the Nez Percé ford under the skillful guidance of We-saw, although this was his first visit since the one with Captain Jones, eight years before, and the channel had meanwhile changed materially. While the rest of the party were camped at Concretion Cove, We-saw and myself went over to the Jones trail on the Pelican, and thence followed it as near as possible for large areas of timber fallen since his visit, to the entrance of his pass of the Sierra Shoshone range, and in order to avoid this timber selected a route via the Hot Springs feeder of Turbid Lake. During this and other occasions I could not fail to admire the intuitive accuracy of his judgment as to Jones's and other routes, even where no trace was visible, and in various conversations as well as comparisons of our daily sketches, which each regularly kept in his own style, obtained much valuable information. I found him an old but remarkably intelligent Indian, and so accurate in his sketches that I could readily trace them, although they were destitute of the point of compass, date, or word of explanation; and yet in that, as in all else,


Fig. 13.


Fig. 14.


Fig. 15.


Fig. 12.


Fig. 16.


Fig. 17.


Fig. 18.


Fig. 19.

he manifested the true Indian character, which, like their farms, *is all long and no wide, i. e.*, a keenness of perception rather than a broad or general comprehension of a subject, or even a region. Hence, although a person skilled in Indian sketching could by his map or sketch easily follow them through a long journey in all its turns and windings, neither one or both of them could therefrom make a general map of the region or of the relative positions of various mountains or other portions of the route, even approximately, and this is in fact the main difficulty with the maps and journals of white rovers also. We-saw states that he had neither knowledge nor tradition of any permanent occupants of the Park save the timid Sheepeaters, his account of whom is embraced in the history of them. He said that his people (Shoshones), the Bannocks, and Crows occasionally visited the Yellowstone Lake and river portions of the Park, but very seldom the geyser regions, which he declared were "*heap heap bad,*" and never wintered there, as white men sometimes did with horses; that he had made several trips before the one with Captain Jones, one of which was, as I understood him, to assist some friends who had intermarried with the Sheepeaters to leave the Park after the great small-pox visitation some twenty years ago. Among the most recent as well as the most interesting of Indian remains are those heretofore reported of the rudely fortified camp of Chief Joseph and his Nez Percés in 1877. Of these, the corral east of Mary's Lake, corral and small breastwork between the Mud Volcano and the river, and others upon Pelican and Cache Creeks, and their dugways in descending into the cañons of Crandall and Clarke's Forks, possess peculiar historic interest. Figs. 10 to 24, inclusive, represent natural size scrapers, knives, lance or spear heads, perforators, and arrow-heads chipped from black obsidian. These were found in various places, such as caverns, driveways, or at the foot of cliffs over which animals had been driven to slaughter, and are typical of a collection of over two hundred such specimens collected this season.

EARLY WHITE ROVERS IN THE PARK—JOHN COULTER.

Since the publication in my report of 1880 of a reference to the trip of the Indian gauntlet-running Coulter across the National Park, in 180[illegible] or 1809, I have, through the kindness of General O. M. Poe, Corps of Engineers, U. S. A., obtained a trace of the prior wanderings of the famous mountaineer, of which, as well as of the map exhibiting them, I had no previous knowledge. This map is contained in the first of the rare volumes now in the military library of the War Department, Washington, and is an English reprint in 1815 of the journals of Lewis and Clarke to the head of the Missouri River, and across the continent to the Pacific and return, during the years 1804–'05 and '06. The portion of the map showing the routes of these explorers, is remarkably accurate, the rest of it a fair representation of what was then known of the regions; but, as that was a medley of fact and fiction, of truth and romance, gleaned from the narratives of three centuries of Spanish rovers from Mexico, two of French missionaries or traders from Canada, and the more recent and more accurate accounts, English or American, between them, far the most valuable fact shown was the existence of an elevated snowy fountain-head and point of divergence for nearly all of the mighty rivers of central North America, while the real relative location of the upper portion of all save those visited by Lewis and Clarke, as there shown, are at best only approximate, and are well known to be mainly erroneous. A knowledge of these facts is alike

cessary to properly estimate the truth and the errors of this map, and especially those portions of the country shown to have been visited by Coulter in 1807. After his honorable discharge, as stated by Lewis and Clarke, in 1806, near the mouth of the Yellowstone, he ascended it to Prior's Creek, a southern branch of the Yellowstone, between the Clarke's Fork and the Bighorn, where he probably wintered, and, as shown by the map, the next year traversed the famous Prior Gap to the Clarke's Fork, which he ascended nearly to its head, and thence crossed the Amethyst Mountain to the main Yellowstone River, and that at the best ford upon it. This is the famous Nez Percé ford at the Mud Volcano, the location of which is accurately shown under the name of Hot Brimstone Spring. But, most strangely, neither the Great Falls of the Yellowstone, 10 miles below, nor the lake, 8 miles above, are represented; but the river is correctly shown as a very wide one, not only to where the foot of the lake really is, but also incorrectly throughout its length, and the locating of one of the fingers to and as being the outlet of Eustus Lake, which he reached by crossing the main divide of the Rocky Mountains without knowing it. This is pardonable, as from the peculiar situation in the mountains of the lake he called Eustus (evidently Shoshone) Lake which was mistaken by Professor Hayden and others as Atlantic and not Pacific waters, only they thought it drained into the Madison, and Coulter supposed it drained into the Yellowstone, while it is in fact the head of one fork of the Snake River of the Columbia, although from its size (12 miles long) Coulter deemed it the large lake at the head of the Yellowstone, of which he must have heard.

FIG. 20.

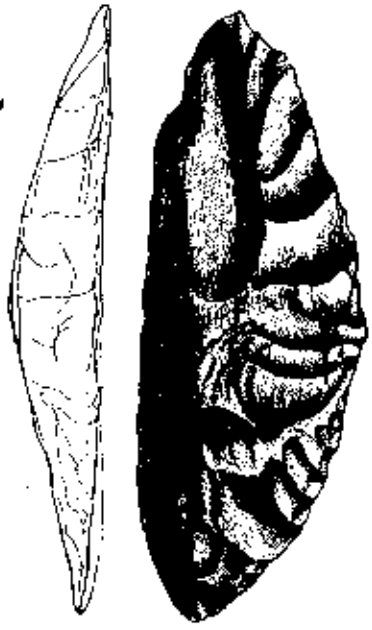

FIG. 21.

From this lake his route seems to have been through or near Two Ocean and Tog-wo-tee Passes to lake Riddle, which, though far too large, is, from its location and drainage into the Upper Bighorn River, probably the Great Hot Spring at the present Fort Washakie, near the Wind River Shoshone Indian Agency. He thence traversed the mountains to Coulter's Fork of the Rio del Norte, as he naturally deemed it, discharging into the Gulf of Mexico, while it is in fact the Green River of the Colorado, of Major Powell's Grand Cañon to the Gulf of California. In traversing the South Pass he crossed the Continental Divide probably for the sixth time, without knowing it, to the Platte, which he calls the Rio de la Plata, and thence across the mountains and Bighorn River, through fossil regions, to the Salt (really South) Fork of the Stinkingwater, to the great Stinking Spring near the forks, and hence the name which, Indian-like, does not signify

FIG. 22.

the river of stinking water, but the river which passes or is near the *stinking water*. From this are two trails, evidently a division of the unknown party, of probably whites and Crow or Shoshone Indians, one of which makes a cut-off to the outward trail on Clarke's Fork, and the other through much of the Bighorn region and a Gap Creek Pass to Prior's, and presumably the Yellowstone River at its mouth. This map shows a band of Snake (Shoshone) Indians, called *Yeppe*, of 1,000 souls, at the location of Pelican Creek and a valley, which, together with the Yellowstone Lake, as above shown, were neither visited nor correctly represented, but with little doubt this is the band to which the Shoshone Indian We-saw referred, as well as some of the evidences at Concretion Cove, in the preceding section upon Indian Remains. I have devoted unusual space to this matter, which I think is of great interest, as being the earliest known record of white men in any portion of the National Park, and is nearly as valuable for what is erroneously as well as for that which is correctly represented, from being a compilation by the highest authority of all that was at that period known of those vast mountain regions, and in no way conflicts with the account of the death of Potts, during Coulter's gauntlet-running expedition upon the Jefferson, or his return through the Park, as that was a subsequent expedition, and probably unknown to Lewis and Clarke at the time of their first publication of their journals, of which this English edition was mainly a reprint.

FIG. 23.

FIG. 24.

RECORDS OF THE EARLIEST WHITE MEN FOUND IN THE PARK.

The next earliest evidence of white men in the Park, of which I have any knowledge, was discovered by myself at our camp in the little glen where our bridle-path from the lake makes its last approach to the rapids, one-fourth of a mile above the upper falls. About breast-high upon the west side of a smooth pine tree, about 20 inches in diameter were found, legibly carved through the bark, and not materially obliterated by overgrowth or decay, in Roman capitals and Arabic numerals the following record:

FIG. 25.

The camp was soon in excitement, the members of our party developing a marked diversity of opinion as to the real age of the record, the most experienced favoring the theory that it was really made at the

date as represented. Upon the other side of this tree were several small wooden pins, such as were formerly often used in fastening wolverine and other skins while drying (of the actual age of which there was no clew further than that they were very old), but there were certain hatchet hacks near the record, which all agreed were of the same age, and that by cutting them out and counting the layers or annual growths the question should be decided. This was done, and although the layers were unusually thin, they were mainly distinct, and, in the minds of all present, decisive; and as this was upon the 29th day of July, it was only one month short of sixty-two years since some unknown white man had there stood and recorded his visit to the roaring rapids of the "Mystic River," before the birth of any of the band of stalwart but bronzed and grizzled mountaineers who were then grouped around it. (This is all which was then or subsequently learned, or perhaps ever will be, of the maker of the record, unless a search which is now in progress results in proving these initials to be those of some early rover of these regions. Prominent among these was a famous Hudson Bay trapper, named Ross, whose grave I have often seen (the last time in going to the Bighole battlefield for the bones of Lieutenant Bradley, in 1879) where he was long since killed by the Blackfeet Indians in Ross's Hole—as parks were then called—at the head of the Ross Fork of Bitter Root branch of the Hell Gate, in Montana, and which was named after him; as was also, perhaps, the branch of Snake River in Idaho, where the Shoshone Indian Agency is situated. The "R" in the record suggests, rather than proves, identity, which, if established, would be important, as confirming the reality of the legendary visits of the Hudson Bay trappers to the Park at that early day. Thorough search of the grove in which this tree is situated only proved that it was a long-abandoned camping ground.) Our intelligent, observant mountaineer comrade, Phelps, upon this, as upon previous and subsequent occasions, favored the oldest date claimed by any one, of the traces of men, and, as usual, proved to be correct.

The narrowest place of the Yellowstone River of which I have any knowledge below the lake is between our camp of the Glen and the Upper Falls; and upon the eastern rock, just above the latter, I had often seen a medium-sized stump, which Phelps declared was cut by himself when returning with two or three comrades from James Stuart's fruitless Big Horn expedition of 1864, or seventeen years before this time, and that if we would cross the river he would show us the ruins of their camp-fire also. This we soon after did with a raft (as the river was then too high to cross as I have frequently done later in the season), in taking the measurements of the river for a future bridge, and where claimed by Phelps found the charred fire-brands of the camp, tent-poles, and even picket-pins for the lariats of the horses, intact, and, saving at the surface of the ground, but little decayed; in fact, the hatchet hacks upon all of the poles, including the ends of the pins, although of pine, in the ground, were uniformly clear and distinct. In company with this comrade I subsequently visited a scaffold for drying meat, at a ford of the Pelican, which I had often at a glance in passing deemed four or five years old, which he accurately described before reaching, and at once recognized as one of their camps of 1864, although he had not in the intervening time visited the vicinity. From the appearance of these and many other camps which were subsequently visited with him, or recognized by his description at various places in the mountains (including a pass near that of Two Ocean), and which I thus particularly mention as being, save those of Captain De Lacy hereafter mentioned, the oldest traces of

white men in the Park, of which we have positive data, I learned to judge of the relative age of certain marks, which, from signs hard to explain, were unmistakably recognized as the traces of unknown white men. In addition to the old loop-holed log ruin near the brink of the Grand Cañon below Mount Washburn; the cache of old Hudson Bay marten traps, near Obsidian Cliffs; decaying stumps of foot-logs over Hellroaring and Crevice streams, and other evidences of early white men, heretofore mentioned in my reports, I saw many during this season's explorations, a few only of which will be here noticed.

In the grove-girt border to the small lake back of Concretion Cove of Yellowstone Lake are the traces of very old tree and brush shelters for horses, larger and differently formed from those of Indians, and the numerous decaying bones of horses, proving that they died probably by starvation during some severe winter, or, as is less likely, were killed by the Indians in an attack before carrying the camp, (as they were not at that day properly armed with guns), for they would certainly have saved and not slaughtered them thereafter. Stumps of trees, remains of old camps, and the fragments of a rough dugout canoe, prove that white trappers long since frequented the famous willow swamps around the mouths of the Upper Yellowstone and the Beaver Dam Creek. Our first noon camp in ascending the east side of the Yellowstone above the lake was purposely made where Harry Yount found a human cranium in 1878. This skull we failed to find, but we utilized some of the wood cut and split, but not corded, by white men so long ago that, though the upper cross-sticks were apparently not decayed, they were dried into curvature from the heart and seams in the well-known manner of timber unearthed from peat bogs or beaver dams, and were easily broken over the knee by a sudden pressure of the hands upon the ends; also one end of a long pole for camp purposes, thrust through the fork of a pine, was there much overgrown. This camp was made near the eastern edge of a then new wind-fall of timber, as shown by the fragments of logs chopped, extending from the river to a lovely lawn skirting the towering cliffs; a well-chosen place for defense, or for secretion, unless betrayed by the presence of horses. A little distance above the camp are the stumps of trees cut and one of the logs not used in the construction of a raft. This wind-fall is now overgrown by trees, certainly not less than fifty or sixty years old; and the skull, fire-wood, raft log, and other circumstances indicate that a party of white men were attacked, and, after loss of horses, at least some of them hastily left their camp and attempted to escape by descending the river. Just south of the trail between the South Creek and the summit of the Two Ocean Pass is one standing and several fallen posts, and some poles of what may have been a very large oblong square tent, or more probably a conical lodge, as the appearance of the notches in the top of these posts, to sustain strong ridge and plate poles, seem to indicate that it was inclosed with skins and not canvas. But as the notches in the top of the posts were unquestionably made by white men, it was probably constructed for some grand council between the early trappers and the Indians, of which we have no other record or tradition than these decaying remnants.

The deep broad, and often branched bridle-paths up the Pelican Creek have usually been attributed to the thousands of horses of the retreating hostile Nez Percés or Bannocks and their white pursuers in 1877 and 1878, but this year I followed heavy trails from Camp Lovely, near the open pass from the South Fork of Pelican Creek, down an unknown branch (which these Indians did not follow) to the East Fork of the Yel-

lowstone, finding constant evidences of camps and other distinctly recognized traces of white men, made long years before the miles of burned and fallen timber—now much decayed—caused the abandonment of the route.

In closing this interesting subject it is only added that to tradition and slight published records I find abundant wide-spread, and, to my mind, conclusive evidence that white men frequented these regions nearly or quite from the visit of Coulter in 1807 until the waning of the fur trade after the discovery of gold in California, and in a lesser degree continuously thereafter. What portion of these rovers were trusty trappers and what hiding outlaws will never be known. Nor is it material to history, as the interest of each conduced to a successful concealment from the public of a knowledge of the cliff and snow girt parks and valleys of the National Park, fully two generations after the surrounding regions, some of which are fully as inaccessible, were well known, correctly mapped, and published to the world.

WHITE PROSPECTING MINERS.

The dwindling of placer mines in California, and their discovery elsewhere, greatly increased the numbers of the worthy prospecting successors of these roving trappers, and these were joined during the war of the rebellion by many deserters from the Union and Confederate armies, and by refugees from the devastated borders between them, and bold men from elsewhere, who preferred fighting Indians in the West to white men in the East, being mostly armed with long-range breech-loading rifles. Scarce since the days of the Pilgrims of the Cross, and the wild crusade of the mailed warriors of Europe for the sacred tomb in Palestine, has the world witnessed an onset more wide-spread, daring, or resistless than that of the grim gold-seeking pilgrims to Wyoming, Idaho, and Montana. Streaming from the East, organized, often broken up and reorganized upon the plains, under Bridger, Bozeman, or other daring leaders, they, with wagon trains, pack trains, on horseback or afoot, collectively or separately, fought their way through the Cheyenne, the Sioux, and other of the fiercest fighting Indian nations of the plains, with bull-boat, raft, or wagon, afoot or on horseback, forded, ferried, or swam the mighty rivers, and in bands, in squads, or alone, poured a resistless stream through nearly every mountain pass, yawning gulch, and dangerous cañon, to all the main parks and valleys from the Platte to the Columbia.

Of some of these parties and pilgrims we have knowledge, but doubtless many prospectors have traversed these regions, visited portions of the park prior to 1870, but as they were seeking mines, and not marvels, and better skilled in fighting Indians than in reporting discoveries, the little known of them is being learned from their own recent publications, or by interviews with those of them still living, the list embracing many of the wealthiest and worthiest citizens of these regions, the narratives of some of which are added.

On page 113 of the first volume of the History of Montana is found the commencement of a very interesting narrative by Capt. W. W. De Lacy, now and long a prominent and esteemed surveyor and engineer of Montana, of the wanderings of himself and party of prospecting friends during the latter part of 1863. Leaving Alder Gulch, now Virginia City, in Montana, August 3, they crossed the main divide at Red Rock Creek, and proceeded thence, via Camas, Market Lake, and the forks of Snake River, and through the broken regions of East Fork, so graphically described in Irving's Astoria and Bonneville, reaching Jackson's Lake, at

the very foot of the towering Tetons. Here the party divided, one portion returning via Lewis Lake and the Fire Hole and Madison Rivers to Virginia City, while Captain De Lacy, with twenty-six men, missed Lewis Lake, but discovered and skirted a lake which was very properly called after their leader, De Lacy. This was named and published in maps for years before Professor Hayden or any of his men saw it; and some of them, for some unknown cause, gave it the name of Shoshone, which, though a fitting record of the name of the Indians who frequented it, is still in my view a gross injustice to its worthy discoverer, as, even if my interpretation of Coulter's visit in 1807 is correct, it was then unknown. From this lake De Lacy and party crossed the main divide of the Rocky Mountains to the East Fire Hole River, which they descended to the forks, and down the main Madison, through its upper cañon, then across the North Fork and through mountain defiles to the head of the west branch of the Gallatin Fork of the Missouri. The above narrative, the high character of its writer, his mainly correct description of the regions visited, and the traces which I have found of this party, proves alike its entire truthfulness, and the injustice of changing the name of De Lacy's Lake; and fearing it is now too late to restore the proper name to it, I have, as a small token of deserved justice, named the stream and park crossed by our trail above the Shoshone Lake after their discoverer.

The journey of G. H. Phelps and comrades connected with the armed expedition of James Stuart early in the spring of 1864, to the Bighorn regions, for the purpose of avenging the slaughter of some, and the terrible sufferings of the rest, of his party, in 1863; failing to find the Indians, they broke up into prospecting parties, that of Phelps wandering through the mountains to the Sweet Water, through the South Pass to Green River, then to the Buffalo Fork of Snake River, crossing the main divide in the pass near Two Ocean, which, as before stated, I recognized from his description, and attached his name. Thence they descended to Bridger's Lake, crossed the Upper Yellowstone, and continued upon the east side of it, as well as of the lake and lower river, past Pelican Creek, and the falls, as before shown, to the trail of another party of white men, which they followed to Emigrant Gulch, near the Gate of the Mountains.

From a well-informed and truthful mountaineer, named Adam Miller, I learned the history of this party. In the spring of 1864, H. W. Wayant, now a leading citizen of Silver City, Idaho, William Hamilton, and other prospectors, to the number of forty men, with saddle horses, pack train, and outfit, ascended the east side of the Yellowstone from the Gate of the Mountains to Emigrant, Bear, and Crevice Gulches, forks of the Yellowstone, East Fork, and Soda Butte; thence over the western foothills of Mount Norris to the bluffs upon the south side of Cache Creek, where their horses were all stolen by some unknown Indians, but their only two donkeys would not stampede, and remained with them. Here the party broke up; Wayant, Harrison, and ten others, with one jack, and what he and the men could carry, ascended Cache Creek to Crandall Creek, Clarke's Fork, Heart Mountain, thence by way of Index Peak and the Soda Butte returned to the cache made by the other party of what they could not carry, aided by their donkey, from where set afoot, and hence called Cache Creek. They then crossed the East Fork, scaled the Amethyst Mountain, forded the main Yellowstone, at Tower Falls, and thence returned via the mouth of Gardiner River, Cinnabar, and Cañon Creek, where I saw traces of them in 1870, to Alder Gulch, now Virginia City, Montana. Meanwhile the other party had returned, and some of them assisted in planting the mining camps of Crevice, Bear, and Emigrant

Later in the same season George Huston and party ascended the main Fire Hole River, and from the marvelous eruption of the Giantess and other geysers, and the suffocating fumes of brimstone, fearing they were nearing the infernal regions, hastily decamped. These, with the visit of Frederick Bottler, and H. Sprague, Barronette, and others mentioned in preceding reports, are the most important of those as yet known, until 1870.

Upon a pine tree, below the confluence of the North Fork of the Stinking Water and the creek which we ascended to the new pass, is plainly and recently carved as follows:

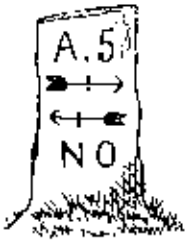

FIG. 26.

Evidently showing that some one, on the 5th day of some month, the name of which commences with A, failed in an effort to ascend the stream, and so informed some person or party, who would then have known the date and circumstances. This record may have been left by a member of A Company, Fifth Infantry, this company having been with General Miles in the Bannock campaign of 1878, or the famous mountaineer and guide, Yellowstone Kelley, may have carved it.

A square pen of logs, with a huge dead-fall at its only entrance, found on Orange Creek, is certainly a white man's bear-trap, and like many other traces is of uncertain date, and not of sufficient interest for further notice.

INDIAN TREATIES.

The first white visitors to the National Park found the timid, harmless Sheepeater Indians the only permanent occupants of it; their nearest neighbors, the Bannocks, Shoshones, and Mountain Crows, its most frequent visitors; and the occasional prowlers therein, the rapacious Blackfeet and Sioux, robbers of their race, and the early white trappers of these regions. Decimation by war and disease, with the occupancy of intervening regions by whites, guarantee future safety from the Blackfeet; a nearly impassable mountain range and a cordon of military posts and armed ranchmen, from the Sioux.

SHEEPEATERS, BANNOCKS, AND SHOSHONES.

The recent sale of the National Park and adjacent regions by these Indians insures future freedom from any save small horse-stealing bands of these tribes also. To prevent these forays, in council at their agency on Ross Fork of Snake River, in Idaho, and in Ruby Valley, in Montana, early in 1880, I obtained a solemn pledge from them to not thereafter go east of Henry's Lake, in Montana, or north of Hart Lake, in Wyoming, to which, as stated on page 3 of my report of 1880, they faithfully adhered. This pledge was renewed at Ross Fork when I was *en route* from Washington this year, and has again been sacredly observed. Unable to visit the Lemhi Agency of these tribes, by letter I represented the matter, and sent printed copies of the rules and regulations for the

management of the Park to Maj. E. C. Stone, their agent, who, in reply under date of May 26, stated that, after mature deliberation in council, he felt justified in pledging that the Indians of his agency would not thereafter enter the Park. The only known disregard of this pledge was by a band of three lodges of hunters upon the North Branch of the Madison, which was promptly reported and checked, and is not likely to occur again.

MOUNTAIN CROWS.

These Indians, numbering about 3,000, have as a tribe never been hostile to the whites, but often their valuable allies in conflicts with others, and though beset with their proverbial craving for horses, without a special observance of brands or collar-marks, besides some minor failings too prevalent with other races also, they have by the sale of much of their lands, and granting the right of way for a railroad through the remainder, proven that, although in common with their race they may be the guilty possessors of a valuable region desired by the all-absorbing white man, still they are not intentional obstructors in the pathway of progress.

As shown in my preceding reports, sustained by memorials of the officers and other leading citizens of Montana, and proven by the records, the following facts are established:

First. No portion of the northern or western watershed of the Yellowstone Range, between the Gate of the Mountains and the borders of Wyoming, including a three-mile strip of the Yellowstone National Park in Montana, was ever occupied, owned, or even claimed by the Crows, save only as being embraced in the then unknown boundaries of their reservation as set off in 1868.

Second. In 1864, or four years prior to the cession of this land to the Crows, the Sheepeater Indians, owners of Emigrant, Bear, and Crevice Gulches, had been dispossessed by the white miners, who have since constantly occupied portions and controlled all of it, with the full knowledge and acquiescence of the Crows.

Third. Upon the discovery of mines upon the northeastern watershed of the said Yellowstone Range, below the Gate of the Mountains, which had always been owned and occupied by the Crows, they promptly sold the entire range, embracing alike that occupied by the miners and that by themselves, including the old agency, buildings and improvements, as well as valuable agricultural lands, and have for many months allowed white men to occupy it, although, by the delay of Congress to appropriate the funds, they are still without one dollar of pay therefor. Besides this, they have, as before stated, shown their peaceful and progressive tendencies by promptly granting for a mere nominal sum a very liberal right of way along the whole river front of the remainder of their reservation for a railroad artery of civilization. Meanwhile, mines, mills, ranches, and the site and buildings of at least one village (Emigrant, or Chico), with a United States post-office, are, in the absence of all lawful organization or protection, held only by actual possession, without legal right of transfer or even improvement, which are alike indispensable to attract capital for the development of a most promising mining and agricultural region. Hence, in justice and good faith alike to the white man and to the Indian—to the Crow who surrendered a region without remuneration, and to the miner who holds it without title; to the race dwindling away for want of civilization for the means which are their due of obtaining it; to the poor but dauntless path-finding prospector of boundless hidden wealth for the race of resistless destiny sure

reward for its discovery and development, and for the peaceful adjustment and legal occupancy of a border of the Wonder Land of earth, and the safety of those who may visit, improve, or occupy it, do I urge, through the active influence of the department, the speedy appropriation by Congress of the means to cancel treaty obligations by paying this confiding people for a valuable region long since peacefully surrendered.

As the hostile incursion of Chief Joseph and his Nez Percés in 1877 was the armed migration of a people, anomalous in all its features, and impossible to ever again occur, with the peaceful adjustment of these Crow difficulties closes all claims or danger of Indians in any portion of the Park, and with it the necessity or semblance of an excuse for tourists to traverse it stalking arsenals of long-range rifles and other weapons, merely to slaughter or frighten away the dwindling remnant of our noblest animals, which it should be the pride as it is the duty of our American people to here preserve from threatened extinction.

HOODOO OR GOBLIN LAND.

A trail was opened this season upon a nearer route than that followed last year, and some new discoveries made around the base of Mount Norris, upon Cache Creek, and thence in nearly a direct line to and beyond the Hoodoo Mountain to Mason's Creek, at the head of the Great Stinkingwater Cañon, near the forks of which is a yawning cañon bordered by unearthly goblin forms as hideous as any conjured in wildest dreams.

C. M. Stephens accompanied me from the Mud Volcano to Clarke's Fork, with his transit for the purpose of taking daily and nightly observations; but although in early September we were terribly annoyed by fogs and storms, from the summit of Mount Chittenden we, protected by overcoats and gloves, through occasional rifts in the fog-clouds, got fair views of the Yellowstone Lake and Pelican Creek regions, but not of the Hoodoo, and upon the latter during the entire day of September 6 we remained, amid chilling fogs which were ascending from the melting snows in all the adjacent valleys, standing behind our monument of last year with compass and field-glass, ready to catch every glimpse of sunshine or opening in the shifting mists below or about us, and at various times obtained fair bearings of most of the leading points of interest, save Index Peak, which was not visible during the entire day. We proposed renewing our observations the next day, and then descend the Middle Fork of Crandall Creek to an open grassy plateau which we had plainly seen from the mountain, but a few miles distant upon Clarke's Fork, to the northeast. But the terrific snow-storm, which had kept us in a clump of fir trees at our camp of last year during much of the 4th and all of the 5th, recommenced with such fury that we hastily descended along our new trail about 30 miles to the gamekeeper's cabin on the Soda Butte, where the weather was warm and pleasant, with little snow. Determined to complete the exploration, leaving our pack-animals and outfit, we ascended the Soda Butte 20 miles to Clarke's Fork Mines, and spent the rest of the day in viewing the pass to Clarke's Fork and a route to Crandall's Creek for the morrow's effort. With the dawn came a snow-storm so furious that we yielded to the inevitable, and pressing through the storm, which as we descended decreased to no snow and a bright sunset at the cabin that night. The next day I returned through mingled snow and sunshine, 35 miles, reaching our headquarters on the eve of September 10, which I had only visited once for a few moments since the morning of July 1.

METEOROLOGICAL RECORD.

Weather record, kept by P. W. Norris, during the exploration of the Sierra Shoshone and a portion of the Rocky ranges.

[* Indicates approximate elevation only.—P. W. N.]

Date.	Camp.	Location.	Time.	Elevation.	Ther.	Weather.	Wind.
1881.				*Feet.*	°		
Aug. 16	1	Two miles below Mary's Lake	7 a. m.	7,500	51	Cloudy	SW.
16	N.	Mud Volcano	Noon	7,725	65	Rainy	SW.
16	2	West side of the foot of Yellowstone Lake.	6 p. m.	7,738	61	Clear	S.
17	2	do	6 a. m.	7,738	41	do	N.
17	2	do	Noon	7,738	70	do	SW.
17	2	do	6 p. m.	7,738	62	Fair	SW.
18	2	do	6 a. m.	7,738	42	do	NE.
18	3	Concretion Cove, on Yellowstone Lake.	Noon	7,738	68	Cloudy	SW.
18	3	do	Sunset	7,738	51	Windy	S.
19	3	do	Sunrise	7,738	40	Cloudy	N.
19	N.	Jones' Pass of the Sierra Shoshone Range.	Noon	9,444	60	do	SW.
19	4	Mouth of Jones' Creek, near Jones' Camp No. 36.	Sunset	6,683	54	Fair	SW.
20	4	do	Sunrise	6,683	34	Clear	S.
20	5	Jones' Camp No. 35, at head of the Grand Stinkingwater Cañon.	1 p. m.	6,319	85	do	N.
20	5	do	Sunset	6,319	65	do	SW.
21	5	do	Sunrise	6,319	51	do	SW.
21	N.	Snow field on Bald Mountain	1 p. m.	*10,850	28	do	SW.
21	5	Camp No. 5, on the Stinkingwater.	8 p. m.	6,310	65	do	SW.
22	5	do	Sunrise	6,319	64	Slight shower	NW.
22	N.	Noon halt on the Norris Creek	Noon	*7,500	73	Clear	NW.
22	6	Forks of Norris Creek	Sunset	*7,812	50	do	W.
23	6	do	Sunrise	7,812	31	do	W.
23	N.	At pond and cascade in pass	Noon	*8,470	43	do	NW.
23	7	Forks of Clear Creek	Sunset	*7,950	70	do	W.
24	7	do	Sunrise	*7,950	51	do	W.
24	N.	Signal Point, Yellowstone Lake	Noon	*7,500	70	do	NW.
24	8	Terrace at the head of the left finger of the Yellowstone Lake.	Sunset	7,800	65	do	S.
25	8	do	Sunrise	7,800	50	Thunder-shower	SW.
25	N.	At Old Hunters' Camp on the east side of the Upper Yellowstone.	Noon	7,910	65	Clear	S.
25	9	Near Bridger's Lake	Sunset	7,950	58	Showery	E.
26	9	do	Sunrise	7,950	22	Clear	N.
26	10	Two Ocean Pass	Noon	8,081	60	do	SW.
26	10	do	Sunset	8,081	51	do	SW.
27	10	do	Sunrise	8,081	23	do	NE.
27	N.	Continental Divide	10 a. m.	*10,100	45	do	NE.
27	N.	Barlow Valley	1 p. m.	8,400	81	do	SW.
27	11	Branch of Barlow River	Sunset	*8,600	60	do	N.
28	11	do	Sunrise	*8,600	21	do	N.
28	N.	Summit of pass from branch of Yellowstone to one of Heart Lake.	Noon	8,481	75	do	SW.
28	12	Head of Heart Lake	Sunset	7,475	60	do	E.
29	12	do	Sunrise	7,475	23	do	N.
29	N.	Summit of Mount Sheridan	11 a. m.	10,386	40	do	S.
29	12	Head of Heart Lake	Sunset	7,475	55	Cloudy	N.
30	12	do	Sunrise	7,475	32	Snowy	N.
30	N.	Head of the thumb of the Yellowstone Lake.	Noon	7,738	31	Snow squalls	SW.
30	13	Bridge Creek, near Natural Bridge.	Sunset	7,908	41	do	SW.
31	13	do	Sunrise	7,908	19	Clear	W.
31	14	Mud Volcano on Yellowstone River.	Noon	7,725	60	Cloudy	W.
31	14	do	Sunset	7,725	51	do	W.
Sep. 1	14	do	Sunrise	7,725	31	Hazy	SW.
1	N.	Pelican Creek	Noon	7,800	58	do	W.
1	15	Foot of Mount Chittenden	Sunset	7,850	43	do	W.
2	15	do	Sunrise	7,850	22	Snow squalls	NW.
2	N.	Summit of Mount Chittenden	9 a. m.	10,190	31	do	NW.
2	N.	Pelican Creek	Noon	8,000	48	do	NW.

Weather record, kept by P. W. Norris, &c.—Continued.

Date.	Camp.	Location.	Time.	Elevation.	Ther.	Weather.	Wind.
1881.							
Sept. 2	16	Camp Lovely, in pass to the East Fork of the Yellowstone River.	Sunset	*8,241	55	Clear	W.
3	16	do	Sunrise	*8,241	14	do	W.
3	N.	East Fork Valley	Noon	7,180	55	Cloudy	SE.
3	17	Three miles up Miller's Creek	Sunset	7,190	61	do	SE.
4	17	do	Sunrise	7,190	50	do	SE.
4	N.	Head of Miller's Valley	11 a. m.	*7,350	48	do	NW.
4	18	Old camp, one mile from Hoodoo Mountain.	Sunset	*8,490	35	Severe snow storm.	NE
5	18	do	Sunrise	*8,490	30	do	NE.
5	18	do	Noon	*8,490	35	do	NE.
5	18	do	Sunset	*8,490	36	do	NE.
6	18	do	Sunrise	*8,490	19	do	E.
6	N.	Summit of Hoodoo Mountain	Noon	*10,700	21	Fogs	NE.
6	19	Old camp, one mile from Hoodoo Mountain.	Sunset	8,490	50	Clear	W.
7	19	do	Sunrise	8,490	18	Snow squalls	E.
7	N.	East Fork of Yellowstone Valley	Noon	6,825	40	Clear	S.
7	20	Game keeper's cabin	Sunset	6,410	24	do	S.
8	20	do	Sunrise	6,410	22	do	NW.
8	N.	Cook City or Clarke's Fork Mines	Noon	7,590	36	Cloudy	NW.
8	21	Miller's Camp in the mines	Sunset	8,425.5	39	do	NW.
9	21	do	Sunrise	8,42	12	Severe snow storms.	N.
9	N.	Soda Butte	Noon	6,500	26	do	N.
9	22	Game keeper's cabin	Sunset	6,410	26	Clear	SE.
10	22	do	Sunrise	6,410	16	do	SE.
10	N.	Forks of the Yellowstone	Noon	6,000	36	do	SW.
10	23	Mammoth Hot Springs	Sunset	6,450	65	do	SW.

Meteorological record for the season kept at the Mammoth Hot Springs.

KEY.—S. R., sunrise; M., noon; S. S., sunset; Cl., clear; Cd., cloudy. No wind gauge.

[Latitude 44° 58' north; longitude 110° 42' west; elevation, 6,450 feet.]

January, 1881.

Date.	Temperature. S. R.	M.	S. S.	Wind.	Snow or rain.	Sky.
1	24	36	26	NW.	.....	Cd.
2	12	20	18	N.	.....	Cd.
3	12	26	18	E.	.....	Cd.
4	24	32	30	SE.	S.	Cd.
5	18	44	32	SE.	.....	Cl.
6	10	30	28	S.	S.	Cd.
7	6	4	2	N.	S.	Cd.
8	14	6	0	N.	S.	Cd.
9	4	10	12	SE.	.....	Cl.
10	16	20	22	S.	.....	Cd.
11	28	34	36	SE.	S.	Cd.
12	34	34	36	SE.	S.	Cd.
13	10	22	18	W.	.....	Cl.
14	18	32	34	SE.	S.	Cd.
15	28	50	40	SE.	.....	Cl.
16	4	28	24	SE.	.....	Cl.
17	1	27	25	SE.	.....	Cl.
18	20	32	30	SE.	.....	Cl.
19	30	46	20	NW.	.....	Cd.
20	12	28	20	NW.	.....	Cl.
21	18	28	26	SE.	.....	Cl.
22	8	22	24	E.	.....	Cl.
23	22	26	24	SE.	.....	Cd.
24	18	38	20	SE.	.....	Cd.
25	0	24	4	NE.	S.	Cd.
26	6	16	18	E.	.....	Cd.
27	22	32	35	SE.	.....	Cd.
28	32	30	34	SE.	S.	Cd.
29	28	36	32	SE.	S.	Cd.
30	30	34	36	SE.	S.	Cd.
31	28	40	38	SE.	.....	Cl.
	19	20	25		(Mean 24.)	

February, 1881.

Date.	Temperature. S. R.	M.	S. S.	Wind.	Snow or rain.	Sky.
1	30	36	38	S.	R.	Cd.
2	39	41	42	SE.	R.	Cd.
3	42	44	44	S.	R.	Cd.
4	30	42	40	S.	R.	Cd.
5	32	51	39	E.	.....	Cl.
6	29	50	39	.....	.....	Cl.
7	20	38	28	NW.	S.	Cd.
8	19	32	24	SE.	.....	Cd.
9	8	30	22	NE.	.....	Cd.
10	8	26	20	NE.	S.	Cd.
11	6	26	18	NE.	S.	Cd.
12	0	17	20	SE.	S.	Cd.
13	14	6	12	N.	S.	Cd.
14	4	14	2	W.	.....	Cl.
15	2	16	16	SE.	.....	Cl.
16	12	22	26	SE.	S.	Cd.
17	16	42	26	SE.	.....	Cd.
18	9	29	20	SE.	.....	Cl.
19	10	36	26	SE.	R. & S.	Cd.
20	9	24	22	SE.	.....	Cd.
21	28	33	30	SE.	.....	Cd.
22	32	39	36	W.	.....	Cl.
23	32	40	34	S.	.....	Cl.
24	32	42	38	S.	.....	Cl.
25	34	32	34	SE.	S.	Cd.
26	26	39	30	SE.	.....	Cl.
27	28	38	38	SE.	S.	Cd.
28	36	49	41	SE.	R.	Cd.
	22	33	29		(Mean 28.)	

March, 1881.

Date.	S. R.	M.	S. S.	Wind.	Snow or rain.	Sky.
1	32	38	34	SE.	.....	Cl.
2	22	36	28	SE.	.....	Cl.
3	26	38	32	SE.	.....	Cl.
4	36	42	36	SE.	.....	Cl.
5	22	44	35	SE.	.....	Cl.
6	37	38	30	N.	.....	Cd.
7	2	44	34	SE.	.....	Cl.
8	16	40	33	SE.	.....	Cl.
9	18	56	40	S.	.....	
10	41	48	41	S.	.....	Cd.
11	29	43	30	N.	.....	Cl.
12	22	32	22	S.	.....	Cl.
13	18	40	29	S.	.....	Cl.
14	12	38	28	S.	.....	Cl.
15	8	46	28	SE.	.....	Cl.
16	11	46	32	SW.	.....	Cl.
17	14	42	26	SE.	.....	Cl.
18	25	38	29	N.	.....	Cl.
19	26	52	32	SW.	.....	Cl.
20	32	41	44	SE.	.....	Cl.
21	28	50	40	SE.	.....	Cl.
22	26	58	43	SW.	.....	Cl.
23	30	50	51	SW.	.....	Cl.
24	38	50	30	SW.	.....	Cl.
25	28	43	45	SW.	.....	Cl.
26	40	48	43	NE.	.....	Cl.
27	40	48	43	NE.	.....	Cl.
28	25	61	46	NE.	.....	Cl.
29	32	66	50	SE.	.....	Cl.
30	35	68	53	W.	.....	Cl.
31	36	50	43	SE.	.....	Cl.
	27	47	37		(Mean 37.)	

April, 1881.

Date.	S. R.	M.	S. S.	Wind.	Snow or rain.	Sky.
1	36	66	65	SE.	.....	Cl.
2	36	53	41	SE.	.....	Cl.
3	30	66	50	SE.	.....	Cl.
4	34	68	54	SE.	.....	Cl.
5	40	58	54	SE.	.....	Cl.
6	44	50	40	SE.	R.	Cd.
7	24	35	30	NW.	.....	Cd.
8	22	38	38	NW.	.....	Cd.
9	24	32	24	NW.	S. & R.	Cd.
10	20	48	38	NW.	R.	Cd.
11	21	43	30	NW.	.....	Cd.
12	18	42	36	NW.	.....	Cd.
13	23	42	34	SE.	.....	Cd.
14	34	48	46	SE.	.....	Cd.
15	40	57	52	SE.	.....	Cd.
16	42	62	56	SE.	.....	Cd.
17	42	51	50	SE.	.....	Cd.
18	44	50	45	SE.	.....	Cd.
19	43	56	50	SE.	R.	Cd.
20	45	62	50	SE.	R.	Cd.
21	36	62	50	SE.	.....	Cd.
22	40	49	40	SE.	.....	Cd.
23	32	44	40	SE.	R	Cd.
24	35	50	46	SE.	R. & S.	Cd.
25	40	48	42	SE.	.....	Cd.
26	35	42	42	SE.	.....	Cd.
27	37	50	47	SE.	.....	Cd.
28	32	48	46	SE.	R.	Cd.
29	40	58	55	SE.	.....	Cd.
30	40	56	50	SE.	.....	Cd.
	34	51	44		(Mean 43.)	

Meteorological record for the season, &c.—Continued.

May, 1881.

Date.	Temperature. S. R.	M.	S. S.	Wind.	Snow or rain.	Sky.
1	40	56	50	S.	.....	Cl.
2	40	60	50	SE.	.....	Cl.
3	32	50	40	SW.	.....	Cl.
4	40	60	56	S.	.....	Cl.
5	40	60	56	S	.....	Cl.
6	35	55	50	S.	.....	Cd.
7	45	60	56	S.	.....	Cl.
8	48	65	60	SE.	.....	Cl.
9	45	66	60	SE.	.....	Cl.
10	49	70	65	SE.	.....	Cl.
11	40	60	56	SE.	.....	Cl.
12	35	56	50	SE.	.....	Cl.
13	35	45	40	SE.	.....	Cd.
14	37	40	40	SE.	.....	Cd.
15	35	48	45	SE.	.....	Cd.
16	40	50	45	SE.	.....	Cl.
17	45	60	57	SE.	.....	Cl.
18	50	65	60	SE.	.....	Cl.
19	50	66	60	SE.	.....	Cl.
20	53	60	58	SE.	.....	Cl.
21	50	62	60	SE.	.....	Cl.
22	50	65	60	SE.	.....	Cl.
23	50	65	60	SE.	.....	Cl.
24	50	65	60	SE.	.....	Cl.
25	45	60	58	SE.	.....	Cl.
26	48	63	60	SE.	.....	Cl.
27	50	65	60	SE.	.....	Cl.
28	55	70	65	SE.	.....	Cl.
29	50	65	63	SE.	.....	Cl.
30	52	67	60	SE.	.....	Cl.
31	51	68	62	SE.	.....	Cl.
	45	60	56	(Mean 54.)		

June, 1881.

Date.	Temperature. S. R.	M.	S. S.	Wind.	Snow or rain.	Sky.
1	50	70	62	SE.	.....	Cl.
2	48	89	74	SE.	.....	Cl.
3	48	74	70	SE.	.....	Cl.
4	42	65	60	SE.	.....	Cl.
5	45	68	60	SE.	R.	Cd.
6	41	68	50	S.	.....	Cd.
7	38	64	48	S.	.....	Cd.
8	46	60	48	SE.	R.	Cd.
9	46	48	48	SE.	R.	Cd.
10	40	55	48	SE.	R.	Cd.
11	40	50	38	SE.	R.	Cd.
12	44	58	50	SE.	R.	Cd.
13	44	66	55	SE.	R.	Cd.
14	52	58	58	SE.	R.	Cd.
15	50	58	58	SE.	R.	Cd.
16	50	58	50	SW.	R.	Cd.
17	40	58	50	E.	.....	Cl.
18	48	68	52	SE.	.....	Cl.
19	55	70	53	SE.	.....	Cl.
20	50	60	55	SE.	.....	Cl.
21	45	60	55	SE.	.....	Cl.
22	50	52	56	N.	.....	Cl.
23	45	50	45	NW.	.....	Cd.
24	50	80	45	S.	R	R.
25	60	72	65	SE.	R.	R.
26	59	74	66	SE.	R.	R.
27	65	80	70	SE.	R.	R.
28	70	86	70	SE.	.....	Cl.
29	70	82	70	SE.	.....	Cl.
30	70	85	70	SE.	.....	Cl.
	50	66	56	(Mean 57.)		

July, 1881.

Date.	S. R.	M.	S. S.	Wind.	Snow or rain.	Sky.
1	53	98	84	(*)	(*)	(*)
2	70	88	84	.....	.....	.....
3	60	78	72	.....	.....	.....
4	55	75	70	.....	.....	.....
5	50	80	76	.....	.....	.....
6	68	82	78	.....	.....	.....
7	62	61	48	.....	.....	.....
8	33	62	60	.....	.....	.....
9	50	56	54	.....	.....	.....
10	47	68	55	.....	.....	.....
11	50	60	58	.....	.....	.....
12	53	78	74	.....	.....	.....
13	58	85	76	.....	.....	.....
14	60	80	74	.....	.....	.....
15	54	76	60	.....	.....	.....
16	56	76	60	.....	.....	.....
17	58	86	80	.....	.....	.....
18	68	90	82	.....	.....	.....
19	66	89	60	.....	.....	.....
20	54	64	59	.....	.....	.....
21	50	76	60	.....	.....	.....
22	50	82	70	.....	.....	.....
23	52	84	80	.....	.....	.....
24	52	80	58	.....	.....	.....
25	50	80	80	.....	.....	.....
26	54	74	68	.....	.....	.....
27	60	78	62	.....	.....	.....
28	53	82	70	.....	.....	.....
29	56	80	74	.....	.....	.....
30	54	84	80	.....	.....	.....
31	64	74	68	.....	.....	.....
	55	77	69	(Mean 67.)		

August, 1881.

Date.	S. R.	M.	S. S.	Wind.	Snow or rain.	Sky.
1	44	72	65	(*)	(*)	(*)
2	46	80	72	.....	.....	.....
3	60	90	62	.....	.....	.....
4	60	92	65	.....	.....	.....
5	52	95	72	.....	.....	.....
6	60	94	87	.....	.....	.....
7	72	80	66	.....	.....	.....
8	60	76	74	.....	.....	.....
9	50	68	55	.....	.....	.....
10	60	74	70	.....	.....	.....
11	50	78	60	.....	.....	.....
12	46	88	74	.....	.....	.....
13	50	88	74	.....	.....	.....
14	60	74	70	.....	.....	.....
15	50	76	70	.....	.....	.....
16	52	75	70	.....	.....	.....
17	45	74	70	.....	.....	.....
18	48	80	65	.....	.....	.....
19	40	78	64	.....	.....	.....
20	47	85	60	.....	.....	.....
21	50	82	60	.....	.....	.....
22	50	85	60	.....	.....	.....
23	40	72	70	.....	.....	.....
24	50	86	58	.....	.....	.....
25	46	74	60	.....	.....	.....
26	54	86	74	.....	.....	.....
27	48	72	64	.....	.....	.....
28	40	76	54	.....	.....	.....
29	42	78	62	.....	.....	.....
30	40	64	60	.....	.....	.....
31	34	68	60	.....	.....	.....
	50	79	66	(Mean 65.)		

No record of wind, rain, or sky.—C. M. S.

Meteorological record for the season, &c.—Continued.

September, 1881.

Date.	Temperature. S. R.	M.	S. S.	Wind.	Snow or rain.	Sky.
1	50	62	56	(*)	(*)	(*)
2	40	66	46			
3	38	74	60			
4	18	48	50			
5	34	46	38			
6	30	58	58			
7	34	46	42			
8	50	70	60			
9	40	60	44			
10	30	68	46			
11	44	74	64			
12	40	80	74			
13	40	80	68			
14	40	78	12			
15	34	86	70			
16	40	84	72			
17	50	64	42			
18	36	74	62			
19	36	60	58			
20	34	64	60			
21	40	60	56			Cl.
22	40	58	54			
23	40	45	40			
24	30	48	40			
25	40	55	37		S.	
26	26	48	32		R.	
27	28	50	35		S.	Cd.
28	26	45	30			Cl.
29	25	50	36		S.	Cd.
30	28	40	35		S.	Cd.
	36	61	50	(Mean 49.)		

October, 1881.

Date.	Temperature. S. R.	M.	S. S.	Wind.	Snow or rain.	Sky.
1	40	50	48	SW.		
2	20	68	64	S.		
3	34	61	42	S.		
4	35	63	46	SE.		
5	38	68	50	E.		
6	38	41	10	E.		
7	32	38	42	NE.		
8	31	51	39	E.		
9	32	64	54	E.		
10	39	68	58	SE.		
11	24	40	32	N.		
12	10	35	18	SE.		
13	6	44	34	N.		
14	12	24	20	SE.		
15	9	30	28	NE.		
16	18	34	25	E.		
17	26	40	30	SE.		
18	31	42	30	SE		
19	36	53	40	SE.		
20	38	54	40	W.		Cl.
21	34	47	42			Cl.
22	32	51	40	N.		Cl.
23	25	63	40	SE.		Cl.
24	26	64	40	SE.		Cl.
25	28	55	44	SE.		Cd.
26	32	43	42	SE.		Cd.
27	30	50	40	SE.		Cl.
28	30	48	41	SE.	S	Cd.
29	31	44	40	SE.		Cd.
30	31	40	32	SE.	R.	Cd.
31	28	30	34	NW.		Cd.
	28	49	39	(Mean 39.)		

November, 1881.

Date.	Temperature. S. R.	M.	S. S.	Wind.	Sky.	Remarks.
1	30	35	31	NW.	Cd.	Rainy.
2	28	34	30	NW.	Cd.	
3	25	31	26	SE.	Cd.	Snow.
4	26	50	24	SE.	Cd.	Squally.
5	20	31	25	SE.	Cl.	
6	24	35	32	SE.	Cl.	
7	28	38	30	SE.	Cl.	
8	21	35	38	SE.	Cl.	
9	21	34	30	N.	Cl.	Windy.
10	20	31	24	N.	Cl.	Windy.
11	18	30	25	N.	Cd.	Snow squalls.
12	20	30	24	N.	Cd.	Snow squalls.
13	26	35	30	SE.	Cl.	
14	30	42	35	SE.	Cl.	
15	30	40	25	SE.	Cl.	
16	32	46	30	SE.	Cl.	
17	34	50	41	W.	Cd.	Rain.
18	34	46	38	W.	Cd.	Rain.
19	30	40	32	SW.	Cd.	Rain.
20	32	44	31	SW.	Cl.	
21	30	42	34	SW.	Cl.	
22	20	36	30	SE.	Cl.	
23	18	30	25	SE.	Cd.	
24	16	28	20	SE.	Cl.	
25	13	20	17	SE.	Cd.	Snow.
26	9	30	20	SE.	Cd.	Snow.
27	14	32	28	SE.	Cd.	Snow.
28	18	40	35	S.	Cl.	
29	19	40	30	S.	Cl.	
30	18	36	30	S.	Cl.	
	23	39	26	(Mean 29.)		

SULPHUR.

The demand for this mineral, for the purpose of preventing and curing the skin and hoof diseases of the sheep, increases, as does the animal, grazing upon the grassy slopes and terraced foot hills of these mountain regions, where they are proving very profitable to their owners; and, as no refining of the substance is necessary for this and similar purposes, all thus needed by ranchmen could be readily obtained in the National Park, if they are allowed to do so, which has not been done further than to test its fitness and invite propositions. At the suggestion of the Hon. John Sherman, while we were visiting Sulphur Mountain during the past season, several excavations were made in the sulphur deposits of that and other localities, in order to learn something of their depth and quality. The uniform result was the finding of sulphur somewhat mixed with geyserite and other substances, in strata, or banding to where we were forced to desist by scalding hot sulphur water, or the stifling fumes arising from the deposit, at depths ranging from 3 to 6 feet from the surface. Specimens of these have been forwarded, with those of obsidian, geyserite, &c., to the National Museum for exhibition, as well as to obtain an opinion regarding their practical value. Although in this first search for beds of sulphur no heavy deposits cold enough to be worked were found, still I deem it far from conclusive evidence that none such exist, which may yet be found and profitably worked, if it be considered best to allow its being done. Hence, I suggest the propriety of allowing the search to be made by some responsible person or company, under a lease, allowing the mining and sale thereof of a limited quantity, and for a restricted length of time, and under such regulations as may be thought necessary and proper. While I do not in this desire to represent that any great revenue will immediately accrue to assist in the protection and improvement of the park, I see little danger of loss or injury in exploring some of its nearly countless sulphur deposits, but a certainty of obtaining many specimens of the fragile but beautiful sulphur crystals, and perhaps beds of commercial value, or knowledge of scientific interest.

PAINT-POTS.

This is a provincialism, or local phrase for the dwindled remnants of salses or mud geysers, which are difficult to describe or comprehend otherwise than by actual view of them.

Having in detail described the various kinds of geysers in my last year's report, I here only need to add that from the choking of the supply pipe, or fissure, to the regular intermittent Geyser, or from the bursting out of new ones, many of them dwindle into salses, with only an occasional eruption of their seething, foaming, muddy contents, and still dwindling in power, while increasing in their density and coloring, as well as the fetid smell, and nauseous, often noxious gasses escaping therefrom in spasmodic, hissing or gurgling throes or eruptions, become what are called paint pots. These are sometimes in gulches or basins commingled with or bordering the other kinds of geysers, but usually in more or less detached localities, each of which generally exhibits a preponderance of red, yellow, or other coloring characteristic of the predominant iron, sulphur, or other mineral substances of the basin, but in many of them are found closely and irregularly intermingled pools or pots of seething nauseous paint-like substances of nearly every color and shade of coloring known to the arts, and with a fineness of material and brilliancy of tinting seldom equalled in the productions of man. Although so

brilliant, the colors of these paints are not permanent, but soon fade, and as the deposits are so numerous, accessible, and constantly accumulating, it is a question for scientific research to learn if the addition of lead or other minerals in proper proportions may not render these mineral paints practically valuable. There is direct evidence that the Indians used this paint liberally in adorning or besmearing their persons, their weapons, and their lodges. They also used a much more durable variety of red and yellow paint found in bands, layers, or detached masses, in the cliffs, a notable deposit of which was discovered by myself during the past season in the face of the almost vertical walls of a yawning, impassible earthquake fissue nearly opposite the mouth of Hellroaring Creek, which has evidently been visited by Indians in modern times.

INSTRUCTIONS TO WYMAN.

CAMP AT FORKS OF THE FIRE HOLE RIVER,
Yellowstone National Park, September 27, 1881.

C. H. WYMAN:

SIR: You are hereby instructed to proceed with George Rowland, and the necessary saddle, pack animals, outfit and provisions to the Lower, Midway, and Upper Geyser Basins, for the purpose of preventing vandalism of geyser cones and other objects of natural interest, and in general attend to the enforcement of the laws, rules, and regulations for the protection and management of the Yellowstone National Park.

For the prompt and full performance of this and other duties, you are hereby appointed an agent of the government, with full power of seizure of vandalized articles, and the outfits of those persons committing depredations, at your discretion, in accordance with article seven of the printed rules and regulations of the Superintendent of the Park and the Secretary of the Interior for the management thereof, published May 4, 1881, a copy of which is hereunto attached. (See appendix marked B.) You are also to use due diligence in keeping a record of the weather, making and recording observations of the periods and altitudes of the various geyser eruptions, and especially the Excelsior in the Midway Basin.

Weather permitting, you are expected to remain ten or twelve days, returning via the Norris Geyser Basin, there spending at least one day and two nights, carefully noting the geyser eruptions, and, upon reaching headquarters at the Mammoth Hot Springs, make a detailed report in writing.

P. W. NORRIS,
Superintendent Yellowstone National Park.

MAMMOTH HOT SPRINGS,
Yellowstone National Park, October 10, 1881.

P. W. NORRIS,
Superintendent of the Yellowstone National Park:

SIR: In compliance with your attached instructions of September 27, I proceeded through the Lower to the Midway Geyser Basin, carefully noting geyser eruptions, until the non-arrival of Rowland necessitated my descending the main Fire Hole River to the Marshall Hotel at night. Returned early upon the morning of the 28th, and Rowland having arrived at noon we made our camp upon the road across the Fire Hole River from the Excelsior Geyser, judging it the nearest safe place for viewing its eruptions, as well as the movements of tourists. A terribly swollen knee, from the effects of a horse kick while in the great cañon of the Gibbon, had not only thus delayed Rowland's arrival, but also, despite his earnest efforts, continued to seriously curtail his proposed observations of geyser eruptions in the Upper Basin while I was thus engaged in the Midway one. Although the attached report contains the main features of these eruptions, I may properly add that the subterranean rumblings and earth tremblings were often so fearful as to prevent sleep—so great the cloud ascending from the Excelsior Geyser, and so dense and widespread the descending spray, as to obscure the sun at mid-day, and the united mists and fogs as to saturate garments like the spray from a cataract, and often render the nights so pitchy dark as to prevent accurate observations.

Most of the rocks, hurled hundreds of feet above the column of water, fall in the foaming pond, but many are strewn over surrounding acres. This monster geyser now seems settling down to regular business, with less powerful but more frequent eruptions than during the summer, but its eruptions fully double the volume of water

the Fire Hole River, here nearly 100 yards wide, 2 or 3 feet deep, here very rapid, rendering it too hot to ford for a long distance.

Owing to Rowland's lameness, and the dense fogs in the valleys, the eruptions of the adjacent geysers, as well as those of the Lower Basin and the Geyser Meadows, were not properly noted; and, although no concert of eruptions was observable, all were unusually active and powerful. Thus also, in the Upper Basin, as noted in the occasional visits of Rowland, as well as during our two days' continuous observations there. While Old Faithful was fully sustaining her proverbial reputation for reliability, the Grand, Beehive, Castle, Splendid, and others geysers, seemed struggling to rival it; in fact, all the evidence indicates greater power and activity than during my first visit in 1875, or at any intervening period.

The recent severe snow storms tend alike to clear the park of the tourists now in it, and restrict the number of future arrivals this fall, as well as the danger of forest fires and vandalism.

En route to the Norris Geyser Basin we had a distant view of geysers in eruption in the Monument Basin, nearly amid the clouds, and others in the cañon of the Gibbon, and the Paint Pots, the appearance of all of which, as well as in the Norris Basin, indicates unusual activity. In fact, there seems no room to question the marked increase of power and activity of the internal forces throughout the Fire Hole regions.

Most respectfully, yours,

C. H. WYMAN.

Record of the eruptions of the Excelsior Geyser in the Midway Basin, Yellowstone National Park.

Date.	Time of eruption.	Duration of eruption in minutes.	Height of the column of water in feet.	Remarks.
1880				
Sept. 27	8.00 a. m	5	100	Witnessed the last eruption from a distance.
27	3.30 p. m	7	75	
27	5.30 p. m	7	100	
27	7.15 p. m	6	90	
28	9.00 a. m	5	60	Heavy fog in the morning, clear until sunset, and thence dense mists from the Excelsior Geyser, and fogs from the foaming, hot Fire Hole River.
28	10.30 a. m	7	75	
28	11.48 a. m	7	75	
28	3.00 p. m	5	100	
28	5.20 p. m	6	100	
28	7.30 p. m	7	125	
29	9.30 a. m	7	60	
29	3.30 p. m	5	60	Heavy snow squalls, shutting off all observation after 7.20 p. m.
29	5.00 p. m	5	70	
29	7.20 p. m	7	75	
30	9.00 a. m	5	50	
30	3.00 p. m	7	100	Heavy clouds and mists much of the day.
30	5.20 p. m	5	125	
30	7.15 p. m	5	75	Mists too dense for observation at night.
30	9.30 p. m	6	75	
Oct. 1	6.15 a. m	5	60	
1	8.06 a. m	10	150	Cloudy and nearly dark all day.
1	10.10 a. m	15	100	
1	12.55 p. m	10	200	
1	3.50 p. m	10	250	
1	5.40 p. m	10	225	
1	7.10 p. m	5	75	Too dense fogs and mists to continue observations.
1	9.00 p. m	5	75	
2	12.15 a. m	5	75	
2	3.30 a. m	5	75	Clear, but a very heavy wind down the valley, allowing approach upon the windward side, disclosing the fact that heavy masses of the horizontally-banded wall-rock were fractured and falling into the foaming cauldron, which was all that could be observed, save an occasional rock eruption.
2	6.45 a. m	5	75	
2	8.15 a. m	5	75	
2	10.10 a. m	5	75	
	12.15 p. m	4	60	

Record of the eruptions of the Excelsior Geyser in the Midway Basin, &c.—Continued.

Date.	Time of eruption.	Duration of eruption in minutes.	Height of the column of water in feet.	Remarks.
1880. Oct. 2	2.15 p. m	5	50	
2	4.15 p. m	7	200	
2	5.30 p. m	5	75	
2	7.00 p. m	5	50	
2	9.05 p. m	5	50	
2	11.15 p. m	5	60	
3	6.30 a. m	5	100	
3	8.00 a. m	10	150	Countless rocks, of many pounds weight, hurled like a rocket high above the column of water, some of which fell in and across the river, which is here 100 yards wide, and during much of the day was a foaming flood of hot water.
3	10.10 a. m	10	300	
3	12.30 p. m	10	75	
3	3.00 p. m	10	250	
3	4.30 p. m	7	75	
3	5.45 p. m	5	80	
3	7.25 p. m	6	75	
3	9.20 p. m	5	75	
3	11.30 p. m	5	75	
4	6.00 a. m	5	75	
4	7.30 a. m	5	75	Broke camp and went to the Upper Basin at 9 a. m.
4	9.00 a. m	7	75	
4	10.20 a. m	10	150	
4	11.45 a. m	5	150	
6	3.00 p. m	5	75	Returned through mist and snow squalls; weather quite cold.
6	5.25 p. m	7	100	
6	7.19 p. m	6	80	
6	9.00 p. m	7	120	
6	10.40 p. m	5	75	
7	3.45 a. m	6	80	Clear and cold, but dense fogs along the river for miles.
7	5.20 a. m	7	125	
7	6.45 a. m	5	100	
7	9.08 a. m	7	120	Left the basin for the Norris Geyser.

ERUPTIONS OF GEYSERS IN THE UPPER BASIN.

Old Faithful—This typical geyser during our visit seemed to be in greatest activity and power, having hourly eruptions of five minutes' duration, and columns of water 175 feet high.

GRAND.

Date.	Time of eruption.	Duration of eruption in minutes.	Height of the column of water in feet.	Remarks.
1881. Oct. 4	9.45 a. m	20	200	Observed by Rowland. The column of water in all of these eruptions was vertical and of remarkable symmetry and beauty.
4	5.10 p. m	25	200	
5	3.25 p. m	20	200	
6	9.15 a. m	20	200	
6	4.20 p. m	20	200	

SPLENDID.

Date.	Time of eruption.	Duration of eruption in minutes.	Height of the column of water in feet.	Remarks.
1880. Oct. 4	7.15 a. m			Eruptions uniformly much like those of Old Faithful, but the form of the column of water less vertical and more spreading.
4	9 a. m			
4	11 a. m			
4	2.30 p. m			
4	6.30 p. m			
5	6 a. m			
5	8.20 a. m			
5	11.20 a. m			
5	1.15 p. m			
5	3.45 p. m			
5	6.30 p. m			
6	6 a. m			
6	8.30 a. m			
6	11 a. m			
6	1.20 p. m			

CASTLE.

Oct. 4	3 p. m	25	75	There was a constant agitation and several small eruptions.
6	9.45 a. m	30	100	

BEEHIVE.

Oct. 4	9.45 p. m	5	175	Column of water always vertical, and of great symmetry and beauty.
5	2.15 p. m	5	200	
6	8.40 p. m	5	180	

GIANT.

Oct. 5	8 p. m	25	250	The accompanying earth-trembling was terrific.

The Lion, Lioness, Grotto, Fan, Riverside, Saw-mill, and other geysers had eruptions during the night, which we failed to properly observe, but, from the noise of their spouting, all were in full force and activity.

LOWER GEYSER BASIN.

Fountain.—Usually had an eruption each forenoon, those observed being of from 10 to 15 minutes' duration, with water column from 60 to 90 feet high, and very spreading. Rowland's lameness and the dense fogs prevented extended observations in the Lower Basin, as well as in the Geyser Meadows.

NORRIS GEYSER BASIN.

Monarch.

Date.	Time of eruption.	Duration of eruption in minutes.	Height of the column of water in feet.	Remarks.
Oct. 8	6.20 a. m	20	100	The eruptions are simultaneously through three orifices—2 by 12, 2½ by 11, and 5 by 6 feet, respectively, their combined flow producing for the time a large sized stream of hot water.
9	6.30 a. m	25	125	

New Crater.—Exhibits two kinds of eruptions—one of them, each half hour, 50 feet high, and another about 100 feet high daily.

Minute Man.—Eruptions 25 or 30 feet high each minute, with little variation.

Emerald.—Evidently has an occasional eruption, although none were observed.

Vixen.—Eruption from 40 to 50 feet high, each two or three hours.

Constant, Twins, Triplets, and many others in the Porcelain Vale, seem in nearly constant eruption, so that the spray and fogs greatly obscure the sun's rays by day, and render the nights dark, damp, and unpleasant.

Report of weather in the Geyser Basins.

MIDWAY BASIN.

Date.	Thermometer. Sunrise.	Noon.	Sunset.	Remarks.
1881.				
Sept. 27	32	50	38	Cloudy.
28	38	49	42	Clear; heavy mist from the Excelsior Geyser.
29	40	55	32	Snow-squalls.
30	26	52	30	Heavy clouds and mist.
Oct. 1	36	50	32	Do.
2	32	60	44	Clear, but windy.
3	34	61	40	Clear, but windy; dense mist at night.
4	26			

UPPER BASIN.

Date.	Sunrise.	Noon.	Sunset.	Remarks.
Oct. 4		64	46	Dense mists from geysers.
5	25	68	42	Clear morning; thunder-shower at 2 p. m.
6	32	38		Snow-squalls and blinding mists.

MIDWAY BASIN.

Date.	Sunrise.	Noon.	Sunset.	Remarks.
Oct. 6			30	Snow-squalls and blinding mists.
7	33			Clear, but very windy. Went to the Norris Geyser Basin.

NORRIS BASIN.

Date.	Sunrise.	Noon.	Sunset.	Remarks.
Oct. 7			32	
8	18	59	40	Clear and lovely.
9	16			Clear day. Left for headquarters at 7.20 a. m., arrived at 12 m.

GEYSERS.

The theories regarding these and other kinds of hot springs in the park were so fully treated of in my report of last year, and the records of their eruption, notably during the latter part of this season, in the foregoing trustworthy report of Wyman, leaves but litte necessary to show that, with the exception of the local changes at the Mammoth Hot Springs and of the Safety-Valve Basin in the Grand Cañon, there is evidently a far greater development of power than ever before witnessed throughout the entire Fire-Hole regions. But as to the cause or causes, probable duration, or future tendencies, we only know that they are at variance with the accepted and apparently correct theory of their dwindling character, with one marked exception. This is in the Midway Basin of the Fire Hole River, where the evidence is conclusive of not only spasmodic, but continuous increase of power.

The following description is from Hayden's Report of 1871, pp. 114, 115:

About three miles up the Fire-Hole from Camp Reunion we meet with a small but quite interesting group of springs on both sides of the stream. There is a vast accumulation of silica, forming a hill 50 feet above the level of the river. Upon the summit is one of the largest springs yet seen, nearly circular 150 feet in diameter; boils up in the center, but overflows with such uniformity on all sides as to admit of the formation of no real rim, but forming a succession of little ornamental steps, from 1 to 3 inches in height, just as water would congeal from cold in flowing down a gentle declivity. There was the same transparent clearness, the same brilliancy of coloring to the waters; but the hot steam and the thinness of the rim prevented me from approaching it near enough to ascertain its temperature or observe its depth, except at one edge, where it was 180°. It is certainly one of the grandest hot springs ever seen by human eye. But

FIG. 27.—Excelsior Geyser, 1872.

the most formidable one of all is near the margin of the river. It seems to have broken out close by the river, to have continually enlarged its orifice by the breaking down of its sides. It evidently commenced on the east side, and the continual wear of the under side of the crust on the west side has caused the margin to fall in, until an aperture at least 250 feet in diameter has been formed, with walls or sides 20 to 30 feet high, showing the laminæ of deposition perfectly. The water is intensely agitated all the time, boiling like a caldron, from which a vast column of steam is ever arising, filling the orifice. As the passing breeze sweeps it away for a moment, one looks down into this terrible, seething pit with terror. All around the sides are large masses of

the siliceous crust that have fallen from the rim. An immense column of water flows out of this caldron into the river. As it pours over the marginal slope, it descends by numerous small channels, with a large number of smaller ones spreading over a broad surface, and the marvelous beauty of the strikingly vivid coloring far surpasses anything of the kind we have seen in this land of wondrous beauty; every possible shade of color, from the vivid scarlet to a bright rose, and every shade of yellow to delicate cream, mingled with vivid green from minute vegetation. Some of the channels were lined with a very fine, delicate, yellow, silky material, which vibrates at every movement of the waters. Mr. Thomas Moran, the distinguished artist, obtained sketches of these beautiful springs, and from his well-known reputation as a colorist, we look for a painting that will convey some conception to the mind of the exquisite variety of colors around this spring. There was one most beautiful funnel-shaped spring, 20 feet in diameter at the top, but tapering down, lined inside and outside with the most delicate decorations. Indeed, to one looking down into its clear depths, it seemed like a fairy palace. The same jelly like substance or pulp to which I have before alluded covers a large area with the various shades of light red and green. The surface yields to the tread like a cushion. It is about 2 inches in thickness, and, although seldom so tenacious as to hold together, yet it may be taken up in quite large masses, and when it becomes dry it is blown about by the wind like fragments of variegated lichens.

The above, cut from the Hayden report of 1872, and the description thereof in that of 1871, are here republished, both for their accuracy and as a datum from which to trace subsequent and future developments. This clearly proves the comparatively recent outburst of the yawning pool of hot water, in border parlance heretofore called "Hell's Half Acre," which during the past season has fully justified the name and greatly exceeded the dimensions. Although noted for the deep ultra-marine blue, ever-agitated waters, so characteristic of the true geyser when not in eruption, there was neither evidence nor indications of recent eruptions until late in August, 1878. I then distinctly heard its spoutings when near Old Faithful, 6 miles distant, but arrived too late to witness them, though not its effects upon the Fire Hole River, which was so swollen as to float out some of our bridges over rivulet branches below it.

Crossing the river above the geyser and hitching my horse, with bewildering astonishment I beheld the outlet at least tripled in size, and a furious torrent of hot water escaping from the pool, which was shrouded in steam, greatly hiding its spasmodic foamings. The pool was considerably enlarged, its immediate borders swept entirely clear of all movable fragments of rock, enough of which had been hurled or forced back to form a ridge from knee to breast high at a distance of from 20 to 50 feet from the ragged edge of the yawning chasm. Perhaps no published statement of mine in reference to the Wonder Land has ever more severely tested the credulity of friends or of the public; and even General Crook and Secretary Schurz, to whom I pointed out the decreasing proofs of this eruption, seemed to receive it with annoying evidences of distrust. The volume of steam arising from this pool continued to increase until on reaching the Lookout lower border of the valley, late in November, 1880, it appeared so great as to cause me to visit it the next day, hopeful of seeing an eruption or evidences of a recent one. This I failed to find, but not a volume of steam which then shrouded all near it, as it did the whole of the lower valley before the next morning. In order to make the Mammoth Hot Springs, 40 miles distant, that day, I started early and with the thermometer but little above zero groped my way through this fog, which chilled to the marrow, to the Lookout Terrace, 3 miles from the Forks of the Fire Holes and 8 from the geyser, and emerged therefrom by ascending above it into a broad and brilliant scene of beauty seldom witnessed by human vision. From the foaming half-acre caldron an enormous column of steam and vapor constantly arose, at first verti-

cally, then swayed by a moderate but steady southern wind northerly, increasing with the altitude, until intermingling with or forming a cloud at the proper elevation, from which a nearly imperceptible descending vapor, carried northerly, covered and loaded to pendency the southern branches of the dark pine and fir fringes to the terrace slopes and craggy cliffs of the Madison Plateau, to its great cañon beyond the Gibbon, fully 15 miles from this earthly Gehenna.

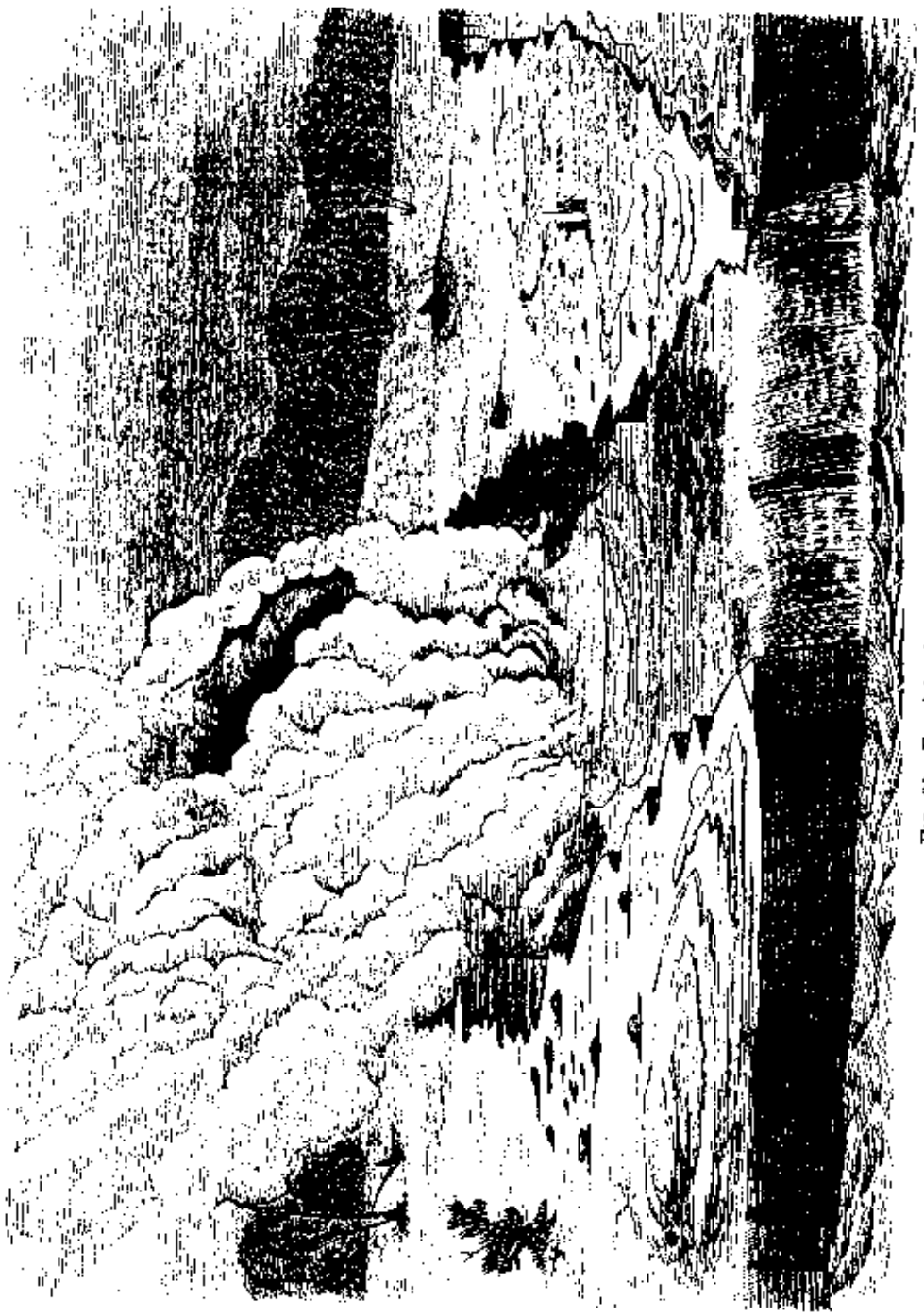

FIG. 28.—Excelsior Geyser, 1881.

Beneath this unique cloud-awning the low and seemingly distant rays of a cold, cloudless sunrising, in struggling through this vapor-laden atmosphere, formed a variety of tints and reflections from the inimitably beautiful festoons of frost formation, while commingled with a dark

green background of foliage, of somber cliffs and snowy mountains—brilliancy of blended wavy shades and halos enchantingly beautiful. This was my parting view of that geyser last year; and before my return this season, great changes had occurred. From the statements of G. W. Marshall, at the Forks of the Fire Holes, February was ushered in by dense fogs and fearful rumblings and earth tremblings, which he ultimately traced to regular eruptions, daily, or rather nightly, commencing about 10 o'clock p. m., gradually recurring later, until by July 1 they were after daylight; and this eruption is now about 10 a. m., showing a loss of twelve hours in nine months. During much of the summer this eruption was simply incredible, elevating to heights of from 100 to 300 feet sufficient water to render the rapid Fire Hole River, nearly 100 yards wide, a foaming torrent of steaming hot water, and hurling rocks of from 1 to 100 pounds weight, like those from an exploded mine, over surrounding acres. By far the finest landmark that I ever beheld in all my mountain wanderings was the immense column of steam, even when the geyser was not in eruption, always arising from this monster, which was ever plainly visible to where, at the proper elevation, it formed a cloud that floated away in a long line to the leeward in the clearest summer's day, and was never to be mistaken for any other wherever seen, which was upon all the surrounding mountains, including the Rocky and Shoshone ranges, portions of which that I visited were fully 100 miles distant. In September the eruptions branched into one about 4 o'clock p. m., and soon after to others, until it now seems to be settling down to regular business as a two or three hour geyser, so immeasurably excelling any other, ancient or modern, known to history, that I find but one name fitting, and herein christen it the "Excelsior" until scientists, if able, shall invent a more appropriate one. This pool is now 400 paces in circumference.

The Fire Hole River is down a declivity of some 20 or 30 feet from where the outlet beside the horseman is shown in the Hayden view (Fig. 27), Wyman's camp being across the river, still eastward—and many rocks were hurled into or across it, and also to the great spring, with the steam cloud in the background, as well as another, sixty paces to the north of the geyser, whose brilliantly colored outlet is shown as joining that of the geyser upon the brink of the declivity to the river, in the above view from my sketch (Fig. 28), which was taken at a period of less activity between the regular daily eruptions early in the season than observed at any subsequent period.

REPORT OF GAMEKEEPER.

MAMMOTH HOT SPRINGS,
YELLOWSTONE NATIONAL PARK,
September 30, 1881.

SIR: I hereby respectfully submit the following report of my operations as gamekeeper of the park, for the protection of its animals, since furnishing my report of November 25, 1880, from the gamekeeper's cabin, near the confluence of the Soda Butte and the East Fork of the Yellowstone River. I there remained, sometimes having George Rowland or Adam Miller for a comrade, but often alone, during the entire winter, the early part of which was so severe that there were no mountain hunters—the Clarke's Fork miners twenty miles distant one way, and the boys at the headquarters nearly forty the other, being the nearest, and in fact the only men in these regions. The snowfall was unusually great, and remained very deep high in the mountains, but the winds and hot vapors from the Fire Hole Basin at the foot of Mount Norris kept the snow pretty clear along its western slopes, where there were abundance of mountain sheep, and some elk, all winter. Elk to the number of about 400 wintered in small bands in the valleys of the East Fork and Soda Butte, where the snow was about knee deep. The Slough Creek and Hellroaring bands of bison did not venture near the cabin until February, nor did those of Amethyst Mountain at all; and the most of the deer and antelope descended into the lower Yellowstone Valley early in the winter.

The most of the Clarke's Fork miners seemed disposed to kill only what game they needed for food, and preserve the rest from slaughter for their hides only, and hence I returned to the headquarters in the spring, which opened very early and continued warm and pleasant. This allowed me to visit many other portions of the park, sometimes on snow-shoes and sometimes with saddle and pack-horses. I found that very few of the deer or antelope wintered anywhere in the park; that a small band of bison wintered on Alum Creek, and another on the South Fork of the Madison; that there were elk in nearly all of the warm valleys, and moose around the Shoshone and the fingers of the Yellowstone lakes; big-horn sheep on all the mountain slopes; wolverine, marten, and various kinds of foxes, who do not leave the park in winter, nor do the bears of all kinds, as they hibernate. During the remainder of the season I have been active in the various duties of killing what game was necessary for our various parties of laborers, and protecting the rest from wanton slaughter by some of the tourists and a band of Bannock Indians on the North Madison. I also guided the party of Governor Hoyt and Colonel Mason from the Two Ocean Pass to the Fire Holes, and accompanied you in the long and arduous exploration of the Sierra Shoshone, and the Rocky Mountain, from Turbid Lake to Mount Sheridan; and in a final tour of the main roads and trails of the park close my services and resign my position as gamekeeper of the park to resume private enterprises now requiring my personal attention. The unfortunate breakage of my thermometer when it could not be replaced prevented my keeping other than a record of fair and stormy days, winds and rain and snow-fall during last winter, a synopsis of which is hereunto attached.

In conclusion, I may justly add that my relations with yourself, with your men, and with nearly all of the visitors to the park, as well as the surrounding miners and hunters have always been most cordial; but, as stated in my report of last year, I do not think that any one man appointed by the honorable Secretary, and specifically designated as a gamekeeper, is what is needed or can prove effective for certain necessary purposes, but a small and reliable police force of men, employed when needed, during good behavior, and dischargeable for cause by the superintendent of the park, is what is really the most practicable way of seeing that the game is protected from wanton slaughter, the forests from careless use of fire, and the enforcement of all the other laws, rules, and regulations for the protection and improvement of the park.

Most respectfully, yours,

HARRY YOUNT,
Gamekeeper.

P. W. NORRIS,
Superintendent of the Yellowstone National Park.

OBSERVATIONS OF WEATHER.

November.—From the 26th to the 30th, inclusive, snowy.

December.—During this month, one day was rainy, two hazy, six clear, cold, and windy, and twenty-two snowy.

January.—The 13th, 16th, 17th, 18th, 20th, 21st, 22d, 24th, and 25th, nine days, were clear; the remainder of the month snowy, and mainly very cold.

February.—The 2d and 3d, two days, rainy; 14th, one day, was clear; the 8th, snowy; the 9th, squally, and twenty-three days snowy.

March.—Twenty-four days were clear, and mostly mild, and some warm; one day rainy, two snowy, and four cloudy.

April.—The 1st, 4th, 5th and 7th were clear, the 2d, 3d, and 6th rainy, and the snow so soft that traveling with my Norwegian snow shoes 14 feet long, was hard work, and leaving them at the middle fall of the Gardiner, went thence through the cañon to the boys at headquarters, they keeping the weather records correctly thereafter.

INTRODUCTION TO ROADS, BRIDLE-PATHS, AND TRAILS.

In preceding reports I have followed the usual custom of calling all traveled routes either roads or trails, but it having become, as it will continue, necessary to mention mountain, fire-hole, cliff, and cañon trails for footmen only, as well as those in common use for saddle and pack animals, the latter are herein tabled as bridle-paths, the former as trails; while the lodge-pole or Indian and game trails only are thus designated whenever mentioned in the body of this report. I have, also, in some of my preceding reports, stated that, as none of our roads, bridle-paths, or trails had ever been measured, the tables of them were at best only approximations, and the distances therein shown are more probably over than under estimated. This view the odometer measurements of Capt. W. S.

Stanton, Corps of Engineers, and of First Lieut. E. Z. Steever, Third Cavalry, made during July and August of the past season, have proven correct, and it is one of the amusing incidents in connection with these peculiar regions that while prominent judges, senators, governors, and other officers of the government were making me the subject of their raillery upon the annoying length of my estimated miles, other officers were by actual measure proving many of them far too short. This is especially noticeable in the direct or Mammoth Hot Spring road, estimated when made, in 1878, as 50 miles in length, and which was nearly correct at that time, but it having been materially shortened by changing the road from the cañon to the plateau of the Madison, a cut-off through the earthquake region and somewhat elsewhere, it is now found to be less than 37 miles long, which is only about one-half of the Mount Wabash route, and can never be essentially shortened. The tables of distances, as received from Captain Stanton and Lieutenant Steever, were well arranged and computed, evincing accurate odometer measurements, and are accepted and used as such; but owing to the subsequent construction of new roads and bridle-paths, or changes in old ones, as well as from their want of knowledge of the names of many places which it is believed essential to mention, these tables are thus amended; but all portions of them have been accepted which were proper to use, and are credited and indicated by a *.

SYNOPSIS OF ROADS, BRIDLE-PATHS, AND TRAILS IN THE YELLOWSTONE NATIONAL PARK.

	Between points.	Total.
Road towards Bozeman.	*Miles.*	*Miles.*
* From headquarters at the Mammoth Hot Springs to northern boundary line of Wyoming		1. [illegible]
Northern boundary line of the National Park, below the mouth of the Gardiner River	5.00	6. [illegible]
Direct road to the Forks of the Fire-Hole River.		
* From headquarters at the Mammoth Hot Springs to Terrace Pass		1. [illegible]
* Swan Lake	3.21	5. [illegible]
* Crossing of Middle Fork of Gardiner River	2.33	7. [illegible]
Willow Park, upper end	3.50	10. [illegible]
* Obsidian Cliffs and Beaver Lake	1.37	12. [illegible]
* Green Creek	1.40	13. [illegible]
* Lake of the Woods	.76	14. [illegible]
* Hot Springs	1.68	16. [illegible]
* Norris Fork Crossing	4.17	20. [illegible]
* Norris Geyser Basin	.71	21. [illegible]
* Geyser Creek and Forks of the Paint-Pot trail	3.13	24. [illegible]
* Head of Cañon of the Gibbon and foot-bridge on trail to Monument Geysers	.73	24. [illegible]
* Falls of the Gibbon River	3.75	28. [illegible]
* Cañon Creek	.59	29. [illegible]
Earthquake Cliffs	3.00	32. [illegible]
* Lookout Terrace	1.50	33. [illegible]
* Marshall's Hotel, at the Forks of the Fire Hole River	2.43	36. [illegible]
Road from Forks of the Fire Hole River to foot of the Yellowstone Lake.		
From Marshall's Hotel to forks of the road near Prospect Point		1. [illegible]
* Hot Springs	1.08	2. [illegible]
* Rock Fork	3.86	5. [illegible]
Willow Creek	2.00	7. [illegible]
Foot of the grade up the Madison Divide	2.00	9. [illegible]
Upper end of Mary's Lake	1.91	11. [illegible]
* Sulphur Lakes and Hot Springs	1.12	12. [illegible]
Alum Creek Camp	2.00	14. [illegible]
Sage Creek Crossing	2.00	16. [illegible]
Fork of the road to the falls near the Yellowstone River	5.00	21. [illegible]
Mud Geysers	2.00	23. [illegible]
Grizzly Creek	3.00	26. [illegible]
* Foot of the Yellowstone Lake	3.28	30. [illegible]

Roads, bridle-paths, and trails in the Yellowstone National Park—Continued.

	Between points.	Total.
	Miles.	*Miles.*
Branch road to the Great Falls of the Yellowstone.		
From Forks of the Fire Hole River to forks of the lake road to the Great Falls, as above	.....	21.97
Sulphur Mountain	1.50	23.47
* Alum Creek	1.61	25.08
* Upper Falls of the Yellowstone, bridle-path	3.26	28.34
* Crystal Falls and Grotto Pool, bridle-path	.40	28.74
* Lower (Great) Falls of the Yellowstone	.24	28.98
Road to Tower Falls.		
* Headquarters at the Mammoth Hot Springs to bridge over the Gardiner River	.....	1.77
* Bridge over the East Fork of the Gardiner River	.38	2.15
* Upper Falls to East Fork of the Gardiner River	2.06	4.21
* Black Tail Deer Creek	2.70	6.91
Lava Beds	2.00	8.91
* Dry Cañon, or Devil's Cut	4.69	13.60
* Pleasant Valley	2.28	15.88
* Forks of the Yellowstone	2.48	18.36
* Tower Falls	3.19	21.55
Geyser Basin road.		
* Marshall's Hotel to forks of road at Prospect Point	.....	1.00
* Old Camp Reunion	1.00	2.00
Fountain Geyser in the Lower Geyser Basin	1.00	3.00
* Excelsior Geyser, in the Midway Geyser Basin	2.00	5.00
* Old Faithful, in the Upper Geyser Basin	6.00	11.00
Madison Plateau road.		
Marshall's Hotel to Forest Spring	.....	3.00
* Marshall's Park	2.12	5.12
* Lookout Cliffs	3.59	8.71
Riverside Station and Forks of Kirkwood or Lower Madison Cañon road to Virginia City	3.52	12.23
Bridge over South Madison River	11.53	23.76
Madison Cañon road.		
Marshall's Hotel to forks of road to the Mammoth Hot Springs	.....	4.00
Mouth of the Gibbon River	5.00	9.00
Foot of the Madison Cañon	6.00	15.00
Riverside Station	3.00	18.00
Queen's Laundry road.		
Marshall's Hotel to crossing Laundry Creek	.....	1.00
Twin Mounds	1.00	2.00
Queen's laundry and bath-house	.50	2.50
A bridle-path 3 miles long extends from there to the Madison Plateau road, and another is partially completed via Twin Buttes and Fairy Falls to the Midway Geyser Basin.		
Middle Fork of the Gardiner bridle-path.		
Headquarters at the Mammoth Hot Springs to the West Gardiner	.....	2.00
Falls of the Middle Gardiner	2.00	4.00
Sheepeater Cliffs	2.00	6.00
Road to the Geysers	1.00	7.00
Painted Cliff bridle-path.		
Meadow Camp to head of Grand Cañon	.....	1.00
Safety Valve Pulsating Geyser	1.00	2.00
Yellowstone River at Painted Cliffs	1.00	3.00
Paint Pots bridle-path.		
Mouth of Geyser Creek to the Paint Pots	.....	1.00
Geyser Gorge	1.00	2.00
Earthquake Gorge	2.00	4.00
Rocky Fork Crossing	2.00	6.00
Mary's Lake Road, near Yellowstone Creek	5.00	11.00
Mount Washburn bridle-path.		
* Tower Falls to Forks of Trail	.....	1.87
* To Summit of Mount Washburn	4.13	6.00
Cascade Creek	7.22	13.22
* Great Falls of the Yellowstone	2.00	15.22

Roads, bridle-paths, and trails in the Yellowstone National Park—Continued.

	Between points.	Total.
	Miles.	*Miles.*
Grand Cañon bridle-path.		
* Tower Falls to Forks of Trail		1.87
Antelope Creek	4.00	5.87
Rowland's Pass of Mount Washburn	2.00	7.87
Glade Creek	2.47	10.34
* Mud Geyser	1.00	11.34
* Hot Sulphur Springs	.83	12.17
* Meadow Camp and fork of Painted Cliffs bridle-path Trail	1.59	13.76
Brink of the Grand Cañon	1.00	14.76
* Lookout, Paint, and forks of trail into the cañon below the falls	2.19	16.95
* Great Falls of the Yellowstone	.74	17.69
Shoshone Lake bridle-path.		
* Old Faithful, in the Upper Geyser Basin, to Kepler's Cascades		1.94
* Leech Lake	2.72	4.66
Norris Pass, Continental Divide	3.00	7.66
DeLacey Creek, Pacific waters	.97	8.63
* Two-Ocean Pond, on Continental Divide	3.50	12.13
* Hot Springs, at head of thumb of the Yellowstone Lake	2.99	15.12
* Hot Spring, on Lake Shore	2.02	17.14
* Hot Spring Creek	4.00	21.14
* Natural Bridge	7.44	28.58
* Outlet of Yellowstone Lake	4.68	33.26
Miners' bridle-path.		
* Baronette's Bridge, at forks of the Yellowstone River, to Duck Lake		1.76
* Amethyst Creek	8.30	10.06
* Crossing, East Fork of Yellowstone River	2.16	12.22
Gamekeeper's Cabin	.50	12.72
* Soda Butte, medicinal springs	2.65	15.37
Trout Lake	2.00	17.37
* Round Prairie	3.00	20.37
North line of Wyoming	3.84	24.21
* Clarke's Forks Run Camp, near northeast corner of the park	3.18	27.39
Hoodoo or Goblin Mountain bridle-path.		
Gamekeeper's cabin, on the Soda Butte, to Hot Sulphur Springs		
Ford of Cache Creek	1	
Alum Springs and return	4	
Calfee Creek	4	11
Miller's Creek	2	13
Mountain Terrace	8	21
Old Camp	5	26
Goblin Labyrinths	2	28
Monument on Hoodoo Mountain	1	29
Fossil Forest bridle path.		
Summit of Amethyst Mountain		
Gamekeeper's cabin to foot of Mountain	3	
Orange Creek	5	11
Sulphur Hills	4	15
Forks of Pelican Creek	8	23
Indian Pond at Concretion Cove of the Yellowstone Lake	5	28
Lower Ford of Pelican Creek	3	31
Foot of the Yellowstone Lake	3	34
Passamaria or Stinkingwater bridle-path.		
Concretion Cove to Turbid Lake		
Jones' Pass of the Sierra Shoshone Range	7	19
Confluence of the Jones and Stinkingwater Fork of the Passamaria River	12	31
Nez Percé bridle-path.		
Indian Pond to Pelican Valley		
Ford of Pelican Creek	3	
Nez Percé Ford of the Yellowstone	6	12
Alum Creek bridle-path.		
From the Great Falls of the Yellowstone, via Crystal Falls and Grotto Pool and the Upper Falls, to the mouth of Alum Creek	4	4

Roads, bridle-paths, and trails in the Yellowstone National Park—Continued.

	Between points.	Total.
	Miles.	*Miles.*
Terrace Mountain Trail.		
Headquarters at the Mammoth Hot Springs, amongst the numerous active and extinct Mammoth Springs, to foot of the Ancient Terraces		1
Up steep pine, fir, and cedar clad terraces, to summit of the mountain	1	2
Along the range of the vertical cliffs, for 400 to 500 feet high	2	4
Descent of South Terrace to Rustic Falls, 40 feet high, at the head of the impassable cañon of the West Fork of the Gardiner River	1	5
Upon the southern cliff, above these falls, is a Sheepeater arrow-covert, and the remains of an ancient game-driveway thereto.		
Swan Lake, on the Fire Hole road	1	6
Trail to the Falls of the East Gardiner River.		
From the road near the middle of the cañon along the eastern declivity, one mile		1
To the fall, not unlike the famous Minnehaha, and like which, allows a safe pathway between the sheet of water and the wall rock.		
Monument Geyser Trail.		
Foot-bridge at head of the cañon of the Gibbon, which ascends nearly 1,000 feet within a distance of one mile, some portions of which are exceedingly difficult for a horseman, and hence called a trail		1
The active and the extinct and crumbling geyser cones are alike uniquely interesting, and the outlook remarkably beautiful.		
Trail, or footpath, to head of the Great Falls of the Yellowstone.		
Leaves at the lower end of the camping ground above, and descends 500 or 600 feet within one-fourth of a mile to the pole-bordered outlook at the very head of the cataract.		
Trail to the Yellowstone River below the Lower Falls of the Yellowstone.		
This trail descends Spring Run from the rustic bridge nearly to its waterfall, thence along the steep declivity beneath Lookout Point, in a winding, dangerous way, to the foaming river, which cannot now be ascended, along it, as formerly, to the foot of the falls upon this side; but can be reached upon the other, via the timber-fringed gorge.		
The main danger is from detached fragments of rock, which attain incredible velocity before reaching the river.		
Besides these trails there are several others to fossil forests, cliffs, geyser or sulphur basins or falls, which will be fully noted in the forthcoming guide-book of the Park.		

RECAPITULATION OF DISTANCES, ROADS, BRIDLE-PATHS, AND TRAILS WITHIN THE PARK.

ROADS.

	Miles.
1. Road to the north line of the Park, towards Bozeman, about	7.00
2. Direct road to the Forks of the Fire Hole Rivers	36.00
3. Road from Forks of the Fire Hole Rivers to the foot of the Yellowstone Lake, about	30.00
4. Branch road from Sage Creek to Alum Creek	4.00
5. Tower Falls road, about	21.50
6. Geyser Basin road	11.00
7. Madison Plateau	24.00
8. Madison Cañon	18.00
9. Queen's Laundry	2.50
	153.00

BRIDLE-PATHS.

1. Middle Gardiner	7.00
2. Painted Cliffs	3.00
3. Paint Pots	11.00
4. Mount Washburn	15.00
5. Grand Cañon from the Forks, about	16.00
6. Shoshone Lake	33.00
7. Mines, to Clark's Fork, about	27.00
8. Hoodoo or Goblin Mountain	29.00
9. Fossil Forest	34.00

	Miles.
10. Passamaria	22.00
11. Nez Percé Ford	12.00
12. Alum Creek	4.00
	213.00

TRAILS.

1. Terrace Mountain	6.00
2. Falls of the East Gardiner	1.00
3. Monument Geyser	1.00
4. To head of Great Falls of the Yellowstone, about 200 yards.	
5. To river below the Great Falls of the Yellowstone, 200 yards.	
	8.00

RAILROADS.

Two railroads have entered Montana, the Northern Pacific being now completed to the vicinity of Miles City, at the mouth of Tongue River, upon the Yellowstone, about 300 miles below its Gate of the Mountains, which they promise to reach during 1882, and soon thereafter run a branch up the tolerably smooth open valley of the Yellowstone to the mouth of the Gardiner, ascending it to the great Hot Medicinal Spring, where application has been made by desirable parties for the establishment of a sanitarium, one mile below the Mammoth Hot Springs and about sixty miles from their main line. The Utah Northern Railroad is completed from Ogden to Silver Bow, near Butte, and is now engaged in surveying the route of a branch by way of Ruby Valley, Virginia City, and the Upper Madison, to the Forks of the Fire Holes, a distance of about 140 or 150 miles from the main line at Dillon. With little doubt, one or both of these roads will enter the Park within two or three years hereafter, and ultimately a connection by the latter, through the valleys and cañoned branches of the Madison and the Gallatin, skirt the western border of the Park from the Forks of the Fire Holes to Bozeman, on the line of the Northern Pacific Railroad.

Should the mining developments of these mountain regions equal present indications, a railroad will reach the Park from the east via Clarke's Forks Mines or the Two Ocean Pass, or both of them, within a few years hereafter. The approach of these railroads—notably the Utah Northern—materially facilitates reaching the Park, which each road as they near it, will increase accessibility, and will soon invite a healthy competition for the patronage of tourists in making a cheap, rapid, and easy visit to the Wonder Land; planning it as the turning point, as well as the main region of attraction, in a season's ramble for health and enjoyment.

Should these anticipations be realized a visit to the Park will become national in character and popular with our people, so that ere long the flush of shame will tinge the cheeks of Americans who are obliged to acknowledge that they loiter along the antiquated paths to pigmy haunts of other lands, before seeking health, pleasure, and the soul expanding delights of a season's ramble amid the peerless snow and cliff encircled marvels of their own.

There is now assurance of increased facilities for conveyance of tourists from Bozeman, nearly 80 miles through Trail Pass, and up the Yellowstone Valley to the headquarters of the Park at the Mammoth Hot Springs, and from Virginia City some 95 miles via the old Henry's Lake route, or 90 miles by the new one up the Madison to Riverside, which was constructed during the past season by Judge Kirkwood for the spirited citizens of that town, to the Forks of the Fire Hole River, and also by the practical use of the old route via Henry's Fork and Lake, which

the odometer measurements of Lieutenant Steever during the past season make 103 miles from the Forks of the Fire Hole River to Beaver Cañon, and practically about the same distance to Camas Station, both upon the Utah Northern Railroad, in the Snake River Valley, below the mountains. Believing it to be a necessity, it is now my purpose to issue a guide-book of the Park, containing a map, illustrations, and descriptions of various objects of interest, routes of approach, list of articles necessary for camp outfit and provisions, approximate time, and cost of a tour of the Wonder Land, in time for the use of next season's tourists thereto.

CONDENSED SUMMARY OF THE SEASON'S EXPLORATIONS' WORK—RECOMMENDATIONS.

For the purpose of concisely showing what has been accomplished in the Park during the past season, as well as what is considered essential to be done therein during the next, the following synopsis of each is added:

SYNOPSIS OF THE PAST SEASON'S OPERATIONS.

The following explorations have been made: Nearly all of the Madison or Mary's Lake Divide, with several brimstone basins, and also passes to Violet Creek, to the Norris Fork of the Gibbon, and to the Paint Pots bordering the Gibbon Meadows, of a nearer route to the Hoodoo region, and additional Labyrinths of Goblins upon the Passamaria and elsewhere of an open lovely pass connecting the Pelican Valley with that of the East Fork of the Yellowstone. The first general exploration of the Sierra Shoshone range, or eastern border of the Park, which is known to have ever been made by white men, including a very low and direct pass from the Passamaria Cañon to the Yellowstone Lake. An examination was also made of the main Rocky Mountain portion of the southern border of the Park from the Two Ocean Pass via Phelps's Pass, and various unknown fountain heads of the Snake River branch of the Columbia, Mount Sheridan and Heart and Riddle Lakes to the Thumb of the Yellowstone, including the discovery of some fine valleys and passes.

IMPROVEMENTS MADE.

Buildings constructed.—Hopeful of a saw-mill and cheaper lumber, the only buildings constructed during the past season were:

A small, earth-covered vault or detached fire-proof store-room for the safety of much of our provision, tools, and camp outfit at our headquarters

A double-roomed earth-roofed bath house at the matchless Queen's Laundry, near the forks of the Fire Hole Rivers, together with wooden troughs for conveying water thereto, for the free use of the public. A line of wooden troughs for the purpose of conducting the Terrace-building waters to and successful recoating and building up of the extinct pulsatory Geyser Cone, called Devil's Thumb, at the Mammoth Hot Springs.

Bridges Constructed.—One amid the spray at the head of the Upper Falls of the east fork of the Gardiner River. A bridge over the main Blacktail Creek near its forks, and another over Elk Creek near the Dry Cañon. Three bridges in the valley of the East Fork of the Fire Hole, two upon Alum Creek; two upon Sage Creek and two upon Hot Spring Creek, all upon the new road to the Yellowstone Lake, and several others upon the Shoshone Bridle Path across the Continental divide

to the said lake. Also two foot bridges across the Fire Hole Rivers near their forks, and two over the main Fire Hole Rivers in the Upper Geyser basin. While none of these bridges are very large or costly, all are necessary and serviceable.

Roads.—One road was constructed from near the bridges of the Gardiner, through the East Fork Cañon, *via* the Dry Cañon and forks of the Yellowstone, to Tower Falls—distance, 20 miles.

A road from the forks of the Fire Hole River *via* the East Fork, Mary's Lake, and Mud Geyser, to the foot of the Yellowstone Lake, 30 miles.

Branch of the latter road from Sage Creek by Sulphur Mountain to the mouth of Alum Creek, 4 miles.

	Miles.
Aggregate of roads constructed	54

Bridle-paths opened as follows:

	Miles.
Paint Pot, length	11
Passamaria	22
Painted Cliffs	3
Hoodoo or Goblin Land	29
Aggregate of bridle paths constructed	65

Trails constructed:

	Miles.
Terrace Mountain	7
East Gardiner Falls	1
Monument Geyser Basin	1
Aggregate of trails constructed	9

The ladders and benches at the Crystal Falls and Grotto Pool, as well as the pole railings to the various points of observation around the different falls, although rude, are convenient and safe for the use of visitors, until a supply of lumber will allow of the construction of better ones. These improvements have been made in addition to the constant care and labor requisite for the removal of falling timber, repairs of bridges, grades, and causeways, and important additions to the latter, notably at Terrace Mountain, Obsidian Cliffs, and Cañon Creek, and a ceaseless vigilance in the prevention of needless forest fires, and wanton vandalism of natural curiosities.

It is believed that the discoveries of the weapons, utensils, and implements, as well as the stone-heap driveways for game, of the present race of Indians or of some unknown prior occupants of these regions, as herein

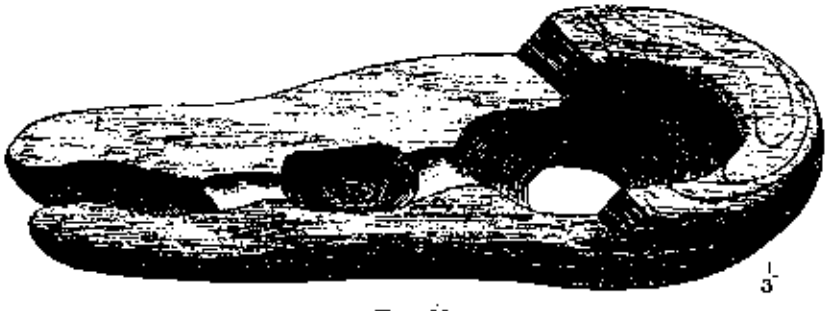

FIG. 29.

illustrated, possess peculiar interest, as well as encouragement for further research; and this is equally true regarding the records, narratives, and traces of early white men in the Park, herein referred to. Nor

can it be doubted that the permanent exhibition in the National Museum in Washington of the beautiful pulsating Geyser Cone, from a secluded gorge, and a large collection of geodes, concretions, amethysts, and fragments of fossil timber, obsidian, and other natural objects of interest from various portions of the Park, now in the National Museum, will

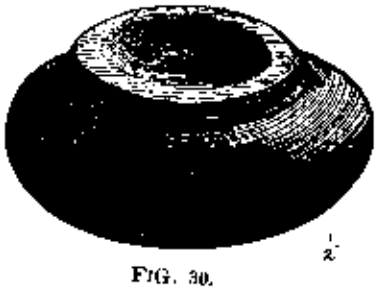

FIG. 30.

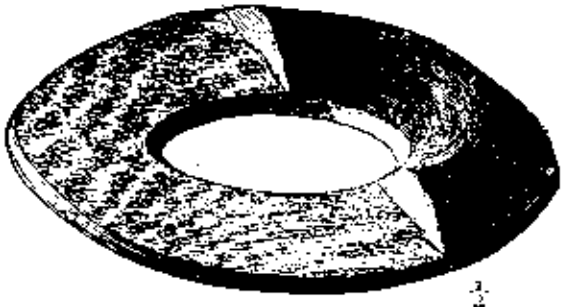

FIG. 31.

there greatly assist in disseminating a knowledge, an appreciation, and a desire to visit the enchanting scenery and matchless marvels of the distant Wonder Land. Figs. 29, 30, 31 exhibit curiously-formed water-worn concretions from the Yellowstone Lake, as described in my report of 1880, pp. 16, 17.

IMPROVEMENTS CONSIDERED IMPORTANT TO BE MADE DURING THE COMING SEASON.

Bridges.—As heretofore mentioned, it will be necessary to bridge the Yellowstone twice in order to avoid constructing several smaller bridges over branches, and heavy expensive grades in reaching the Great Falls from Alum Creek. A bridge between the mouth of this stream and that of Tower Creek nearly opposite, at a point where the river is fully 300 feet wide and very deep, but has a sluggish current, gravelly bottom, and fine approaches upon both sides, and another at the narrowest place upon the Yellowstone River below the lake, which is something less than 70 feet between the rocky abutments just above the Upper Falls where there are good approaches, if a bridge be built high above the dashing waters near the brink. A bridge at this point would render accessible far the most open, elevated, and commanding views of the falls and adjacent rapids, as well as the most desirable site for a hotel, application for a leasehold of which by desirable parties is now pending. Several bridges of considerable magnitude, and a number of heavy grades will be necessary in the construction of a road from the Great Falls to those of Tower Creek, where one very high and costly bridge or expensive rock excavation, and probably both, are unavoidable to reach the forks of the Yellowstone, and complete the circuit of roads to the leading wonders of the Park. For reasons heretofore shown, it is very important that the old miner's bridge at the forks of the Yellowstone should be legalized as a toll-bridge, purchased, or else a new one constructed where there are more favorable approaches, as well as another over the East Fork of the Yellowstone near the mouth of the Soda Butte, at that end of the Park, and very long, heavy, and expensive grades or bridges, or both, on the Madison Plateau or Cañon route at the other.

Although not indispensable it is very desirable to construct bridges over the Fire Hole Rivers near their forks, and upon the main fork in, above, and below the Upper Geyser basin, and also just above the midway Geysers as soon as the necessary lumber can be obtained from a

mill within the Park. A road from the Excelsior Geyser via the Twin Buttes to the Queen's Laundry, and thence to the forks of the Fire Holes with a bridle-path branch to the Fairy Falls, will be very valuable for its cost, as allowing tourists a choice of routes or a circuitous one upon each side of the river in a trip to the Upper Geyser basin. The desirability of the middle Gardiner Cañon route and of a bridle path to connect with the Two Ocean route to Wind River, the construction of troughs and scaffolding to carry the terrace building waters from the Devil's Thumb to the Liberty Cap for its preservation, and the necessity of a supply of cold water from the McCartney Creek or the West Gardiner in wooden troughs or iron pipes, have been heretofore treated of. Two other matters are of practical importance:

First. The cutting down of at least the dry timber along the main roads and bridle paths to a width sufficient to prevent the annoying obstructions constantly occurring along them.

Second. The removal of the uniformly low but troublesome stumps along the wagon roads, the necessity for both of which will, I am confident, be endorsed by all who have been jolted, or delayed by them. Nor can I believe that the prominent personages who have visited the Park, will consider my views as above expressed in reference to the necessity of additional legislation, registered guides, and an ample police force, far fetched, unnecessary, or impracticable.

SUGGESTIONS REGARDING LEASEHOLDS IN THE PARK.

The clause in the act setting apart the Yellowstone National Park, which refers to revenues from leaseholds for hotel sites and from other sources therein, to be expended in its improvement, renders it evident that it was not the purpose of Congress in dedicating this heritage of wonders as a matchless health and pleasure resort for the enjoyment of our people, to thereby legalize a perpetual drain upon their treasury, a cardinal feature which in the entire management of the Park has been neither overlooked nor forgotten.

But it is also evident that leaseholds cannot be effected to parties possessing the requisite capital and ability to construct and properly manage hotels, which should be adequate to the wants of the public and creditable to the Park, until permanently clear of Indians, and the construction of roads alike necessary for the convenience of visitors, and for the conveyance of a portable steam saw-mill to the proper localities for the manufacture of material for bridge and building purposes.

Hence the undeviating policy has been to encourage and assist in making treaties with the four Indian tribes owning or frequenting any portion of the Park, to cede and forever abandon it as well as the adjacent regions, and with the construction of only such buildings as were absolutely necessary for the safety and convenience of the government officers, employés, and property, crowding the exploration of routes, and the construction of roads, bridle-paths or trails to the leading points of interest throughout the Park; meanwhile making only temporary leases for hotel purposes, but carefully selecting sites and securing propositions for permanent ones.

Upon the accompanying map of the Park may be found in distinct colors the various Fire Hole regions, at which or at other leading points of interest differently colored, the sites properly marked and numbered, as selected for 10 hotels, 2 sanitariums, and 1 for a steamboat harbor and landing at the foot of the Yellowstone Lake, being No. 6 of these hotel sites.

Temporary leases have been made for sites of the hotels at the Forks of the Fire Holes and at the Mammoth Hot Springs, for which as well as for 3 additional sites for hotels, for both of the sanitariums, and for the steamboat wharf, written propositions for permanent leaseholds are now pending, as well as for the establishment of a portable steam saw-mill and zoological garden.

The settled policy of the department has been to grant no titles to any portion of the soil, nor licenses to persons or companies for toll roads or bridges, but rather to make and manage all the improvements of a general nature, such as roads, bridges, bridle-paths and trails, leaving to private enterprise those of a local or private nature, such as hotels, &c., upon leaseholds, under proper restrictions as to time (which, for the purpose of securing a better class of structures, I suggest should be for any period not exceeding 30 years), for a prescribed portion of the frontage for buildings and rear extension for pasturage and fuel purposes at each of these selected sites, leaving the remainder for public use or future leaseholds.

The portable steam saw-mill, together with a sticker planer and other attachments necessary for the proper manufacture of lumber and shingles, should be constructed and managed by private enterprise, under a judicious arrangement as to price, and option of the government as to the place, time, and quantity desired for buildings, bridges, &c., allowing a generous stumpage to the owners of the mill upon any additional quantity which they may wish to manufacture for their own use or for sale to others for the purpose of constructing hotels or other necessary improvements within the Park.

An examination of the accompanying map of the Park, showing the lines of our various roads, bridle-paths and trails, and relative distances, and perusal of the above statements regarding them, it is believed will show a gratifying progress towards the completion of a circle of roads, and a net work of bridle-paths and trails to the main and the minor routes of ingress as well as points of interest throughout the Park, and afford the assurance that appropriations for these purposes need not be perpetual, but that a point is nearly reached when, as above shown, responsible parties will secure leaseholds and make improvements which, without producing great immediate revenues, will soon add to the attractions and enjoyments of the Park, and ultimately at least assist materially in rendering it self-sustaining.

REMARKS ON THE MAP OF THE PARK.

The accompanying map, containing as it does the latest explorations and improvements, is believed to be far the most complete and accurate which has been made of the Park, and will be found reliable in all essential particulars. But as it is intended for practical use in the Park, it is upon a scale so small as to preclude showing many cliffs, cañons, and even some mountains throughout the Park, while the Two Ocean Pass, being outside its limits, is not shown, and the terrible cliffs and yawning cañons beyond the Sierra Shoshone range are mainly omitted in order to show the route of exploration along various creeks in that region. With care it is believed the route of this year's explorations can be traced along a fine continuous line, where, apart from roads or bridle-paths, and save No. 10 at the Two Ocean Pass, each of the 23 camps can be found by their numbers and guidons marked upon the map.

CONCLUSION.

In conclusion, I feel that I cannot in justice fail to express my th for the uniform kindness and assistance which I have ever received yourself as well as from the other officers of the department over w you so ably preside, and it is hoped that any defects in the arrange or the language of this report may be attributed to the fact tha writer thereof is more experienced in handling the weapons and utensils of border warfare and life than the pen; but an earnest e has, by a fair and full statement of facts, been made to show to gress and the people of the United States, that the slender appro tions which have been made for the protection and improvement of distant nearly unknown Wonder Land have not been misappropri or misspent.

My own personal assistants in the Park know full well how thorou I appreciate their faithful and earnest services, and need no fur recognition than that already made in different portions of this rep Without their cheerful and constant co-operation, my task in explo and improving the Park, would have been indeed a hard one, and w nigh impossible.

Very respectfully, yours,

P. W. NORRIS,
Superintendent of the Yellowstone National Par

APPENDIX A.

ACT OF DEDICATION.

AN ACT to set apart a certain tract of land lying near the headwaters of the Yellowstone River public park.

Be it enacted by the Senate and House of Representatives of the United States of Amer in Congress assembled, That the tract of land in the Territories of Montana and Wyo ing lying near the headwaters of the Yellowstone River, and described as follo to wit: commencing at the junction of Gardiner's River with the Yellowstone River a running east to the meridian passing ten miles to the eastward of the most eastern po of Yellowstone Lake; thence south along the said meridian to the parallel of latitu passing ten miles south of the most southern point of Yellowstone Lake; thence w along said parallel to the meridian passing fifteen miles west of the most western poi of Madison Lake; thence north along said meridian to the latitude of the junction the Yellowstone and Gardiner's Rivers; thence east to the place of beginning, is here reserved and withdrawn from settlement, occupancy, or sale under the laws of t United States, and dedicated and set apart as a public park or pleasure ground for t benefit and enjoyment of the people; and all persons who shall locate, settle upon, occupy the same or any part thereof, except as hereinafter provided, shall be consi ered trespassers and removed therefrom.

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

The Secretary may, in his discretion, grant leases for building purposes, for terms no exceeding ten years, of small parcels of ground, at such places in said park as shal require the erection of buildings for the accommodation of visitors; all of the proceed of said leases, and all other revenues that may be derived from any source connecte with said park, to be expended under his direction in the management of the sam and the construction of roads and bridle-paths therein. He shall provide against th wanton destruction of the fish and game found within said park and against their cap ture or destruction for the purpose of merchandise or profit. He shall also cause al

persons trespassing 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.

Approved March 1, 1872.

APPENDIX B.

RULES AND REGULATIONS OF THE YELLOWSTONE NATIONAL PARK.

DEPARTMENT OF THE INTERIOR,
Washington, D. C., May 4, 1881.

1. The cutting or spoliation of timber within the Park is strictly forbidden by law. Also the removing of mineral deposits, natural curiosities or wonders, or the displacement of the same from their natural condition.

2. Permission to use the necessary timber for purposes of fuel and such temporary buildings as may be required for shelter and like uses, and for the collection of such specimens of natural curiosities as can be removed without injury to the natural features or beauty of the grounds, must be obtained from the Superintendent; and must be subject at all times to his supervision and control.

3. Fires shall only be kindled when actually necessary, and shall be immediately extinguished when no longer required. Under no circumstances must they be left burning when the place where they have been kindled shall be vacated by the party requiring their use.

4. Hunting, trapping, and fishing, except for purposes of procuring food for visitors or actual residents, are prohibited by law; and no sales of game or fish taken inside the Park shall be made for purposes of profit within its boundaries or elsewhere.

5. No person will be permitted to reside permanently within the Park without permission from the Department of the Interior; and any person residing therein, except under lease, as provided in section 2475 of the Revised Statutes, shall vacate the premises within thirty days after being notified in writing so to do by the person in charge; notice to be served upon him in person or left at his place of residence.

6. *The sale of intoxicating liquors is strictly prohibited.*

7. All persons trespassing within the domain of said Park, or violating any of the foregoing rules, will be summarily removed therefrom by the Superintendent and his authorized employés, who are, by direction of the Secretary of the Interior, specially designated to carry into effect all necessary regulations for the protection and preservation of the Park, as required by the statute; which expressly provides that the same "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."

Resistance to the authority of the Superintendent, or repetition of any offense against the foregoing regulations, shall subject the outfits of such offenders and all prohibited articles to seizure, at the discretion of the Superintendent or his assistant in charge.

P. W. NORRIS,
Superintendent.

Approved:
S. J. KIRKWOOD,
Secretary.

INDEX.

OF THE

SUPERINTENDENT

OF THE

YELLOWSTONE NATIONAL PARK

TO THE

SECRETARY OF THE INTERIOR.

P. H. CONGER,
SUPERINTENDENT.

FOR THE YEAR 1882.

WASHINGTON:
GOVERNMENT PRINTING OFFICE.
1882.

REPORT

OF THE

SUPERINTENDENT OF THE YELLOWSTONE NATIONAL PARK.

HEADQUARTERS YELLOWSTONE NATIONAL PARK,
Mammoth Hot Springs, Wyo., December 1, 1882.

SIR: I have the honor to submit the following as my annual report:

I arrived in the Park on the 22d day of May, coming in by the Union Pacific Railroad from Omaha to Ogden, thence by the Utah Northern Railroad to Dillon, thence by stage to Virginia City, Mont. From there I was obliged to take private conveyance up the valley of the Madison River to its head in the great Fire-Hole Basin, a distance from Virginia City of 115 miles. After remaining there at the Marshall House two days, Mr. Marshall, with Mr. George Graham (a blacksmith, whom I had hired at Virginia City for the season), my son, and myself, set out on horseback for the Mammoth Hot Springs, the official headquarters of the Park, a distance of 50 miles over the mountains. It was a severe and perilous journey, on account of the snow and the swollen rivers and mountain streams that lay across our way. However, thanks to the experience and indomitable courage of my guides and the endurance of our faithful horses, we all reached headquarters in safety the second day out, a little before midnight.

On reaching the house all was dark and silent, but we soon made ourselves heard. A light gleamed through the windows, the door was thrown open, and we were invited in by Mr. Stephens, the superintendent in charge, with a generous cordiality seldom found elsewhere than in these mountains.

After spending a day or two at headquarters, and advising with Mr. Stephens, I started with two teams for Bozeman, Mont., our nearest market town (from this point 80 miles distant), to purchase us supplies and tools, hire a crew of men, and prepare for the season's campaign. The road was in a horrible condition, consequently we could haul but light loads, yet we succeeded in landing sufficient supplies to last until better roads.

We also hired a small crew of men which we set at work on the 5th of June, at the north side of the Park, near the Yellowstone River, at the foot of McCartney's hill. We also employed a carpenter and a mason, and set about repairing the headquarter's house, which we found to be in a sadly dilapidated condition, and hardly habitable for a white man. Our mason first burned a small limekiln, and then pointed the house from the ground to the roof, inside and out, and whitewashed the wall through all of the inside until it was white as snow, thereby destroying the vermin that infested the premises in such vast numbers that no person with a cuticle less sensitive than that of a rhinoceros could live in them through the summer months. Meantime our carpenter was at work repairing the doors, windows, roof, and other parts of

the building, putting up ceiling overhead with cotton cloth, for want of lumber; making domestic furniture, such as tables, bedsteads, and settees; the latter we covered with calico, making a convenient seat for the numerous callers that have visited us the past summer. So we can now say that the government buildings here are in a state of preservation, and comfortable, if not elegant.

Simultaneously with commencing work on this side of the Park, I had taken steps to organize and equip another party to begin work at Riverside, on the Madison River, near the west line of the Park, and near the point where the travel from Virginia City and a place on the Utah Northern Railroad called Beaver Cañon unite, and proceed together to the central attraction, the Fire-Hole Basin and the great geysers. Here I found it necessary to do some heavy grading. Heretofore the travel had been forced principally to reach the Fire-Hole Basin by following the river through a difficult and rough cañon, involving the fording of the stream five times in the short distance of about 10 miles. The Madison River at this point is a broad and rapid stream, and except in time of low water these crossings are both difficult and dangerous. A good road, however, can be made through this cañon when the government will supply the money. I estimate that it will cost not less than $15,000 to bridge and grade about 20 miles of this route. Under these circumstances there seemed to me nothing left us but to try and scale the mighty mountains and hills that lie along the Madison, and between us and our objective point.

The Fire-Hole Basin work was begun here on the 8th of June, and after six weeks of hard digging, plowing, and scraping, the summit was attained, leaving behind us a road and grade up which our four-mule team has hauled repeatedly a load of freight weighing over 2,500 pounds. This party, headed by Mr. George Graham and my son, C. M. Conger (when not engaged in doing blacksmith work or hunting), proceeded on the road towards the Fire-Hole, removing the stumps and rocks from the path, putting in culverts and cross-ways or bridges over mirey ground and deep gulleys, until they reached the big hills on the verge of the basin, where another long and heavy grade had to be made to let us down to a level with the Fire-Hole River at Marshall Hotel.

In the meantime the party commencing work at McCartney's hill had been recruited to about a dozen men, and placed under the command of Capt. E. S. Topping. They worked up from McCartney's, making an excellent road, considering the high and rough character of the ground over which the road lies. Thence they pushed on over the immense mountains which surround the valley of the Gardiner River at this place, doing all that could be done to render passable the road out over this range, until a level plateau is reached, over which our way passes for a distance of about 8 miles, bringing us to the main branch of the Gardiner River, and about 12 miles from headquarters. Here we found it necessary to construct a bridge, as the river is deep and rapid, and an attempt to ford it, except at low water, is attended with great difficulty and danger. Indeed, a party of tourists went into camp for a week here, waiting for a decline of the water before venturing to cross. My assistant, Mr. G. L. Henderson, went with me out to the river, and, after a careful examination of the same for a mile or two, up and down, we agreed upon the most eligible point to locate the bridge, and upon the plan of its construction. Captain Topping and his men took hold of the work in earnest, and in less than two weeks they had finished a substantial structure across the river that we think reflects credit upon its builders. The bridge is built with abutments on each shore, well

out into the river. The abutments are made by a crib of logs firmly pinned together at the corners, and then filled with rock above high-water mark. The center pier we made in the shape of a V, fastened in the same manner at the corner, and filled, like the abutments, with rock; then the structure was covered with hewn logs five inches thick, the whole making a bridge that I think will stand any strain that is likely to happen it, either from the elements or otherwise. The cover of the bridge is 96 feet long. Up to this time it was the custom of Mr. Henderson or myself to be on the ground daily with the men; and, indeed, during the whole season one or both of us has been in the field nearly all of the time.

After the bridge was finished, the captain, with his party, pushed on south toward the Fire-Hole Basin, that being the grand center towards which both parties were aiming. Our route now runs up the Willow Creek to near the great obsidian or glass mountain, which is a marvelous thing in nature and well worth the journey to see. There was considerable work on this part of the road in taking out rocks in the path, and building and repairing culverts and cross-ways.

After passing the glass mountain we soon come upon high hills and rough country, requiring a great amount of labor to render the road passable. We are now leaving the waters that flow into the Gardiner River, and are climbing the mountains that separate the Gardiner from the Gibbon River. About here we pass a beautiful lake, called Lake of the Woods. I do not know what the altitude is at this point, but it cannot be less than 7,500 feet above sea level.

From thence we worked our way over a rough and hilly country to the Gibbon Basin, where the traveler is startled by his first sight of this wonderful Fire-Hole. Standing on the eminence that surrounds and overlooks this basin, with its thousand columns of hissing steam rising to the clouds, and its hundred spouting and boiling springs, all in active operation, hurling their heated waters high into the air, he sees a sight so novel and so sublime as to daze the beholder and fill him with awe. In this basin are several large geysers and a great number of lesser ones. We have now reached a point 30 miles nearly south of headquarters, or the Mammoth Hot Springs, and about 35 miles from the north line of the Park. It is yet 20 miles to the great Fire-Hole Basin. Our road is still in a mountainous and rugged country, requiring much labor and expense before it can be said to be a good road. Still we pushed on; but owing to the limited amount of the appropriation (and when you consider the extent of the territory and the great natural obstructions that have to be encountered, it seems to me it must be evident to you that the amount heretofore placed at the disposal of the Secretary of the Interior "for the protection and improvement of the Yellowstone National Park" is entirely inadequate) we are obliged to content ourselves by making such roads and improvements only as will render travel possible.

But to proceed with our road: we have to pass over some very high hills to reach the valley of the main Gibbon, where we encounter a wide, low bottom called the Geyser Meadows, a place where it will require a large amount of labor to make a good road. After passing this meadow our road enters the Gibbon Cañon, and follows the river down several miles, close on the edge of the stream, crossing the same three times in as many miles over difficult and dangerous crossings in time of high water. After passing through this cañon our road gains the highlands by a steep grade along the side of the mountain on the south side of the river. We soon come to the great falls of the Gibbon, where the

river plunges over a perpendicular precipice of 75 feet, which in the stillness of the evergreen forest that covers this country renders the scene as enchantingly beautiful as "fairy-land." We are now within 10 miles of our objective point, viz, the Lower Fire-Hole Basin; and as the character of the country differs little from that over which we have passed, I need not particularize further than to mention that we made two quite important grades on the way, changing the road from the old track, and materially lessening the difficulties over two high and rugged hills.

At last, through much tribulation, we have arrived at the head of the Madison River, which is formed by the junction of the two Fire-Hole Rivers at the northern edge of the Lower Fire-Hole Basin. When I tell you that at this point the Madison River is a deep and rapid stream, nearly or quite 200 feet in width, you will have some conception of the immense flow of boiling hot water that comes out of the earth within less than 15 miles of this point, and forms the two Fire-Hole Rivers which here unite.

My working force (both parties) were now here, and I found it an imperative necessity to build a storehouse and blacksmith shop in order properly to care for our provisions and supplies, the government having no building nearer than our headquarters, 50 miles distant. Besides, this point is the grand center of attraction, and a place to which every tourist who visits the Park is certain to come. One other reason why I selected this site for a storehouse was, on account of its central position working parties can be supplied from this depot in one day from almost any part of the Park. After having resolved to build, and decided upon the size and style of the buildings required, I drafted the plans and set part of the men to getting out the timber for the proposed buildings.

The rest of the men, under Captain Topping, continued work on the road. I directed them first to go over the road to the Yellowstone Lake, a distance of 35 miles from this point, and put the same in good repair, and then turned their attention toward the Great Falls and the Grand Cañon of the Yellowstone, about 20 miles below the lake. The work was comparatively light on the road from the Fire-Hole to the lake; but when we neared the falls and cañon I found it necessary to cut a new road along the bank of the river for over three miles to enable tourists to ride to the falls. Heretofore they have been compelled to abandon their carriages, and climb almost impassable mountains on the back of a pony or on foot. This road along the river was a difficult and costly piece to build, requiring heavy excavation along the side of the steep mountain for nearly the whole distance. But it is finished, and we have received the commendation and thanks of every person who has passed over the road, for having built it.

Meantime our buildings are progressing at the Fire-Hole Basin, the place we now call our summer headquarters. The government storehouse here in dimensions is 34 by 22 feet, built of hewn logs, substantially and neatly put up, one story high, with solid log partition framed into the structure, making two rooms in the building. One room is floored with hewn logs, 5 inches thick, neatly fitted together, for the storage of provisions; this heavy partition and floor being necessary to protect our supplies from the ravages of the mountain rats and squirrels that here abound. The other room is not yet floored, as we have no lumber except what we manufacture with an ax; but by putting in an old cooking stove, which I was fortunate enough to obtain here, it makes a very convenient and comfortable place for us when at work in this

vicinity, besides being a great accommodation to tourists who desire to leave a portion of their luggage while they visit the lake, the Grand Cañon, and the Great Falls of the Yellowstone. We have a strong door on the storeroom, and one window in the same; also an outside door, and two windows in the front room.

The blacksmith shop is similar in construction, 20 by 20 feet, with a door and two windows. Convenient to the shop is a coal-house, 10 by 15 feet, in which I have a quantity of charcoal left over after the season's business, from a pit that we burned early in the season. The buildings are all carefully chinked on the inside and daubed on the outside, and thoroughly covered with dirt roofs, which we consider storm-proof, and will probably answer the purpose for which they were constructed, for many years.

Mr. Secretary, I would gladly have consulted you in regard to these buildings before they were begun, but the demand was so urgent, and it takes so very long to communicate by mail, in these far-off mountains, with your office, that I ventured on my own judgment to proceed without specific authority, trusting that what I might do would receive your sanction and approval.

After the buildings were completed I sent the men who had been there employed with a pack-train and outfit over to the falls to improve the trails and bridle-paths around them and the Grand Cañon, also to open a new and better bridle path from the falls along the base of Mount Washburn, via Tower Falls, to intersect the Clark's Fork wagon road near Barronett's bridge, thus enabling tourists to make a complete circuit of the Park, and to see most of the marvelous wonders of nature that so abound in this our nation's great play-ground, and which I am assured by eminent travelers are not to be found elsewhere on the globe.

It is September. Our bridle-paths are finished; our grades along the banks of the Yellowstone are completed; and the gathering snows on the distant mountain tops admonish us that we must soon seek a lesser altitude. We therefore take a parting glance at the Great Falls, the Grand Cañon, and the glorious snow-crowned mountains, and all depart for our summer headquarters in the Lower Fire-Hole Basin. Arrived there we still find plenty of work that requires our attention, notably the building of three foot-bridges, two of them across the Great Fire-Hole River, and the other across the Little Fire-Hole, near our store-house. The bridges across the larger river are 130 feet in length, and the one across the lesser stream is 50 feet long. These bridges are built by hewing long timbers flat, and placing two pieces side by side upon strong benches standing in the river, and securely fastened together, then putting up a hand-rail along one side, enabling any person to cross with ease and safety. These foot-bridges have long been a necessity, and will prove a great convenience to ourselves as well as the public.

September 14 I took my departure for the Mammoth Hot Springs, to give attention to my office work, which I confess I had too long neglected. But (as I have before written you), deeming it of the first importance that the money appropriated by Congress for the improvement of the Park be judiciously and properly expended, I felt it to be my first duty to remain in the field to direct and supervise the work. Before leaving, I directed Captain Topping with his party to work back over the road to the Mammoth Hot Springs, and repair some crossways that had become badly demoralized by the heavy military trains and others passing over them during the summer. I left Mr. Graham and

my son with their men to finish the foot-bridges, to take an inventory of the stock and tools to be left there, to close up and lock the buildings, and then to come to the springs and construct a bridge across the Gardiner River, which had recently been destroyed by a devastating fire that had swept over a large tract of the Park in the immediate neighborhood of headquarters. I spent a few days in my office, and then took stage for Bozeman, Mont., to settle with the merchants of that bright and busy mountain city for the supplies that they had so generously advanced me for the use of the government during the season. I was thus occupied there for several days, when I again took the stage for Virginia City, Mont., another trade center in these mountains, to whose liberal merchants I was under like obligations for the same kind of favors. I closed my business here, and returned by the same route, reaching home in time to see the last plank fastened down upon our new bridge across the Gardiner. The bridge is a splendid one of the kind, and is constructed after the pattern before described. I then settled with the few men that had still stuck to the work until it was finished, which was on the 25th day of October.

The snow was now getting deep all over the Park. The bell had summoned all ashore who were not going to sail, and, not desiring to be blockaded here all winter, I bade farewell to my assistant, Mr. G. L. Henderson, and his son, whom we left in charge, and myself and wife made our escape down the valley of the Yellowstone to the North Pacific Railroad, and thence to the green fields of Iowa, our home.

Mr. Secretary, I desire to say, in concluding this prosy report, that we do not claim to have written our names upon the mountain tops here, and will be content if you shall approve, and the great public, from whose verdict there is no appeal, shall concede, that we have left our mark upon the roads, trails, and bridle-paths of this great National Park.

I have the honor to be, very respectfully, your obedient servant,

P. H. CONGER,

Superintendent Yellowstone National Park.

THE PARK.

I consider the man entitled to all honor who first had the foresight to propose to the Congress of the United States the project of setting apart this wonderful country for all time for the use and pleasure of the people. So grand an idea could emanate only from the brain of a wise and far-seeing statesman. No nation on earth has ever bequeathed to its people a nobler gift. Its area is not accurately known, but enough is known to be certain that it contains more square miles than either of two of the States in this Union. The donation was a grand one, made upon a truly American scale, and the people of this country will demand of their representatives that this great Park be opened and improved, so that the present generation may enjoy it. In this connection I would call the attention of members of Congress to the fact that heretofore the annual allowance for all purposes in the Park has been only $15,000; and I beg them to inquire of themselves how far this sum would go toward building and repairing the roads in their State or district, and also to bear in mind that this Park is on the top of the Rocky Mountains, and that everything that enters into use there costs at the least twice as much as the same would cost in almost any of the States.

VANDALISM IN THE PARK.

I have hardly the patience to discuss this subject without passion. The most of the depredations committed seem to me so entirely purposeless that I am unable to conceive the cause that impels men and women to wantonly destroy, purely for destruction's sake. What are we to think of a man that will pack long poles, as heavy as he can carry, a great distance, for the purpose of thrusting them into the cone and down the throat of these great geysers, when the only possible effect must be to obstruct their flow and mar their beauty? This is done repeatedly, although I have neglected no opportunity to warn, admonish, and entreat all tourists whom I have met in the Park not on any account to do so. I have also by published order, forbidden the collection of any specimens and cautioned all persons having occasion to build a fire in the Park to be certain to extinguish the same before leaving camp. But, notwithstanding all this, tourists go into the Park with iron bars and picks secreted in their wagons, with the express intent to disregard the law and defy the superintendent. The cones of the great geysers are already badly defaced, and vast tracts of the beautiful forests that adorn this Wonder-Land are laid waste by fire annually through the wanton carelessness and neglect of visitors.

Another source of great annoyance is the hunters in the Park. I am sure you will agree with me that it is not possible for a single gamekeeper to guard so vast a territory as the National Park and prevent the breach of the laws in regard to the killing of game. When we consider the temptation, and the opportunity which these vast solitudes afford, we need not wonder that the laws are broken, and the orders disobeyed. But I leave it for the superior wisdom of the honorable Secretary of the Interior to suggest some remedy for these evils.

VISITORS TO THE PARK.

Many eminent people have visited the Park the past summer, both from our own and foreign lands. A few among the more prominent names I will mention:

United States Senator Bayard, of Delaware; Commander Gorringe, of the United States Navy; Lloyd S. Bryce, of New York City; Mr. Fuller, of London, England; and Mr. Merrill, of Philadelphia, with a cavalry escort, composed the Senator's party.

General P. H. Sheridan, Col. M. P. Sheridan, General Anson Stager, of New York City; Mr. John McCullough, the great actor; General D. B. Sackett, U. S. A.; Col. James F. Gregory, U. S. A.; Mr. H. R. Bishop, New York; Mr. Charles D. Rhodes, Chicago; General W. E. Strong, Chicago; Capt. W. P. Clark, U. S. A.; Capt. J. L. Wheeler, commanding escort, with 150 men and 300 horses and pack-mules.

Mr. Edw. Massicott, a great traveler, Paris, France.

B. A. Colonna, United States Coast and Geodetic Survey.

Bishop Hurst, of the Methodist Episcopal Church, Iowa.

Rev. C. H. Fowler, New York.

Joseph Moore, jr., esq., Philadelphia, a great traveler in foreign lands, and eminent author.

Captain Gibson and Lieutenant Spellman, Seventh United States Cavalry, with large party.

Dr. Sanderson, U. S. A.

Major Gordon and family, Fort Ellis, N. Y., with escort.

Major Hughes, Saint Paul, Minn.

A large party from the Omaha Board of Trade, headed by their president, Mr. Clark (a number of them having their families with them), Mr. Fitch, of the Omaha Bee, and many others.

Prof. S. C. Armstrong, Hampton, Va.

Henry W. Foote and Arthur Lyman, Boston, Mass.

Rev. Geo. Comfort and wife, with a large party of friends from Bozeman, Mont.

Dr. J. H. Warren, Janesville, Wis.

M. V. Nichols, Osage, Iowa.

Lord S. George Littledale and lady, England.

Mr. J. O. Hussey, with a large party, White Sulphur Springs, Mont.

Samuel Mallory and wife, with friends, Montana.

Alanson Trask, esq., with family and friends, Brooklyn, N. Y.

Hon. J. C. Burrows, M. C., Michigan.

Earl Hope, of Hopeton, Scotland, with cousin and large retinue of servants.

A. T. Argens, Copenhagen, LL. D. and envoy of the King of Denmark.

We had also a German count, and many other people of distinction whom I must omit to name.

We had on our register at headquarters on the 15th of October 815 names, and we estimate that not one-tenth part of the visitors to the Park the past season came to headquarters at all. Taking this estimate as a basis, there could not have been less than ten thousand people there the past season. Indeed, it has seemed that the people of our own country are just beginning to find out that there is such a place as the Yellowstone National Park, while it has attracted the attention of European scientists and travelers ever since it was first known. The distinguished travelers of our own country who have been there the past summer have told me that they felt compelled to visit the Park, so that they might be able to answer the thousands of inquiries that are made of them concerning this great Wonder-Land, wherever they go, in all parts of the earth. From this I think it safe to predict that as soon as the great railroads are completed to the borders of the Park, and the roads in the Park made comfortable by grading and bridging, it will speedily become the most popular summer resort in this or any land.

LINES OF TRAVEL LEADING TO THE PARK.

The tourist desiring to visit the Park, who may be, we will say, at Chicago, has his choice of either of the great Pacific railroads. The Union Pacific via Omaha to Ogden, thence by the Utah Northern to Beaver Cañon, where he takes stage or private conveyance up the valley of the Snake River to the Lower Fire-Hole Basin, a little over 100 miles from the railroad. Or he can take the northern route via Saint Paul and the North Pacific to Livingstone (Benson's Landing), from whence a branch road is to be built, I am informed, early next season, to the borders of the Park near my headquarters, 65 miles from Livingstone. In this connection I will also say, that active operations are already in progress to build and have ready for the accommodation of the public, a number of elegant hotels at the points of greatest interest throughout the Park, so that tourists will not be compelled, as heretofore, to carry their own supplies, and camp on the ground.

I have the honor to be, very respectfully, your obedient servant,

P. H. CONGER.

Hon. H. M. TELLER,
Secretary of the Interior.

ANNUAL REPORT

OF THE

SUPERINTENDENT

OF THE

YELLOWSTONE NATIONAL PARK

TO THE

SECRETARY OF THE INTERIOR.

P. H. CONGER,
SUPERINTENDENT.

FOR THE YEAR 1883.

WASHINGTON:
GOVERNMENT PRINTING OFFICE.
1883.

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REPORT

OF

THE SUPERINTENDENT OF THE YELLOWSTONE NATIONAL PARK.

HEADQUARTERS YELLOWSTONE NATIONAL PARK,
Mammoth Hot Springs, September 10, 1883.

SIR: In compliance with the requirements of your office I have the honor to submit the following report pertaining to the Yellowstone National Park for the fiscal year ending June 30, 1883. A detailed statement of last summer's business, after the first of July and up to the close of business on the last of October, will be found in my annual report of last year, now in your office, and to which I respectfully refer you for particulars. All kinds of labor and improvements are necessarily suspended in the Park on or about the 1st of November on account of snow and the inclemency of the weather, at which time I settled with and dismissed all employés, except assistant and two men, whom I left in charge of the Government stock and property for the winter. Not deeming it necessary to remain here during the winter I returned to my home in Iowa, thence proceeded to Washington to counsel with you in regard to park management, and to prepare my annual report, which, owing to the press of business, I was unable to furnish at an earlier date. When my business was accomplished which called me to the capital, in compliance with your orders I returned to my post, where I arrived on the 1st of March, 1883, you deeming my presence in the Park necessary that early in the season by reason of reports reaching you of the slaughter of game within the Park. Upon investigating these rumors I ascertained that a few elk and deer had been killed by parties contracting to furnish meat for the hotel company. They were notified that hunting in the Park would not be allowed, and they immediately desisted. Hunting here has been practically suspended ever since, except what may be done by stealth. Indeed, I am glad I can assure you that the reports which reached you last winter relative to the slaughter of game in the Park were greatly exaggerated. On March 1 it was yet winter in this vicinity, and there was little we could do until the latter part of the month, when the weather became mild, and we were able to build a blacksmith shop 16 by 20, with attachment 10 by 16, used as cow house, a storehouse 16 by 37, a carpenter shop 16 by 20. The lumber was kindly furnished us by the hotel company, which had saw-mills running here. With refuse lumber and slabs (which cost us nothing but the hauling) we constructed a large corral, a wagon shed, and harness house; all of these buildings were absolutely requisite—indeed, they were indispensable for the proper care of our supplies and tools. I consider it fortunate for the interests of the Government here

that the hotel company consented to let us have the lumber, as we have no mills anywhere near here, consequently lumber could not be delivered in the Park without costing three times as much as the hotel company charged us for the lumber we used. In justice to this company, it is my duty to inform you that they only charged $20 per M at their mills. It cost the company that amount per M to get the logs to their mill and manufacture the same. The aforementioned buildings are covered with boards and battened. The roofs are not rain proof, and should be covered with shingles to be tight. This mountain lumber is full of knots, which crack open upon exposure to the sun; consequently, it is impossible to make compact roofs with any boards that can be obtained here. During the construction of these buildings I was also making the necessary preparations to commence the work on the roads. As soon as the snow cleared away and the roads became passable I went to Livingston, Bozeman, and Virginia City, Mont., and purchased one span of mules, harness, and wagon; also, one span of horses, harness, and wagon—the latter for the use of Superintendent—also purchased the necessary supplies and tools to carry on the season's campaign of road-making and bridge-building in the Park. We commenced active operations on the roads in the neighborhood of Mammoth Hot Springs the latter part of May. It was near the middle of June before we could get supplies and men into the Park from Virginia city to the Fire Hole Basin. My object was only to employ sufficient force to consume the unexpended balance of the appropriation applicable to the fiscal year ending June 30, 1883, at which time I understood a new law would take effect, and the expenditures for the construction of roads and bridges in the National Park would thereafter be under the supervision of the War Department. I kept two parties of men at work on the roads, each party about 12 strong, in different parts of the Park, repairing those places which required immediate attention.

At the end of the fiscal year I found, according to my accounts, that I had expended all of the appropriation except $191.50, which amount still remains in my possession.

My accounts for the fourth quarter of the fiscal year ending June 30, 1883, await the examination and verification of the Treasury Department.

So urgent was the necessity for the improvement of the roads in the Park, and as tourists had already began to arrive in large numbers, and as I daily expected the arrival of the engineer officer who was to relieve me of the charge of the construction of roads and bridges in the National Park, I still retained my men at work on the roads after the 1st of July. On the 20th of July, 1883, I addressed a letter to you, stating the embarrassment under which I was laboring by reason of the non-arrival of this officer whom I expected to relieve me; and not until the 27th of July did I receive your letter, under date of July 14, informing me of the assignment of an engineer officer to duty here, and advising me of the construction to be placed on the law passed last winter, making the appropriation for the protection, preservation, and improvement of the Yellowstone National Park.

I believe that I have given you a general idea of our operations for the fiscal year ending June 30, 1883, and I will now proceed to mention some matters that pertain more especially to the future management of the Park.

ASSISTANT SUPERINTENDENTS.

The law passed by the last Congress making the appropriation for the Park and creating the ten new officers, called "assistant superin-

tendents," seems to me not to have been well considered, as no provision was made for them except a meager salary, which is inadequate, if these men are required to build their own quarters, furnish their own horses, equipments, and sustenance. To be effective these officers necessarily ought to be stationed at different points throughout the Park, and to be well mounted, suitably uniformed and equipped. With the present force of ten men, I would recommend that they be stationed by twos at five of the most important points in the Park. This disposition of the force will require the erection of five comfortable cabins, as the law requires a permanent residence, and men cannot exist in this mountain country in the winter season without comfortable quarters. At this date, September 12, it will hardly be practicable to construct these buildings this season. Snow and severe weather are expected very soon. As to the operation of the law dividing the responsibility for the protection and improvement of the Park between two Departments of the Government, I am compelled to say that I think the measure unwise.

I need not enter into details in regard to this question, but I think there can be but little doubt that Congress at its next session will choose to have one responsible head for the transaction of business here as elsewhere. It must not be understood that I reflect upon the officer who has been assigned by the Secretary of War for duty here. Lieut. D. C. Kingman is all that I could desire as an officer and gentleman.

By the operation of this law the Superintendent of the Park is left without a dollar for any incidental expenses whatever for the care of these headquarters; no provision for the Government horses and mules, repairs of the buildings and fences, and many other things which I need not enumerate, but which will suggest themselves to the mind of any person familiar with the custody and care of an establishment of this kind. I cannot believe it was the intention of the makers of this law that the Superintendent should be left without the means to protect and preserve the property of the Government intrusted to his care and keeping.

HEADQUARTERS.

The headquarters building or Superintendent's residence is located, in my judgment, injudiciously. It is situated on the pinnacle of a very high and precipitous mound or hill, exposed to the fierce winds that prevail here, especially in the winter. Besides, it is nearly a half mile from water, necessitating the constant employment of a man and team to supply wood, water, and other necessaries. My predecessor (Colonel Norris) built the house here a number of years ago. He gave as his reason for locating the headquarters on the hill, that he thought it the best defensive point against Indians. There may have been, and doubtless was at that time, a necessity for such precaution; but that day and necessity have passed. The Indians in this vicinity are no longer to be feared, and, allow me to remark, that I believe the whole Indian question solved and forever disposed of just so far as railroads penetrate our country. Hence other and more economic reasons should govern in selecting a site on which to erect suitable buildings for the use of the Government in this great National Park. The house now occupied is nothing but a log cabin at the best, sadly out of repair, roof leaky, and the force of the winds shakes the plaster out of the cracks between the logs constantly, rendering the house hardly habitable, especially during the cold season. Heretofore these rude cabins were all that were re-

quired, but all is now changed here. We have railroads, the telegraph, and great hotels, with all the crowd, business, and fashion that these wonderful civilizing agencies imply. I respectfully request that this subject be brought before Congress. In my next estimate, which I shall forward soon, I have named an amount which I deem necessary for this object.

HOTEL COMPANY.

Messrs. Rufus Hatch & Co. have erected at the Mammoth Hot Springs, in the vicinity of the headquarters, a large and elegant hotel for the accommodation of tourists. The hotel is very commodious and designed to be first class in every particular. The season for travel here was well advanced before the house was near enough completion for the accommodation of guests. It is not yet finished, and workman mingle with visitors through its great halls; the sound of gong that calls one to dinner is deadened by the clatter of the carpenter's hammers upon the walls. There is much dissatisfaction and resentment manifest amongst the people of the Territories, especially amongst those living in the Yellowstone Valley, in the vicinity of the Park, against and with the claims that the "Yellowstone National Park Improvement Company" asserts, to wit, that this company holds the exclusive right and privilege to do all business of whatever kind or character (aside from that which is done by the Government) within the limits of the Park. I have had numerous inquiries to know if this is true, and I have invariably replied that if such was the case I had not been so informed by the Interior Department. The Northern Pacific Railroad Company have constructed a branch railroad from Livingston, Mont. (on their main line), up through the valley of the Yellowstone River to within 8 miles of the Mammoth Hot Springs, from which point Wakefield and Hoffman's excellent stages connect with every train to and from the hotel. This hotel company will doubtless be prepared by next season to furnish first-class accommodation to all who may come at most of the important points in the Park.

LAWS PERTAINING TO THE GOVERNMENT AND PROTECTION OF THE PEOPLE OF THE PARK.

The time has arrived when an imperative necessity demands the attention of Congress to this subject. The people here at this time have no security against any depredation or lawless act against either person or property. And no one understands better than does the vicious and criminal classes our defenseless condition.

The consequences are that this Park is overrun (especially in the summer) with large numbers of men of very doubtful character—a menace not only to the officers and employés of the Park, but also to the life and property of every visitor. It is not my province to recommend the form of government required here, but my duty to call your attention to this important subject, and I trust you will submit to Congress some plan of action to guide and protect us, best suited in your judgment to accomplish the desired end. It has not been the fault of the Secretary of the Interior that good and sufficient rules for the government of the Park have not been made. Nor is it the fault of the Superintendent that the same have not been duly published and promulgated, for all of this has been done. But the trouble is and has been that the Superintendent has not been provided with the necessary

and regulations issued by the Secretary of the Interior for the government of the Park. Cheyenne, Wyo., the seat of government of this Territory, is nearly 1,000 miles from here, and, so far as I am advised, the nearest point to which we can appeal to the civil law for protection. Several men have been shot in the Park this season, and one instantly killed. I notified the Interior office of one shooting that occurred last March near the headquarters. I also gave notice of the commission of the crime to the governor of Wyoming, who replied that he had placed my communication in the hands of the United States district attorney, and requested me to furnish the names of the witnesses, which I promptly did. But in the mean time the culprit escaped, and, so far as I know, has not been apprehended or heard of since.

TOURISTS.

Visitors to the Park this season have been largely in excess of the number of last year, and a very wide distinction in the locality from whence they came. Heretofore the principal number of those visiting the Park came from the Territories and adjacent States, except those from foreign countries, many of whom were scientists, and who had been attracted here long before the savans of our own country had thought it worth their while to inspect the marvelous wonders to be found in the Yellowstone National Park and nowhere else on the globe. But that day of indifference has passed; the Eastern people have heard of the grandeur of the National Park, and the Eastern States have contributed their quota of their most learned and eminent citizens to swell the great multitude that have thronged these mountains the past summer, who have been invigorated by inhaling the pure air, healed by drinking the wonderful waters, and to be inspired to great thoughts and noble deeds by the beautiful and sublime scenery that here surrounds you on every hand. This season an unprecedented number of very distinguished personages have visited the Park—both of our own country and from foreign climes—the most eminent of whom was the President of the United States, accompanied by a member of his cabinet, Hon. Robert Lincoln, Secretary of War, and escorted by the Lieutenant-General of the Army, with his staff officers, and a company of cavalry. We had the distinguished honor and the pleasure, as the representative of the Government here, to welcome the President with his eminent friends and companions to this Park, and to assist them in pitching their camp within the inclosure, immediately in front of these headquarters.

Before the arrival of the Presidential party, came a party hardly less distinguished, viz: The General of the Army, with staff officers and escort of cavalry, accompanied by the Chief Justice of the United States and Associate Justice Gray, of the Supreme bench; also, Vermont's eminent and distinguished Senator, Mr. Edmunds. Close following this party came another of equal importance, led by three United States Senators, from three different and important States in the Union, to wit: Senator Dawes of Massachusetts, Senator Logan of Illinois, and Senator Cameron of Wisconsin. Next, the great States of Kentucky and Missouri were represented by their distinguished and chosen sons, Senator Beck of Kentucky, and Senator Vest of Missouri. Besides these eminent personages, who are now directly connected with the Government, many others visited this "wonderland," whose names are as familiar as household words with the people of our country, both for

their distinguished ability and no less distinguished public service, a few of whom I will name: Hon. Roscoe Conkling, New York; Hon. George S. Boutwell, Massachusetts; Hon. Edwards Pierrepont, New York; Hon. George C. Gorham, Washington, D. C.; Governor Crosby, of Montana; Hon. Morton E. Post, Wyoming.

In conclusion, Mr. Secretary, of this brief report I append a few of the names of the more prominent persons who have visited the Park this season, and who called at headquarters and subscribed their names on our register:

JUNE.

Dr. Max Siring, Germany; E. G. Taber, New Bedford, Mass.; Otto Deutsh, Dr. G. L. Gates, John Castle, and Henry Castle, Milwaukee, Wis.; Ralph Sailey, Dakota; James B. Williams, John Herrimen, and J. A. Baker, New York City; Waton Ferguson, Pittsburgh, Pa.; Charles Brayton, Cleveland, Ohio; J. H. Ames, Saint Paul, Minn.; J. E. Neal, San Francisco, Cal.; J. Hilton Scribner, New York; Hon. F. Jacobs, Delhi, N. Y.; W. F. Spalding, Binghamton, N. Y.; Frank Sibley, Norwich, N. Y.; Rev. S. E. Winger, Helena, Mont.; A. O. Linsley, A. P. Poney, F. Mix, and H. Hughitt, jr., Chicago, Ill.; Miss Nellie Blaire, Lancaster, Ohio; Miss A. Pease, and Walter Ayrault, Geneva, N. Y.

JULY.

General W. T. Sherman, United States Army; Chief Justice Waite, Associate Justice Gray, and United States Senator Edmunds, Vermont; General A. H. Terry, Colonel Hughes, Lieutenant Arthur, and Col. J. C. Tidball, United States Army; Major Gregg, of Fort Ellis, Mont. (commanding escort of 43 cavalry); Henry Anderson, Minnesota; George B. Bailey, San Francisco, Cal.; Louis Shaw, Philadelphia; T. Ward, Butte City, Mont.; George Sands and sons, Capron, Ill.; Col. P. W. Norris, ex-Superintendent National Park, Michigan; Hon. R. Elwood and wife, Sycamore, Ill.; J. L. Elwood and wife, De Kalb, Ill.; Robert McKnight, Miss Flora McKnight, and Robert McKnight, jr., Pittsburgh, Pa.; Hon. Alfred C. Coxe, Utica, N. Y.; Hon. Timothy Griffith, New York; T. McF. Patten, Salem, Oreg.

AUGUST.

A. F. Townsend, Chicago, Ill.; R. C. Moore and wife, Associated Press, Minnesota; A. W. Brayton, M. D., Indianapolis, Ind.

Mr. John Renshaw and party arrived August 6, commissioned by the Government to make a topographical survey of the Park, and on the 8th instant Mr. Arnold Hague arrived with his party, having like authority to make a geological examination of the same.

Miss Kate Dunn Dewey, Milwaukee, Wis.; Mrs. Charles W. Burne, Mrs. Alfred H. Anderson, and Charles W. Brown, La Crosse, Wis.; Paul Selby, Springfield, Ill.; Hon. Martin I. Townsend, Troy, N. Y., accompanied by three youths; E. L. Cole and wife, Grand Rapids, Mich.; George Armitage and wife, Monroe, Mich.; Rev. W. Atterberry, N. Y. City; W. W. Atterberry, Detroit, Mich.; Miss L. P. Chapin, Miss L. Griswold, Miss Florence E. Clough, and Col. J. B. Clough and wife, Minneapolis; M. D. Knecland, Fredonia, N. Y.; Stella Knecland, Syracuse, N. Y.; C. A. O. McClellan and James I. Best, Waterloo, Ind.; Hon. B. F. Gue, Des Moines, Iowa; T. M. Ferry, Benton Harbor, Mich.; G. W. Bassett and J. N. Moore, Fort Dodge, Iowa; H. B. Allen and wife, G. Conger and wife, and Emmons Johnson, Waterloo, Iowa.

Daniel C. Kingman, first lieutenant of Engineers, United States Army, accompanied by Charles H. Hendricks, of Omaha, Nebr., Henry Kehl and Robert Stone, topographical assistants, United States Army, arrived August 13, and assumed charge of the construction of the roads and bridges in the Park; Hon. J. B. Grinnell, Iowa; D. R. Jones, Des Moines, Iowa.; Hon. William H. Lyon, Indian commissioner, New York City; F. H. Dayton and wife and Mrs. D. W. Vanderhoof, Saint Paul, Minn.; United States Senator John A. Logan, Chicago, Ill.; United States Senator H. L. Dawes, Massachusetts; L. M. Desney, Shenandoah, Iowa; William H. Armstrong, Mrs. Armstrong, Miss Annette Armstrong, James Armstrong, Miss Earp and Thomas Hassard, Washington, D. C.; Charles H. F. Collis, Mrs. C. H. F. Collis, and Lloyd Collis, Philadelphia, Pa.; M. T. Lyon and William H. Lyon, jr., Brooklyn, L. I.; United States Senator James B. Beck and wife, Lexington, Ky.; Maj. G. Clay Goodloe and wife, Washington, D. C.; Col. W. Cassius Goodloe, Lexington, Ky.; James W. Corcoran, Pine Bluff, Ark.; W. L. Perkins, Saint Paul, Minn.; Asa Fisher and John Bowen, Bismarck, Dak.; E. L. Koon, Hillsdale, Mich.; Edwin Dun, London, Ohio; T. W. Plankinton, London, England; Prof. Samuel E. Tillman, West Point Military Academy; Lieut. F. H. Barber, United States Army, New York Harbor; Lieut. W. S. Schuyler, Fifth Cavalry, United States Army, accompanied by Frank Gruaeyo, post guide, Fort McKinney, Wyo., and an escort of 11 cavalry; J. W. Baxter, Chief Medical Purveyor United States Army, W. Scott Smith, P. Murphy, M. D., and William Lee, M. D., Washington, D. C.; Mrs. J. S. Harris, C. W. Cannon and wife, Helena, Mont.; Hon. Edwards Pierrepont, New York City; L. A. Luce, Bozeman, Mont.; George O. Eaton, Cooke City, Mont.; G. H. Carver, Livingston, Mont.; Charles P. Clark, Saint Paul, Minn.; Rufus Hatch, New York City; John Neate, London, England; Professor Passey, Paris, France; Johann H. Schmitz, George W. Mathers, Amsterdam; John C. Wyman, Rhode Island; Webb M. Samuels and H. L. Newman, Saint Louis; Thomas Mack, Boston, Mass.; George Fisk, Buffalo, N. Y.; and Kinney M. Shephard, Chicago, Ill.

SEPTEMBER.

T. A. Harvey, George B. Morley, W. A. Avery, R. B. McKnight, William B. Mershon, A. H. Mershon, Amasa Rust, Levi Tillotson, Wilber Hill, R. J. Berne, E. A. Sage, William Butman, D. L. C. Salér and son, N. W. Merrill, and Hugh Smith, East Saginaw, Mich.; Mrs. C. M. Finch and daughter, Mrs. G. W. Wakefield and daughter, Bozeman, Mont.; J. H. Jerkian, Chicago, Ill.; J. E. Curtis and daughter, Toledo, Ohio; Mrs. E. W. Herendeen, Virginia City, Mont.; Hon. John A. Kasson, Iowa; Dr. F. R. Dedolph and wife, Saint Paul, Minn., and many others.

Later, a large number of distinguished foreigners, guests of President Villard, of the Northern Pacific Railroad, arrived, prominent amongst whom were the English and German ministers; Hon. Carl Schurz; Sir James Hannen, president of the probate, divorce, and admiralty division of the high court of justice, England; General C. S. Hutchinson, R. E., inspector of railways and tramways, board of trade, London, England; Henry Edwards, M. P. for Weymouth, England; John Holmes, M. P. for Hackney, London, England; Mrs. John Holmes, Hackney, London, England; Charles M. Norwood, M. P. for Hull, England; James C. Hannen, London, England; Dr. Adam Eisenbohn,

Heidelberg, Germany; Mrs. Von Eisendecher and Madame Bonny, Washington, D. C.

All of which is respectfully submitted.

I have the honor to be, very respectfully, your obedient servant,

P. H. CONGER,
Superintendent Yellowstone National Park.

Hon. H. M. TELLER,
Secretary of the Interior.

REPORT

OF THE

SUPERINTENDENT OF THE YELLOWSTONE NATIONAL PARK

TO THE

SECRETARY OF THE INTERIOR.

1885.

WASHINGTON:
GOVERNMENT PRINTING OFFICE.
1885.

5460

REPORT

OF THE

SUPERINTENDENT OF THE YELLOWSTONE NATIONAL PARK.

YELLOWSTONE NATIONAL PARK,
OFFICE OF SUPERINTENDENT,
Mammoth Hot Springs, Wyo., October 5, 1885.

SIR: I have the honor to submit the following report, in compliance with your telegram of the 2d instant.

I arrived in the Park on the 28th day of June last. On the 1st day of July I assumed control of the Park as superintendent. I found the stock belonging to the Government in a worn-out condition, poor in flesh, stiff, and scarcely fit for service.

The discipline of the force was bad; no head to anything. I at once set about recruiting my stock and making such disposition of my assistants as would best serve to protect the game and the objects of interest in the Park, which had apparently been little thought of except for the purpose of spoliation or total destruction.

The game in the Park had been shot with impunity and marketed at the hotels without any interference on the part of the officers whose sworn duty it was to protect and prevent its destruction. I secured the services of a true and trusty mountaineer, and soon had the satisfaction of bringing to justice some of the worst "skin-hunters" that had infested the Park for years, and caused them to be punished to the full extent of the law. With this warning to the others, and a constant watch, both by day and night, I succeeded in a measure in breaking up the wholesale slaughter of the game that had been carried on in the Park for years, and at this time I am glad to be able to say that the Park is full of game of all kinds. There is somewhere in the neighborhood of two hundred bison in the Park, the elk in large numbers, and several bands of antelope have been seen within 3 miles of the Mammoth Hot Springs. With proper protection the game would soon become gentle, the Park would abound with it, and it could be seen by tourists in their travels through the Park, which would add greatly to their pleasure; to this end there should be no shooting or hunting of any kind allowed within the limits of the Park.

I found the residence of the superintendent situated on a high hill, far removed from wood and water, and not tenantable on account of the leaky and worn-out condition of the roof. I caused it to be repaired and shingled in order to be protected from the heat and rain, and to be occupied as a summer residence. The furniture was old and not fit for use. I partially furnished two rooms, and with much patching made it passably comfortable for the summer, but it will be impos-

sible to occupy it during the winter. I shall build an addition to one of the assistant superintendent's houses, and move down on the flat, where I can be protected from the terrible gales of wind that blow here nearly the winter long.

A new building for the superintendent should be built at the earliest possible time, where wood and water are convenient and the residence accessible.

I found Lieut. Dan C. Kingman, of the Engineer Corps, U. S. Army, in charge of the construction of roads and bridges in the Park. This being his third season here, he was able to give me valuable information, and was of great assistance to me in many ways. The forces under him have constructed and completed 16 miles of splendid road between Mammoth Hot Springs and the Upper Geyser Basin. This road, with one or two exceptions, is what might be called a splendid drive. Besides building this road, he has built a number of bridges, and repaired the road through Gibbon Cañon, so that its passage is one of pleasure. These roads and bridges have cost in the neighborhood $15,000. By this new road the Lake of the Woods country is avoided, and the Green Creek Mountain gone around, which will be glad tidings to the tourists who have had the sad experience of a trip from Mammoth Hot Springs to Norris Geyser Basin. This road shortens the distance by some 2½ miles, and is now one of the finest roads in the Park.

The road from the Fire Hole to the Upper Geyser Basin, a distance of about 9 miles, is simply a splendid drive. Too much cannot be said in its praise.

The work of repairing and opening new roads and trails will continue until about October 20, which I am informed is as long as one can work with any comfort. There are a number of roads that should be opened at the earliest possible moment, which would shorten the distance to be traveled in the Park by parties desiring to see all of the curiosities in the shortest possible space of time—all of which Lieutenant Kingman no doubt will mention more fully in his report.

Of Lieutenant Kingman's work in the Park too much cannot be said in his praise. My relations with him have been of the most pleasant character, and I would suggest that he be detailed and assigned permanently to duty in the Park, in order that he may have the time and opportunity of perfecting and completing the system of roads and bridges begun by him.

The hotel accommodations in the Park are not what they should be for the prices charged, and there should be some one authorized to see that there is something like the equivalent given their patrons. I would suggest that some suitable person be designated for this purpose; also to regulate the police affairs of these hotels, which have been bad this summer.

The force of assistant superintendents is not sufficient to protect the game and the many objects of interest in the Park; hence many acts of vandalism occur, such as filling up the geyser craters with logs and stones, chipping off the formations, writing of names, and breaking the beautiful hot-water crystallizations that are formed at the many hot springs that abound throughout the Park. I would most respectfully suggest that the force of assistants be increased from ten to fifteen, and that they be paid $1,000 per year; that they be required to furnish their own horses and equipments, and allowed $100 a year, in addition to their pay proper, for the latter item. I am convinced that a better service would be had, and that it would insure better care being taken of the stock.

One of the most difficult things that I have had to contend with was the prevention of fires in the Park, of which, I am happy to say, up to this time none have occurred worth mentioning, though some sixty-odd were put out by the assistants. A very stringent law should be enacted against the spread of fires, or leaving camp-fires without extinguishing them completely.

LAWS OF THE PARK.

I would most earnestly call your attention to the entire inadequacy of the laws to provide punishment for violations of the regulations for the protection of the Park. In fact, so far as the enforcement of the laws of the Park proper, there is no system available by which it can be done. The protection that I have been able to give the Park has been through the Territorial laws of Wyoming, which, in my opinion, are of very questionable validity, even within that portion of the Park lying wholly within Wyoming Territory, and certainly none in that portion lying in other Territories. I would suggest that a law be enacted by Congress establishing a court within and for the Yellowstone National Park, with exclusive jurisdiction of all misdemeanors, and with power to examine and hold to bail all cases of felonies, to be tried at the nearest court having criminal jurisdiction. That the assistant superintendents be authorized to serve any process of said court. That the judge thereof be a man learned in the law, of at least ten years' experience, and of good moral character. With a court of this character, and an effectual force of assistants to act as ministerial officers, there would be comparatively little trouble in protecting and keeping the Park in a state of preservation beautiful to look upon; but unless some stringent enactment is made, and that at the earliest possible time, it will be too late. Too much importance cannot be attached to the establishment of a court exclusively for the protection of the Yellowstone National Park.

The travel in the Park this summer has been much greater than ever before. Many distinguished persons, both from home and abroad, came to see the wonders of the nation's play-ground; and I am gratified to be able to say that none, so far as I have been able to learn, were disappointed.

The transportation in the Park was good. No serious accident of any kind occurred, to my knowledge.

I would most respectfully suggest that it is of the greatest importance that the lines of the Park be surveyed at the earliest opportunity, and so marked that there can be no mistaking them. This I deem next in importance to the organization of a proper court for the protection of the Park, which should be attended to at the earliest possible moment.

The estimate for the appropriation asked for the Park for the year ending June 30, 1887, in round numbers, amounts to $150,000. Its purposes are set out in detail in my estimate for appropriations forwarded to the Department of the Interior on the 3d instant.

I am, sir, very respectfully, your obedient servant,

D. W. WEAR,
Superintendent Yellowstone National Park.

The Hon. the SECRETARY OF THE INTERIOR,
Washington, D. C.

(4552-500.)

REPORT

OF THE

SUPERINTENDENT OF THE YELLOWSTONE NATIONAL PARK

TO THE

SECRETARY OF THE INTERIOR.

1886.

359

WASHINGTON:
GOVERNMENT PRINTING OFFICE.
8552 1886.

REPORT

OF THE

SUPERINTENDENT OF THE YELLOWSTONE NATIONAL PARK.

MAMMOTH HOT SPRINGS, WYOMING,
August 20, 1886.

SIR: In compliance with your request of July 31 I have the honor to submit the following report of the operations of my office for the year ending June 30, 1886.

I assumed control of the Park as Superintendent on the 1st day of July, 1885. When I took control I found everything in confusion. Buildings in a dilapidated condition, fences down, the stock in a run-down and unserviceable condition from hard usage and improper attention. I immediately set to work to recruit the stock and get such of it as was possible in a serviceable condition. I have built about 4 miles of pasture fence, and repaired all the buildings and made them tenantable. I built an addition to one of the assistant superintendent's houses which I occupied as a headquarters during the long, cold winter, and have continued to occupy up to this time. A new building for the Superintendent should be built at the earliest possible time, where wood and water are convenient and the residence accessible.

EXPENDITURES.

Of the $40,000 appropriated by the act of Congress for the protection and improvement of the Yellowstone National Park for the fiscal year ending June 30, 1886, $39,000 have been placed to my credit and has been disbursed.

ROADS AND BRIDGES.

The roads and bridges in the Park, constructed by Capt. Dan C. Kingman, Corps of United States Engineers, are in good condition, but owing to the want of funds and the failure of Congress to make an appropriation for roads in the Park earlier in the season there has been nothing, except repairing the roads already constructed, done. No new roads have been built this season, and the season is so far advanced now that there can be very little accomplished before the cold weather sets in. I am, however, informed by Captain Kingman that work on the roads will be continued until some time in October, or as long as the weather will permit. Of Captain Kingman's work in the Park too much cannot be said in praise.

HOTEL ACCOMMODATIONS.

The hotel accommodations have been far better this season than ever before. The Yellowstone Park Association have leased hotel sites at

Mammoth Hot Springs, Norris Geyser Basin, Upper Geyser Basin, and the Grand Cañon, and have run hotels and furnished good accommodations at all the above-named places at reasonable rates. They have completed the erection of a splendid new hotel building on their lease at Norris, and contemplate building new hotels at all the other points mentioned as soon as practicable and before the commencement of the tourist season next year.

TRANSPORTATION.

The transportation during the season has been good and ample to accommodate the heavy travel. No serious accident of any kind has occurred to my knowledge, and no complaints have been made by any one.

LAWS OF THE PARK.

I would most earnestly call your attention to the entire inadequacy of the laws to provide punishment for violations of the regulations for the protection of the Park. In fact, so far as the enforcement of the laws of the Park proper there is no system available by which it can be done. The protection that I have been able to give the Park has been through the Territorial laws of Wyoming, which the legislature repealed last winter. I would suggest that a law be enacted by Congress establishing a court within and for the Yellowstone National Park, with exclusive jurisdiction of all misdemeanors, and with power to examine and hold to bail all cases of felonies, to be tried at the nearest court having criminal jurisdiction; that the assistant superintendents be authorized to serve any process of said court; that the judge thereof be a man learned in the law and of good moral character. With a court of this character, and an efficient force of assistants to act as ministerial officers, there would be comparatively little trouble in protecting and keeping the Park in a state of preservation, beautiful to look upon; but unless some stringent enactment is made, and that at the earliest possible time, it will be too late. One of the most difficult things I have had to contend with was the prevention of fires in the Park, of which, I am happy to say, up to this time none have occurred worth mentioning. A very stringent law should be enacted against the spread of fires or leaving camp-fires without extinguishing them completely.

LINES OF THE PARK.

I would most respectfully suggest that it is of the greatest importance that the lines of the Park be surveyed at the earliest possible time, and so marked that there can be no mistaking them. This I deem next in importance to the organizing of a proper court for the protection and enforcement of the laws of the Park.

GAME.

There is more game in the Park now of every kind than was ever known before. Elk, antelope, deer, and mountain sheep are here in large bands, and within less than four miles of Mammoth Hot Springs. I have since I came here paid particular attention to the enforcement of the laws for the protection of the game, and have by their rigorous enforcement stopped the wholesale slaughter of game that existed heretofore. In the enforcement of the law I have been greatly assisted by assistant superintendents C. J. Baronett, Ed. Wilson, William Wilson,

E. L. Fish, Monroe Berry, William McClellan, Thomas E. Brocken, and George. B. Miller, whose services have been invaluable, and too much praise cannot be awarded them for the faithful and efficient manner in which they have discharged their duties; better men for the service would be hard to find. In order to protect the trust confided to my keeping, I remained at my post of duty all last winter and kept my men constantly on the scout for trespassers, hunters, and other violators of the law. When the snow got too deep for them to travel on horseback I sent them out on snow-shoes. I think I am justified in saying that there have been fewer violations of the law and better order in the Park during the past year than was ever known before.

TRAVEL.

The travel in the Park this season has been much greater than ever before. Many distinguished persons, both from home and abroad, have come to see the wonders of the nation's play-ground, and I am gratified to say that none, so far as I have been able to learn, have been disappointed, no complaints having been made to me by any one.

APPROPRIATION.

I would most respectfully repeat my recommendation for the appropriation asked last year, as follows:

For every object and purpose necessary for the protection and improvement of the Yellowstone National Park, $150,000, as follows:

For pay of superintendent	$3,500
For pay of 15 assistant superintendents, at $1,000 each per year	15,000
For pay of one secretary	1,500
Incidental expenses	7,500
For headquarters building and other buildings for Government use	10,000
For suitable stables and sheds for the use of Government stock	2,500
For extinguishment of claims prior to the dedication of the Park, or as much therof as may be awarded by a duly constituted commission to be appointed by the Secretary of the Interior	5,000
For the erection of telephone wires for the use of the officers of the Park	5,000
For construction of roads and bridges	100,000

Congress having failed to make any provision for the pay of the Superintendent or his assistants or for the protection of the Park, I was notified on August 14, by telegram from the Secretary of the Interior, that he had called upon the Secretary of War for a detail of soldiers to do duty in the Park, and that Capt. Moses Harris's Troop M, First United States Cavalry, would arrive in a few days, and was directed upon the arrival of Captain Harris to turn over to him all public property in my charge, taking receipts therefor. On the 17th of August Captain Harris, with 50 men of Troop M, First Cavalry, arrived in the Park. On the 20th of August he assumed control of affairs in the Park and I turned over to him all public property in my charge, taking receipts therefor as instructed.

Before closing my report I desire to say that I have endeavored to do my duty, and my whole duty, fearlessly and without favor or affection toward any one. In my official capacity I have done nothing that I would not do over under similar circumstances, and have no apologies or excuses to offer for anything I have done.

I am, sir, very respectfully, your obedient servant,

D. W. WEAR,
Superintendent Yellowstone National Park.

The SECRETARY OF THE INTERIOR,
Washington, D. C.

REPORT OF CAPT. MOSES HARRIS, FIRST CAVALRY, ACTING SUPERINTENDENT.

YELLOWSTONE NATIONAL PARK,
OFFICE OF SUPERINTENDENT,
Mammoth Hot Springs, Wyo., October 4, 1886.

SIR: In compliance with your telegram of the 31st ultimo, I have the honor to submit the following report:

In obedience to the orders of my military superiors I arrived with my command, Troop M, First United States Cavalry, at the Mammoth Hot Springs, Yellowstone National Park, late in the evening, August 17, 1886, and at once reported by telegraph to the honorable Secretary of the Interior. Having, in response to my telegram, been informed that it was desired that I should assume the duties previously performed by the superintendent of the Park, I assumed those duties, relieving Col. D. W. Wear, the late superintendent, August 20, 1886. Colonel Wear accompanied me through the Park, and I stationed detachments from my command at the following points, viz: The Norris Geyser Basin; the Fire Hole, or Lower Geyser Basin; the Upper Geyser Basin; the Grand Cañon, or Falls of the Yellowstone; Riverside, on the Madison River; and Soda Butte, on the road to Cook City. These stations have been continued to the present time, and from frequent inspections made by myself and the officers of my command I am assured that the private soldiers and non-commissioned officers in charge have performed their duties faithfully, and that the Park has received all of the protection possible under the circumstances. A copy of the order published for the guidance of these several detachments in the discharge of their duties is forwarded with this report and marked A. It is proper to here state that much efficient assistance has been rendered by the following-named gentlemen, who were formerly employed as assistant superintendents, viz: Mr. C. J. Baronett, William McClellan, and Ed. Wilson. The first named has been employed as a scout and guide under authority received from the War Department, and, owing to his long experience and perfect familiarity with the mountain trails, his services are invaluable. It is to be regretted that it has been found inexpedient to authorize the employment of more than one of these experienced scouts.

Upon assuming my present duties I found two persons, Mr. Metcalf and a Mrs. Crary, residing at the Mammoth Hot Springs in violation of the Park regulations, and I at once served each of them with the requisite thirty days' notice to vacate. The order was promptly obeyed in both instances, and the buildings improperly occupied will soon be demolished and removed. I have also found it necessary, for the preservation of good order and property, to expel a number of disreputable characters from the Park. This is at present the only authorized method for the enforcement of good order in the Park, and although the exercise of this authority may at times appear harsh and arbitrary, it is indispensable to the proper protection of life and property. I have also found it necessary to forbid the turning loose of stock to graze in the vicinity of the Hot Springs and Geyser formations. This practice was not only a source of annoyance to visitors, but of much injury to the formations.

FOREST FIRES.

I regret to have to report that destructive forest fires have been raging in the Park during the greater portion of the present season. The most destructive one, which was burning when I arrived in the Park, originated on the 14th of August last, near the East Fork of Gardiner River, in full view from the Mammoth Hot Springs Hotel and about seven miles distant. This fire is still burning, and has extended over a tract of country some ten or twelve miles in length by three to five in width.

It was the opinion of my predecessor, Colonel Wear, that this fire was started maliciously by some of his personal enemies; but nothing is positively known as to its origin. Another fire, of less magnitude, originated on Tower Creek about the 10th of September. It was confined principally to the timber along the creek. Several other fires have originated, and after burning a short time have either been extinguished by the efforts of the men of my command, or have failed to spread destructively from the absence of suitable material. A large number of fires have been extinguished by men of my detachments stationed through the Park, many of them under circumstances which led to the belief that they had been set maliciously. The most of these fires originated on the eastern side of the Park, near the road from Gardiner to Cook City, and while some of them may have been started maliciously, the most of them were probably caused by the carelessness of camping parties. Those fires which have been started intentionally may be attributed to unscrupulous hunters, who, being prevented from hunting in the Park, resort to this method of driving the game beyond the Park limits. The Park is surrounded by a class of old frontiermen, hunters and trappers, and squaw-men, who, as the game diminishes outside the Park, increase their efforts and resort to all sorts of expedients to get possession of that which receives the protection of law. The facility with which forest fires can be started, and the impossibility of extinguishing them, when once under way, by any available methods, render it extremely difficult in this high and wind-swept region to guard against them. The only provision against them which can be proposed is that which is also required for the protection of the Park in other respects—"a stringent law vigorously enforced." Two fires were started on the west border of the Park some two weeks ago; and the presence of a small band of Bannock Indians from the Lemhi Reservation, who left as soon as the fires were seen well under way, was to me a sufficient explanation of their origin. Fortunately, they were extinguished by an opportune snow-storm before much damage had resulted. A considerable band of these Indians approached the western border of the Park, along the Beaver Cañon road, in the latter part of August last; but upon my reporting the fact by telegraph to the Department, they were promptly recalled by their agent. These Indians are, however, allowed entirely too much liberty, and are a constant source of annoyance. They visit the Madison Valley, on the western border of the Park, and in their hunting excursions are not particular whether they cross the line of the Park or not. It is reported to me that they are incited to hunt in the Park by unscrupulous white men, who also furnish them whisky.

GAME AND ITS PROTECTION.

From the reports of reliable scouts, familiar with the ranges of the elk, the deer, and the buffalo, there can be but little doubt that there

is an abundance of game in the Park. Detachments from my command on the eastern and western sides of the Park have constantly scouted the portions of the Park not frequented by ordinary tourists, and the scout Barronett has also been constantly on the go, watching suspected parties. I am confident that up to the present date there have been no depredations of any magnitude, and that the game has been well protected."

THE GEYSERS.

It is apparent from the most casual observation that the means heretofore employed for the preservation of the natural objects of wonder and beauty in the Park have been entirely inadequate. It may be said without exaggeration that not one of the notable geyser formations in the Park has escaped mutilation or defacement in some form. Those that have been most fortunate are covered with lead-pencil inscriptions recording the names of those shallow-minded visitors to whom such a distinction is a pleasure. A lead-pencil mark seems to be a very harmless defacement, but names bearing date of 1880 are still discoverable through the thin deposit of silica, and if this marking should go on unchecked, in a very few years these once beautiful formations will have become unsightly and unattractive objects. At the Upper Geyser Basin names with date of June, 1886, have been chiseled into the solid geyserite so deep that, in the slow process of nature, many years must elapse before this mutilation will be obliterated. Not content with the defacement of the formations, efforts are constantly being made to destroy the geysers themselves by throwing into them sticks, logs of wood, and all sorts of obstructions. The eruptive force of several of the geysers has been totally destroyed by vandalism of this character. The footsteps of the throngs of visitors are wearing away the delicate and lace-like tracery of the silicious deposits, and in a few years the formations surrounding the geysers will present the appearance of the worn pavements of a city street. The willful defacement of these beautiful objects can only be prevented by watchful supervision, supported by the rigid enforcement of lawful penalties. A certain amount of wear and deterioration, incident to the multitude of visitors, is probably unavoidable.

ROADS.

Cap. Dan C. Kingman, Corps of Engineers, United States Army, the officer in charge of the construction and improvement of the roads of the Park, will doubtless submit, through the chief of his corps, a detailed report of the work preformed under his supervision.

The small appropriation for the construction of roads and bridges in the Park for the present fiscal year was not made available until towards the last of August, and it was not until the first part of September that work was finally commenced; but by the vigorous efforts of Captain Kingman much good work has already been accomplished, and before the end of the season it is expected that the new road from the Norris Geyser Basin to the Grand Cañon and Falls of the Yellowstone will be completed, and a bad piece of road along the Obsidian Cliff, where construction is extremely difficult, thoroughly improved.

After consultation with Captain Kingman, I have, in my estimate of appropriation required for the fiscal year ending June 30, 1888, placed the amount which can be judiciously and economically expended in the construction and improvement of the roads of the Park at $150,000. The appropriation by Congress of this amount will render it practicable to construct a good road from the Upper Geyser Basin, the terminus

of the present road, to the Shoshone Geyser Basin; thence around the southern shore of Shoshone Lake and across the continental divide to the west arm of the Yellowstone Lake; thence along the western shore of Yellowstone Lake to lake outlet, and along the Yellowstone to the Falls and Grand Cañon. From the falls the road will be continued down the Yellowstone to a junction with the present road to Cook City, which will be improved from the point of junction to the Mammoth Hot Springs. It is also in contemplation to improve the present road from Mammoth Hot Springs to the Upper Geyser Basin throughout its length, and also the Beaver Cañon road from the Fire Hole to the western boundary of the Park. Although this scheme does not embrace all of the roads necessary or desirable in the Park, it will, when carried into effect, enable tourists to visit the principal objects of interest without discomfort, and without pasing twice over the same road.

Owing to the shortness of the season in which labor can be profitably expended upon roads in this region, it is of the utmost importance that any appropriation made by Congress should be made available at the earliest possible date.

HOTEL ACCOMMODATIONS.

The hotel accommodations in the Park have in general been excellent. During the rush of visitors in the month of August the hotel managers at two or three points in the Park found some difficulty in providing for their numerous guests, but although some inconvenience by visitors may have been experienced, there was but little actual discomfort. A fine new hotel has been completed at the Norris Geyser Basin, and I am informed that before the next season it is the intention of the Yellowstone Park Association to erect one equally as spacious at the Grand Cañon.

It is to be hoped also, that the structures at the Lower and Upper Geyser Basins may soon be replaced by others more suitable for the accommodation of the increasing number of annual visitors.

TRANSPORTATION.

The transportation facilities have been adequate to the demands of travel. No serious accidents have occurred, and no complaints of incivility on the part of the drivers, or of extortion by the proprietors have been made. There have been during the season a large number of irresponsible persons doing business in the Park with saddle animals and pack outfits. These parties do not reside permanently in the Park but come in for the season.

In my opinion no persons should be allowed to do business of this character in the Park without first obtaining permission from the superintendent, and registering their names in his office.

A person so authorized to do business, or act as guide, should be furnished with a certificate to that effect, and the visiting public should be cautioned to do business with those parties only who are thus duly authorized.

The tariff of charges for transportation for all persons doing business in the Park should be uniform, and should include the charge per day for saddle and pack animals, and for all kinds of carriages in use.

LEASES.

As far as I am informed by the records of this office the following-described leases are the only ones now operative in the Park, viz: John F. Yancy, ten acres upon the mail route from Mammoth Hot

Springs to Cook City, to be measured from the building now occupied by said Yancy as a central point. Helen S. Henderson and Walter J. Henderson, ten acres of land at Mammoth Hot Springs. James A. Clark 4 acres of land at Mammoth Hot Springs. F. Jay Haynes 4 acres of land at Mammoth Hot Springs, and 4 acres at the Upper Geyser Basin. Charles Gibson four different sites in the Yellowstone National Park, containing seven acres in all. No. 1 at Mammoth Hot Springs, No. 2 at Norris Geyser Basin, No. 3 at the Grand Cañon of the Yellowstone, No. 4 at the Yellowstone Lake. All of the rights and privileges conferred by Mr. Gibson's lease appear to be exercised by a stock company known as the Yellowstone Park Association. Mr. Gibson has executed an instrument transferring the lease to this company, and the paper was forwarded for the approval of the honorable Secretary of the Interior through this office, September 15, 1886. The Park Association has carried on the business of hotel keeping during the past season at the following points in the Park, viz: Mammoth Hot Springs, Norris Geyser Basin, Grand Cañon of the Yellowstone, Fire Hole, or Lower Geyser Basin, and Upper Geyser Basin.

At none of these points are the buildings occupied by the Park Association located upon land described in the leases. It appears that permission was granted by the Department, by telegraph June 10, 1886, to change the original location at Norris Geyser Basin subject to the approval of the Department, upon formal application by the lessee, with description of site selected. I am not informed whether or not this application has been made and approved. A good hotel has been erected upon the new site, and it appears to be well located.

It appears by a letter from the Department, on file in this office, dated May 27, 1886, that permission was granted Mr. Gibson to erect a temporary building to be used for hotel purposes at the Grand Cañon of the Yellowstone, with the understanding that it should be removed on or before the 1st day of August, 1886. This building has not yet been removed, nor has the erection of the permanent building at that point been commenced.

At the Fire Hole, or Lower Geyser Basin, there are three buildings occupied by the Park Association, a hotel building of limited capacity and rude construction, and two cottages used in connection with it. A piece of ground at this place, four acres in extent, was leased to G. W. Marshall in January, 1884. A half interest was subsequently transferred to one Henderson, and I believe several sales and transfers of this lease have since been made without the authority of the Department. It is presumed that the Park Association are occupying the buildings at this point under the color of this lease. I am unable to state by what process it came into possession.

The company is also occupying a hotel building at the Upper Geyser Basin, which, I believe, was originally erected by the Park Improvement Company. This building is less than one-fourth of a mile from the Old Faithful Geyser, contrary to the provisions of the act of March 3, 1883. The hotels of the Park Association at these points have been of unmixed benefit to the public, and the accommodations they have afforded have enabled many visitors to enjoy the wonderful objects in their vicinity who would otherwise have been unable to do so; but it is recommended that if this company is to continue to occupy these sites that it be required to have them accurately surveyed, and that leases be applied for and taken out in proper form. The remaining lease holders in the Park have, so far as I am informed, complied with the requirements of their leases.

RULES AND REGULATIONS.

The only rules and regulations of the Park which have received the approval of the Department are those bearing date of May 4, 1881, as amended by Secretary Teller, January 15, 1883.

These regulations are no longer applicable under the changed conditions in the Park. Probably for this reason they have not been posted in the Park or generally published. Various rules have been, from time to time, established by the superintendent, but they have not been so published or posted as to be generally known, and their enforcement has consequently been difficult. I have prepared certain rules and regulations which appear to me proper and necessary, and submit them herewith (paper inclosed and marked B) for the consideration of the Department. If approved, I recommend that 1,000 copies be printed on muslin and forwarded in time to be posted throughout the Park before the next season for visitors opens. The enforcement of these rules and regulations will be difficult until some more effective penalty for their infringement is provided than expulsion from the Park.

The necessity of a form of government for the National Park is becoming, year by year, more urgent, as the number of visitors to the Park increases. All sorts of worthless and disreputable characters are attracted here by the impunity afforded by the absence of law and courts of justice. Evanston, the county seat of Uinta County, Wyoming, more than 250 miles distant, with a rugged and mountainous region intervening, is the nearest point at which even a justice of the peace with the necessary jurisdiction can be found.

This subject has been so frequently brought to the attention of the Department, and of Congress, that any recommendation from me would seem superfluous.

In the preparation of the estimate of appropriations required for the Yellowstone National Park for the fiscal year ending June 30, 1888, I have assumed that the civil administration of the affairs of the Park would be continued, and have estimated for the pay of a superintendent and a sufficient number of assistants to insure some effective protection to the Park. The amount included in these items may, in view of previous appropriations for this purpose, appear excessive, but after giving the subject careful consideration, I am of the opinion that a less amount would be inadequate to the end in view.

I have also included in this estimate the necessary amounts for a suitable residence and office for the superintendent and for the purchase and keeping of such animals as will be necessary to replace those which have been ordered sold because no fund is available from which they can be subsisted.

I am, sir, very respectfully, your obedient servant,

MOSES HARRIS,
Captain First Cavalry, Acting Superintendent.

The SECRETARY OF THE INTERIOR.

A.

[Orders No. 5.]

CAMP SHERIDAN, MAMMOTH HOT SPRINGS, WYO.,
August 21, 1886.

I. The following Park Regulations will be enforced by the soldiers of this command stationed at the various points of interest for the protection of the National Park:

(1) The cutting of green timber, or the removal or displacement of any mineral deposits or natural curiosities, is forbidden.

(2) Hunting or trapping and the discharge of firearms within the limits of the Park is prohibited. Fishing is forbidden except with hook and line, and the sale of fish so taken is also disallowed.

(3) Wagon tires on all wagons used for freighting purposes on the roads constructed by the Government are required to be at least four inches in width.

(4) Camping parties will only build fires when actually necessary, and must carefully extinguish them when no longer required.

(5) The sale of intoxicating liquors, except by hotel proprietors to their guests, for their own use, is strictly prohibited.

(6) Trespassers within the Park for illicit purposes, or persons wantonly violating the foregoing rules, will be summarily removed from the Park.

(7) No stock will be allowed to run loose in the vicinity of the various points of interest within the Park frequented by visitors.

(8) No rocks, sticks, or other obstructions, must be thrown into any of the springs or geysers within the Park.

It is enjoined upon all soldiers, when on duty at points frequented by tourists, to be vigilant and attentive in the enforcement of the foregoing regulations, and also to see that the stage drivers and other employés of the hotels do not use abusive language to, or otherwise maltreat, the visitors to the Park. They will also at all times exert themselves to preserve peace and order at the points where they are stationed.

They will in the enforcement of their orders conduct themselves in a courteous and polite, but firm and decided, manner. They will not hesitate to make arrests when necessary, reporting at once by telephone to the commanding officer.

II. All loose stock found in the vicinity of this camp or the formation of the hot springs, will be driven into the corral near the office of the Park superintendent, and there held until a proper guaranty is given that they will not again be turned loose.

By order of Captain Harris.

H. E. TUTHERLY,
First Lieutenant, First Cavalry, Adjutant.

MOSES HARRIS.

B.

RULES AND REGULATIONS PROPOSED FOR THE PROTECTION OF THE YELLOWSTONE NATIONAL PARK.

(1) The cutting or spoliation of timber within the Park is strictly forbidden by law; also the removing of mineral deposits, natural curiosities or wonders, or the displacement of the same from their natural condition.

(2) Permission to use the necessary dry or fallen timber, or to cut hay within the Park, must be obtained from the superintendent, and be subject at all times to his supervision and control.

(3) Fires shall only be kindled when actually necessary, and shall be immediately extinguished when no longer required. Under no circumstances must they be left burning when the place where they have been kindled shall be vacated by the party requiring their use.

(4) The shooting at, wounding, capturing, or killing of any animal or bird within the Park is hereby prohibited. Fishing except with hook and line is also prohibited. The outfits of all persons found hunting, or having in their possession game killed within the Park, shall be subject to seizure and confiscation.

(5) No person will be permitted to reside permanently within the Park without permission from the Department of the Interior.

(6) The sale of intoxicating liquors is prohibited, except to hotel guests for table use. No bar-room or saloon shall be maintained within the Park.

(7) No advertisements shall be posted or displayed within the Park, except such as may be necessary on buildings situated on leased ground.

(8) No person shall do business of any kind in the Park, or act as guide, without a license from the superintendent, who shall have power to revoke such license in his discretion.

(9) The defacement of any of the geyser or hot spring formations, by written inscription or otherwise, is strictly forbidden, as is also the throwing of any substance into the geyser vents.

(10) Riding or driving upon any of the geyser or hot spring formations, except upon regularly established driveways, or the turning loose of stock to graze in their vicinity, is prohibited.

(11) All persons who shall render themselves obnoxious by bad behavior, or who shall violate any of the foregoing rules, shall be summarily removed from the Park under the authority of Section 2475 Revised Statutes of the United States, which pro-

es that the National Park "shall be under the exclusive control of the Secretary he Interior, whose duty it shall be to make and publish such rules and regulations he shall deem necessary or proper," and who "generally shall be authorized to take such measures as shall be necessary or proper to fully carry out the object and poses of this act."

MOSES HARRIS,
Captain, First Cavalry, Acting Superintendent.

ESTIMATE OF APPROPRIATION FOR FISCAL YEAR ENDING JUNE 30, 1888.

For every object and purpose necessary for the protection and improvement of the llowstone National Park, $200,000.

r pay of 1 superintendent	$3,000
r pay of 1 chief gamekeeper	1,200
r pay of 10 assistant gamekeepers	9,000
r pay of 1 chief of police	1,200
r pay of 20 policemen	18,000
r pay of 1 clerk	900
r construction of building for residence and office of superintendent	6,000
r purchase of necessary animals to be used for protection of Park	3,000
r construction of stables for public animals	2,000
r subsistence of public animals	1,000
r incidental expenses	4,700
r construction and repair of roads and bridges	150,000
Total	200,000

REPORT

OF THE

SUPERINTENDENT OF THE YELLOWSTONE NATIONAL PARK

TO THE

SECRETARY OF THE INTERIOR.

1887.

WASHINGTON:
GOVERNMENT PRINTING OFFICE.
1887.

REPORT

OF THE

SUPERINTENDENT OF THE YELLOWSTONE NATIONAL PARK.

MAMMOTH HOT SPRINGS, WYOMING, *August* 20, 1887.

SIR: In compliance with your communication of the 30th ultimo, I have the honor to submit the following report of the operations of the office of the Superintendent of the Yellowstone National Park for the fiscal year ended June 30, 1887, and to the present date.

My last report was dated October 4, 1886. The visiting season for tourists was at that time nearly over, all the hotels of the Park Association having closed for the season of 1886 by the 15th of October. A severe snow-storm, which began on the 10th of the month, lasting several days, served to hasten the departure of the summer visitors, and so seriously interfered with the operations of the parties engaged in road-construction that work was suspended for the season and the parties withdrawn about the 20th.

Upon the cessation of tourist travel and the closing of the Park roads by deep snow, the detachments which had been stationed at the different geyser basins for their protection were withdrawn, and the services of the men made available for the important duty of affording protection to the large game which was being driven from the mountains by the early and unusually heavy snowfall. The professional hunters who surround the Park commenced their operations in good season, and great activity and vigilance by scouting parties were requisite to prevent them from operating within the borders of the Park. It is the practice of these hunters to locate camps on the tributaries of the Yellowstone River, just outside the limits of the Park on its northern and eastern borders, and thus to intercept the game when, driven out of the mountains by the deep snow, it seeks the lower valleys and the safety afforded by the Park. The boundary lines of the Park never having been officially surveyed or marked, there is a narrow strip of debatable ground on its border which encourages hunters to encroach upon its limits. All parties found near the borders of the Park were warned off, and were so well watched by scouting parties that it is believed little or no game was killed within the Park. Several arrests were made under circumstances which seemed to require investigation, but in no case was the evidence sufficient to warrant action. In one or two instances where the fact was established that the game had been killed outside of the Park and it was impracticable to get the meat to market without taking it through the Park, permission to do so was granted. This concession, however, gave rise to injurious reports and the transportation through the Park of any portion of the carcasses of game animals will hereafter be discouraged by every legitimate method.

The open season, during which it is lawful to kill game in the Territories of Wyoming and Montana, terminating on the 1st day of January, and the great depth of the snow also interfering with the transportation of meat through the mountains, the active operations of the hunters ceased and a period of comparative quiet and freedom from annoyance was experienced.

After the close of the tourist season the trains of the Northern Pacific Railroad on the branch line from Livingston to Cinnabar were run weekly until about the 20th of January, when, in consequence of severe gales and deep snows, they were discontinued, only resuming their weekly trips in the middle of March. Fortunately the stage line from Livingston to Mammoth Hot Springs was operated with skill and energy, the mail being regularly received every day in the week, except Sunday, the entire winter.

A party of travelers under the leadership of Mr. Frederick Schwatka, of Arctic fame, arrived in the Park in the latter part of December for the purpose of seeing the Park in its winter aspect; but owing to the illness of Mr. Schwatka and the difficulties developed by the light and soft character of the snow, the expedition was only partially successful. Mr. F. Jay Haynes, however, the photographer of the party, with three companions, succeeded in surmounting all obstacles and made a complete tour of the Park, securing many fine views peculiar to its winter aspect. The difficulties of snow-shoe travel in the Park are such, however, that it is not to be recommended as a winter diversion.

Although an unusually large quantity of snow fell throughout the elevated area of the Park, the quantity at the Mammoth Hot Springs was not excessive, nor could the winter, when the weather and temperature of the surrounding region is considered, be called a severe one, as may be seen by reference to the meteorological record which is appended to the report (marked A).

During the month of April I had occasion to arrest and expel from the Park one William James, who was in the employ of the Yellowstone Park Association, for trapping beaver on the Gibbon River, near the Norris Hotel. My letter to the Department reporting this affair is appended to this report (marked B). The property found in the possession of James is still in my custody awaiting your instructions. Several other employés of the Park Association who were to some extent implicated in the unlawful acts of James were, at my request, discharged from the employ of the company and ceased to make their home in the Park.

During the month of May, as the season for tourist travel approached, instructions were given to the several lease holders in the Park requiring them to thoroughly police the grounds around their buildings and place them in a proper sanitary condition. This work was at once entered upon with vigor and accomplished in a satisfactory manner.

Many unsightly barns, stables, and stacks were destroyed or demolished and removed and the appearance of the surroundings of all of the hotels much improved. On the 23d of May a team left this place for the Lower Geyser Basin, and by free use of shovels and axes succeeded in getting through to that point. Upon the disappearance of the snow, work was commenced on the roads by parties under the direction of Capt. Clinton B. Sears, Corps of Engineers, U. S. Army, the officer charged with the duty of road construction and repair in the Park. By the 15th of June, the date on which the hotels of the Park Association were opened for the reception of guests, the roads were in good condition for travel. Active scouting operations were resumed

upon the disappearance of the snow, and the stations at the different geyser basins and at the Grand Cañon were re-established as soon as the opening of the roads made it practicable to supply them with subsistence for men and animals. Copies of the new rules and regulations of the Park were widely distributed, and have been of great utility not only in affording information to the public, but in fixing and limiting the duties of the troops charged with the protection of the Park.

On the evening of the 4th of July one of the stages of the Park Association was stopped a short distance within the Park limits and the passengers robbed of a small sum of money. My communication reporting this affair is appended (marked C). In the first part of July a large number of professional tramps and hard cases, who had been sent out of the neighboring towns along the Northern Pacific Railroad by the authorities, made their way to the Park. They were promptly taken in charge and warned off, but it is probable that the stage affair was the work of the advance guard of this army of tramps. Since the ejection of this party the Park has been quite free from this species of annoyance.

On the evening of July 14 the hotel of the Park Association at the orris Geyser Basin was totally destroyed by fire. The fire originated through a defective chimney flue, and in the absence of any appliances for extinguishing fire the building was entirely consumed within two hours. Fortunately no person was injured, and all of the baggage belonging to tourist visitors was saved. A hotel camp was at once established by the Park Association, and having in view the comfort and convenience of the traveling public I permitted the company to begin the erection of a temporary building subject to your approval.

The volume of travel to the Park during the present season has to the present date fallen somewhat short of that of last year for the same period. This may probably be attributed in a great measure to the effect of recent legislation with reference to railroad transportation rather than to any loss of interest in the "wonderland of the world" by the people.

When I assumed my present duties I found, residing at Round Prairie, on the Cook City road, a Mr. Z. R. Sowash, who kept a roadside station or stopping-place for freighters. I was informed by my predecessor in office that doubt existed as to whether Mr. Sowash's place was within the limits of the Park or not; but after investigation I was convinced that he was at least three miles within the boundaries of the Park. As an order for his removal at the beginning of winter would have involved considerable hardship, I gave Mr. Sowash verbal intimation that he would have to move in the spring, and on the 9th of May last served him with a formal notice to remove within thirty days, which order was promptly obeyed.

FOREST FIRES.

No forest fires of any magnitude have as yet occurred in the Park during the present year; but as the dry season is not yet over, it is probably too early for congratulations on this subject. Several fires have been discovered and extinguished by the soldiers, and constant vigilance and activity have been enjoined upon all to discover and prevent the spread of such fires by every possible means.

LEASES AND BUSINESS PERMITS.

The following are the leases now operative in the Park, as shown by the records of this office, viz: John F. Yancy, 10 acres upon the mail

route from Mammoth Hot Springs to Cook City, to be measured from the building now occupied by said Yancy as a central point; Helen S. Henderson and Walter J. Henderson, 10 acres of land at Mammoth Hot Springs; James A. Clark, 4 acres of land at Mammoth Hot Springs; F. Jay Haynes, 4 acres of land at Mammoth Hot Springs, and 4 acres at the Upper Geyser Basin; Charles Gibson, four different sites in the Yellowstone National Park, containing 7 acres in all: No. 1 at Mammoth Hot Springs, No. 2 at Norris Geyser Basin, No. 3 at the Grand Cañon of the Yellowstone, No. 4 at the Yellowstone Lake.

From a communication dated Department of the Interior, Washington, July 28, 1887, it appears that on the 6th of March, 1885, a lease was granted to Mrs. C. M. Finch, of Bozeman, Mont., of 10 acres of ground "lying about one-half mile from the Lower Falls of the Yellowstone River and on the north side of said river, and about one-half mile from the bridge over Crystal Cascade Creek measured northeast along the Yellowstone trail." No steps have ever been taken by the lessee to comply with the conditions of this lease; no survey of the described ground has ever been made, and no buildings, temporary or otherwise, have ever been erected thereon.

The rights and privileges conferred by the lease to Mr. Gibson are exercised by a corporation known as the Yellowstone Park Association, and this company is also occupying ground and buildings at the Lower and Upper Geyser Basins. The unsatisfactory condition of matters connected with Mr. Gibson's lease and the operations of the Yellowstone Park Association, as related in my last report and as you have since been fully informed by letter, still continues; but pending the action which has been taken by your Department further comment on this subject is thought to be unnecessary. The other lease-holders in the Park have complied with the requirements of their leases in all essential particulars.

The following permits have been granted by your Department for the transaction of business within the Park, viz:

Mr. James E. Stuart, artist, July 26, 1887, permission to exhibit and offer for sale at the Mammoth Hot Springs hotel paintings in oil and water-color of the geysers, cañons, and other curiosities of the Yellowstone National Park, such paintings being his own personal work.

Louis C. Pettitt, M. D., July 26, 1887, to practice medicine in the Park without the privilege of erecting any building.

Bassett Brothers, of Beaver Cañon, July 27, 1887, permission to continue to furnish transportation to visitors within the Park, pending consideration by the Department of the Interior of their application for a lease of ground.

Mr. Elwood Hofer, August 3, 1887, to act as guide and engage in the business of outfitting camping parties, it being understood that he proposes to reside at one of the hotels and to keep his horses, &c., upon ground embraced in one of the existing leases.

Under the authority granted by Rule 7 of the rules and regulations of the Park I have issued licenses as guides to the following-named persons: W. C. Cannon, June 13, 1887, to October 31, 1887; Ole Anderson, July 11, 1887, to October 31, 1887.

TRESPASSERS WITHIN THE PARK.

In addition to the before-named persons who have the authority of your Department to transact business within the Park, one J. W. Pomford, in partnership with J. L. Sanborn, have possession of and operate

within the Park a toll-bridge across the Yellowstone River. This bridge, known as "Barronette's Bridge," was constructed in 1880 upon the site of of a former bridge owned by C. J. Barronette and destroyed by the Nez Perce Indians in 1877. I have attempted no interference with the business as conducted by these parties, as it would seem that the long period in which they have been permitted to carry on their business unmolested has given them a certain right of possession which should be settled by investigation and adjudgment. A statement of the fact that free travel through the National Park, the "pleasure ground of the people," is obstructed by a toll-bridge, whether by authority or otherwise, should be sufficient to cause a remedy to be at once applied.

One J. C. McCartney has also several buildings within the northern limit of the Park, one of which is used as a drinking-saloon. I find by the records of this office that a communication was addressed to McCartney by the then superintendent of the Park, R. C. Carpenter, November 17, 1884, requiring him "to remove himself and his personal property out of the Park within thirty days," and that thereupon McCartney made affidavit to the effect that he believed the buildings occupied by him not to be within the Park and protested against the execution of the order of removal. Upon the receipt of McCartney's protest at the Department of the Interior a communication was addressed to the superintendent of the Park stating that "pending examination into the subject, it is deemed proper that you should not insist upon compliance with your order respecting the removal of the buildings." This has been considered by Mr. McCartney and by former superintendents a sufficient authority for McCartney's continued residence within the Park. On the 14th of December last I addressed a communication on this subject to the honorable Secretary of the Interior, to which no reply has been received.

It is the generally expressed opinion of the community that McCartney's buildings are within the Park, and it is the belief that he has the authority of the Department for his continued residence.

It is believed that the before-named comprise all of the persons now doing business in the Park who have not the authority in writing of the Secretary of the Interior, as required by the published rules and regulations of the Park.

HOTEL ACCOMMODATIONS.

The hotel accommodations within the Park have thus far during the present season been adequate to the demands of travel, though not in all cases of the most desirable character. A domicile in tents at an altitude of 7,000 or 8,000 feet, where heavy frosts prevail every night, can, by no stretch of the imagination, be made to appear comfortable. It may, as a novelty, be endured for one or two nights, but at the end of that period the average summer visitor prefers to seek a lower altitude and the comforts of a good hotel.

The Cottage Hotel at Mammoth Hot Springs, owned and managed by the lessees, Walter J. and Helen L. Henderson, has been enlarged since last year, and is now a well-appointed hotel with accommodations for about one hundred guests. The rates at this hotel are $2.50 per day or $10 per week.

Mr. John F. Yancy keeps at Pleasant Valley, on the Cook City road, a comfortable hotel which is much frequented by lovers of trout-fishing, and, being near the junction of the horse-back trail from the Grand Cañon with the road, is a convenient stopping place. He can accom-

modate comfortably twenty guests, and his rates are $2 per day or $10 per week.

The hotel of the Park Association, at Mammoth Hot Springs, is of ample dimensions, and is well equipped and conducted. Workmen are now engaged in putting in the requisite appliances for electric lights, which will add greatly to security from fire as well as to the convenience of the guests.

The loss of the new hotel of the Park Association at the Norris Geyser Basin, by fire, on the 14th of July, was a serious misfortune not only to its owners but to the visiting public. Since its destruction visitors have been served as well as possible in tents. The temporary structure which was at once commenced is now completed, and will afford sleeping accommodations for about sixty persons.

The Park Association still maintains at the Grand Cañon the temporary hotel structure which was erected in the spring of 1886, supplemented by tents, and can probably accommodate at that point about seventy guests. Appreciating the necessity for some accommodation for visitors at the lake, I have permitted Mr. Gibson's representatives to pitch some tents there upon the condition that they shall be removed at the end of the season, and all camp débris well destroyed.

The hotel at the Lower Geyser Basin, formerly known as Marshall's Hotel, is under the management of the Park Association. Two "cottages," so called, were erected at this place in the spring or summer of 1886, flanking the hotel building on either side. These structures seem to be needlessly ugly in architectural design, resembling nothing so much as the section houses of a railroad. About seventy guests can be taken care of at this point. All of the buildings at this place are of poor and mean construction, and should be replaced by a commodious and well-constructed building capable of accommodating at least one hundred guests.

The hotel at the Upper Geyser Basin is still conducted in the barn-like structure left by the Park Improvement Company. It is in a more dilapidated condition than last year, being considered not worth repairing. It will probably accommodate fifty persons. The location of this building, as stated in my last report, is, contrary to law, within one-fourth of a mile of the Old Faithful Geyser.

It is proper to state that all of the hotels of the Park Association are well conducted. The service is generally excellent, the food is well cooked, and the beds are clean. The rates charged are $4 per day for a less period than ten days, $3 per day beyond that time, with special rates for longer periods. When the difficulty of providing supplies and service at these remote points is considered, it is believed that these charges are not excessive.

In closing this subject I urgently invite your attention to the importance of requiring on the part of the lessees a more adequate and suitable provision for the comfortable lodging of visitors.

TRANSPORTATION.

The transportation facilities provided by the lessees within the Park have been excellent in character, and amply sufficient for the demands of travel. The drivers employed have been generally skillful in their profession, and sober, intelligent, and reliable men. No serious accidents have occurred, and no complaints of negligence, incivility or extortion have been made. The enforcement of the regulation which forbids "any person to engage in business in the Park without permis-

sion in writing from the Department of the Interior," has had the effect of ridding the Park of a large number of irresponsible persons, who during the summer came in to prey upon the tourists. A considerable business in transportation is done by persons residing without the Park, but no instance of unfair dealing by them has come to my knowledge.

I append to this report (marked D) the rates of transportation as charged by the three lease-holders at this place, approved by me and submitted for the action of the Department July 10, 1887.

ROADS OF THE PARK.

The travelled wagon roads in the Park are at this date as follows:

(1) A road from the town of Gardiner, on the northern border of the Park, to the Upper Geyser Basin, a distance of about 50 miles. The graded portions of this road are in extent as follows: From Gardiner, via Mammoth Hot Springs, to near Swan Lake, about 10 miles. From Willow Park to the Norris Geyser Basin, about 10 miles. From Gibbon Meadows to the head of Gibbon Cañon, about 6 miles. From the Lower Geyser Basin to the Upper Geyser Basin, 9¾ miles. The portion of this road not yet graded is in fair condition and perfectly safe for travel, a considerable amount of labor having been expended upon it yearly for repairs.

(2) A road from the Norris Geyser Basin via the Grand Cañon and Falls of the Yellowstone to Lake Outlet, about 27 miles. This road is graded for a distance of about 8 miles from the Norris Basin. The remainder of the road is in fair condition at this date. The portion of the road between the Falls and the lake is not ordinarily in condition for travel before about the middle of July, the altitude being such as to prevent the early melting of the snow.

(3) A road diverging from the road to the Lake in Hayden Valley, about 8 miles from the Falls and extending to the Lower Geyser Basin, via Mary's Lake and Nez Percé Creek. The distance from the Falls of the Yellowstone to the Lower Geyser Basin by this route is about 32 miles. The road is ungraded, but in fair condition, being an excellent natural road with the exception of a somewhat precipitous descent from the plateau between the waters of the Madison and Yellowstone, on its western slope. This road from its altitude is seldom open for travel before the middle of July.

(4) A road from the Lower Geyser Basin to the western border of the Park, about 20 miles. This road extends beyond the Park limits to Beaver Cañon Station, a stage line from that point bringing visitors to the Park at the Lower Geyser Basin. This is a fair mountain road and safe for travel.

(5) A road diverging from the main Park road near Mammoth Hot Springs and extending via the cañon of the East Gardiner River, Barronette's Bridge, and Soda Creek, to the northeastern corner of the Park, about 55 miles, and to Cook City, some 5 miles farther on. This road, over which all supplies for the mining camp of Cook City are freighted, is through a rough and hilly country and throughout the greater portion of its extent is unimproved. Some slight grades have been made where it was absolutely necessary, and a few rude bridges constructed. The road has been chiefly built and kept in repair by private enterprise and is by far the worst road in the Park, being well-nigh impassable a large portion of the year. Toll is very properly charged at Barronette's Bridge, as it could not otherwise be kept in repair by private means. The bridge across Lamar River is in a very di-

lapidated condition and will probably not last more than a year or two longer. It would seem to be eminently proper that this road, within the Park limits, should be taken in charge by the Government, the Barronette's Bridge claim extinguished, and the road kept in proper and safe condition for travel.

Summarizing the above, it will be seen that the total extent of the traveled wagon roads in the Park is about 177 miles. The portion of these roads which has been constructed under the supervision of an officer of the Corps of Engineers, U. S. Army, amounting to about 44 miles, is well built with a grade about 18 feet wide, properly ditched and drained, the streams being crossed by well-constructed bridges.

In addition to these wagon roads there are a number of trails or bridle-paths to different points of interest, which are kept in condition for travel by Government means.

As the roads of the Park are exclusively under the control of an officer of the Corps of Engineers, U. S. Army, and as his estimates for road construction and repair have already been made and submitted for the action of the Chief of his Corps, any recommendations on the subject from me may be superfluous; but nevertheless, following the custom of this office, I will include in my estimate of appropriations the sum which has been considered sufficient by Capt. Clinton B. Sears, Corps of Engineers, U. S. Army, the officer charged with the duty of road construction and repair in the National Park, for the continuation of his work during the next fiscal year, which is $130,000.

In my last annual report I recommended the construction of a good road from the Upper Geyser Basin, the terminus of the present road, to the Shoshone Geyser Basin; thence around the southern shore of Shoshone Lake and across the continental divide to the west arm of Yellowstone Lake; thence along the western shore of Yellowstone Lake to Lake Outlet, and along the Yellowstone River to the Falls and Grand Cañon. From the Falls the road to be continued down the Yellowstone to a junction with the present road to Cook City, the latter road to be improved from the point of junction to Mammoth Hot Springs. Believing this scheme to be substantially in accord with the views of Captain Sears, I earnestly renew my recommendation that a sufficient amount be appropriated to warrant the beginning of this work.

This National Park having been, in the words of the statute, "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 pleasuring ground for the benefit of the people," has become a national trust; and it would seem that the policy which refuses, by a proper appropriation, to open and render accessible this "wonder land" is opposed to the sentiment which created the Park and unworthy a great nation whose treasury overflows with accumulated wealth.

BOUNDARIES OF THE PARK.

The following are the present boundaries of the Park as defined by law:

Commencing at the junction of Gardiner's River with the Yellowstone River and running east to the meridian passing 10 miles to the eastward of the most eastern point of Yellowstone Lake; thence south along said meridian to the parallel of latitude passing 10 miles south of the most southern point of Yellowstone Lake; thence west along said parallel to the meridian passing 15 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's Rivers; thence east to the place of beginning.

It has been proposed to rectify and change these boundaries as follows:

Beginning at a point on the forty-fifth parallel of north latitude where said parallel is intersected by the western boundary of the Territory of Wyoming; thence due east to its point of intersection with the meridian of 110 degrees west longitude; thence due south 5 miles; thence due east to the meridian of 109 degrees and 30 minutes west longitude; thence due south along said meridian to the forty-fourth parallel of north latitude; thence due west along said parallel to its point of intersection with the west boundary of the Territory of Wyoming; thence due north along said boundary line to the place of beginning.

While there are some undoubted advantages to the Park in the proposed changes, there would be a very serious disadvantage in permitting a frontier town, with its saloons, gambling houses, and disreputable resorts, to approach within 2 miles of this place, which is, and will of necessity continue to be, the headquarters of the Park and the principal resort of visitors.

The disorders of the neighboring town of Gardiner, 5 miles distant, which now overflow into the Park, are a constant and serious source of annoyance. Should the town approach to within the distance permitted by the proposed change of boundary, and the present condition of lawlessness, with the unrestricted sale of liquor, continue, it would be well-nigh impossible by the present methods of government in the Park to preserve such a degree of order here as would make the place pleasant and desirable to visitors. The constant agitation of the subject of a change of the boundary lines of the Park has probably the effect of postponing the very important measure of an accurate survey of the present boundaries. I have embraced in my estimate of appropriations an amount sufficient to accomplish this purpose, and cannot too strongly urge its importance. The present uncertainty is a constant invitation to lawless hunters and others to encroach upon the Park, and adds greatly to the annoyance and labors of those charged with its protection.

THE PROTECTION OF THE PARK.

The Park has been protected during the past year by means of the employment of the military force under my command in the enforcement of the rules and regulations established by the Secretary of the Interior in accordance with law. The force at my disposal for this purpose has been one troop of cavalry, the maximum strength of which is three commissioned officers and sixty-four enlisted men, but by the casualties of service the ordinary strength of the command is much below this number. For the quartering and subsisting of this force the post of Camp Sheridan has been established at Mammoth Hot Springs, Wyoming.

The buildings of this post are eight in number, as follows:

No. 1. One cottage, officers' quarters, 65 feet long, 28 feet wide, 16 feet high, with a T 22 feet long, 22 feet wide, 10 feet high (weatherboarded).

No. 2. Post hospital, 44 feet long, 24 feet wide, 10 feet high, with an L 20 feet long, 10 feet wide, 10 feet high.

No. 3. Headquarters office, 36 feet long, 26 feet wide, 10 feet high.

No. 4. Men's barracks, 130 feet long, 24 feet wide, 10 feet high, with a back extension, 55 feet long, 18 feet wide, 10 feet high, forming with the main building a T.

No. 5. Storehouse, 100 feet long, 24 feet wide, 10 feet high.

No. 6. Guard-house, 26 feet long, 20 feet wide, 10 feet high.

No. 7. Cavalry stable, 150 feet long, 26 feet wide, 10 feet high.

No. 8. Quartermaster's stable, 50 feet long, 25 feet wide, 10 feet high.

These buildings are somewhat roughly constructed, and are of a temporary character, but afford good and sufficient protection for men, animals, and supplies, and are not unsightly. They are located nearly south of the building known as the superintendent's headquarters, and east of the hot spring terraces.

A military post involves the maintenance of a sufficient garrison for the proper care and protection of buildings and supplies by military methods, which in this instance correspondingly reduces the number of men available for distribution through the Park.

Stations have been established within the Park and are occupied as follows: At Soda Butte during the whole year. At Norris Geyser Basin, the Grand Cañon, Lower Geyser Basin, and Upper Geyser Basin from June 1 to November 1. At Riverside, on the Madison River, from August 1 to November 1.

The men thus stationed make daily excursions in every direction from their several camps, and the protection thus afforded is supplemented by constant scouting operations directed by an experienced scout and mountaineer acquainted with all of the trails, and indeed with every inch of ground within the Park. It is believed that the measures thus taken have been reasonably efficient in protecting the game of the Park, its various objects of wonder and beauty, and its forests. I am, however, convinced that the force at my disposal is inadequate to the proper protection of the Park during the tourist season. If it should be increased by two additional scouts and by one company of infantry from June 1 to October 15, it would probably be sufficient during the next year, but as travel to the Park increases and the game outside of its limits diminishes a much larger force will be necessary to give proper protection.

In my last report I alluded to the necessity which existed for an established form of government for the Park. That necessity still exists. It may be possible to give the Park sufficient protection by the employment of an adequate military force and a number of experienced scouts. But should this method be adopted it will be expedient to request such legislation as shall define the jurisdiction of the Territorial courts within the Park, so as to permit the same powers which they now have with reference to other reservations, and the enactment of a stringent law for the protection of the game.

In connection with the subject of park protection I append to this report copy of an order issued for the guidance of the enlisted men of my command in the discharge of their duties (marked E), and for convenience of reference a copy of the rules and regulations of the Park (marked F).

THE GAME AND ITS PROTECTION.

I am gratified to be able to report that the rules for the protection of the game in the Park have been generally well observed and respected.

One or two isolated instances of unlawful killing have occured, but immense herds of elk have passed the winter along the traveled road from Gardiner to Cook City with the same safety which herds of domestic range cattle enjoy in other localities. Several stacks of hay which had been placed along this road in anticipation of winter freighting, were appropriated and doubtless enjoyed by these animals. It is difficult to form any accurate estimate concerning the number of elk that passed the winter in the Park; certain it is that the number that win-

tered in the valley of Lamar River and on its tributaries have been estimated by all who saw them at several thousands. The elk are accustomed, when driven out of the mountains by the snows of winter, to follow down the course of the mountain streams into the lower valleys. For this reason but little efficient protection can be afforded to this species of large game in the Park except upon the Yellowstone River and its tributaries.

The elk which follow down the outward slopes of the mountains surrounding the Park along the tributaries of the Madison and the Gallatin on the west, or the Snake River on the south, pass beyond the Park limits before the hunting season permitted by the Territorial laws has closed, and fall an easy prey to the hunters who are in wait for them.

A small number of buffalo still remain in the Park, but after as careful and thorough an investigation as is practicable I am unable to state their numbers with any approach to accuracy. My impression is that they have been heretofore somewhat overestimated, and that at the present time they will not exceed one hundred in number. They are divided into three separate herds. One of these ranges between Hellroaring and Slough Creeks; in summer well up on these streams in the mountains, outside the Park limits, and in the winter lower down on small tributaries of the Yellowstone, within the Park. If the reports made several years ago can be relied on, this herd has rapidly diminished, and it is doubtful if it now exceeds some twenty or thirty in number. Whether or not this decrease has been due to illegal killing by hunters or to other causes I am unable to say, though I do not believe that many have been killed within the past two years. Another herd ranges on Specimen Mountain and the waters of Pelican Creek. The herd was seen by reliable parties several times last winter and was variously estimated at from forty to eighty. A traveler on the Cook City road claimed to have counted fifty-four near the base of Specimen Ridge. A scouting party which I sent out during the month of May found but twenty-seven head of this herd, with four young calves. It is possible that the herd at this time was broken up and that but one portion of it was found. The third herd ranges along the continental divide and is much scattered. A band of nine or ten from this herd was seen several times this spring in the vicinity of the Upper Geyser Basin. It will take close observation for several years to determine with any certainty the number of these animals, or whether or not they are diminishing in numbers. It is practically certain that none have been killed within the Park limits during the past two years, and yet there is an equal certainty that the present numbers do not approach those of past estimates.

Large numbers of antelope are found in the Park. A herd of some two hundred passed the winter within a mile of the town of Gardiner, pasturing on the plain between the Yellowstone and Gardiner Rivers, south of the town. They were unmolested, though it was found necessary to occasionally drive them back towards the hills, that they might not get beyond the Park limits.

The mountain sheep are found in all of the mountain ranges within the Park. A band of seven or eight spent a large portion of the winter in the cliffs along the traveled road between Mammoth Hot Springs and Gardiner, and they became so accustomed to the sight of travelers as to manifest but little more timidity or wildness than sheep of the domestic variety.

I have heard considerable anxiety expressed by those who profess interest in the Park lest the rule which protects equally all animals in the Park should work to the detriment of the game proper by causing an undue increase of the carnivora. But while it is true that there are some noxious animals that are not worthy of protection, chief among which is the skunk, or polecat, yet I am convinced that at the present time more injury would result to the game from the use of fire-arms or traps in the Park than from any ravages which may be feared from carnivorous animals.

THE GEYSERS AND HOT SPRINGS.

The United States Geological Survey, to which the National Park is indebted for the only accurate and reliable surveys and maps which have been made, has now in progress, under the direction of Prof. Arnold Hague, the work of mapping topographically the different geyser basins and hot-spring localities throughout the Park. The importance of this work cannot be overestimated.

It will serve to fix and render permanent the established and authorized names of the different objects of interest, and check the tendency which has prevailed of attaching personal, fanciful, or absurd names to nature's most grand and wonderful objects.

The new rules and regulations of the Park, together with increased watchfulness and care, has had the effect of suppressing in a great degree the former vandalism which was rapidly destroying the beauty of the geyser and hot-spring formations. The throwing of foreign substances into the springs and geyser vents has been quite effectually checked. The number of foolish visitors who have found pleasure in defacing the beauties of nature by written inscriptions of their names is less than that of previous years, though I regret to say the practice has not been entirely suppressed. Nothing short of the arrest and expulsion from the Park of a number of these offenders, who have the outward appearance of ladies and gentlemen, will probably be effectual to stop the practice.

I have, as far as practicable with the means at my disposal, caused the grounds and formations in the vicinity of the objects of interest to be cleaned up and all unsightly objects, such as old tin cans, bottles, &c., to be removed.

This has been a labor of love on the part of the soldiers, as it cannot be considered any part of their duty in connection with the Park. I allude to the subject chiefly to emphasize the necessity of providing a certain sum to be expended by the Superintendent of the Park in keeping it in proper order. I advocate no expensive improvements beyond the construction of the necessary roads, bridges, and bridle-paths necessary to make accessible the wonders and beauties of the Park; but the accumulation of unsightly rubbish which is brought into the Park by the numerous camping parties and visitors is such as to very seriously mar the beauty of those objects which are the attractive features of the Park. In my opinion this "wonderland" should for all time be kept as nearly as possible in its natural and primitive condition. No appliances of art and no expenditure of money can improve upon this condition. But the history of all like reservations has shown that where large numbers of visitors came to view nature's wonders, a constant expenditure of labor is essential to preserve those natural conditions which charm and attract the busy workers of the world.

There are now scattered throughout the Park many abandoned and unsightly cabins and shacks, and the débris of a hundred camps. I had hoped to be able to clear up and remove much of this old material, but the press of other duties has forbidden the employment of the soldiers for this work, and I have not had a dollar at my disposal for this or any other purpose connected with the improvement of the Park.

The sign-boards, which have been previously provided under more fortunate circumstances, showing the names of the various objects of interest are becoming obliterated by the action of the weather and should be renovated and replaced, and others should be provided as new objects are discovered and brought to notice. The appearance of neglect throughout the Park, due to the absence of any appropriation for its care and preservation, must be a source of mortification to any right-minded officer performing the duties of Superintendent, and who, by public opinion at least, is held responsible for its condition.

I have included in my estimate of appropriations a modest sum for the "care and preservation of the National Park, to be expended under the direction of the officer charged with its protection," and trust that it may receive your favorable indorsement.

APPROPRIATIONS.

I inclose with this report my estimate of appropriations for the fiscal year ending June 30, 1889, for the improvement and preservation of the Yellowstone National Park, and for convenience of reference summarize the items as follows, viz:

For construction of roads and bridges	$130,000
For care and preservation of the Park, the sum to be expended by the officer charged with the protection of the Park	3,000
For the settlement of the Barronette's bridge claim (or so much thereof as may be awarded by a duly constituted commission)	2,000
For accurately surveying and marking the boundary lines of the Park	10,000
Total	145,000

Before closing my report it is fit and proper that I should acknowledge with thanks the assistance given me in the protection of the Park by Mr. Ed. Wilson, scout and guide, who has always been zealous and untiring in the discharge of his duties; by the officers of my command, whose valuable aid has been cheerfully given; and to the enlisted soldiers, who have shown the value of military discipline and training in the efficient discharge of new and unaccustomed duties requiring patience, intelligence, and discretion.

I am sir, very respectfully, your obedient servant,

MOSES HARRIS,

Captain First Cavalry, Acting Superintendent.

The SECRETARY OF THE INTERIOR,

Washington, D. C.

A.

Meteorological record kept at Mammoth Hot Springs, Yellowstone National Park, from November 5, 1886, to July 31, 1887.

NOVEMBER, 1886.

Dates.	Self-registering thermometer.			Winds.		State of weather.	Remarks.
	Maximum.	Minimum.	Mean.	Direction.	Force.		
1886.	°	°	°				
Nov. 5	40	8	24	W.	Light breeze	Fair	
6	48	17	31.50	SW.	Calm	do	
7	56	20	38	S.	do	Clear	
8	42	27	34.50	SW.	Light breeze	Fair	
9	35	16	25.50	N.	Gentle breeze	do	Light snowfall during night.
10	32	5	18.50	NW.	Fresh breeze	do	
11	33	7	20	NW.	Light breeze	Clear	
12	42	18	30	SW.	Strong wind	Fair	
13	45	19	32	S.	Calm	do	
14	25	5	15	NW.	Gentle breeze	Cloudy	Snow during night.
15	14	— 5	4.50	NW.	Light breeze	Clear	
16	14	8	11	NW.	High wind	Cloudy	Snow in the morning.
17	28	12	20	SW.	Light breeze	Fair	
18	30	8	19	SW.	Calm	do	Snow in the afternoon.
19	21	14	17.50	SE.	Gentle breeze	do	
20	28	13	20.50	W.	Calm	Cloudy	Light snowfall in the afternoon.
21	16	—17	—0.50	NW.	Gentle breeze	Fair	Snow during night.
22	10	— 6	2	NW.	Fresh breeze	Clear	
23	22	5	13.50	SW.	Calm	Fair	
24	21	10	15.50	SW.	Light breeze	do	
25	32	17	24.50	SW.	Calm	do	
26	33	16	24.50	SW.	Strong wind.	Entire clear	
27	35	23	29	S.	Light breeze	Fair	
28	34	28	31	SW.	Calm	Cloudy	Snow during day.
29	37	27	32	SW.	Light breeze.	Fair	
30	39	25	32	SW.	Calm	do	
Monthly mean			21.75				

Summary for November, 1886.

An earthquake occurred at Norris and vicinity at 1 a. m., the 7th instant. The hotel was shaken violently, dishes fell from the shelves in the china closets, and lamps were thrown from their brackets. Distinct waves followed during the following few days.

Average cloudiness (scale of ten)	4.36
Number of days on which cloudiness averaged 8 or more on a scale of ten	4
Number of days of snow	9
Depth of snowfall during the month ... inches	7.5
Temperature during the month:	°
Highest	56
Lowest	—17
Mean	21.75

Meteorological record kept at Mammoth Hot Springs, &c.—Continued.

DECEMBER, 1886.

Dates.	Self-registering thermometer. Maximum.	Minimum.	Mean.	Winds. Direction.	Force.	State of weather.	Remarks.
1886.	°	°	°				
Dec. 1	40	22	31	SE.	Very light breeze.	Clear	
2	36	25	30.50	SE.	Light breeze	Fair	
3	33	26	29.50	SE.	Calm	Cloudy	Snow during night.
4	40	30	35	W.	do	Fair	
5	38	29	33.50	S.	do	do	
6	41	21	31	W.	do	do	
7	37	28	32.50	S.	Light breeze	do	Light snowfall in the afternoon.
8	41	34	37.50	SE.	Gentle breeze	do	Rain at intervals during day.
9	36	23	29.50	SE.	Calm	Cloudy	
10	31	11	21	NW.	do	Fair	
11	25	21	23	SE.	do	Clear	Snow during night.
12	32	22	27	SW.	Gentle breeze	Fair	
13	36	23	29.50	S.	Calm	Clear	Light snowfall in the morning.
14	34	18	26	S.	Light breeze	do	
15	31	26	28.50	SE.	Gentle breeze	Fair	
16	35	18	26.50	SW.	Calm	Entire clear	
17	26	19	22.50	NW.	Light breeze	Clear	Snow during night.
18	38	15	26.50	SW.	Calm	Entire clear	
19	44	18	31	S.	Gentle breeze	Fair	Snow at and during night.
20	26	17	21.50	SW.	Calm	do	
21	24	12	18	E.	Strong wind	do	
22	25	12	18.50	NW.	Fresh breeze	do	
23	24	16	20	SW.	Strong winds	do	
24	34	19	26.50	NW.	Strong wind	Cloudy	Snow.
25	30	—10	10	SE.	Fresh breeze	Entire cloudy	Do.
26	18	8	13	W.	Calm	Cloudy	Do.
27	33	5	19	S.	do	Fair	Do.
28	41	24	32.50	SE.	Strong wind	Cloudy	Do.
29	36	26	31	S.	Fresh breeze	do	Do.
30	36	17	26.50	SE.	Calm	do	Do.
31	32	21	26.50	SE.	do	Fair	Do.
Monthly mean			26.27				

Summary for December, 1886.

Average cloudiness (on a scale of ten)	4.77
Number of days on which cloudiness averaged 8 or more on a scale of ten	8
Number of days of rain	1
Number of days of snow	15
Depth of snowfall during the month ... inches	34.5
Temperature during the month:	°
Highest	44
Lowest	—10
Mean	26.80

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Meteorological record kept at Mammoth Hot Springs, &c.—Continued.

JANUARY, 1887.

Dates.	Self-registering thermometer. Maximum.	Minimum.	Mean.	Winds. Direction.	Force.	State of weather.	Remarks.
1887.	°	°	°				
Jan. 1	38	24	31	W.	Gentle breeze.	Fair	
2	39	21	30	SE.	Strong wind	do	
3	32	20	26	NW.	Calm	Cloudy	Snow.
4	22	13	17.50	SE.	Gentle breeze	do	Do.
5	24	—3	10.50	NE.	Light breeze	Entire cloudy	Do.
6	38	—1	18.50	W.	Gentle breeze.	Fair	Rain in the forenoon. Snow in the afternoon.
7	26	—12	7	N.	do	Fair	Snow in the forenoon.
8	6	—21	—7.50	SW.	Calm	Clear	
9	14	—3	5.50	SW.	Fresh breeze	do	
10	27	6	16.50	SE.	Gentle breeze	Fair	Light snowfall, forenoon.
11	28	10	19	SE.	Fresh breeze	Cloudy	
12	30	15	22.20	NW.	do	Entire cloudy	Snow.
13	32	18	25	SE.	Gentle breeze.	Cloudy	Do.
14	38	20	29	S.	Strong wind	Fair	Rain and snow at intervals.
15	39	18	28.50	SW.	do	Entire cloudy	Snow.
16	20	8	14	SW.	Fresh breeze	Fair	Do.
17	22	4	13	SE.	Strong wind	do	Do.
18	29	10	19.50	SE.	High wind	do	Do.
19	40	20	30	SE.	Gale	do	Rain forenoon. Snow at night.
20	28	12	20	SE.	Fresh breeze	Cloudy	Snow.
21	30	16	23	W.	do	Fair	Do.
22	24	12	18	SW.	Light breeze	do	Do.
23	30	15	22.50	W.	Fresh breeze	Cloudy	Do.
24	32	12	22	NW.	do	Fair	Do.
25	17	3	10	SE.	do	do	
26	21	10	15.50	SW.	Strong wind	Cloudy	
27	22	11	16.50	NW.	do	Fair	
28	18	10	14	SW.	Gentle breeze.	Cloudy	Snow.
29	28	18	23	S.	Calm	Entire cloudy	Do.
30	36	22	29	NW.	do	Cloudy	Do.
31	19	5	12	NW.	Light breeze	Fair	Light snowfall, afternoon.
Monthly mean			18.99				

Summary for January, 1887.

During the 18th heavy snow fell nearly all day, accompanied by high southeasterly wind (Force 5). At 3 10 p. m. on the 19th a northwesterly gale set in, and continued until 5 p. m. Thermometer fell rapidly from 38° at 3 p. m. to 20° at 5 p. m. Telephone wires and poles were blown down in several places between here and Norris.

There was a slight but distinct earthquake shock at Norris during the month. Exact information could not be obtained, because the lines are down.

Solar halos were observed on the 2d, lunar halos on the 2d and 3d.

Average cloudiness (scale of ten)	5.0[illegible]
Cloudiness averaged 8 or more (scale of ten) on ..... days	[illegible]
Number of days of rain	[illegible]
Number of days of snow	2[illegible]
Depth of snowfall during the month ..... inches	7[illegible]
Depth of snow on the ground at the close of the month ..... do	1[illegible]
Temperature during the month:	°
Highest	40
Lowest	—21
Mean	18.[illegible]

Meteorological record kept at Mammoth Hot Springs, &c.—Continued.

FEBRUARY, 1887.

Date.	Self-registering thermometer.			Wind.		State of weather.	Remarks.
	Maximum.	Minimum.	Mean.	Direction.	Force.		
1887.	°	°	°				
Feb. 1	13	—28	— 7.50	NE.	Calm	Cloudy	Snow.
2	—16	—30	—23	NE.	do	Fair	Snow from 9 to 11 o'clock a. m.
3	16	—19	— 1.50	NW.	Light breeze	do	Snow at intervals.
4	28	—22	3	SE.	do	Entire cloudy	Heavy snow.
5	31	— 2	14.50	SE.	do	Fair	Snow.
6	45	3	24	S.	Fresh breeze	Cloudy	Snow—rain, afternoon.
7	29	16	22.50	S.	do	Fair	Light snowfall at intervals.
8	31	15	23	SE.	Calm	Cloudy	Snow.
9	26	— 4	11	NE.	do	Entire cloudy	Heavy snow.
10	10	—15	— 2.50	NE.	do	Fair	Snow.
11	25	— 7	9	SW.	Light breeze	do	
12	30	18	24	S.	Gentle breeze	do	Snow.
13	29	20	24.50	S.	do	do	Do.
14	19	4	11.50	SW.	Calm	do	Light snowfall at intervals.
15	39	3	21	S.	do	Clear	
16	33	10	21.50	SW.	do	Cloudy	Snow.
17	28	12	20	W.	Light breeze	Fair	
18	29	3	16	NW.	Calm	do	
19	29	7	18	NW.	do	do	Light snowfall at intervals.
20	15	— 8	3.5	SE.	do	Entire clear	
21	24	0	12	SE.	do	Fair	Light snowfall, afternoon.
22	24	— 3	10.50	SE.	Light breeze	Clear	
23	25	7	16	SW.	Calm	Fair	Snow at night.
24	27	16	21.50	SW.	Fresh breeze; high wind at night	Cloudy	Snow.
25	24	3	13.50	SE.	Gentle breeze	Fair	
26	25	12	18.50	SW.	do	do	Light snowfall at intervals.
27	39	19	29	S.	Calm	do	
28	47	28	37.50	S.	Gentle breeze	Clear	
Monthly mean			15.2				

Summary for the month of February, 1887.

Average cloudiness	5.73
Cloudiness averaged 8 or more (scale of ten) on ....days	5
Number of days of rain	1
Number of days of snow	19
Depth of snowfall during the month ....inches	46.5
Depth of snow on the ground at the close of the month ....do	4
Temperature during the month:	°
Highest	47
Lowest	—30
Mean temperature	16.5

Meteorological record kept at Mammoth Hot Springs, &c.—Continued.

MARCH, 1887.

Date.	Self-registering thermometer.			Winds.		State of weather.	Remarks.
	Maximum.	Minimum.	Mean.	Direction.	Force.		
1887.	°	°	°				
Mar. 1	48	31	39.50	S.	Strong wind	Fair	
2	42	24	33	SE.	Light breeze	Cloudy	Snow.
3	35	3	19	N.	Calm	Clear	
4	42	2	22	SE.	Gentle breeze	Cloudy	Snow.
5	36	25	30.50	SW.	Fresh breeze	Fair	
6	45	27	36	W.	Gentle breeze	do	Light snowfall.
7	46	30	38	SW.	Calm	do	
8	44	20	32	SW.	do	do	
9	46	31	38.50	S.	Light breeze	Cloudy	
10	54	38	46	SW.	do	Fair	
11	55	36	45.50	SW.	Gentle breeze	do	
12	53	28	40.50	SW.	Calm	Clear	
13	54	27	40.50	S.	Fresh breeze	do	
14	54	32	43	SE.	Gentle breeze	Fair	
15	49	28	38.50	S.	Light breeze	Cloudy	Sprinkling forenoon.
16	56	38	47	SW.	Calm	Clear	
17	59	32	45.50	SW.	do	Fair	Light rain during night.
18	52	28	40	NW.	Gentle breeze	Cloudy	Rain; light rain and snow; sleeting afternoon.
19	44	11	27.50	NW.	Calm	Clear	
20	52	13	33.50	SW.	do	do	
21	36	21	28.50	NW.	Fresh breeze	Fair	Snow during night.
22	55	15	35	SW.	Calm	Clear	
23	50	26	38	S.	Light breeze	do	
24	48	27	37.50	SW.	Calm	Fair	Light snowfall.
25	45	30	37.50	SW.	Fresh breeze	do	
26	35	20	27.50	NW.	Gentle breeze	do	Sleeting forenoon; light snow afternoon.
27	47	17	32	SW.	Calm	Clear	Light snow forenoon.
28	58	30	44	S.	do	Fair	
29	44	28	36	W.	Gentle breeze	Entire cloudy	Rain; sleeting afternoon; snow during night.
30	40	22	31	SE.	Calm	Fair	
31	44	20	32	S.	Light breeze	do	Snow at and during night.
Monthly mean			36.94				

Summary for March, 1887.

Average cloudiness	4.77
Cloudiness averaged 8 or more (scale of ten) on ... days	1
Number of days of rain	3
Number of days of sleet	3
Number of days of snow	9
Depth of snowfall during the month ... inches	6.5
Depth of snow on the ground at the close of the month ... do	.5

Temperature during the month:	°
Highest	59
Lowest	2
Mean	34.6

Meteorological record kept at Mammoth Hot Springs, &c.—Continued.

APRIL, 1887.

Date.	Self-registering thermometer. Maximum.	Minimum.	Mean.	Winds. Direction.	Force.	State of weather.	Remarks.
1887.	°	°	°				
Apr. 1	52	36	44	SW.	Gentle breeze	Fair	
2	54	22	38	SE.	Light breeze	Cloudy	Heavy snow afternoon; 2.50, high S. wind; 3.40, gale, NW.; 6.10, strong gale.
3	38	14	26	NW.	do	Fair	
4	51	16	33.50	W.	Fresh breeze	do	
5	53	35	44	SW.	Calm	do	
6	65	28	46.50	S.	Light breeze	do	
7	66	36	51	S.	Gentle breeze	do	
8	48	35	41.50	SW.	Calm	Cloudy	Light rain.
9	56	28	42	S.	do	Entire cloudy	
10	47	30	38.50	NW.	Fresh breeze	Cloudy	Light snow; rain afternoon.
11	40	29	34.50	SE.	Gentle breeze	Cloudy	
12	47	28	37.50	S.	Fresh breeze	Fair	Heavy snow 8.40 p. m. and during night.
13	52	20	36	NW.	Light breeze	do	
14	50	30	40	W.	Calm	do	
15	58	24	41	NW.	Gentle breeze	Cloudy	Light snow and rain.
16	54	31	42.50	NW.	Calm	Fair	
17	53	30	41.50	NW.	Strong wind	Cloudy	Sleeting, followed by heavy snowfall.
18	35	21	28	W.	Fresh breeze	Fair	
19	44	13	28.50	S.	Calm	do	
20	42	28	35	W.	Gentle breeze	do	Snow at intervals.
21	31	27	29	NW.	Strong wind	Entire cloudy	Snow.
22	41	22	31.50	NW.	Fresh breeze	Cloudy	Light snow and rain.
23	42	23	32.50	W.	Calm	Fair	
24	40	18	29	SW.	Light breeze	Cloudy	
25	49	27	38	SW.	Calm	Fair	Snow at night.
26	56	32	44	S.	Light breeze	Cloudy	Light snowfall.
27	62	36	49	S.	Calm	Fair	
28	67	38	52.50	S.	Light breeze	do	
29	70	41	55.50	S.	Gentle breeze	do	4.15 to 4.35 p. m. sprinkling, followed by strong S. gale and heavy rain.
30	41	33	37	NW.	Strong wind	Cloudy	
Monthly mean			38.92				

Summary for April, 1887.

Average cloudiness	6.08
Cloudiness averaged 8 or more on ... days	11
Number of days of rain	5
Number of days of sleet	1
Number of days of snow	10
Depth of snowfall during the month ... inches	14
Temperature during the month:	°
Highest	70
Lowest	13
Mean	36.9

Meteorological record kept at Mammoth Hot Springs, &c.—Continued.

MAY, 1887.

Dates.	Self-registering thermometer. Maximum.	Minimum.	Mean.	Winds. Direction.	Force.	State of weather.	Remarks.
1887.	°	°	°				
May 1	46	27	36.50	NW.	Fresh breeze	Fair	
2	57	22	39.50	S.	Light breeze	do	Snows during night.
3	56	37	46.50	SW.	Fresh breeze	Cloudy	Rain.
4	58	39	48.50	S.	Gentle breeze	Fair	
5	60	38	49	S.	High wind	do	
6	67	40	53.50	S.	Fresh breeze	Clear	
7	48	30	38	SE.	do	Fair	Light snowfall.
8	63	36	49.50	SW.	Calm	do	
9	75	39	57	S.	do	Entire clear	
10	71	42	56.50	W.	do	Entire clear	
11	46	27	36.50	W.	do	Cloudy	Snow.
12	38	27	32.50	NW.	do	Fair	
13	36	24	30	W.	do	do	
14	54	23	38.50	S.	do	do	
15	56	28	42	W.	Fresh breeze	Cloudy	Snow.
16	57	30	43.50	SW.	Calm	Clear	
17	74	30	52	S.	do	do	
18	76	40	58	S.	do	Fair	Rain, afternoon.
19	67	38	52.50	SW.	Light breeze	do	
20	74	35	54.50	W.	Gentle breeze	do	
21	55	33	44	SW.	Light breeze	Clear	
22	66	28	47	SW.	Gentle breeze	Entire clear	
23	77	38	57.50	S.	Light breeze	Clear	
24	77	42	59.50	S.	do	Fair	Sprinkling.
25	67	41	54	NW.	Calm	Cloudy	Rain.
26	73	37	55	W.	Light breeze	Clear	
27	74	38	56	SE.	do	Fair	
28	75	38	56.50	W.	Fresh breeze	Clear	
29	76	39	57.50	SW.	Calm	Entire clear	
30	89	39	64	SE.	Light breeze	do	
31	81	47	64	W.	Calm	Cloudy	4.15 p. m. heavy rain accompanied by several distinct peals of thunder. 10 p. m., heavy rain and hail. Thunder-storm with strong electrical detonations and numerous lightning.
Monthly mean			49.31				

Summary for May, 1887.

Average cloudiness .....
Cloudiness averaged 8 or more on .....days..
Number of days of rain .....
Number of days of hail .....
Number of days of snow .....
Depth of snowfall during the month .....inches..
Thunder-storms .....

Temperature during the month:
Highest .....
Lowest .....

Mean .....

Meteorological record kept at Mammoth Hot Springs, &c.—Continued.

JUNE, 1887.

Dates.	Self-registering thermometer. Maximum.	Minimum.	Mean.	Winds. Direction.	Force.	State of weather.	Remarks.
1887.	°	°	°				
June 1	68	43	55.50	SE.	Gentle breeze	Fair	High NW. wind set in during night.
2	45	30	37.50	NW.	High wind	Cloudy	Snow.
3	65	26	45.50	S.	Gentle breeze.	Fair	
4	51	39	45	SW.	Calm	do	Rain.
5	59	37	48	SW.	Gentle breeze	Cloudy	Sprinkling.
6	61	38	49.50	S.	Calm	Fair	
7	69	36	52.50	SW.	do	Clear	
8	76	40	58	S.	do	do	
9	82	46	64	SW.	do	do	Rain, thunder-storm in the afternoon
10	72	39	55.50	S.	do	do	
11	74	41	57.50	W.	do	Fair	Light rain.
12	83	44	63.50	SE.	Gentle breeze	Clear	
13	81	40	60.50	S.	Light breeze	Entire clear	
14	76	46	61	S.	Calm	Cloudy	Rain and thunder-storm.
15	65	45	55	SE.	do	Fair	
16	66	44	55	S.	Gentle breeze.	do	Rain.
17	75	46	60.50	W.	Fresh breeze	do	
18	78	50	64	NW.	Calm	Clear	
19	78	47	62.50	SW.	Gentle breeze	Fair	
20	71	40	55.50	W.	Light breeze	Entire clear	
21	75	37	56	W.	Calm	do	
22	85	41	63	W.	Light breeze	Fair	
23	76	49	62.50	S.	Calm	do	
24	81	39	60	S.	Light breeze	do	Threatening.
25	87	51	69	S.	Gentle breeze	Cloudy	Rain, strong gale, and heavy rain during night.
26	59	42	50.50	S.	Strong wind	Fair	
27	73	33	53	NW.	Calm	Clear	
28	81	30	55.50	W.	do	Entire clear	
29	82	38	60	SW.	do	Fair	
30	81	42	61.50	W.	do	do	Sprinkling.
Monthly mean			54.84				

Summary for June, 1887.

Thunder-storms: 9th, temperature at the beginning of the rain, 2.20 p. m., 76°; during the storm at 3.50 p. m., 70°; at the close of the storm, 4.30 p. m., 71°; 14th, no considerable fluctuation of the thermometer.

Average cloudiness	3.68
Cloudiness averaged 8 or more on ..... days	3
Number of days of rain	8
Number of days of snow	1
Depth of snowfall	1.5
Temperature during the month:	
Highest	° 87
Lowest	26
Mean	57

Meteorological record kept at Mammoth Hot Springs, &c.—Continued.

JULY 1887.

Dates.	Self-registering thermometer.			Winds.		State of weather.	Remarks.
	Maximum.	Minimum.	Mean.	Direction.	Force.		
1887.	°	°	°				
July 1	76	39	57.50	S. W.	Light breeze	Fair	Rain; thunder-storm.
2	72	40	56	S.	Calm	do	
3	83	42	62.50	W.	do	Clear	
4	89	49	69	SW.	do	do	
5	90	48	69	W.	do	do	
6	93	52	72.50	S.	Gentle breeze	Fair	Thunder-storm; rain and hail.
7	84	54	69	NW.	Fresh breeze	Cloudy	Thunder between 2 and 3 p. m.
8	86	40	63	SW.	Calm	Clear	
9	87	48	67.50	SE.	Light breeze	Fair	
10	79	50	64.50	NE.	do	Cloudy	Rain.
11	77	48	62.50	SW.	Gentle breeze	Fair	Heavy rain and thunder-storm during night.
12	83	39	61	SE.	Light breeze	do	Rain at intervals.
13	82	59	70.50	E.	Gentle breeze	do	Rain, 1.15 to 2.20 p. m.
14	83	52	67.50	SW.	Fresh breeze	do	Heavy rain and thunder-storm; light rain at night.
15	76	46	61	SE.	Calm	Clear	
16	81	51	66	W.	do	do	
17	86	53	69.50	SE.	Gentle breeze	Fair	
18	82	52	67	NW.	Fresh breeze	do	Light rain; afternoon.
19	73	47	60	SW.	Calm	Cloudy	Light rain; thunder-storm.
20	73	50	61.50	NW.	Gentle breeze	do	Rain; thunder-storm.
21	72	45	58.50	NW.	Light breeze	Fair	Rain, hail; thunder-storm.
22	75	49	62	W.	Calm	Clear	
23	84	39	61.50	S.	Gentle breeze	do	
24	85	47	66	S.	Calm	Fair	
25	82	40	61	SW.	do	Clear	
26	65	43	54	NW.	Fresh breeze	Fair	
27	79	40	59.50	NE.	do	Clear	
28	81	41	61	W.	High wind	Fair	2.50 p. m. Strong westerly gale set in; ended with rain and thunder-storm.
29	78	39	58.50	SW.	Calm	Clear	
30	86	40	63	W.	Gentle breeze	Fair	
31	82	51	66.50	NW	do	do	
Monthly mean			63.60				

Summary for July, 1887.

Thunder-storms: 1st, no considerable fluctuation of thermometer. 6th, thermometer between 12 and 1 o'clock p. m., 93°; fell rapidly during the approach of the storm; at 2 p. m., 70°; 2.20 p. m., 60°; at the close of the storm, 2.50 p. m., 62°. 11th, during night. 14th, thermometer at 12 m., 82°; fell rapidly to 50° at 1 p. m. 19th, accompanied with strong electrical detonations; thermometer fell from 66° at 2.40 p. m., to 59° at the close of the storm at 5.40 p. m. 20th, passed over. 21st, temperature, 70°; 12.35 p. m., 57°; at the close of storm, 1.15 p. m., 51°; 2 p. m., 62°. 28th, no considerable fluctuation of thermometer.

Average cloudiness ..... days	4.38
Cloudiness averaged 8 or more on	4
Number of days of rain	19
Number of days of hail	3
	0
Temperature during the month:	
Highest	93
Lowest	39
Mean	61.1

B.

DEPARTMENT OF THE INTERIOR,
YELLOWSTONE NATIONAL PARK, OFFICE OF SUPERINTENDENT,
Mammoth Hot Springs, Wyo., April 24, 1887.

SIR: In the month of January last one William James went to the Norris Geyser Basin with a number of teams, under an alleged contract with the Park Association, to haul lumber between the Grand Cañon and the Norris Basin.

The depth of snow having rendered the hauling of lumber impracticable, he sent back the largest portion of his outfit, but remained himself at Norris.

A few days ago I received information which caused me to believe that James was engaged in trapping beaver on the Gibbon River, near Norris. I accordingly sent a party on the 20th instant, at night, on snow-shoes, to this locality, with instructions to make diligent search, and, in the event of finding any evidence of trapping operations, to arrest Mr. James and any other persons whom they might believe to be implicated in violating the rules of the Park.

The party, with a sergeant of my troop in charge, proceeded to the locality indicated, and, having found three beaver traps set and baited along the Gibbon River, went to the Norris Hotel, and, having searched the premises, found in an out-building, which was used by James as a store-house and granary, five beaver-skins and one lynx-skin.

Having found these evidences of unlawful acts, the sergeant, in obedience to my orders, arrested James, and, having reported to me by telephone, sent him to this place on the 22d instant.

James, when examined by me, admitted that he had trapped and killed the beaver and lynx, and also that he had, in company with one Brown, an employé of the Park Association, killed an elk near the Falls of the Yellowstone, in the month of February last.

There appearing to be no doubt whatever as to the guilt of this man James, I have this day summarily expelled him from the Park.

The property found in the possession of James, which I have taken charge of, consists of the following articles, viz: 1 Martin rifle; 3 beaver traps, number 4; 5 beaver-skins, 1 lynx-skin, 4 horses, 2 sleds, 4 sets of harness, 3 chains, 2 pairs of blankets, 1 A tent, 1 whip, 1 coffee-pot, 1 frying-pan; also a small quantity of bacon, flour, coffee, and sugar, about four days' supply for one man.

James states that the two sleds belong to the Park Association, and that two of the horses belong to Mr. Wakefield, who carried on the business of transportation in the Park last season. This statement is probably correct.

This property is now at the Norris Geyser Basin, in charge of Sergeant John Swan, of my troop, who made the arrest, where it must remain until the melting of the snow shall make it practicable to bring it to this place, which will probably be in about two weeks.

I recommend the confiscation of all of this property which James has acknowledged as belonging to him, and request that I be informed with as little delay as practicable what disposition I shall make of it.

I am, sir, very respectfully, your obedient servant,

MOSES HARRIS,
Captain First Cavalry, Acting Superintendent.

Hon. H. L. MULDROW,
Acting Secretary of the Interior.

C.

DEPARTMENT OF THE INTERIOR,
YELLOWSTONE NATIONAL PARK, OFFICE OF THE SUPERINTENDENT.
Mammoth Hot Springs, Wyo., July 7, 1887.

SIR: For the information of the Department, I have the honor to report that on the night of the 4th instant one of the stages of the Yellowstone Park Association was stopped by footpads about 1 mile from the town of Gardiner, and about the same distance within the limits of the Park, and the passengers robbed of money to the amount of $16. The robbers appeared to be new at the business, were nervous and hurried, took what money was given them without searching the passengers for more, and took no watches or jewelry.

The town of Gardiner, which is located just outside the northern boundary of the Park, is destitute of all means for the preservation of law and order, and is the resort of hard and worthless characters who assemble to prey upon the visitors to the Na-

tional Park, and who have been excluded from the Park by my order. It is believed that this outrage was committed by some of these hard cases from the town of Gardiner.

The affair has no significance with reference to the police condition of the Park, and could not have occurred at any distance within its border.

Stages entering the Park at night will hereafter be provided with a mounted escort in order to prevent the possibility of a repetition of this offense.

All possible efforts are being made to detect and arrest the culprits, and it is hoped that they may be successful.

Very respectfully, your obedient servant,

MOSES HARRIS,
Captain First Cavalry, Acting Superintendent.

Hon. H. L. MULDROW,
Assistant Secretary of the Interior.

D.

TRANSPORTATION RATES.

(1) CHARLES GIBSON YELLOWSTONE PARK ASSOCIATION.

STAGE-ROUTE FARES.

Single trips.

From Mammoth Hot Springs to—	
Cinnabar	$1 50
Norris Geyser Basin	4 00
Lower Geyser Basin	7 50
Upper Geyser Basin	9 00
Grand Cañon	7 50
Yellowstone Lake	12 00
From Norris Geyser Basin to—	
Upper Geyser Basin	5 00
Lower Geyser Basin	3 50
Grand Cañon	3 50
Yellowstone Lake	8 00
From Lower Geyser Basin to—	
Upper Geyser Basin	1 50
Norris Geyser Basin	3 50
Grand Cañon	7 00
Mammoth Hot Springs	7 50
From Upper Geyser Basin to—	
Lower Geyser Basin	1 50
Norris Geyser Basin	5 00
Grand Cañon	8 50
Mammoth Hot Springs	9 00
From Grand Cañon to—	
Norris Geyser Basin	3 50
Lower Geyser Basin	7 00
Upper Geyser Basin	8 50
Mammoth Hot Springs	7 50
Yellowstone Lake	5 00

Round trips.

From Mammoth Hot Springs to Norris Geyser Basin, Lower Geyser Basin, Upper Geyser Basin and return, with stop-over privileges	18 00
From Mammoth Hot Springs to Norris Geyser Basin, Lower Geyser Basin, Upper Geyser Basin, Grand Cañon and return, with stop-over privileges	25 00
From Mammoth Hot Springs to Norris Geyser Basin, Lower Geyser Basin, Upper Geyser Basin, Grand Cañon, and Yellowstone Lake and return, with stop-over privileges	28 00
Carriage, two-horse, and driver:	
Per day	10 00
First hour	4 00
Each subsequent hour	2 00

Saddle-horse or pony:		
Per day		$2 50
First hour		1 00
Each subsequent hour		50
Pack-horse	per day	1 50
Guide, with saddle-horse	do	5 00

(2) WALTER J. AND HELEN L. HENDERSON, COTTAGE HOTEL.

Fare to and from Cinnabar		$1 50
Trip around the park with two or more persons	each	25 00
Wagon or carriage:		
Two horses and driver	per day	10 00
Four horses and driver	do	15 00
Single horse and buggy	do	6 00
Saddle horse:		
Per day		2 50
For one hour		1 00
For each subsequent hour		50
Pack animal	per day	2 00
Guides or cooks for camping parties	do	3 00
Use of a tent	do	50
Board and lodging for camping parties, each	do	4 00
Single horse:		
To hay and grain, one night		1 00
To one feed of hay and grain		50
Use of corral:		
Per team one night		25
Per head		15
For trunk to and from Cinnabar	each	50

(3) JAMES A. CLARK.

From Cinnabar to Mammoth Hot Springs, in carriage (driver included), per person		1 50
From Mammoth Hot Springs to Golden Gate:		
One person in carriage		2 50
Three or more persons	per person	1 00
From Mammoth Hot Springs to East Gardiner Falls:		
One person in carriage		4 00
Three or more persons	per person	1 50
From Mammoth Hot Springs to Norris Geyser Basin	each person	4 00
From Norris Geyser Basin to Lower Geyser Basin	do	3 00
From Lower Geyser Basin to Upper Geyser Basin	do	2 00
From Norris Geyser Basin to Falls or Grand Cañon	do	3 00
Four-horse team and driver with five passengers' outfit	per day	15 00
Two-horse team and driver with three passengers' outfit	do	10 00
Regular trip through Park:		
Saddle horse without guide	do	3 00
Guide with saddle horse	do	2 50
Pack horses with saddle and outfit, each	do	1 00
Packers, guides, and cooks, with saddle horse	do	4 00
Team with single-seated carriage	do	8 00
Team, with single-seated carriage and driver	do	10 00
Team, to hay and grain, over night		2 00
Use of stall in barn	per day	50
Use of open corral over night for stock		3 00
Single horse to grain		50
Stock in herd, night or day	each	25
Saddle, without horse	per day	50

E.

CAMP SHERIDAN, WYOMING, *June 2, 1887.*

ORDERS NO. 37.]

1. Orders No. 5, dated Camp Sheridan, Wyo., August 21, 1886, is hereby revoked.

2. The enlisted men of this command, when on duty within the limits of the Yellowstone National Park, are charged with its protection, and will under all circumstances enforce a strict compliance with the established rules and regulations.

The soldiers occupying the detached stations for the protection of the Park will not only enforce the rules and regulations, but will exert themselves to discover and prevent the spread of forest fires, to protect visitors to the Park from any abuse or extortion by stage drivers or other persons, and generally to preserve respect for law and order.

In the enforcement of the regulations of the Park and the foregoing instructions soldiers will conduct themselves in a courteous and polite but firm and decided manner.

They will not hesitate to make arrests when necessary, reporting without delay to the commanding officer by telephone or otherwise.

By order of Captain Harris.

GEO. W. GOODE,
Second Lieutenant First Cavalry, Post Adjutant.

F.

RULES AND REGULATIONS, OF THE YELLOWSTONE NATIONAL PARK.

DEPARTMENT OF THE INTERIOR, *Washington, April* 4, 1887.

(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 inscription 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 shall 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 shall 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 in 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 or displayed within the Park, except such as may be necessary for the convenience and guidance of the public, upon buildings on 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."

L. Q. C. LAMAR,
Secretary of the Interior.

REPORT

OF THE

SUPERINTENDENT OF THE YELLOWSTONE NATIONAL PARK

TO THE

SECRETARY OF THE INTERIOR.

1888.

WASHINGTON:
GOVERNMENT PRINTING OFFICE.
1888.

REPORT

OF THE

SUPERINTENDENT OF THE YELLOWSTONE NATIONAL PARK.

OFFICE OF THE SUPERINTENDENT
YELLOWSTONE NATIONAL PARK,
Mammoth Hot Springs, Wyo., August 15, 1888.

SIR: I have the honor to submit for your information the following report of the operations of the office of the Superintendent of the Yellowstone National Park for the fiscal year ended June 30, 1888, and to the present date.

When my last report was rendered, August 20, 1887, the hotels of the Park were filled with tourist visitors, and many camping parties, with every description of outfit, were scattered throughout the Park. All possible efforts were made to see that these numerous visitors were made acquainted with the rules and regulations established for their guidance in the Park, and that they were observed and respected. In the enforcement of these regulations several arrests were made, and in one or two instances, where the offenses were flagrant, the offenders were summarily expelled from the Park. In the exercise of the authority which is devolved upon the office of the Superintendent of this National Park great care has been taken to keep strictly within the limits sanctioned by law and to avoid all appearance of a harsh and arbitrary exercise of authority. No person has ever been expelled from the Park who had not admitted the commission of the offense for which the penalty was enforced; and whenever there has been reason to believe that the offenses were committed without intention or through thoughtlessness, or when a sincere regret was perceived, the persons have been permitted to go unmolested, after suitable instruction and admonition. This explanation is made in view of the unwarranted and unjust comments of the Montana newspapers, which, copied by Eastern exchanges, have tended to disseminate the idea that the National Park is subjected to harsh and arbitrary military rule, and that visitors are liable to humiliation and annoyance from a capricious exercise of power.

While these strictures of the press were generally expressed in vague and indefinite terms, they appeared to be founded chiefly upon the two following cases: John Noack, who was arrested at the Upper Geyser Basin, September 18, 1887, for writing upon the geyser formation, in violation of the rules and regulations; and Frank Chatfield, who was arrested near Heart Lake, October, 2, 1887, for killing an elk. In the case of Noack, he was arrested by the soldier on duty at the Upper Geyser

Basin, pursuant to his general instructions to enforce the rules of the Park, in the act of writing his name on the formation. Both he and his companion having offered the soldier money, the latter to clear himself of the suspicion of being improperly influenced, thought best to send the young man to the office of the Superintendent. For this purpose he was permitted to proceed by the regular stage, a soldier following on horseback. When Noack came to my office, he admitted his offense, stated that he had been treated by the soldiers in a courteous and considerate manner, but instead of manifesting any regret for his misconduct professed to consider himself ill treated in having his pleasure trip interrupted for so slight a cause, and threatened to have the affair published in the newspapers. As it was apparent, in this case, that the rules of the Park had been willfully violated, and as the young man's speech and manner evinced a contempt for authority, it was thought that the provisions of Rule X of the rules and regulations of the Park would properly apply to his case. But as it was not desired to subject him to the unnecessary humiliation of being escorted out of the Park by a military guard, he was given twenty-four hours in which to leave the Park, and was informed that at the expiration of that time he would be liable to arrest and expulsion. He was subjected to no physical restraint at any time, and left the Park on the morning following his interview with the Superintendent by the usual stage to Cinnabar.

The case of Chatfield has been fully reported to the Department by letter, a copy of which is appended to this report (marked A). In this case there were absolutely no extenuating circumstances, and no leniency could have been shown without bringing into contempt the authority exercised by your Department over the National Park.

In my last report it was stated that the volume of travel to the Park at the date of the rendition of the report had fallen somewhat short of that of the previous year. Visitors continued to arrive, however, in considerable numbers, until the last part of September, when travel became so light as to warrant the closing of the hotels of the Park Association and placing them in charge of their winter keepers. Visitors who arrived after the 1st of October were accommodated at this place at the Cottage Hotel, under the management of the lessees, Helen L. and Walter J. Henderson, and through the Park were cared for by the winter keepers of the hotels as well as their limited facilities permitted.

The efforts to discover and bring to justice the perpetrators of the stage robbery within the Park, on the evening of July 4, 1887, which were initiated immediately upon the occurrence of the robbery, and continued unremittingly, were finally successful, and I append to this report two letters, marked respectively B and C, which were addressed to your Department, reporting fully the incidents connected with the arrest and conviction of the guilty parties. Although the punishment decreed in these cases appears to be entirely inadequate to the gravity of the offense, yet in view of the uncertainty which seems to exist relative to the administration of justice by the established courts within this reservation, it is perhaps a subject for congratulation that the perpetrators of the robbery were not permitted to escape all punishment.

On the 15th of October the work on the roads, which had been diligently prosecuted during the summer months by Capt. Clinton B. Sears, Corps of Engineers, U. S. Army, was discontinued and the various working parties discharged.

Although but little snow fell in the Park during the fall and early winter the temperature was at times quite low, the climatic conditions being very dissimilar to those of the previous season, as may be seen

by reference to the meteorological record which is hereto appended and marked D.

This record has been kept pursuant to Army regulations, under the direction of the medical officer at Camp Sheridan, Acting Assistant Surgeon G. L. Cline, U. S. Army, and may be accepted with confidence as being accurate and correct.

The first snows of the season indicated favorable conditions for the hunters' work; and at this time scouting operations were vigorously conducted for the protection of all game within the Park limits. Fortunately the efforts of the troops were seconded and furthered by other causes. The snow-fall being light the game tarried in the inaccessible mountain regions, safe from ordinary hunters, much later than usual, and the excellent law passed at the last session of the legislature of Montana, prohibiting the killing of any of the large game animals "for the purpose of procuring the head or hide only, or for speculative purposes, or for market, or for sale," although not always strictly enforced by the local authorities, served to exercise a discouraging effect upon the class of professional hunters, so that many of them quit the business in disgust.

As a result of these several causes the game of the Park has been free from molestation, and I am confident in the belief that little if any has been killed since the arrest and expulsion of Chatfield in the month of October last.

Upon the closing of the Park hotels and cessation of tourist travel, the daily trains of the Northern Pacific Railroad from Livingston to Cinnabar were discontinued. Trains were, however, run once each week until interrupted in January of the present year by severe storms. Subsequently, upon the opening of certain coal mines near Cinnabar, Mont., a tri-weekly service was established, and continued through a large portion of the spring.

During the early part of the winter it had occurred to me as extremely desirable, if possible, to secure some accurate information concerning the winter haunts of the buffalo which were known to be in the Park. I accordingly consulted with my scout, Mr. Edward Wilson, as to the practicability of a snow-shoe trip into the regions where it was believed they would be found. As Mr. Wilson felt confident that such a journey could be successfully made, I secured the willing services of Sergeant Charles Schroegler, Troop M, First Cavalry, as a companion for Mr. Wilson, and these two men left Camp Sheridan on the 13th of February, 1888, taking with them a pack of provisions and one blanket each. They proceeded the first day to Yancey's Hotel, in Pleasant Valley, and from there struck into the wilderness, scouting the whole length of Specimen Ridge; from there, via Amethyst Mountain, to Pelican Creek; down this stream to the lake; across the lake and down the Yellowstone, via Hayden's Valley, to the Park Association Hotel at the Grand Cañon. After a day's rest at that point, the party returned to this post via Norris, on the 23d of the same month, after an absence of ten days. The hardships of an expedition of this character can only be realized by those who are acquainted with the winter aspect of the mountain solitudes into which these brave and hardy men ventured. The snow at this altitude being very soft and light, the use of sledges, such as are used in Arctic explorations, is impracticable, and the traveler is confined to such quantity of provisions and appliances for comfort as he may find it possible to carry on his person. Snow shoeing through the Park between the different hotels, where comfortable shelter can be procured every night, is comparatively easy, but where

rest is forbidden by the absence of warmth and shelter, the difficulties are such as can only be overcome by hardy and resolute men.

In its principal object, that of gaining accurate information concerning the numbers and location of the buffalo in the Park, this expedition was not entirely successful. The herd of buffalo which had passed a portion of the previous winter along Specimen Ridge was not encountered, and the only buffalo found on the trip were three which were seen in Hayden Valley. Valuable information was, however, obtained relative to the winter ranges, habits, and condition of the large game of the Park, so that the results could not be considered inadequate to the toil and labor expended. Immense bands of elk were encountered in every portion of the Park visited, and both men expressed themselves as being loth to make an estimate as to numbers, fearing that they might be suspected of exaggeration. From the testimony of these men and other reliable information, there can be no doubt that many thousands of elk, deer, and mountain sheep winter in the Park every year, and that their numbers are constantly increasing. But few carniverous animals were encountered on this trip, and the tracks of but two mountain lions were seen on the whole expedition, so that the fears of those who think the game animals may be exterminated by the carnivora may be considered as without present foundation. Early in April it was discovered that a band of buffalo were located in Hayden Valley and along Alum Creek. A second snow shoe trip by Mr. Wilson, accompanied by Mr. Edward Hofer, an enterprising correspondent of the Forest and Stream, was fruitful in results eliciting the fact that a herd of buffalo numbering at least one hundred had passed the winter on the divide between the waters of the Madison and Yellowstone Rivers and in the adjacent valleys. Numbers of these animals have been seen during the spring along the Fire Hole River and its tributaries, and extended investigations have shown that they range in considerable numbers from Alum Creek, in Hayden Valley, across the divide between the waters of the Yellowstone and Madison Rivers and the Continental Divide to Fall River Basin, in the southwestern part of the Park. From the numbers seen and from the quantity of "sign" observed over an extended area, the number of these animals that range in this portion of the Park can be estimated at not less than two hundred. This conclusion is not in accordance with an opinion expressed in my last report, but it has been reached after careful investigation, and is believed to be correct. The large number of young calves and yearlings which have been seen leads to the belief that a natural increase is in progress, and that if proper protection is afforded the species will not, as has been feared, become extinct.

Early in May last information was received here that the Excelsior Geyser in the Midway Geyser Basin, which had been quiescent since 1882, was again active. This geyser was discovered in eruption on the 30th day of April last by one of the winter keepers of the hotel at the Upper Geyser Basin. It continued to give exhibitions of its power with great regularity at intervals of about 60 minutes until the latter part of July, since which time its periods have been more irregular—a possible premonition of another long period of quiescence. If the account of the previous wonderful performances of this geyser can be relied on its character has somewhat changed in the lapse of years. The duration of its eruptive energy this year has not been observed to exceed 2 minutes, and the height of its column of water has seldom reached 200 feet.

The winter snow-fall through the Park being lighter than usual,

was possible to travel the roads with vehicles as early as the middle of May; and by the 1st of June, numbers of tourists, probably attracted by the reported activity of the Excelsior Geyser, were daily visiting the Park. Early in June the hotels of the Park Association were put in operation, and by the 15th of that month the season was fairly opened, the volume of travel showing a marked increase over that of the previous year, an increase which has been sustained up to the date of this report.

During the month of April, Capt. Clinton B. Sears, Corps of Engineers, U. S. Army, was relieved of his duties in connection with the construction of roads in the Yellowstone National Park, by Maj. Charles J. Allen, of the same Corps. Major Allen visited the Park during the month of June, but the appropriation for the fiscal year ending June 30, 1888, having been exhausted, and the new appropriation not being available, no work, except necessary repairs, was practicable.

FOREST FIRES.

It was stated in my last report that at that date no forest fires of any magnitude had occurred in the Park during the year. It is with gratification that I now add that the forests of the Park have continued to the present time safe from the destructive effects of fire. The immunity from this evil which was enjoyed during the summer of 1887 may be attributed in some degree to the abundant showers which prevailed, but it is believed also that it was in a great measure due to the care and vigilance exercised by the troops charged with the protection of the Park. This care and vigilance will be constantly exercised in the future, but it would be presumptuous to infer that it will always be effective to prevent the occurrence and spread of fires.

LEASES AND BUSINESS PERMITS.

The following are the changes which may be noted under this head since my last report:

On the 6th day of December, 1887, your Department approved the sale and assignment of the lease of ground at this place which had been granted to James A. Clark February 17, 1885, as modified by an agreement dated March 4, 1886, to the firm of White, Friant & Letellier, of Grand Rapids, Mich. This firm, subsequently, on the 14th day of June, 1888, executed an agreement, subject to the approval of the Department of the Interior, transferring their rights in this lease to George W. Wakefield, of Bozeman, Mont. This last agreement has not as yet received the approval of your Department, but, pending action in the case, Mr. Wakefield has been permitted to take possession of the property. Mr. George W. Wakefield has also made application to the Department for the lease of certain pieces of ground in the Park, and while awaiting action upon his application has been permitted to continue his transportation business as the agent of the Yellowstone Park Association.

The short-comings and derelictions of Mr. Charles Gibson in matters pertaining to his lease in the National Park, and the unsatisfactory condition of affairs connected with the operations of the Yellowstone Park Association, has been the subject of frequent communications to your Department, and it is probable that no further information from this office is needed to guide intelligent action. But it seems proper that the subject should not be avoided in this report, and I accordingly

present in connected form, and as briefly as possible, the principal features of the case.

On the 9th day of March, 1883, the Department of the Interior granted to Carroll T. Hobart, Henry F. Douglass, and Rufus Hatch, a lease of land in the Yellowstone National Park, in seven different lots, amounting in all to 10 acres. These lessees agreed to build on the piece of ground leased at Mammoth Hot Springs a hotel to cost not less than $150,000, and at other points covered by their lease such buildings as might be approved by the Secretary of the Interior.

These lessees carried on their business under the title of the Yellowstone Park Improvement Company, Rufus Hatch president, and Carrol T. Hobart vice-president and general manager. A large hotel was built at this place, which may have cost the amount agreed upon, but it was poorly constructed upon a slight and insecure foundation, and the money it cost was badly invested. This hotel, with its out-buildings, which were all located on ground not leased, comprise all of the improvements made by this company in the Park. In the spring of 1885 the Park Improvement Company became insolvent, a receiver was appointed by a court of Wyoming Territory, and the property was subsequently sold. In November, 1884, Mr. Carroll T. Hobart entered into an agreement with one Charles F. Hobart for the construction of a hotel building at the Upper Geyser Basin upon the grounds leased to the Park Improvement Company. A building was erected under this agreement during the spring and summer of 1885, but instead of being placed upon the leased ground of Messrs. Hobart, Douglass & Hatch, was located on the lease of F. Jay Haynes, and, contrary to law, within one-fourth of a mile of Old Faithful Geyser.

On the 20th day of March, 1886, a lease was granted by the Department to Mr. Charles Gibson embracing 7 acres of land in the National Park, located as follows:

No. 1.—At the Mammoth Hot Springs, commencing at a stake about 1,500 feet east from the summit of the Hot Spring Terraces, and from which the flag-pole on the Government headquarters building bears N. 35° W. distant 1,860 feet, as calculated. Thence running S. 14° 30′ E. for a distance of 511 feet; thence S. 75° 30′ W. for a distance of 170 feet; thence running N. 14° 30′ W. for a distance of 511 feet; thence running N. 75° 30′ E. for a distance of 170 feet to the point of beginning, comprising an area of 2 acres more or less.

No. 2.—At Norris Geyer Basin, commencing at the northeast corner of the Government building, and running N. 67° E. by the magnetic needle for a distance of 425 feet to the point of beginning; thence running N. 37° 30′ W. for a distance of 164 feet to a stake; thence running N. 52° 30′ E. for a distance of 208 feet to a stake; thence running south 37° 30′ E. for a distance of 208 feet to a stake; thence running S. 52° 30′ W. for a distance of 208 feet to a stake; thence running N. 37° 30′ W. for a distance of 44 feet to the point of beginning and comprising an area of 1 acre more or less.

No. 3.—At Grand Cañon of the Yellowstone Falls, commencing at Point Lookout and running due north by the magnetic needle a distance of 1,400 feet; thence due west a distance of 600 feet; thence due south a distance of 160 feet; thence S. 53° 45′ W. a distance of 511 feet; thence N. 81° W. a distance of 315½ feet to point of beginning; thence running N. 7° W. a distance of 170 feet; thence running S. 83° W. a distance of 511 feet; thence running S. 7° E. a distance of 170 feet; thence running N. 83° E. a distance of 511 feet to the point of beginning, comprising an area of 2 acres, more or less.

No. 4.—And 2 acres at the Yellowstone Lake, to be definitely located hereafter as may be agreed upon by the parties hereto. The lessee shall cause the site agreed upon to be accurately surveyed and marked, and submit for the approval of the lessor a plat and description of the same, together with plans of the building to be erected thereon, it being understood that this lease, so far as it relates to the site at the Yellowstone Lake, shall not take effect in law or equity until such site has been definitely located and the plans of buildings approved as above provided.

After this lease was granted it appears that a joint stock company was organized, under the style of the "Yellowstone Park Association,"

to carry on the business of hotel-keeping under the privileges granted by Mr. Gibson's lease. The records of this office afford no information as to who the stockholders of this company are, further than that Charles Gibson is president and L. R. Casey vice president of the association. It is understood, however, that a majority of the stockholders are gentlemen connected with the Northern Pacific Railroad, and the intimate business relations existing between the two companies lends color to this belief.

Article 2 of Mr. Gibson's lease provides that—

> The lessee shall erect on each of the said sites a hotel of such character and dimensions as will adequately and properly accommodate all visitors to the Park, and will from time to time increase the same as the travel increases, upon plans and descriptions which shall have been approved by the Secretary of the Interior, and the buildings thereon, except the one at Mammoth Hot Springs, shall be finished by October 1, 1886. The buildings at Mammoth Hot Springs to be finished by the first day of January, 1887. In addition thereto the lessee shall pay annually to the Secretary of the Interior, at his office in Washington, $500 per annum as rent for said premises, payable on the first day of January of each year at the Department of the Interior.

The Yellowstone Park Association appear to have begun operations with great vigor in the spring of 1886. The construction of a substantial hotel building at the Norris Geyser Basin was undertaken and carried well on to completion during the summer. A large quantity of material was also accumulated at that point to be used in the construction of a hotel at the Grand Cañon of the Yellowstone. The Park Association also, through an agreement with the Northern Pacific Railroad, came into possession of the hotel at this place which had been built by the Park Improvement Company and which was purchased by the Northern Pacific Railroad when that company had become insolvent. The Association also acquired by purchase or bargain the hotel at the Upper Geyser Basin which had been erected the year previous by C. F. Hobart, and the establishment at the Lower Geyser Basin, known as Marshal's Hotel. This establishment was located upon a lease granted by the Department to George W. Marshal, January 29, 1884.

Upon the urgent solicitation of Mr. Gibson authority was granted by the Department May 25, 1886, for the erection of a temporary hotel building at the Grand Cañon, with the understanding that work upon the permanent hotel at that place should be continued as fast as possible, and that the temporary building should be removed before the 1st day of August following.

Before the hotel building at Norris was constructed permission for a change of site at that place was granted by the Department, subject to approval upon formal application by the lessee with description of the new site selected. There is no record in this office that such application has ever been made. The hotel at Norris, which was the only building in the Park constructed in conformity with the obligations of Mr. Gibson's lease, was destroyed by fire, as previously reported, July 14, 1887.

A temporary structure was erected at that place near the site of the former hotel by my permission, subject to your approval, such a course being deemed necessary to prevent the inconvenience and discomfort to visitors which must have resulted from the absence of shelter at that point. This temporary structure is still in use as a hotel.

Mr. Charles Gibson has failed completely to comply with the obligations of his agreement to build on the sites leased to him hotels of such character and dimensions as will adequately and properly accommodate all visitors to the Park, upon plans approved by the Secretary of the Interior. He has failed to build any hotels at the Mammoth Hot Springs, at the Grand Cañon of the Yellowstone, or at the Yellowstone

Lake, and there is no present indication that he or the parties to whom he has, without authority, transferred his privileges in the Park intend to erect the required buildings. But Mr. Gibson has made use of his lease to gain a foot-hold in the Park for a company which has no recognition by your Department, and which has, by unauthorized methods, obtained possession of cheap and unsuitable buildings at different points in the Park, some of them badly located with reference to the convenience of visitors, in which it is now carrying on the business of hotel keeping without any direct sanction or authority from the Department of the Interior.

To correct this unsatisfactory condition of affairs I have the honor to recommend that the sixty days' notice provided for by article 10 of Charles Gibson's lease be given without delay, and that at the expiration of that period the lease be declared forfeited; that the parties who have gained possession of buildings in the Park without proper authority be required to either vacate the same or to take out proper leases, with the sites properly surveyed, plotted, and described, under a proper guaranty that the unsuitable and unsightly buildings shall be replaced by suitable buildings constructed on approved plans, by a fixed date to be agreed upon.

The permission granted by the Department to James E. Stuart, artist, July 26, 1887, to exhibit and offer for sale, at the Mammoth Hot Springs Hotel, paintings in oil and water colors of the geysers, cañons, and other curiosities of the National Park, has not been taken advantage of during the present season. Louis C. Pettitt, M. D., has also failed to avail himself of the privilege of practicing medicine in the Park.

On the 14th of March last permission was granted to Mrs. M. A. Baronett, postmistress at Mammoth Hot Springs, to keep for sale to tourists and others, during her term of office, or at the pleasure of the Secretary of the Interior, photographic views, stationery, and other small articles, subject to the approval of the Acting Superintendent of the Park. Mrs. Baronett has procured a stock of the class of goods indicated and has to the present time conducted her business in a satisfactory manner.

TRESPASSERS IN THE PARK.

In my last report I called attention to the fact that a toll bridge across the Yellowstone River, known as Baronett's Bridge, was operated in the Park without the authority of the Department, and included in my estimate of appropriations an amount which was deemed sufficient to extinguish the claim to that property. I again invite your attention to the importance of causing the removal of this obstruction to free travel in the National Park, and have again placed in my estimate a sufficient amount to accomplish that object. I also reported in detail the circumstances connected with the trespass of J. C. McCartney, who has located within the northern border of the Park contrary to law. This case has been presented for the consideration and action of your Department upon various occasions and still calls for your attention.

No trespass within the Park has occurred during the past year.

HOTEL ACCOMMODATIONS.

But little change has been made in the character of the hotel accommodations in the Park since my last report. The project of lighting

the hotel of the Park Association at this place by electricity was not carried out, the work being abandoned after the wires and lamps had been placed in the building. This is to be regretted, as danger from fire in a wooden building of such dimensions, lighted by kerosene oil, is always imminent.

The two hotels at this place, that of the Park Association and the Cottage Hotel, conducted by the lessees, Helen L. and Walter J. Henderson, afford ample and excellent accommodations for all visitors. All of the hotels in the Park south of the Mammoth Hot Springs, except that of Mr. Yancey's, at Pleasant Valley, are managed by the Yellowstone Park Association. The buildings are all of a temporary character, of cheap and poor construction, and a shame and discredit to the National Park. The accommodations they afford are entirely inadequate to the demands of travel, and are a cause of frequent and bitter complaint by patrons who, while paying first-class hotel rates, are crowded into cold and leaky buildings, totally devoid of all appliances for comfort.

The building at the Norris Geyser Basin is a long and narrow one-story building built of 1 inch pine boards. It has some twenty small sleeping rooms, is cold and open, with no appliance for heating beyond a sheet iron stove in the common hall.

At the Grand Cañon there is a similar structure, heated in the same manner, but the roof, which is of some patent material, is leaky. The building is located in thick timber where the sun seldom penetrates, and is always cold and damp. Visitors who pass the night at this place are fortunate if they escape sickness from severe colds.

At the Lower Geyser Basin the old Marshal Hotel, a two story log building, has been supplemented by two cheap wooden structures, two stories high and each divided into four rooms on each floor by partitions at right angles, the staircases being on the outside of the building. The partitions, both in the main building and the "cottages," are so thin as to afford but little privacy for guests. It is believed that all of the buildings at this place have been erected without the approval of the Department.

The building at the Upper Geyser Basin was pronounced by Mr. Charles Gibson, in a letter to the Department dated August 2, 1887, "a cheat from beginning to end." He also states in the same letter that "the architects and carpenters condemned it as unsafe and liable to fall down," but that "it was made tenantable by props and braces." In my opinion the building is still in an unsafe condition, and its faults of construction are such as to render it improbable that they can be remedied without the demolition of the building.

The increase of travel to the Park this season beyond that of previous years indicates that the number of visitors will become larger year by year, as the advantages of its climate, the curative properties of its thermal springs, and its many beauties and wonders are made known.

The necessity of providing suitable and adequate accommodations in the Park for all conditions of people is daily becoming more pressing, and I urgently request your early consideration of this important subject. I stated in my last report that the hotels of the Park Association were well conducted, that the service was excellent, the food well cooked, and the beds clean. The management during the present season has continued excellent, but the character of the buildings has rendered it impossible to provide properly for the comfort of the numerous visitors.

TRANSPORTATION.

The only change in the transportation facilities of the Park durin the past year has been the withdrawal of James A. Clark from th business through the transfer of his lease, as heretofore reported. An ple facilities of excellent character are furnished at Mammoth Ho Springs by the Park Association, through its agent, Mr. George W Wakefield, and by the Cottage Hotel under the management of Mr. C L. Henderson. The daily trains of the Northern Pacific Railroad hav this season left Livingston at 8.30 a. m. and arrived at Cinnabar at 1 a. m. The passengers have there been met by comfortable carriage from the hotels arriving at this place about 1 p. m., a much better ar rangement than that of last year, when the travelers did not reach th hotels until late in the evening. Passengers of the Union Pacific an Utah Northern Railroad reach the Park at the Lower Geyser Basin after a s age ride of two days, at which point the transportation facil ties afforded by the Park Association become available.

Mr. Edward Hofer, under the authority of the Department of the In terior, furnishes at this place outfits and reliable guides for campin parties. I append to this report (marked E) a schedule of rates sub mitted by Mr. Hofer for the approval of the Department.

During the past year no complaints of extortionate or unjust charge by any of the transportation managers have been made. The driver and other employés have been attentive to their duties, civil and court cous in their intercourse with visitors, and no accidents have occurre which could be attributed to their unskillfulness or want of attention

ROADS.

During the past year a new road has been built from the hotel at th Norris Geyser Basin across the Gibbon Meadows, connecting with th graded road at the entrance of Gibbon Cañon, a distance of about miles. The graded road from the vicinity of the Obsidian Cliffs ha been extended north about 7 miles, and the position of the road fro Norris to the Grand Cañon, which was left incompleted in the fall o 1886, has been finished to within a short distance of the present Fall Road. In order to complete the connection between the present systen of hotels by suitable and substantially built roads, there remains to b constructed about 10 miles of road from the head of Gibbon Cañon t the Lower Geyser Basin, about 2 miles from Swan Lake to Indian Creek and about 2 miles in the vicinity of the Grand Cañon.

It was expected last year that this work would have been carried t completion during the present season, but no appropriation has bee available.

The lateness of the season and the uncertainty attending the actio of Congress afford but little encouragement to expect much effectiv work this summer.

The estimates and reports relating to the roads of the Park are mad by the engineer officer charged with this work, to the chief of his corps and in this report I have only designed to note for your information th result of my personal observations. I will venture, however, to sug gest that as work on the roads of the Park can only be carried on wit economy during about four months of the year, it would seem desirabl that a definite scheme of road construction should be decided upon an

THE BOUNDARIES OF THE PARK.

Among the many needs and wants of the Park no more important or pressing necessity exists than that of an official and accurate survey of its boundaries.

The act setting aside and dedicating the National Park described the area reserved in loose and indefinite language, and made no provision for a survey of its lines.

I am informed that a bill is now pending in Congress which provides for a change and enlargement in the area of the Park, and a survey of its boundaries, but nevertheless, in view of the importance of the subject, I have deemed it proper to include in my estimate of appropriations a sufficient sum for a survey of its present limits, and for which I ask your approval.

THE PROTECTION OF THE PARK.

In my last report I expressed the opinion that the force then at my disposal was inadequate to the proper protection of the Park during the tourist season. I accordingly, at the opening of the present season, made application to the commanding general of the Department of Dakota for an additional force of one commissioned officer and fifteen enlisted men, for duty in the Park until the 1st of October next.

With the approval of the Secretary of War, my application was favorably considered. The detachment, under the command of Second Lieut. T. M. Moody, Twenty-second Infantry, arrived at Camp Sheridan on the 22d of last month, and was immediately ordered on duty in the vicinity of the Lower and Upper Geyser Basins. This additional force gives much needed protection to various objects of interest that were previously unguarded, and the presence of a commissioned officer in this portion of the Park, before whom all complaints and controversies can be taken, will greatly facilitate the enforcement of the established rules and regulations.

During the season of travel detachments from my command cover every portion of the Park accessible to wheeled vehicles, and constant scouting operations are conducted into the more remote regions. The rules of the Park have been generally observed, and good order and a respect for the rights of property have prevailed. All obnoxious and disorderly characters have been rigorously excluded from the Park, and by this means the necessity for violent arrests has been avoided.

As stated elsewhere in this report, the volume of travel during the present season indicates a steady increase from year to year. As the number of visitors becomes larger, and new points are rendered accessible to tourist visitors by the extension of the system of roads, a much larger force than that at present employed will be required to render efficient protection. The present arrangement, however effective it may be as a temporary expedient, can not be considered as a settlement of the difficult question of Park government, or in any way to obviate the necessity of wise and well-considered legislation on this subject.

Frequent reference having been made to the rules and regulations of the Park, I append, in connection with this subject, a copy of the same to this report (marked F).

THE GAME AND ITS PROTECTION.

This subject having been dwelt upon elsewhere in this report, but little remains to be added here. During the past two years, in which

the Park has been intrusted to the care of the troops under my command, but little game has been killed within its limits.

It is also believed that the protection afforded in the previous year, under the administration of my predecessor, was reasonably effective. It would seem, therefore, that at this date the results of this protection should be visible through a natural increase in the numbers of game animals in the Park. The fact of such an increase is, I believe well established by the testimony of well informed and disinterested parties, who have visited the portions of the Park remote from the ordinary lines of travel, and by the observation of the many scouting parties from my command.

Certainly, in the absence of any barriers, the elk and the deer will not be confined to the Park, and any increase will doubtless, to some extent, overflow into the surrounding country. But as long as a secure refuge and breeding place is afforded by this reservation, and the Territorial laws restricting the killing of game to certain seasons, and by sportsmanlike methods are observed, there will be but little danger of a total extinction of the species. The buffalo or bison have so narrowly escaped extinction, and the number which now find a refuge in this Park is so limited, that they should be protected by every possible method. Hunters, stimulated by the high prices offered by taxidermists for specimens, are now lying in wait beyond the borders of the Park ready to pounce upon any unfortunate animal which may stray beyond its limits.

It is unfortunate that the legislative bodies of the surrounding Territories have not as yet provided laws for the absolute protection, at all seasons, for this now nearly extinct species.

THE GEYSER AND HOT SPRINGS.

There has been apparently considerable decrease of activity in most of the geysers in the Upper Basin during the present year. Old Faithful still maintains its reputation for regularity, but nearly all of the other large geysers have increased the length of their periods of inaction. It has been surmised that the activity of the Excelsior Geyser has had the effect of decreasing the energy of action in this adjacent basin, but long continued scientific investigation can alone determine whether such a speculation has any value.

Constant and unremitting care has been exercised to prevent the defacement of the beautiful geyser formations by the foolish and shallow-minded visitors who delight to publish their ignorance and want of appreciation of the beautiful by writing thereon their names and places of residence. This practice has been quite effectually checked, and it is hoped that the additional precaution recently adopted will serve to entirely suppress it.

THE CARE AND PRESERVATION OF THE PARK.

In my last report I requested in strenuous and urgent terms the appropriation of a small sum to be used by the acting superintendent of the Park in providing sign boards to warn the numerous visitors of dangerous places, to display the names of the different geysers and other objects of interest, to clean up and dispose of the débris of abandoned camps, and generally to keep in order and in a decent condition this large reservation, which has been by law declared "a pleasuring ground for the benefit and enjoyment of the people."

No other public pleasuring ground, of ever so humble a character, is maintained without the expenditure of a dollar for decency's sake. Eminent men from all parts of the civilized world, scholars, law makers, divines, and soldiers come here, attracted by the fame of this land of wonders, and by the invitation implied in its dedication as a National Park, to have their senses offended and their enjoyment of nature's most wonderful and beautiful gifts destroyed by the presence of unsightly filth and rubbish.

I again include in my estimate of appropriations a modest sum for this purpose and again appeal to you for your favorable indorsement and recommendation.

APPROPRIATIONS.

I inclose with this report my estimate of appropriations for the improvement and preservation of the Yellowstone National Park for the fiscal year ending June 30, 1890, and here summarize the items as follows, viz:

For the care and preservation of the Park and the protection of visitors from danger	$3,000
For the settlement of the Barronett Bridge claim, or so much thereof as may be awarded by a duly constituted commission	2,000
For accurately surveying and marking the boundary lines of the Park	10,000
Total	15,000

In closing this report, it again gives me pleasure to acknowledge, with thanks, and to commend to your appreciation, the services rendered in the protection of this National Park by Mr. Ed. Wilson, scout and guide, whose energy and interest has been untiring; and by the officers and enlisted men of my command, who have discharged their duties with interest and zeal, and who have accepted cheerfully the discomforts and deprivations of an isolated and dreary station.

I am, sir, very respectfully, your obedient servant,

MOSES HARRIS,
Captain First Cavalry,
Acting Superintendent Yellowstone National Park.

The SECRETARY OF THE INTERIOR,
Washington, D. C.

APPENDIX A.

DEPARTMENT OF THE INTERIOR,
OFFICE OF SUPERINTENDENT YELLOWSTONE NATIONAL PARK,
Mammoth Hot Springs Wyo., October 7, 1887.

SIR: I have the honor to report that on the 2d instant a scouting party from my command arrested one Frank A. Chatfield near the western shore of Heart Lake for killing an elk at that place, which is within the Park. The hunter had killed the animal—a bull elk—and after taking the scalp or skin of the head and neck, which is used for taxidermist purposes, had abandoned the remainder of the carcass.

The shots fired at the animal were heard by the scouting party, and the hunter was found near the carcass with the freshly removed scalp tied to his saddle. Upon examination Chatfield admitted that he killed the elk, but alleged that he thought he was outside the limits of the Park. This defense was without weight, as a few days previously he had been shown a map of the Park in my office, and had had carefully pointed out and explained to him the boundaries of the Park with special reference to the locality of Heart Lake.

I accordingly took possession of his hunting outfit, and yesterday, the 6th instant, caused him to be summarily expelled from the Park.

The articles found in his possession, which I hold subject to your instructions, are as follows, viz:

One horse (pony).
One saddle and bridle.
One Ballard rifle, caliber .50.
One field-glass (U. S. Signal Service).
Two steel traps (No. 4 Newhouse).
One belt of ammunition, with knife and steel.

I am, sir, very respectfully, your obedient servant,

MOSES HARRIS,
Captain First Cavalry, Acting Superintendent.

Hon. H. L. MULDROW,
Acting Secretary of the Interior.

APPENDIX B.

DEPARTMENT OF THE INTERIOR,
OFFICE OF SUPERINTENDENT YELLOWSTONE NATIONAL PARK,
Mammoth Hot Springs, Wyo., November 7, 1887.

SIR: In pursuing the investigation for the detection of the persons who robbed the stage in the National Park on the 4th day of last July, suspicion was finally attracted to William James, the man who was expelled from the Park in April last for violating the rules.

It was stated that a foreign coin had been seen in his possession, the description of which corresponded with that of a pocket-piece taken from one of the passengers when the stage was robbed. Two men were found who stated that James had boasted in their presence that he was one of the parties who had robbed the stage. The robbery having been committed within the territorial limits of Montana I, on the 12th of October, addressed a communication to the United States attorney for Montana, giving him all the information in my possession relative to the affair, and requesting him to take prompt action looking to the arrest and examination of the suspected persons, who, together with the witnesses against them, were at that time in the Madison Valley just beyond the Park limits, but in the Territory of Montana.

I, at the same time, instructed my scouting parties to be vigilant to discover and arrest James if found within the Park. No reply was received to my communication and no action was taken by the civil authorities in the matter.

Mr. G. W. Wakefield, the owner of the stage which was robbed, and who had a transportation contract with Mr. Charles Gibson, endeavored to induce action by the civil authorities of Montana, but without success, the reply being made, "that as the crime was committed in the National Park, the officers of the Territory have no jurisdiction."

On the 21st day of October James was arrested within the Park limits by a sergeant of my troop, and was brought to this place on the 23d ultimo. On the same day two citizens, H. C. Henkley and Frank Moor, came before me and made statements to the effect that James had stated to them that he was one of the men who had robbed the stage, relating to them minutely the circumstances of the affair. He also showed them a piece of gold money of French coinage of the time of Napoleon I, and bearing date of 1811. The description of the piece agreed with the description of a piece of money taken from one of the passengers, Mr. John F. Lacy, of Oskaloosa, La., and described by him to me on the night of the robbery, and the circumstances of the robbery, as stated, agreed in all essential particulars with the facts as narrated by the passengers at the time of the robbery.

I accordingly placed James in confinement, and again wrote to Hon. Robert B. Smith, United States attorney, informing him that I held James subject to his requisition and requesting him to take prompt action in the case. On the 27th ultimo, having received no reply, I made a full statement of the case to the governor of Montana and requested that I be informed what action, if any, would be taken by the authorities of Montana.

In the evening of the same day I received a telegram from the United States attorney requesting me to keep James until an officer could be sent for him.

James was accordingly held in custody until this morning, when he was taken into the portion of the Park which lies within the territorial limits of Montana and there turned over to a deputy United States marshal, who served upon him a warrant duly issued by the commissioner of the district court of Montana for the third judicial district.

While James was in confinement at this place he made a full admission of his participation in the robbery to Mr. G. W. Wakefield, and gave the name of his principal confederate, one Higginbottom, formerly employed as a stage-driver by Mr. Wakefield, who has also been arrested and held for trial.

It would seem that there is now reason to believe that these offenders will be convicted and punished.

I am, sir, very respectfully, your obedient servant,

MOSES HARRIS,
Captain First Cavalry, Acting Superintendent.

HON. H. L. MULDROW,
Acting Secretary of the Interior.

APPENDIX C.

DEPARTMENT OF THE INTERIOR,
OFFICE SUPERINTENDENT YELLOWSTONE NATIONAL PARK,
Mammoth Hot Springs, W'ty., December 9, 1887.

SIR: Referring to the subject of my letter of November 7 last, I have now the honor to inform you that William James and one Higgenbottom were indicted by the United States grand jury, which sat at Bozeman, Mont., for highway robbery in stopping the stage in the National Park on the 4th of July last, were brought to trial in the district court of Montana for the third judicial district, were permitted to plead guilty to a charge of larceny, and were sentenced to one year's imprisonment in the penitentiary and fined $1,000 each.

I am, sir, very respectfully, your obedient servant,

MOSES HARRIS,
Captain First Cavalry, Acting Superintendent Yellowstone National Park.

HON. H. L. MULDROW,
Acting Secretary of the Interior.

APPENDIX D.

Meteorological record kept at Mammoth Hot Springs, Wyo., Yellowstone National Park, from August 1, 1887, to July 31, 1888.

AUGUST, 1887.

Dates.	Self-registering thermometers. Maximum.	Minimum.	Mean.	Winds. Direction.	Force.	State of weather.	Remarks.
	°	°	°				
1887. Aug. 1	79	50	64.50	N.E.	Light breeze..	Cloudy	Light rain; thunder-storm.
2	85	46	65.50	N.W.	Calm.....	Fair	Rain and thunder-storm.
3	86	39	62.50	S.W.	Gentle breeze.	Cloudy	
4	69	38	53.50	N.W.	... do	Fair	
5	84	41	62.50	W.	Light breeze..	Clear	
6	82	43	62.50	S.W.	do	Fair	
7	77	42	59.50	N.W.	Fresh breeze..	Cloudy	Do.
8	76	43	59.50	N.W.	High wind ..	...do	Do.
9	84	39	61.50	S	Strong wind..	Fair	3.10 p. m., wind changed from S. strong wind to N.W. gale.
10	87	40	63.50	S.W.	Gentle breeze	Clear	
11	85	38	61.50	S.E.	Light breeze..	...do	
12	85	52	68.50	N.W.	High wind.....	Fair	Thunder-storm; heavy rain; 7.05 p. m., strong northwesterly gale.
13	78	38	58	S.	Fresh breeze..	Clear	
14	81	40	60.50	W.	Gentle breeze	Fair	
15	82	48	65	N.W.	Fresh breeze..	....do	Thunder-storm passed at a distance.
16	84	43	63.50	S.W.	Light breeze..	Clear	
17	86	43	64.50	W.	....do	Fair	From 1.10 to 1.25 p. m., hail; thunder-storm.
18	90	44	67	N.W.	Fresh breeze...	Clear	
19	91	44	67.50	S.W.	Calm.....	Entire clear...	
20	86	47	66.50	E.	... do	Clear	Sprinkling; between 11 and 12, thunder.
21	75	44	59.50	N.W.	Strong wind..	Fair	
22	73	44	58.50	E.	Fresh breeze...	Cloudy	
23	64	47	55.50	N.W.	High wind.....	... do	Light rain; 10 p. m., distinct peals of thunder at a distance.
24	58	44	51	W.	... do	Fair	Rain.
25	75	38	56.50	N.E.	Light breeze..	Clear	Sprinkling in the forenoon; rain and hail between 3 and 4 o'clock p. m.; thunder at a distance.
26	76	39	57.50	N.W.	Calm	Clear	
27	83	41	62	S.W.	... do	... do	
28	84	48	66	S.W.	Gentle breeze.	Entire clear...	
29	82	49	65.50	W.	....do	Cloudy	Rain in the afternoon; rain and thunder-storm during night.
30	71	40	55.50	N.W.	Light breeze..	Fair	Heavy rain and hail from 5 to 6.40 p. m.
31	59	37	48	W.	Very l't breeze	....do	Rain at night.
Monthly mean.			61.06				

Summary for August, 1887.

Thunder storms: 1st, passed at a distance; 2d, between 4.50 and 5.40 p. m., accompanied by heavy rain, strong N.W. winds; temperature at 4.50, 75°—at the end of the storm, 5.40 p. m., 49°; 7th, temperature fell during storm from 75° at 12.10 p. m. to 54° at 12.55 p. m; 8th, passed at a distance from SW. in SE. direction; numerous lightning; 12th, heavy rain during storm; no considerable fluctuation of thermometers; 17th, accompanied by hail; temperature fell from 84° to 61° between 1.10 and 1.50 p. m.; 20th, thunder at a distance; temperature fell from 82° to 62° between 11 and 12 a. m.; raised again after 12; 28th, during night.

Temperature during the month:

Highest	degrees..	91
Lowest	do....	37
Mean	do....	58.33
Average cloudiness		3.8

Meteorological record kept at Mammoth Hot Springs, etc.—Continued.

SEPTEMBER, 1887.

Dates.	Self registering thermometers. Maximum.	Minimum.	Mean.	Winds. Direction.	Force.	State of weather.	Remarks.
	°	°	°				
1887.							
Sept. 1	58	30	44	SW.	Gentle breeze	Cloudy	Hail, rain, and thunder-storm.
2	64	37	50.50	S.	Fresh breeze	do	
3	79	40	59.50	S.	do	Clear	
4	76	44	60	S.	do	Fair	Rain during night.
5	84	42	63	SW.	Calm	Entire clear	
6	86	39	62.50	SW.	Fresh breeze	do	
7	88	42	65	NW.	High wind	Fair	Rain and thunder-storm during night.
8	72	46	59	SE.	do	do	Light rain between 1 and 2 p. m.
9	68	40	54	W.	Calm	do	
10	76	35	55.50	S.	Light breeze	Clear	
11	76	42	59	NW.	High wind	Fair	Rain turned into snow-fall during night.
12	42	32	37	S.	do	Entire cloudy	Light snow; melted as it fell after 7 a. m.
13	56	30	43	SW.	Gentle breeze	Cloudy	
14	76	42	59	SW.	do	Clear	
15	76	38	57	S.	Fresh breeze	Entire clear	
16	79	43	61	SW.	do	Clear	
17	78	42	60	S.	do	Fair	
18	72	43	57.50	S.	High wind	do	
19	65	48	56.50	S.	Strong wind	Clear	
20	76	29	52.50	S.	Light breeze	do	
21	75	34	54.50	SW.	High wind	do	
22	79	30	54.50	SW.	Calm	Entire clear	
23	63	40	51.50	S.	Gentle breeze	Fair	Rain and hail from 1 to 5 p. m.
24	76	40	58	S.	Fresh breeze	Clear	Sprinkling from 3.10 to 3.40.
25	77	43	60	W.	Calm	do	Thunder at a distance; double rainbow.
26	69	34	51.50	SW.	do	Clear	
27	82	33	57.50	S.	Gentle breeze	do	
28	85	37	61	SW.	Calm	do	
29	85	40	62.50	SE.	Light breeze	do	
30	73	45	59	S.	High wind	Entire cloudy	
Monthly mean			56.18				

Summary for September, 1887.

Thunder storms, dates of: 1st, 7th, 24th. Double rainbow on the 25th.

Average cloudiness (scale of ten)	3.40
Number of days on which cloudiness averaged 8 or more on scale of ten	2
Number of days of rain	7
Number of days of hail	1
Number of days of snow	1
Temperature during the month:	
Highest ... degrees	88
Lowest ... do	29
Mean ... do	73.05

Meteorological record kept at Mammoth Hot Springs, etc.—Continued.

OCTOBER, 1887.

Dates.	Self-registering thermometers. Maximum.	Minimum.	Mean.	Winds. Direction.	Force.	State of weather.	Remarks.
1887.	°	°	°				
Oct. 1	70	44	55	NW.	High wind	Fair	Rain.
2	68	24	46	SE.	Light breeze	Clear	
3	73	36	54.50	S	Gentle breeze	do	
4	78	45	61.50	SW.	High wind	Cloudy	
5	70	47	58.50	SW.	Calm	Fair	
6	53	28	70.50	SW.	Fresh breeze	Entire cloudy	Rain. Snow in the afternoon; melted as it fell.
7	35	25	30	NW.	High wind	Fair	
8	49	12	30.50	NW.	Fresh breeze	Entire clear	
9	52	24	38	NW.	Strong wind	Cloudy	Snow; sleet from 11 to 11.45 a. m.
10	53	25	39	NW.	Gentle breeze	Clear	
11	74	27	50.50	SW.	do	Entire clear	
12	73	28	50.50	SE.	Calm	do	
13	72	26	49	SE.	Very light breeze.	do	
14	70	33	51.50	SW.	Strong wind	Fair	
15	44	31	37.50	NW.	Fresh breeze	Cloudy	Snow.
16	55	20	37.50	SW	do	Fair	
17	53	28	40.50	SE.	Calm	do	
18	52	28	40	SW.	Strong wind	Clear	Snow at night.
19	46	30	38	NW.	Gentle breeze	Cloudy	Snow.
20	57	18	37.50	SW.	Light breeze	do	
21	50	37	43.50	SW.	do	Fair	
22	42	25	33.50	NW.	Gentle breeze	do	Snow from 8.45 to 10.30 a. m.
23	29	5	17	NW.	do	Entire cloudy	Snow during night.
24	33	−20	6.50	NW.	do	Cloudy	
25	41	7	24	NW.	Light breeze	Clear	
26	40	16	28	SW.	Gentle breeze	do	
27	57	32	41.50	SW.	Light breeze	do	
28	69	34	51.50	SE.	Calm	Fair	
29	67	31	49	SE.	do	Clear	
30	73	31	52	S.	do	do	
31	71	31	51	S.	Gentle breeze	do	
Monthly mean.			41.40				

Summary for October, 1887.

Average cloudiness (scale of ten)	4.28
Number of days on which cloudiness averaged 8 or more on scale of ten	5
Number of days of rain	2
Number of days of sleet	1
Number of days of snow	6
Depth of snow fall during the month ... inches	2
Temperature during the month:	
Highest ... degrees	74
Lowest ... do	−20
Mean ... do	39.1

Meteorological record kept at Mammoth Hot Springs, etc.—Continued.

NOVEMBER, 1887.

Date.	Self-registering thermometers.			Winds.		State of weather.	Remarks.
	Maximum.	Minimum.	Mean.	Direction.	Force.		
1887.	°	°	°				
Nov. 1	68	28	48	S.	Light breeze	Clear	
2	67	29	48	SW.	Gentle breeze	do	
3	65	25	45	NW.	Very light breeze.	Entire clear	
4	64	26	45	SE.	Fresh breeze	Clear	
5	61	33	47	SW.	High wind	Fair	
6	55	31	43	SW.	Gentle breeze	do	7-9 a. m.; light snow-fall.
7	52	21	36.50	NW.	Very light breeze.	Clear	
8	36	26	31	SE.	do	Fair	
9	53	28	40.50	SW.	Gentle breeze	do	
10	59	33	46	S.	Light breeze	Clear	
11	64	30	47	SW.	Strong wind	do	
12	60	30	45	NW.	do	Cloudy	
13	55	29	42	SW.	High wind	Clear	
14	52	34	43	SE.	do	do	
15	44	29	36.50	SW.	Gentle breeze	Cloudy	Snow melted as it fell.
16	49	19	31	SW.	Calm	Clear	
17	44	8	26	SE.	Light breeze	do	
18	45	23	34	W.	Fresh breeze	Fair	
19	56	26	41	SW.	Calm	do	
20	47	23	35	S.	Light breeze	Cloudy	
21	45	22	33.50	SE.	Fresh breeze	Entire cloudy	Light snow-fall; ground covered.
22	27	0	13.50	SE.	Calm	Fair	
23	41	— 3	19	SW.	do	do	
24	44	6	25	NE.	do	do	
25	26	— 2	12	W.	do	do	Light snow at night.
26	24	— 19	2.50	SE.	Very light breeze.	Clear	
27	20	— 4	8	SE.	Fresh breeze	Entire cloudy	Snow in the forenoon.
28	38	11	21.50	S.	Calm	Fair	
29	48	18	33	SW.	Light breeze	do	
30	34	18	26	SE.	Gentle breeze	do	Do.
Monthly mean			33.58				

Summary for November, 1887.

Average cloudiness (scale of ten)	4.01
Number of days on which cloudiness averaged 8 or more (scale of ten)	2
Number of days of snow	6
Depth of snow-fall during the month "inappreciable."	
Temperature during the month:	
Highest ... degrees	68
Lowest ... do	—19
Mean ... do	31.05

Meteorological record kept at Mammoth Hot Springs, etc.—Continued.

DECEMBER, 1887.

Date.	Self-registering thermometers. Maximum.	Minimum.	Mean.	Winds. Direction.	Force.	State of weather.	Remarks.
1887.	°	°	°				
Dec. 1	31	14	22.50	SW.	Light breeze..	Entire cloudy..	Snow.
2	30	20	25	S.	Calm	....do	Do.
3	41	16	28.50	SW.	....do	Fair	
4	23	15	19	SE.	Fresh breeze..	Cloudy	Do.
5	31	22	26.50	S.	High wind ...	.. do	Do.
6	27	21	24	S.	Strong wind ..	Entire cloudy.	Do.
7	39	26	32.50	S.	Fresh breeze..	Fair	
8	42	25	33.50	SE.	Light breeze..	do	Snow during night.
9	33	24	28.50	S.	Strong wind ..	Cloudy	
10	46	16	31	W.	Light breeze..	Clear	Light snow-fall 2 to 6 p. m.
11	26	20	23	SE.	Gale	Entire cloudy.	Snow.
12	34	18	26	SE.	Very light breeze.	Fair	Do.
13	34	6	20	SE.	Calm	Clear	
14	26	0	13	E.	Light breeze..	....do	
15	43	6	24.50	S.	... do	... do	
16	30	12	21	SW.	Calm	Fair	
17	30	17	23.50	S.	Light breeze..	Cloudy	Do.
18	29	18	23.50	W.	Calm	Fair	Snow in the forenoon.
19	20	−2	9	NW.	Light breeze..	.. do	Snow.
20	17	−8	4.50	NW.	Gale	Clear	
21	10	−16	−3	E.	Light breeze..	Cloudy	Do.
22	35	9	22	SE.	Calm	Clear	
23	32	5	18.50	SE.	Light breeze..	Fair	
24	21	10	15.50	S.	Gentle breeze	....do	Snow in the forenoon.
25	29	11	20	SW.	Fresh breeze..	Cloudy	Snow.
26	30	8	19	S.	Calm	Fair	Snow, ended 2.30 p. m.
27	26	−1	12.50	SE.	Light breeze..	....do	
28	42	13	27.50	SE.	Fresh breeze..	...do	Snow.
29	31	22	26.50	S.	Strong wind ..	Entire cloudy	Do.
30	27	5	16	SE.	Calm	Cloudy	Do.
31	24	6	15	E.	....do	Fair	
Monthly mean..			21.02				

Summary for December, 1887.

Average cloudiness (scale of ten)	5.80
Number of days on which cloudiness averaged 8 or more (scale of ten)	10
Number of days of snow	19
Depth of snow-fall during the month ..... inches..	24.1
Depth of snow on the ground at the close of the month ..... do....	8.6
Temperature during the month:	
Highest ..... degrees..	46
Lowest ..... do....	−16
Mean ..... do....	19.2

Meteorological record kept at Mammoth Hot Springs, etc.—Continued.

JANUARY, 1888.

Dates.	Self-registering thermometers.			Winds.		State of weather.	Remarks.
	Maximum.	Minimum.	Mean.	Direction.	Force.		
1888.	°	°	°				
Jan. 1	17	2	9.50	SE.	Light breeze.	Fair	
2	19	12	15.50	E.	do	Cloudy	Snow.
3	16	8	12	N.	Calm	do	Do.
4	5	—14	—4.50	NE.	do	Entire cloudy	Do.
5	—2	—24	—13	E.	do	Fair	Do.
6	—5	—28	—16.50	NE.	do	Entire clear	Snow ended during night.
7	12	—28	—	SE.	do	Fair	
8	7	—18	—5.50	SE.	do	do	
9	6	—18	—6	SE.	do	do	Snow, afternoon.
10	14	—1	6.50	S.	Fresh breeze	Cloudy	
11	26	10	18	E.	Light breeze	do	Snow.
12	22	9	15.50	NW.	do	do	Do.
13	—29	—31	—30	0	Calm	Fair	Snow ended 11 a.m.
14	—25	—41	—33		do	Clear	
15	—5	—35	—20	SW.	Very light breeze.	Cloudy	
16	3	—28	—12.50	SE.	Strong wind	Clear	
17	10	—15	—2.50	SW.	Fresh breeze	Fair	
18	18	2	10	SE.	Strong wind	Cloudy	
19	24	—12	6	SW.	Fresh breeze	do	Snow at intervals.
20	20	—14	3	S.	Light breeze	do	Do.
21	31	20	25.50	E.	Strong wind	do	
22	38	28	33	S.	Fresh breeze	do	Snow at intervals; melted as it fell.
23	35	29	32	SE.	Gentle breeze	do	Snow.
24	31	21	26	SE.	High wind	do	Snow during night.
25	36	22	29	SE.	do	Entire cloudy	Snow ended 12.15 p.m.
26	44	36	40	SW.	Light breeze	Fair	
27	49	24	36.50	SW.	do	Clear	
28	44	26	35	S.	Gentle breeze	do	
29	46	32	39	S.	do	Fair	
30	46	33	39.50	SW.	Calm	Clear	
31	47	26	36.50	S.	Very light breeze.	Entire clear	
Monthly mean			10.33				

Summary for January, 1888.

Average cloudiness (scale of ten)	5.57
Number of days on which cloudiness averaged 8 or more (scale of ten)	11
Number of days of snow	15
Depth of snow fall during the month ... inches	39.3
Temperature during the month:	
Highest ... degrees	49
Lowest ... do	41
Mean ... do	10.24
Barometer during the month:	
Highest ... inches	24.054
Lowest ... do	23.372

Meteorological record kept at Mammoth Hot Springs, etc.—Continued.

FEBRUARY, 1888.

Dates.	Self-registering thermometers. Maximum.	Minimum.	Mean.	Winds. Direction.	Force.	State of weather.	Remarks.
1888.	°	°	°				
Feb. 1	30	18	28.50	W.	Calm	Clear	
2	30	24	27	SW.	do	Entire cloudy.	
3	34	18	26	W.	Gentle breeze	Fair	
4	31	17	24	W.	Calm	do	
5	30	9	19.50	SW.	Light breeze	do	
6	27	15	21	SW.	Fresh breeze	do	
7	30	19	24.50	SW.	do	Cloudy	
8	40	30	35	S.	Very light breeze.	Fair	
9	35	29	32	S.	do	Cloudy	
10	31	23	27	SE.	do	do	
11	43	27	35	S.	do	do	
12	44	32	38	.....	Calm	do	Rain.
13	39	25	32	.....	do	Fair	
14	27	18	22.50	SE.	do	Clear	
15	45	10	27.50	SE.	Very light breeze.	do	
16	46	17	31.50	SE.	Light breeze	do	
17	47	21	34	SE.	do	do	
18	38	19	28.50	SW.	Calm	Cloudy	
19	33	10	21.50	W	do	Fair	
20	32	19	25.50	SE.	Light breeze	Clear	
21	34	18	26	S.	do	Fair	Snow; ground covered.
22	37	12	24.50	NE.	do	Entire clear	Do.
23	34	16	25	S.	do	Cloudy	Snow at intervals.
24	36	17	26.50	NE.	Gentle breeze.	Fair	
25	31	18	24.50	SW.	do	Cloudy	Snow.
26	40	22	31	SW.	do	Fair	
27	41	27	34	S.	do	Cloudy	Do.
28	37	7	22	NE.	Calm	Entire cloudy.	Do.
29	7	—5	1	.....	do	do	Do.
Monthly mean			26.72				

Summary for February, 1888.

Average cloudiness (scale of ten)		5.29
Number of days on which cloudiness averaged 8 or more (scale of ten)		7
Number of days of rain		1
Number of days of snow		7
Depth of snow-fall during the month	inches	20.2
Temperature during the month:		
Highest	degrees	47
Lowest	do	—5
Mean	do	25.78
Barometer during the month:		
Highest	inches	24.120
Lowest	do	23.324

Meteorological record kept at Mammoth Hot Springs, etc.—Continued.

MARCH, 1888.

Dates.	Self-registering thermometer.			Winds.		State of weather.	Remarks.
	Maximum.	Minimum.	Mean.	Direction.	Force.		
1888.	°	°	°				
Mar. 1	1	—12	—5.50	N.	Light breeze	Clear	Snow at intervals.
2	22	—13	4.50	0	Calm	Fair	Do.
3	28	3	15.50	.....	do	Cloudy	Snow.
4	16	— 4	6	.....	do	do	Do.
5	29	— 3	13	NW.	do	Fair	Snow at intervals.
6	34	16	25	S.	Gentle breeze	do	Do.
7	27	4	15.50	SE.	Calm	Entire cloudy	Snow.
8	11	— 2	4.50	.....	do	Cloudy	Do.
9	24	0	12	S.	Light breeze	Fair	Do.
10	25	6	15.50	W.	Fresh breeze	Clear	Snow ended in the morning.
11	33	14	23.50	S.	Strong wind	Fair	
12	44	28	36	SW.	Gentle breeze	do	
13	51	25	38	SW.	do	do	
14	49	31	40	SW.	do	do	Snow at night.
15	46	20	33	.....	Calm	Clear	
16	48	23	35.50	S.	Light breeze	Fair	
17	47	30	38.50	SW.	Strong wind	Cloudy	Snow during night.
18	40	19	29.50	N.	High wind	do	Snow at intervals during forenoon.
19	34	7	20.50	SE.	Light breeze	Fair	
20	31	15	23	NW.	High wind	Cloudy	Snow.
21	35	6	20.50	SW.	Fresh breeze	Entire clear	
22	43	22	32.50	S.	do	Fair	
23	48	29	38.50	SW.	Strong wind	Cloudy	Light snow from 3.10 p. m.
24	37	10	23.50	N.	Gale	do	Light snow at intervals.
25	25	4	14.50	NW.	High wind	Clear	
26	19	2	10.50	N.	do	do	
27	22	0	11	SW.	Fresh breeze	Cloudy	Light snow.
28	39	19	29	SW.	do	do	
29	41	25	33	NW.	Strong wind	do	Snow melted as it fell; 2 to 3 o'clock p. m. NW gale.
30	38	25	31.50	SE.	Light breeze	do	Snow.
31	45	32	38.50	SE.	Gentle breeze	do	Snow, rain, sleet, alternately.
Monthly mean			22.79				

Summary for March, 1888.

Average cloudiness (scale of ten)		5.39
Number of days on which cloudiness averaged 8 or more (scale of ten)		9
Number of days of rain		1
Number of days of snow		17
Depth of snow-fall during the month	inches	31.2
Depth of snow on the ground at the end of the month	do	4.5
Temperature during the month:		
Highest	degrees	51
Lowest	do	13
Mean	do	21.88
Barometer during the month:		
Highest	inches	24.088
Lowest	do	23.292

Meteorological record kept at Mammoth Hot Springs, etc.—Continued.

APRIL, 1888.

Dates.	Self-registering thermometers. Maximum.	Minimum.	Mean.	Winds. Direction.	Force.	State of weather.	Remarks.
1888.	°	°	°				
Apr. 1	40	28	34	NW.	Calm	Fair	Snow and sleet at intervals.
2	44	27	35.50	S.	Light breeze	do	
3	47	23	35	S.	do	do	
4	44	30	37	SW.	Calm	Cloudy	Snow.
5	40	22	31	SW.	Light breeze	Clear	
6	47	23	35	SW.	Fresh breeze	do	
7	54	29	41.50	S.	Calm	do	
8	52	29	40.50	S.	Light breeze	do	7.35 to 8.20 p. m., light snow, accompanied by westerly gale.
9	43	20	31.50	S.	Gentle breeze	do	
10	49	32	40.50	SW.	do	Fair	
11	53	33	43	.....	Calm	Entire clear	
12	60	31	45.50	W.	Gentle breeze	do	
13	63	33	48	S.	do	Clear	
14	64	40	52	W.	do	Entire clear	
15	64	35	49.50	SW.	Calm	Clear	
16	48	35	41.50	NW.	Strong wind	Fair	Rain, 7.30 to 8.50 a. m.; sleet at intervals.
17	55	24	34.50	S.	Fresh breeze	Clear	
18	65	38	51.50	S.	Light breeze	Fair	
19	66	36	51	.....	Calm	Clear	
20	70	35	52.50	S.	Gentle breeze	do	
21	70	37	53.50	S.	Fresh breeze	Fair	
22	72	37	54.50	SW.	Gentle breeze	do	
23	75	37	56	W.	Light breeze	Cloudy	Sprinkling, 9.50 to 10.30 p. m.
24	61	40	50.50	NW.	Calm	do	Sprinkling, 8.50 to 8.40 a. m.; hail, 1.10 to 1.35 p. m.
25	42	31	36.50	NW.	Strong wind	Fair	Rain during night.
26	47	30	38.50	SE.	Gentle breeze	do	Snow during night.
27	42	27	34.50	N.	do	Cloudy	Snow.
28	47	22	34.50	NW.	Light breeze	Clear	
29	58	28	43	.....	Calm	do	Rain, 5.10 to 7.40 p. m.
30	58	33	45.50	NW.	Gentle breeze	Cloudy	Rain at intervals.
Monthly mean			42.58				

Summary for April, 1888.

Average cloudiness (scale of ten)	3.6
Number days on which cloudiness averaged 8 or more (scale of ten)	3
Number of days of rain	8
Number of days of hail	1
Number of days of snow	5
Depth of snow-fall during the month ... inches	4
Number days sleeting (1st and 10th)	2
Temperature during the month:	
Highest ... degrees	75
Lowest ... do	20
Mean ... do	41.77
Barometer during the month:	
Highest ... inches	24.1[illegible]
Lowest ... do	23.3[illegible]

Meteorological record kept at Mammoth Hot Springs, etc.—Continued.

MAY, 1888.

Dates.	Self-registering thermometers. Maximum.	Minimum.	Mean.	Winds. Direction.	Force.	State of weather.	Remarks.
1888.	°	°	°				
May 1	48	37	42.50	S.	Strong wind	Cloudy	Rain and thunder-storm during night. Rain, hail, and snow, alternately during day.
2	46	30	38	NW.	Gentle breeze	Fair	Snow.
3	52	29	40.50	S.	do	do	Threatening.
4	56	37	46.50	S.	Fresh breeze	do	
5	53	37	45	W.	do	Cloudy	Rain at intervals.
6	53	32	42.50	NW.	do	Fair	
7	64	29	46.50	N.	Calm	Clear	
8	64	33	48.50	S.	Strong wind	Fair	Rain.
9	52	35	43.50	NW.	do	Cloudy	
10	44	30	37	NW.	Fresh breeze	Fair	8.10 a. m., light snow. 10.40 a. m. to 1.45 p. m., heavy snow and hail.
11	50	27	38.50	NW.	Calm	Clear	Snow during night.
12	67	37	52	S.	do	do	
13	75	34	54.50	NW.	Gentle breeze	Entire clear	
14	76	37	56.50	NW.	Strong wind	do	
15	56	40	48	NW.	High wind	Cloudy	
16	39	30	34.50	NW.	Gentle breeze	do	Snow melted as it fell.
17	52	31	41.50	S.	do	Fair	
18	60	31	45.50	S.	do	Clear	
19	58	33	45.50	N.	Strong wind	Cloudy	Rain.
20	53	36	44.50	NW.	Fresh breeze	do	Rain and thunder-storm.
21	50	32	41	W.	do	Clear	12.30 to 1.10 p. m., heavy rain and hail.
22	52	34	43	N.	Strong wind	Cloudy	Thunder and lightning between 1 and 2 p. m. Rain at night.
23	51	33	42	N.	Light breeze	do	1 to 3, thunder-storm; rain mixed with snow.
24	59	28	43.50	E.	do	Clear	
25	63	33	48	NW.	Strong wind	Fair	Rain at night.
26	54	40	47	NW.	do	Cloudy	
27	57	33	45	NW.	Fresh breeze	Clear	
28	66	32	49	NW.	do	do	
29	69	35	52	NW.	Light breeze	do	
30	72	37	54.50	W.	do	do	
31	72	42	57	.....	Calm	Fair	Sprinkling, thunder-storm passed at a distance 1 to 2 p. m.
Monthly mean			45.60				

Summary for May, 1888.

Thunder-storms, dates of: 1st, 20th, 22d, 23d, and 31st.

Average cloudiness (scale of ten)	4.33
Number of days on which cloudiness averaged 8 or more (scale of ten)	2
Number of days of rain	10
Number of days of hail	3
Number of days of snow	5
Depth of snow-fall during the month, "inappreciable."	
Temperature during the month:	
Highest ... degrees	76
Lowest ... do	27
Mean ... do	44.31
Barometer during the month:	
Highest ... inches	24.004
Lowest ... do	23.444

Meteorological record kept at Mammoth Hot Springs, etc.—Continued.

JUNE, 1888.

Dates.	Self-registering thermometers.			Winds.		State of weather.	Remarks.
	Maximum.	Minimum.	Mean.	Direction.	Force.		
1888.	°	°	°				
June 1	60	39	54	NW.	Light breeze	Fair	Thunder, rain, and hail, 2.45 to 3.30 p. m.
2	70	44	57	SW.	Gentle breeze	do	Rain and hail, 6 to 6.45 p. m.
3	67	44	55.50	W.	do	Cloudy	Rain at night.
4	48	42	45	N.	Calm	Entire cloudy	Rain at intervals.
5	60	37	48.50	W.	do	Cloudy	Rain in the afternoon.
6	69	39	54	SE.	Gentle breeze	do	4 to 5 p. m., thunder, lightning, heavy shower of rain.
7	63	34	48.50	S.	Calm	Fair	10.30 to 2 p. m., thunder; rain at intervals.
8	56	38	47	NW.	do	Cloudy	Sprinkling, forenoon.
9	71	36	53.50	SW.	Light breeze	Clear	
10	74	42	58	S.	do	Cloudy	Rain.
11	68	40	54	SW.	Calm	Clear	
12	75	39	57	W.	Light breeze	Fair	Sprinkling, 1 30 to 2 p. m.
13	71	47	59	S.	Gentle breeze	do	
14	75	46	60.50	S.	do	do	
15	72	48	60	SW.	do	do	Rain during night.
16	75	43	59	S.	do	do	
17	83	45	64	S.	Calm	Clear	
18	82	49	65.50	E.	do	Fair	Do.
19	67	47	57	S.	Fresh breeze	Cloudy	
20	55	38	46.50	W.	Gentle breeze	do	
21	53	37	45	W.	Calm	do	
22	55	39	47	NW.	Gentle breeze	do	
23	65	37	51	NW.	Light breeze	Fair	
24	68	39	53.50	SE.	do	Cloudy	Rain in the afternoon; thunder and lightning at night.
25	59	43	51	W.	Calm	do	Rain; thunder 2.45 to 3.15 p. m.
26	71	38	51.50	W.	Light breeze	do	Rain during night.
27	71	49	60	SW.	Gale	Fair	Rain in the afternoon; hail and thunder from 3.45 to 4.30 p. m.
28	72	44	58	E.	Gentle breeze	do	
29	76	45	60.50	SW.	do	Clear	Sprinkling at night.
30	76	46	59	SW.	do	Fair	
Monthly mean			54.77				

Summary for June, 1888.

Thunder and thunder-storms, dates of: 1st, 6th, 7th, 24th, 25th, and 27th.	5.91
Average cloudiness (scale of ten)	6
Number of days on which cloudiness averaged 8 or more (scale of ten)	17
Number of days of rain	3
Number of days of hail	
Temperature during the month:	
Highest ... degrees	83
Lowest ... do	37
Mean ... do	54.[illegible]
Barometer during the month:	
Highest ... inches	23.[illegible]
Lowest ... do	23.[illegible]

Meteorological record kept at Mammoth Hot Springs, etc.—Continued.

JULY, 1888.

Date.	Self-registering thermometers. Maximum.	Minimum.	Mean.	Winds. Direction.	Force.	State of weather.	Remarks
1888.	°	°	°				
July 1	71	46	58.50	S.	Fresh breeze	Fair	
2	67	41	54	W.	Gentle breeze	do	Rain during night.
3	73	49	61	SE.	Strong wind	do	
4	80	45	62.50	S.	High wind	Clear	
5	77	47	62	NW.	Light breeze	Cloudy	Rain at night; thunder and lightning during night.
6	80	47	63.50	E.	Calm	do	
7	85	51	68	W.	Light breeze	Clear	10 to 10.20 a. m. rain.
8	81	54	67.50	S.	do	Fair	Thunder-storm and rain during night.
9	91	49	70	W.	Gentle breeze	Clear	
10	91	51	71	S.	Light breeze	do	
11	95	54	74.50	W.	Gentle breeze	Fair	Rain at intervals.
12	72	57	64.50	S.	Light breeze	do	Do.
13	71	41	56	SW.	Gentle breeze	Clear	
14	78	44	61	S.	do	do	
15	73	45	59	SW.	do	do	
16	73	40	56.50	NW.	Light breeze	do	
17	74	38	56	NW.	do	Entire clear	
18	86	38	62	.....	Calm	do	
19	90	47	68.50	SW.	Gentle breeze	Clear	
20	87	53	70	NW.	do	do	
21	83	54	68.50	NW.	Light breeze	do	
22	87	47	67	NE.	do	Fair	
23	81	55	68	.....	Calm	Cloudy	Rain in the afternoon.
24	81	48	64.50	NW.	Gentle breeze	do	
25	82	52	67	SW.	do	do	3.30 to 7.30 p. m. thunder-storm, rain, and hail.
26	85	48	56.50	SW.	Gentle breeze	Fair	Rain; thunder-storms in the afternoon.
27	84	46	65	S.	Light breeze	do	Rain and hail; thunder-storm passed at a distance 8 p. m.
28	85	49	67	NE.	Calm	do	Thunder and lightning during night.
29	87	51	69	SW.	Light breeze	Clear	
30	80	47	63.50	N.	do	Fair	
31	66	53	59.50	NW.	do	Entire cloudy	Rain from 11.20 a. m. to 2 p. m.
Monthly mean...			64.24				

Summary for the month of July, 1888.

Thunder-storms: dates of, 5, 8, 25, 26, 27, 28. On the 26th, 3.30 p. m., distinct peals of thunder at a distance; temperature 85°; 4.50 p. m. thunder-storm from westerly direction approaching; wind changed from SW. light breeze to W. gale; heavy rain; strong electrical detonations and numerous lightning; thermometer fell from 76° to 56° in twenty minutes; double rainbow observed SE.; 5.50 p. m., wind changed from W. gale to SE. fresh breeze with approach of thunder-storm; heavy rain ended at 6.30 p. m.

Average cloudiness (scale of ten)		3.98
Number of days on which cloudiness averaged 8 or more (scale of ten)		2
Number of days of rain		11
Number of days of hail		1
Temperature during the month:		
Highest	degrees	95
Lowest	do	38
Mean	do	64.07
Barometer during the month:		
Highest	inches	24.172
Lowest	do	23.802

APPENDIX E.

Schedule of rates for camping outfits submitted by Mr. Elwood Hofer:

For guide and horse per day	$5.00
For packer and horse per day	4.00
For cook and horse per day	4.50
For saddle horses each per day	2.00
For pack animals each per day	1.00

Tents and camp equipage are furnished without additional charge.

APPENDIX F.

Rules and regulations of the Yellowstone National Park.

DEPARTMENT OF THE INTERIOR,
Washington July 1, 1888.

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 inscription 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 shall 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 in 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 or displayed within the Park, except such as may be necessary for the convenience and guidance of the public, upon buildings on 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."

WM. F. VILAS,
Secretary of the Interior.

REPORT

OF THE

SUPERINTENDENT OF THE YELLOWSTONE NATIONAL PARK

TO THE

SECRETARY OF THE INTERIOR.

1889.

WASHINGTON:
GOVERNMENT PRINTING OFFICE.
1889.

REPORT

OF THE

SUPERINTENDENT OF THE YELLOWSTONE NATIONAL PARK.

DEPARTMENT OF THE INTERIOR,
YELLOWSTONE NATIONAL PARK,
OFFICE OF SUPERINTENDENT,
Mammoth Hot Springs, Wyo., June 1, 1889.

SIR: Having been relieved from duty, with my command, in this National Park, I have the honor to submit for your information this report of the operations of the office of the Superintendent of the Yellowstone National Park for the period from August 15, 1888, to the present date.

During the season of travel to the Park, which closed October 31, 1888, probably a larger number of people visited the Park than in any previous year. By a careful estimate from the various hotel-registers, and registers of camping parties, kept at this place and the Lower Geyser Basin, the number was placed at about six thousand.

No disorder of any magnitude occurred during the season, and no complaints of extortion or of unfair treatment, except such as were incident to the crowded condition of the hotels and the insufficient accommodations which they afforded, were received.

On the 19th of August, 1888, a man was arrested by one of my scouting parties near the southern border of the Park, having in his possession the outfit of a hunter and trapper, and to all appearances engaged in trapping beaver. He was brought to this place, and upon examination gave his name as Andrew S. Page, but was identified as a person who was arrested in June, 1887, under suspicious circumstances near the Upper Geyser Basin, and who then gave his name as John Andrews. He at that time made his escape from his captors, leaving his outfit in their possession. He finally admitted that he was the same person. He was then told that if he would produce any evidence of his honesty of purpose, or would find anybody who would vouch for his future good behavior, his property would be restored to him. This he stated he would do, and was permitted to take one of his horses to go in search of the required evidence. He has not since been heard of, and the property which was taken from him still remains in custody at this place.

September 11, 1888, one William Moore, an employé of the Yellowstone Park Association, was expelled from the Park for repeated acts of drunkenness and disorder.

On the 12th of September, 1888, Thomas Garfield was arrested by a scouting party from my command, on Willow Creek, within the Park, in the act of trapping beaver. He had in his possession several green beaver-skins and the freshly-killed carcass of a beaver. He was ex-

TRESPASSERS IN THE PARK.

Attention is invited to remarks under this head contained in my two previous reports. No trespass has occurred since my last report.

HOTEL ACCOMMODATIONS.

On this subject attention is also invited to my report for the year 1888. At the date of this report no improvement has been made in the character of the accommodations provided for visitors.

TRANSPORTATION.

During the rush of travel to the Park in the months of August and September last the transportation facilities provided by the Yellowstone Park Association, through its agent, George W. Wakefield, were inadequate to the requirements of travel. The surrounding country was scoured, and animals and vehicles of every description were brought into requisition. Many visitors were forced to ride through the Park in uncomfortable and unsuitable conveyances, or otherwise to forego the object of their visit. Fortunately no serious accidents occurred. This immunity, when the character of the outfits and drivers employed is considered, may rather be ascribed to good fortune than to any proper precautions on the part of the Yellowstone Park Association or its agents.

ROADS.

There being no appropriation available, no road work was done in the Park during the year 1888, except some very slight repairs in the spring of that year to open the roads for travel. The appropriation for the fiscal year ending June 30, 1889, having finally become available, work was commenced as early as the 18th of March last, and has been vigorously prosecuted to date.

The road from the northern border of the Park to Gibbon Cañon has been put in a perfect state of repair. The approach to the hotel plateau from the Gardiner River has been greatly improved by the construction of a new piece of road about one-half mile in extent. The gap in the existing system of roads, of about 3 miles, between Swan Lake and Indian Creek, has been filled, and a substantial bridge placed across Indian Creek.

Work is now in progress on the new road through the cañon of the Gibbon River, with a prospect of its completion to a point beyond the cañon before the end of the fiscal year. Work is also in progress upon the extension of the road to the Grand Cañon, across Cascade Creek and down the cañon as far as Lookout Point.

PROTECTION AND GOVERNMENT OF THE PARK.

The legislation by which this National Park was brought into existence was unfortunately defective, in that it failed to provide any effective method for its government or protection.

Section 2 of the act approved March 1, 1872, provides:

> That 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 or 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 trespassing 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.

The inadequacy of mere rules and regulations, unsupported by any appearance of force or penalties for their infraction, soon become apparent, and there has been hardly a report rendered relating to the Park during the eighteen years of its existence in which the necessity of some further provision of law for its preservation and government has not been urged.

A full account of all the various methods and expedients which have been resorted to since the establishment of the Park in the endeavor to protect it would exceed the limits of this report, but brief allusion to some of them may serve to illustrate the difficulties and uncertainties which have surrounded the subject, and to emphasize the necessity which exists for the adoption of some definite and well-considered scheme of government. In the summer of 1882 the unchecked vandalism of visitors and the destruction wrought by forest fires had reached such a point, that the application of some remedy appeared absolutely necessary, if any portion of the Park was to be preserved, and the Department, in despair, it would seem, of any Congressional action, determined, under the authority contained in the act of dedication, to lease considerable portions of the Park to persons believed to be responsible, in the hope that they would, through self-interest, give it that care and protection which the Government had failed to give. This action of the Department seemed to invite attention to the deplorable condition of the Park, and it may be believed induced more liberal appropriations, thereby permitting the employment of a larger number of assistant superintendents, and at least an attempt at better protection. It was also provided by the act approved March 3, 1883, that—

The Secretary of War, upon the request of the Secretary of the Interior, is hereby authorized and directed to make the necessary details of troops to prevent trespassers or intruders from entering the Park for the purpose of destroying the game or objects of curiosity therein, or for any other purpose prohibited by law, and to remove such persons from the Park if found therein.

Under this authority a troop of cavalry passed a portion of the summer of 1883 in the Park, but it does not appear that it was called upon to engage actively in its protection.

The weakness of a government unprovided with any means for the enforcement of its established rules continuing to be apparent, the legislature of Wyoming, in the winter of 1884, passed "An act to render operative and effectual the laws of the Territory of Wyoming within that portion of the Yellowstone National Park lying within said Territory, and to protect and preserve the timber, game, fish, and natural objects and curiosities of the Park, and to assist in preserving the rights of the United States therein." This act, which was approved March 6,

1884, made the portion of the Park lying within Wyoming Territory a part of Uintah County; provided for voting precincts and for the election of justices of the peace and constables; extended the laws of Wyoming Territory over the portion of the Park within that Territory, and provided that the rules and regulations of the Secretary of the Interior for the government of the Park should have the same force in the Park as the laws of Wyoming Territory. Section 7 of this act provided—

> That it shall be unlawful for any person, whether resident or visitor, to deface, injure, or remove any part, portion, or particle of the natural curiosities or objects of interest, or anything whatever, within the Yellowstone National Park, whether tree, rock, stone, shrubbery, earth, geyser formation, grass, or anything whatever, except that it may be permissible to use timber or any other thing not objects of curiosity or of interest or adding to the scenic attractions of the said Park, for the necessary purposes of fuel or house-building or any domestic, useful, or necessary purpose not prohibited by the laws of the United States or the rules and regulations of the Secretary of the Interior, and any person so offending shall be guilty of a misdemeanor, and shall, on conviction thereof, be punished by a fine not exceeding $100 or by imprisonment in the county jail not exceeding six months.

Section 8 provided for the protection of the game of the Park, and fixed pains and penalties. The act further provided that a jail should be established in the Park; that the expenses of all criminal prosecutions and the salaries of the justices of the peace and constables should be paid by the Territory of Wyoming; and that one-half of the fines assessed against offenders under the provisions of the act should be paid to the informers.

Judged by the stringency of its provisions, this act should have afforded to the Park all needed protection, and yet it completely failed in its object. Vexatious arrests were made under the sweeping provisions of section 7 of the act, and it soon became evident that its tendency was to defeat the principal object for which the National Park was established. Instead of a "pleasure ground for the benefit and enjoyment of the people," it seemed likely to become a place where visitors would be subject to arbitrary arrest and serious annoyances for the most ordinary and innocent actions.

The indignation aroused by certain arrests, which appeared to have been made without sufficient cause or justification, together with the uncertainty which existed as to the authority of Wyoming Territory to exercise judicial powers within a national reservation which had been placed by law under the exclusive control of the Secretary of the Interior, caused the repeal of the obnoxious act March 10, 1886.

The repeal of this ill-considered and unwarranted act was a necessity, but as it was the first and only law under which judicial authority had been exercised in the Park, the first effect of its abrogation was to leave the Park in a worse plight than ever before. It became generally known that the superintendents had no support beyond the rules and regulations of the Department and their own personal force, and as a result the rules and regulations were ignored, while outlaws and vagabonds from the surrounding region made the nation's pleasure ground a place of refuge. The hotels were frequented by gamblers and adventurers who preyed upon the unwary tourist, while forest fires, originating mysteriously in remote and inaccessible places, raged unchecked. During the summer of 1885 a committee of Congress visited the Park for the purpose of inquiring "into the expenditure of public money for the Yellowstone Park and the administration of the laws applicable to said Park, whether any change should be made in said laws or the boundary of the Park, and what steps, if any, can be taken to make of practical benefit and utility that portion of the public domain."

This committee remained in the Park five days and took a quantity of testimony bearing upon the subject of inquiry.

The Park was at this time under the government provided by the Wyoming statute. The following extracts, taken from the majority report of this committee, signed by two members who visited the Park and one absent member, are of special interest in connection with this subject:

The magnificent mountain scenery of this Park, as well as the wonderful display of the forces of nature in foaming fountains, boiling lakes, marvelous and awe-inspiring geysers, great mountain sheets of water, and the great falls of the Yellowstone seem to have fully justified the policy of setting apart this marvelous region as a national park.

Hotels are established, or are being established, in the vicinity of each of the most interesting objects, and the persons to whom special privileges have been given for this purpose have a special object in protecting them from wanton injury by inconsiderate travelers and curious tourists, even if such protection was necessary.

None of these natural curiosities, however, are of a nature which exposes them to material injury; and if they were so exposed to deterioration and injury, a much larger force than has ever been contemplated would be necessary to protect them, as they are not only numerous, but scattered over a vast extent of country.

Nor is the police force, superintendent, and assistants, eleven in all, of special value for this purpose. A favorite purpose has been the protection of the wild animals—buffalo, elk, deer, bear, etc.—of the Park, animals which are so rapidly disappearing from all parts of the Great West. But in so extended a mountain region it is scarcely possible, even with every reasonable precaution, that these animals can be protected from the cupidity of the hunter and the wanton and more than savage barbarism that has exterminated the herds of buffalo that a few years ago pastured in countless numbers on the great prairies. It will be seen from the testimony in the appendix how improbable it is that any of these animals will for any considerable period remain, even in imagination, an interesting feature of this Park.

But on the subject of "utility," mentioned in the provision of law under which this committee was appointed, connected with the real interests of the Park for the enjoyment of all the people of the United States, the preservation of the forests, which clothe with verdure the valleys, rugged declivities, and mountain peaks of the whole region, are of special moment.

These magnificent forests, while adding beauty to the rugged grandeur of these mountain ranges, are of the highest value to extended regions of country.

In the Park are found the sources of the great rivers west of the Mississippi—the Yellowstone, and Snake Rivers; the one, traversing an immense region of fertile land, swells the waters of the Missouri, while the other is a main branch of the Columbia.

It is made very clear by the practical and scientific views presented of this subject in the testimony already presented that the regular flow of water in these rivers is greatly dependent on these forests. These mountain regions are of no value for agriculture, while their wealth of forests is of the highest economic value, besides the beneficent influence they probably exert over the rain-fall, temperature, and climate of a vast region of country.

The irrigation of the magnificent valleys of the Yellowstone is believed greatly to depend on the gradual and regular flow of water in that beautiful river, greatly dependent on those protecting forests. It is believed that the rapid flow of water from these mountain regions, from barren range of peaks and declivities, would produce wide-spread disaster in valleys even remote from the mountains.

It is therefore, in the judgment of the committee, of the highest moment that these forests should be protected from destruction either by fire or the axe. To this extent, having in view at once the beauty of the Park as a delightful resort for the people and the value of the great streams of water that issue from the mountains, as well as the benign influence of the forests on climate and health, this Park should receive the special care of the Government.

The committee further submit, for reasons above named, that the region of country to the width of 30 miles on the east side of the Park and 8 miles on the south—a mountainous region of the same general character with the Park, barren ranges covered with forest—should be reserved forever from sale and the forests protected from destruction.

Beyond the dedication of this "tract of land" as a "public park or pleasure ground for the benefit and enjoyment of the people," and placing the same under the control of the Secretary of the Interior and appropriating of late years $40,000 a year for the improvement of its roads and providing a police force for its protection, Congress up to this time has done nothing in relation to the Park; and yet, except in extortionate charges of those permitted to build hotels and carry on business in the Park

for the public convenience, there is no cause for complaint. The roads now reach every object of special interest. The Park should, as far as possible, be spared the vandalism of improvement. Its great and only charms are in the display of the wonderful forces of nature, the ever-varying beauty of the rugged landscape, and the sublimity of the scenery. Art can not embellish these.

The sum of money heretofore of late years annually appropriated of $40,000 is more than ample to continue the construction of roads, the salaries of the police force, and contingencies, but the appropriations to each purpose should be specific. In the opinion of the committee the only important duty of a police force—superintendent and assistants—in the Park is to protect the forests from fire and ax.

This report recommended—

That the boundary line dividing Montana and Wyoming on the north of Wyoming be changed so that the strip of land on the north end of the Park now in Montana shall be made a part of Wyoming, and that the western line of the Park be the western line of Wyoming as now established, and that the strip of land 8 miles wide immediately south of the Park and the strip of land immediately on the east side of the Park to the width of 30 miles be reserved from sale, and a stringent law enacted against the destruction of the forests thereon.

A report of the minority of this committee, signed by two members who visited the Park, states as follows:

While agreeing generally in the conclusions of the committee as to the Yellowstone Park, we do not agree that sufficient roads have been constructed in the Park. On the contrary, new roads should be constructed to many places of interest in the Park, and much of the road built at an early day, and not under the direction of an engineer officer of the Army, needs to be relocated and reconstructed; and while we agree that the most important duty of the superintendent and assistants in the Park "is to protect the forests from fire and the ax," yet we are of opinion that it is important to protect the objects of interest from injury, especially at the hands of the relic hunter and the professional collector of specimens, and the game from injury or destruction.

It may be presumed that the failure of Congress to make any appropriation for payment of the salaries of the superintendent of the Park and his assistants for the fiscal year ending June 30, 1887, was due to the influence of this report. The effect of this failure was to abolish these offices, and the only method remaining for the protection of the Park was that provided by the act of March 3, 1883. Under this authority a troop of cavalry, under my command, was ordered into the Park, arriving at this place August 17, 1886.

All of the circumstances connected with my administration of affairs in the Park having been previously reported, it will suffice to state here that the general method of Park government pursued since the date above mentioned has been that of a military reservation, re-enforced and guided by the rules and regulations established by your Department and the authority of the statute law.

During the first year recourse was had with considerable frequency to the authority which permits offenders to be removed from the Park, but since it has become known that the National Park can not be made a resort for vagabonds and outcasts and that any serious or intentional violation of the established rules is quite certain to result in arrest and expulsion, with possible pecuniary loss, comparatively little difficulty has been experienced. The penalties for violation of the rules not being severe, it has been considered important to make it generally understood that they could not be violated without reasonable certainty that detection with some punishment, or at least inconvenience, would follow. By a liberal distribution and posting of the published rules and regulations and by timely admonition and warning it has been the endeavor to prevent the commission of offenses rather than to seek opportunities to inflict penalties.

The people residing in the vicinity of the Park have seen that their interest lies in supporting the authorities and in encouraging an observ-

ance of the reasonable and just regulations which have been established.

Hunters and trappers have not been permitted to operate within the limits of the Park, and the game animals under the protection afforded have visibly increased and multiplied. Good order, peace, and quietness have generally prevailed. Life and property has been secure, and many thousands of visitors from every part of the civilized globe have been permitted to enjoy the wonders of nature undisturbed by fears of molestation or uncalled for espionage.

These statements as to the satisfactory condition of the Park with respect to law and order are not made for the purpose of vaunting the superiority of present methods of government and protection over all others, but to show that by the use of an organized and disciplined force, respect for the established rules and regulations and the rights of life and property can be maintained. And it is believed that to the extent in which the present method of government and protection is an improvement upon former methods it is due to the visible power and force of the National Government as represented by the military garrison in the Park.

It is not to be inferred that the claim is made that a military government is the only one practicable for the Park, or even that it is the best adapted or most suitable. It is believed, however, that no efficient protection can be given to the Park without the support of a well-organized and disciplined police force of some description.

In my report to your Department for the year 1886 I recommended the following appropriations for the protection of the Park:

For pay of one superintendent	$3,000
For pay of one chief game-keeper	1,200
For pay of ten assistant game-keepers	9,000
For pay of one chief of police	1,200
For pay of twenty policemen	18,000
For pay of one clerk	900
Total	33,300

I am now of the opinion that on account of the extension of the system of roads and the increase of summer travel the number of policemen should be increased to thirty, thus making the total to be paid for salaries $42,300. The equipment of this force would probably cost $6,500 additional, making the cost of protection, not counting the subsistence of necessary animals, $48,800.

In view of previous appropriations made for this purpose this estimate may appear somewhat excessive, and yet from my acquaintance with the subject I am convinced that any attempt to accomplish the object sought with a less force of civilians or with decreased salaries must result in failure. This sum would also appear moderate when compared with the annual amount expended in the support of the military force which now performs the duty of protection in the Park.

The present status of this subject with reference to the employment of a military force for the protection of the Park is in a very unsatisfactory condition. The uncertainty which surrounds it may be presumed to preclude the establishment of a military post in the Park of sufficient capacity for a garrison large enough to perform the duties of Park protection well and efficiently without risking any impairment of military efficiency in the force so employed, and necessitates the employment of temporary and less-effective means with a maximum of discomfort to the troops so employed.

The officer in command of the troop has during the past three years performed, in addition to the duties of his position, those civil duties which pertain to the office of the superintendent of the Yellowstone National Park without compensation other than such recognition of his services as has been accorded by your Department. In alluding to this subject there is no intention of complaining. The duties to which reference has been made have been cheerfully and willingly performed, as they will doubtless be by other officers of the Army under like circumstances. But it is an exceedingly anomalous condition of affairs which ought not to prevail indefinitely and as a matter of course.

The time would seem to be fully ripe for a definite settlement of the question as to the means to be employed in the protection and government of the National Park, and as my connection with the Park ceases with the renditon of this report, I deem it a suitable time to urgently invite your attention to the importance of this subject.

The annoyance experienced by the hunting operations of bands of Bannock Indians from the Fort Hall and Lemhi Agencies in Idaho has been the subject of frequent communications to the Department of the Interior during the past two years. In the month of January last copies of certain reports rendered by Peter Gallagher, Indian agent at the Fort Hall Agency, and J. M. Needham, of the Lemhi Agency, to the honorable Commissioner of Indian Affairs, having been furnished me for my information, and in the reports a general denial that the Indians referred to had hunted in the vicinity of the Park having been made, I, on the 12th of February last, submitted to the Department a report on the subject supported by a number of affidavits. The receipt of this report not having been at this date acknowledged, and as the subject appears to be of sufficient importance to require your attention, I append it to this report, marked A.

In my experience in connection with this National Park I have been very forcibly impressed with the danger to which it is subjected by the greed of private enterprise. All local influence centers in schemes where y the Park can be used for pecuniary advantage. In the unsurpassed grandeur of its natural condition it is the pride and glory of the nation; but if under the guise of improvement selfish interests are permitted to make merchandise of its wonders and beauties it will inevitably become a by-word and a reproach.

In the last two annual reports which I have submitted to your Department I have had great pleasure in acknowledging the services rendered in the protection of this National Park by Mr. Edward Wilson, the scout and guide employed at this station under the authority of the War Department. In taking leave of the National Park I deem it my duty to again bear witness to his faithful, zealous, and courageous performance of the difficult duties with which he has been charged.

I have this day transferred to Capt. F. A. Boutelle, First Cavalry, the records of the office of the superintendent of the Yellowstone Park, the public property pertaining to the Department of the Interior for which I am accountable, and certain property which has been taken from persons violating rule 5 of the Rules and Regulations of the Yellowstone National Park, together with your instructions of the 24th ultimo for the disposition of the same which were received yesterday.

I am, sir, very respectfully, your obedient servant,

MOSES HARRIS,
Captain First Cavalry.

The SECRETARY OF THE INTERIOR,
Washington, D. C.

A.

DEPARTMENT OF THE INTERIOR.
YELLOWSTONE NATIONAL PARK, OFFICE OF SUPERINTENDENT,
Mammoth Hot Springs, Wyo., February 12, 1889.

SIR: I have the honor to acknowledge the receipt of your communication of the 22d ultimo, by indorsement upon copy of letter from the Commissioner of Indian Affairs, dated January 19, 1889, referring to me the said letter and accompanying inclosures for my information, and, in connection therewith, to submit the following: The letter of the Commissioner of Indian Affairs and the correspondence transmitted therewith have reference to two communications from this office to the Department, dated respectively May 4, 1888, and August 24, 1888. In that of May 4 attention was invited to the annoyance occasioned in previous years by the hunting operations in the vicinity of this National Park of parties of Bannock Indians from the Fort Hall and Lemhi Reservations, and requesting that such timely instructions might be given as would prevent these Indians from approaching the Park boundaries. With reference to this letter a communication was received, dated Office of Indian Affairs, May 23, 1888, and signed by the Acting Commissioner, A. B. Upshaw, in which it was stated that letters had been addressed "to the United States Indian agent at Fort Hall and Lemhi Agencies, instructing each to adopt adaquate measures to keep their respective Indians from entering the Park or going into the vicinity of the same."

On the 24th of August, 1888, having received reliable information that a party of Bannock Indians, supposed to number about one hundred, men, women, and children, were hunting in the country just south of the Park, and that an Indian and his squaw had come into the Park as far as the Grand Cañon of the Yellowstone, I addressed a communication to the Department, reporting the facts, and stating that it was evident that the instructions to the Indian agents at the Fort Hall and Lemhi Agencies "to adopt adaquate measures to keep their Indians from entering the Park or going into the vicinity of the same," had not been complied with.

In this communication I also stated that during the summer of 1886, as a result of telegraphing the Department that Indians from Fort Hall and Lemhi were approaching the Park, the two agents came into the Park, and after having visited the various objects of interest, returned without seeing their Indians; also that upon a similar occasion in the summer of 1887 the agent from Lemhi came into the Park, and making the regular tour, returned to the agency, paying no attention whatever to his Indians, who were in the mountains near the Park line.

The United States Indian agents at the Fort Hall and Lemhi Agencies having each been instructed to report concerning the correctness of the allegations contained in the before named letter submitted reports to the Office of Indian Affairs, that of the agent at Lemhi being dated September 25, 1888, and that of the agent at Fort Hall December 12, 1888. In both of these reports denial was made in more or less explicit terms to all statements in my letter which implied any neglect of duty on the part of these Indian agents, and in both of them strong doubt was expressed as to the correctness of the report that Indians from their agencies were hunting in the vicinity of the National Park. These reports appear to have been accepted by the Indian Bureau as satisfactory, and it would appear that no further action in the matter is considered necessary by that office. I have no desire to enter into a controversy on the subject. My letter of August 24, 1888, was written with the sole object of discharging my duty of protecting this National Park. I had at this time no acquaintance whatever with the Indian agents at the Fort Hall and Lemhi Agencies, their names even being unknown to me, and my only object in alluding to their failure to gather in their Indians on previous occasions was to induce such instructions as would tend to the employment of more efficient methods for the restraint and control of their Indians.

I am persuaded, however, that all the statements contained in my letters to the Department dated May 4, 1888, and August 24, 1888, respectively, are substantially correct and irrefutable.

The essential and important part of this matter is to determine whether or not Indians from the Fort Hall and Lemhi Agencies did camp and hunt in the vicinity of the Yellowstone National Park during the months of August and September, 1888, and in this connection I invite attention to the affidavits submitted.

The affidavit of Mr. Elwood Hofer, marked A, alleges that a large party of Bannock Indians were camped on Pacific Creek in the month of August, 1888, about 10 miles south of the National Park, and engaged in hunting in the direction of the Park; and further, that on the 24th day of October, 1888, on the Snake River, about 9 miles outh of the southern boundary of the Park, he found a camp of seven lodges of Bannock Indians, who stated that they were from the Fort Hall and Lemhi Agencies; hat these Indians had been engaged in hunting, and had in their possession a large uantity of dried meat and hides; that they started back to their agencies with a arge number of animals packed with dried meat, and that they went towards the

southwest corner of the Park, saying they were going to hunt on Fall River, which is within the Park; and that at this time a forest fire was raging in the country immediately south of the Park line, which had destroyed a large extent of forest; and that in his opinion this fire had been started by Indian hunting parties for the purpose of facilitating their hunting operations, or through the careless use of fire.

The band of fourteen lodges of Bannocks which were found by Mr. Hofer on Pacific Creek, in the month of August, were also reported to me by Nelson Garnell, who is employed as a Government scout at Fort Washakie, Wyoming. He estimated the band at about one hundred, men, women, and children.

About the time this report reached me two Indians were seen near the Yellowstone Falls who said they were from Beaver Cañon, but their trail was followed in a southerly direction to near the border of the Park, and there is little doubt that they belonged to the band which camped on Pacific Creek.

The presence of these Indians in the Park is vouched for by the affidavit of Private James J. Pearson, a soldier of Troop M, First Cavalry, marked B. These Indians were also seen by a large number of tourists, and their presence in the Park gave rise to much alarm and uneasiness among the tourist visitors.

The affidavit of Mr. Edward Wilson, my scout, and Saddler Joseph M. Loyne, of my troop, marked respectively C and D, established the fact that seven lodges of Bannock Indians, who said they were from the Fort Hall and Lemhi Agencies, were in camp on Snake River from 4 to 6 miles south of the Park line on the 7th of September, and that they said they had been there about ten days; that they were engaged in hunting, and that they had in their possession large quantities of elk meat, and that two destructive forest fires were raging in the vicinity of this camp. Mr. Wilson states that from his knowledge of the habits of these Indians he thinks it probable that these fires were either intentionally started by these Indians or that they originated through their careless use of fire.

The affidavit of Mr. Charles H. Stuart, marked E, doubtless relates to this same band of Indians. They stated to him that they had been hunting on Huckleberry Mountain, which is near the edge of the Park, its northern slope being within the Park. Mr. Stuart also saw the forest fires alluded to in other affidavits. It may be inferred that this is the same party which was seen near this place by Mr. Hofer as late as the 24th of October.

More evidence can easily be obtained on this subject, but I have accepted that which is at hand, which is believed to be perfectly reliable, and sufficiently conclusive as establishing the fact that Indians from the Fort Hall and Lemhi Agencies were engaged in hunting in the immediate vicinity of the National Park during the months of August, September, and October, 1888; and that therefore the inference expressed in my letter of August 24, 1888, that the United States Indian agents at the Fort Hall and Lemhi Agencies had failed to obey their instructions to "adopt adequate measures to keep their respective Indians from entering the Park, or going in the vicinity of the same," was correct and warranted by the facts of the case. It not unfrequently happens that well-taken measures fail to accomplish the object to which they are directed, but the correspondence connected with this case fails to show that any measures whatever were taken by these agents to prevent their Indians from hunting in the vicinity of the National Park, except indefinite verbal cautions and warnings.

The agent at Fort Hall, Mr. P. Gallagher, wrote me under date of September 27, 1888, saying that he had cautioned his Indians "time and time again about the Yellowstone and Lost River countries, and insisting that under no circumstances must they go to the places mentioned." This well illustrates the indefinite and vague instructions which these Indians may be presumed to have received. The Lost River is in Idaho, several hundred miles west of the Yellowstone National Park, and the Yellowstone country is generally understood as embracing the valleys of the Yellowstone River and its tributaries. Now, it has never been charged that the Bannock Indians visited the Yellowstone country, nor do I believe that any of them have done so during the past three years. The hunting operations of these Indians, which have injured the National Park and which have been complained of, have been carried on on the tributaries of the Madison, on the west of the Park, and on those of the Snake River to the south, and all of my communications to the Department have so indicated.

Agent Gallagher telegraphed the Commissioner of Indian Affairs September 21, 1888, that many of the Indians were off their reservations, hunting without passes. He was instructed by the Commissioner of Indian Affairs by telegraph the same day "to ascertain by correspondence with the superintendent of the Park, or otherwise, whether any of his Indians were in the vicinity of the same, and if so to carry out the instructions of the 17th instant," which were "in the event of any of his Indians being near the Park to go immediately after them and take them back to their reservation." On the 26th of September I telegraphed Agent Gallagher:

"Twenty-five Indians from Fort Hall Reservation were 4 miles south of Park on Snake River September 7th; have no later information."

To which he replied by letter on the 27th "that so much time had elapsed that he presumed it was hard telling where they then were." These Indians were permitted by him to remain 4 miles from the Park line and secure many pack-loads of meat from game protected in the Park a month after he had been informed of their location, and in defiance of the instructions which he had received from the Indian Bureau. This agent puts forward the excuse that his Indian police are inefficient, and that the Indians are very hard to manage, and intimates that there is danger of war if an attempt is made to confine them to their reservation. With this condition of affairs I have nothing to do, and can only express my regret that the efforts which are being made to protect the remnant of the large game of this country and the growing timber in the National Park and adjacent regions are to be thwarted for no better purpose than to afford summer amusement and winter sustenance to a band of savage Indians, who might better be engaged in cultivating the arts of peace and civilization. With reference to the personalities contained in the report of Mr. Gallagher, as they can have no bearing upon the merits of this controversy, I have no remarks to make. I have no reason to doubt the correctness of Mr. Gallagher's statement that when he visited the Park in the summer of 1886 he remained only from Saturday to Monday, and visited only two of the geyser basins, but I think that he should not have been disappointed at his failure to find his Indians at these places. They are well known not to be good hunting grounds during the tourist season.

The agent at the Lemhi Reservation, Mr. J. M. Needham, in a communication to the Commissioner of Indian Affairs, dated May 31, 1888, with reference to his instructions "to adopt effective measures to keep the Indians of his agency away from the Park or its vicinity," says very plainly that he is unable to control his Indians; "that they are of a roving disposition, and have gone when and where they pleased in spite of all he had been able to do to prevent them from so doing." In view of this, his assertion in his letter to the Commissioner of Indian Affairs of September 25, 1888, as to the entire falsity of the matter contained in my letter of August 24, 1888, and his confident expression of belief "that there is not a single Indian from his reservation at or in the vicinity of the Park" is somewhat surprising.

He seems to rest his assertion concerning the falseness of the statement made in my letter upon the evidence contained in the letter itself. Upon re-reading this letter I find that it was stated that the Indians who were reported as near the Park were believed to be from the Fort Hall Agency.

The Indians from these two agencies on their hunting trips generally travel and camp together, and it is not always easy to ascertain which agency they are from, and the failure to associate the Lemhi Agency with Fort Hall in my letter was an omission.

I am unable, however, to see that this proves the statements contained in the letter to be false, and trust that the evidence as to the presence of Indians from the Lemhi Agency in the vicinity of the National Park last summer, submitted with this report, may fully supply the omission referred to.

The statement of this agent that he can make a report in detail "which will not show the captain up to any advantage" obliges me to request that he be at once required to make the report to which he refers, and that such portion of it as may have personal reference to myself be transmitted to me.

With reference to Mr. Needham's visit to the Park in August, 1887, I invite attention to the statement of Lieut. G. W. Goode, First Cavalry, U. S. Army, inclosed and marked F. The register of the hotel at Mammoth Hot Springs shows that J. M. Needham, of Lemhi Agency, Idaho, arrived August 31, 1887, and departed the following day. The register of the other Park hotels are not at this time accessible, but can be referred to in the future should the necessity arise. It is certain that the agent was in the Park several days, and that he failed to make himself known to the acting superintendent of the Park. Certainly, if he was bent on pleasure, there was no reason why he should have done so, but if his business was on duty connected with the incursion of his Indians on the western border of this Park, and in accordance with the message which he states he received from the Department dated August 22, 1887, it appears, to say the least, somewhat singular that he should not have considered it worth his while to consult in any way with the officer charged with the care of the Park.

But I have no desire to dwell on the personal features of this controversy further than may be necessary to justify fully the statements contained in my letter which have been pronounced false, and which, as before explained, were made for the sole object of suggesting such instructions from the Indian Bureau to its agents as would more effectually meet the requirements of the situation.

This subject has a significance far beyond any personal considerations. The summer raids of these Indians into the regions adjacent to the Park are an unmitigated evil. Destructive forest fires invariably follow in their track, which is the result of the traditional custom which incites these Indians to fire the grass at the close of every summer. The wasteful and improvident methods employed by them in their

hunting operations, and the large number of game animals killed in their protracted hunts of several months' duration, is such a drain upon the protected game of the Park as to tend, in a large measure, to defeat all the efforts which are being made for its protection.

The overflow of the Park game into the adjacent regions renders the vicinity of the Park a favorite hunting ground, not only for these Indians, but for gentlemen sportsmen from all parts of the world. As long as the restrictive laws of the surrounding Territories are observed the Park suffers but little detriment; but these Indians have no knowledge of the law, and submit to no restrictions; and it is believed that a single one of these hunting parties works more destruction during a summer's hunt than all of the gentlemen sportsmen put together who annually visit this region.

In conclusion, I most earnestly urge that this subject may continue to receive the attention of the Department until some method shall be found which will be effective for the correction of the evils which I have endeavored to set forth.

I am, sir, very very respectfully, your obedient servant,

MOSES HARRIS,
Captain First Cavalry, Acting Superintendent Yellowstone National Park.

A true copy.

WILLIAM CANNON RIVERS,
Second Lieutenant First Cavalry, Post Adjutant.

HON. H. L. MULDROW,
First Assistant Secretary of the Interior.

EXHIBIT A.—*Affidavit of Elwood Hofer.*

COUNTY OF PARK, *Territory of Montana:*

Personally appeared before me, R. T. Smith, a notary public, one Elwood Hofer, who, being duly sworn according to law, deposes and says: That for the past ten years he has been engaged in the business of outfitting hunting and tourist parties, at and in the vicinity of the Yellowstone National Park; that he is well acquainted with the country surrounding said Park, and the boundaries of the same as far as determined; that during the month of August, 1888, he was in the region of country immediately south of the Yellowstone Park, in company with Mr. W. Hallett Phillips, of Washington, D. C., and that while in camp on Pacific Creek, some Indians came into his camp and stated that fourteen lodges of Bannock Indians were then in camp on the same creek, about ten miles south of the park line, and engaged in hunting in a direction toward the National Park; and that subsequently, during the month of September, 1888, he being then in company with Mr. Lewis A. Eldridge, of Brooklyn, New York, he visited the locality where these Indians had been in camp and saw by the remains of camp fires and other evidences that a large number of Indians had been in camp at that place, and had been engaged in drying meat. And further, that about the 24th of October, 1888, he was with the before-named Mr. Lewis A. Eldridge, on Snake River, about nine miles south of the southern boundary of the Yellowstone National Park, and at that place he found a camp of Bannock Indians consisting of seven lodges, numbering probably fifty people; that these Indians stated that they were from the Fort Hall and Lemhi agencies, and that they were then about to return to their agencies, having had a successful hunt; that they had a large quantity of dried meat and hides in their possession; and that upon the following day they started upon their return with a large number of animals packed with dried meat, going toward the southwest corner of the Yellowstone National Park, saying that they were going to hunt on Fall River which is within the park limits.

The deponent further swears that at this time a forest fire was raging in the county immediately south of the Park line, which had destroyed the forest over an extent of many miles, and that in his opinion this fire had been started by Indian hunting parties for the purpose of facilitating their hunting operations, or through the careless use of fire.

And further the deponent sayeth not.

ELWOOD HOFER.

Subscribed and sworn to before me this 2d day of February, 1889.
[SEAL.]

R. T. SMITH,
Notary Public.

EXHIBIT B.—*Affidavit of James J. Pearson.*

COUNTY OF PARK, *Territory of Montana:*

Personally appeared before me, R. T. Smith, a notary public in and for said county, one James J. Pearson, who being duly sworn according to law, deposes and says that he is a soldier in the service of the United States, stationed at Camp Sheridan, Mammoth Hot Springs, Wyoming Territory; that on or about the 13th day of August, 1888, being at that time on duty at the Grand Cañon of the Yellowstone, for the purpose of enforcing the rules and regulations of the Yellowstone National Park, he met and conversed with two Indians, a buck and a squaw, near the Grand Cañon; that these Indians said that they were Bannock Indians and that they came from Beaver Cañon, which is a station on the Utah Northern Railroad west of the Yellowstone National Park; that they were both mounted and had with them a pack animal, the buck being armed with a rifle; and further the deponent sayeth not.

JAMES J. PEARSON.

Subscribed and sworn to before me this 4th day of February, 1889.

[SEAL.] R. T. SMITH,
Notary Public.

EXHIBIT C.—*Affidavit of Edward Wilson.*

COUNTY OF PARK, *Territory of Wyoming:*

Personally appeared before me, R. T. Smith, a notary public in and for said county, one Edward Wilson, who, being duly sworn according to law, deposes and says that since the month of May, 1887, he has been employed in the military service of the United States as a scout and guide for the protection of the Yellowstone National Park, and that for several years previous he had been employed under the Department of the Interior as a gamekeeper and assistant superintendent in the Yellowstone National Park; that he is well acquainted with all of the region of country adjacent to the said park and with the boundaries of the same as far as determined.

The deponent further swears that, on or about the 7th day of September, 1888, he was in company with Saddler Joseph M. Laynes, Troop M, First United States Cavalry, on Snake River, Wyoming Territory, about four miles south of the Park line, and at that point he saw a camp of Indians, consisting of three lodges and numbering, as estimated, about twenty-five people, men, women, and children; that these Indians stated that they were Bannock Indians from Salmon City, and that there were four lodges of Bannock Indians from Fort Hall, about two and one-half miles further down on the west side of the river; that he went near enough to the last-named camp to see the lodges, but did not enter it; that these Indians had large quantities of elk-meat in their camp, and stated that they had been in that vicinity about ten days, and were engaged in hunting; that at this time two large forest fires were raging in the adjacent country, one some distance south of the camp of these Indians and one to the north and west of their camp, near the edge of the park; and that, from his knowledge of the habits of these Indians, he thinks it probable that these fires were either intentionally started by them or that they originated through their careless use of fire; and further the deponent sayeth not.

EDWARD WILSON.

Subscribed and sworn to before me this 4th day of February, 1889.

[SEAL.] R. T. SMITH,
Notary Public.

EXHIBIT D.—*Affidavit of Joseph M. Loyns.*

COUNTY OF PARK, *Territory of Montana:*

Personally appeared before me, R. T. Smith, notary public in and for said county, one Joseph M. Loyns, who, being duly sworn according to law, deposes and says that he is a soldier in the service of the United States, holding the rank of saddler, in Troop M, First Cavalry, stationed at Camp Sheridan, Mammoth Hot Springs, Wyoming Territory; and that on or about the 7th day of September, 1888, he then being on a scout for the purpose of enforcing the rules and regulations of the Yellowstone National Park, in company with Mr. Edward Wilson, a scout and guide in the employ of the Government, found a party of Indians in camp on Snake River, in Wyoming Territory, the party being divided into two bands, one, of three lodges, being camped on

the east bank of the river, about four miles south of the Yellowstone Park, and the other, of four lodges, some two miles or more down the river, on the opposite bank; that these Indians said that they were Bannocks, from Lemhi and Fort Hall, and that they had been in that vicinity ten days; that they stated that they were engaged in hunting, and that he saw a large quantity of elk meat in their camp.

The deponent further swears that at this time two forest fires were raging in the vicinity of these Indian camps, one very large one some distance to the south, and one less extensive to the north and west and near the south line of the Park; and further the deponent sayeth not.

JOSEPH M. LOYNS.

Subscribed and sworn to before me this 6th day of February, 1889.
[SEAL.] R. T. SMITH,
Notary Public.

EXHIBIT E.—*Affidavit of Charles H. Stuart.*

COUNTY OF PARK, *Territory of Montana:*

Personally appeared before me, R. T. Smith, notary public in and for said county, one Charles H. Stuart, who being duly sworn according to law, deposes and says that he is a resident of Mammoth Hot Spring, Wyoming Territory, and that he is associated with the lessees Helen L. and Walter J. Henderson of that place in the Yellowstone National Park, in the business of hotel keeping and the outfitting of tourist and hunting parties; that he was for several years employed with the division of the U. S. Geological Survey in the Yellowstone National Park under Mr. Arnold Hague, and that he is well acquainted with the country in and adjacent to the Yellowstone National Park, and the boundaries of said Park as far as they are determined; that on or about the 15th day of September, 1888, being at the time in company with Mr. Frank C. Crocker, of Portland, Maine, he saw a party of Indians in camp on Snake River, there being two separate camps. One of these lodges on the east bank of the river about four miles from the Park line, and one of four lodges farther down the river on the opposite bank; that he camped near these Indians and conversed with them both in their camps and in his own; that they stated that they were Bannocks and that one band was from Fort Hall and that the other was from Salmon City, and that they were engaged in hunting on Huckleberry Mountain which is near the Park line; that in conversation they stated that they had been instructed not to go near the Park, and asked where the Park line was; and that upon being told expressed surprise that it was so near to them; that he saw a large quantity of elk meat and some hides in their camps. The deponent further swears that at this time two forest fires were raging in this vicinity. One in the country south of the Indian camps and one to the west near the south line of the Yellowstone National Park; and further the deponent sayeth not.

CHARLES H. STUART.

Subscribed and sworn to before me this 5th day of February, 1889.
[SEAL.] R. T. SMITH,
Notary Public.

EXHIBIT F.—*Statement of Lieut. G. W. Goode, First Cavalry, U. S. Army*

About the 21st of August, 1887, under orders from Capt. Moses Harris, First Cavalry, commanding Camp Sheridan, Wyoming, I made a reconnaissance of the country just outlying the Yellowstone Park, at the northern portion of the western boundary. In accordance with my instructions, the object of this scout was to discover the presence of hunting parties of Indians (Bannock), reported to have been seen in that locality, or en route there, and return them to their reservation. After three days I found the party from the Lemhi Agency encamped about three or four miles from the western boundary line, near the headwaters of the Gallatin River.

They had been one day in camp and had killed quite a number of elk. With good rifles and ammunition, over a hundred fine looking ponies; within such easy access of the Park—and judging from the amount of elk meat already in camp—their facilities for slaughtering game within the Park limits seemed the best possible.

I ordered these Indians back to their reservation, and told them they would not be allowed to hunt in the vicinity of the Park. They promised to return, and started the following morning; in the morning I also started back to the Lower Basin to report my action to Captain Harris. I had no confidence, however, that those Indians would return to the reservation; believing that they would only change the locality of their

camp, and continue to hunt in the vicinity of the Park line, where on one side or the other, they were certain to find abundance of game.

On my way back to the lower basin, I passed on the road a man traveling in a covered wagon; he hailed me, said he was the agent at the Lemhi Agency, and asked if I had seen any of his Indians hunting in that locality. He also said he had made inquiry of some men living on the road, at Henry's Lake, and could get no information.

I told him that I had been sent out by Captain Harris to intercept Indians who were coming to hunt in the park, and I found a party of about fourteen (bucks and squaws) just outside of the park limits; that they had killed quite a number of elk; and that, although they had promised to return at once to the agency, I believed they had no such intention, but would continue to hunt in the vicinity, and would in all probability go into the park, where the elk were most plentiful.

In answer to his inquiries, I gave him directions for finding these Indians, telling him it would be necessary to proceed most of the way mounted, but the trail was fresh and very plain. He said he was unaccustomed to riding and could not possibly make such a journey; that a ride of 10 miles (I think that is the distance) would wear him out completely. He said he would proceed on to the hotel and confer with Captain Harris.

At the hotel, Lower Basin, I reported by telephone to Captain Harris, relating all the circumstances, as nearly as possible over a badly working wire, and he ordered me to return to the post.

Whether or not this agent communicated with Captain Harris from the Lower Basin, I do not know. I got the impression that he was not at all concerned about his Indians. At that time, and subsequently, he appeared to me like a tourist and pleasure-seeker, but not like a government official in the discharge of his duties.

According to my recollection this man made the regular tour of the Park, and took his departure thence without having spoken to Captain Harris of the business which was the ostensible cause of his presence there. I can not assert this positively at the present time, but I do remember distinctly that his conduct was discussed; and that Captain Harris and myself both pronounced him guilty of neglect of duty, because he had made no effort, and shown no desire, to control the actions of these Indians for whom he was responsible.

GEO. W. GOODE,
Second Lieutenant, First Cavalry.

FORT MACGINNIS, MONT.,
February 5, 1889.

SUPPLEMENTAL REPORT

OF THE

SUPERINTENDENT OF THE YELLOWSTONE NATIONAL PARK.

The Hon. Secretary of the Interior,
Washington, D. C.:

Having assumed the duties of Superintendent of the Yellowstone National Park only one month ago, my report for a part of the fiscal year ending June 30, 1889, will naturally be very brief.

I have been favored by Capt. Moses Harris, First Cavalry, my predecessor, with a perusal of his report closing his administration of affairs of the Park May 31, 1889. It will be found very comprehensive and interesting. His management has left matters in the Park in so healthy a condition that little trouble is apprehended in its government.

I have not had an opportunity for making a thorough inspection of the Park, but while making a tour with Senators Hoar, Allison, Hale, Pugh, and Dolph I was impressed with the danger that exists of its utter ruin as a Park by forest fires. There is no equipment for fighting fires, and I am sure that without proper appliances a fire well under way in any part of the Park would be uncontrollable, and, besides destroying its beauty, would be of incalculable injury to the countries receiving their water supply from this great reservoir.

A great deal of damage has already been done to the Park by fires, but there are still thousands of acres of dense, low-grade pine timber which protects the snow from the sun's rays, and retards the melting until late in the season. A rapid melting of the snows of this region would certainly be attended by freshets on both sides of the continental divide. The unruly character of Snake and Missouri rivers in high water are too well known to deserve comment.

If this wonderland is considered worth preservation a liberal appropriation should at once be made to be used in clearing away the down timber for 100 yards on each side of the roads and trails. Many parties pass through the Park camping, and many of the fires which occur are traced to them. I do not believe they are, as a rule, willfully careless, but they often leave their fires believing them out, when in fact they are not, and the winds soon fan the embers into flames. It may become necessary to establish regular camping grounds, at intervals of a few miles, when the camps can be examined every morning by persons charged with the duty, and all remaining fires extinguished. As fires often occur at a distance from water, there should be supplied two or more water wagons, drawn by four mules, a number of folding rubber buckets, axes, and shovels. The rubber buckets could be carried on horses. The tanks could be filled at the nearest streams and hauled to the fires. It very often happens that fires get into the dead roots of

trees, where they can not be reached by shovels and axes, and such fires have to be watched for days, or until they are burned out, while a few buckets of water would put them out at once.

Except at the Mammoth Hot Springs there are no suitable hotels in the Park. I believe the Yellowstone Park Association intend erecting good buildings as fast as possible. The work on their buildings has been greatly impeded by the regulations prohibiting the cutting of live timber in the Park. Your recently received authority for the cutting of the necessary timber for the erection of hotels will greatly facilitate matters.

The Park is so far from the supply of both labor and material that the work is slow. The breaking of a single piece of the saw-mill, for instance, or the sickness or incapacity of a workman brought out from St. Paul, will stop the work until they can be replaced.

The hotel at the Grand Cañon will be completed this season, and the one at the lake is so far under way that mechanics can work on it this winter and have it ready for next season.

That portion of the statute which prescribes that no hotel shall be erected within 440 yards of any object of interest is very embarrassing, and I think should be modified to read 220 yards. A special case in point is the hotel at Upper Geyser Basin; it is about 250 yards from "Old Faithful" geyser and is situated on the only good site for a hotel building in that basin. From its porch every active geyser in the basin can be seen. To inforce the 440-yards proviso would be to push the hotel back out of sight of many.

The work on the roads through the Park is being pushed vigorously by the engineer corps under the immediate direction of Lieut. William P. Craighill, Engineer Corps, and by the close of the season travel will be greatly improved.

There is much down timber on the trails. This, with promised assistance from the engineer party, I hope to have removed very soon.

The game seen in the Park appears so remarkably tame that I believe with time many varieties will become so gentle that they will have little greater fear of man than the animals seen in eastern parks.

With a small appropriation I believe an inclosure on the roadside could me made and stocked with elk and deer and antelope, so as to be seen by all tourists passing. The only expense attending their support would be a little hay for winter.

From what I can learn, the Park until recent years was considered by many living in the neighborhood little else than a fine hunting ground. I think most of those who were in the habit of hunting in the Park have now a feeling of proprietary interest and recognize that the protection afforded the game makes it a safe breeding-ground, and that there will be more game in the adjacent country if the animals while in the Park are not disturbed.

The carnivora of the Park have, in common with other animals, increased until, I believe, something should be done for their extermination. This will be made the subject of a special letter. If the proposition is favorably considered the work should be done by persons under my control.

In passing through the Park I noticed with surprise the barrenness of most of the water of the Park. Besides the beautiful Shoshone and other smaller lakes there are hundreds of miles of as fine streams as any in existence without a fish of any kind. I have written Col. Marshall McDonald, U. S. Fish Commission, upon the subject, and have received letters from him manifesting a great interest. I hope through

him to see all of these waters so stocked that the pleasure-seeker in the Park can enjoy fine fishing within a few rods of any hotel or camp. There are other reasons, too, to be considered in this connection. The stocking of these waters will add vastly to the breeding-grounds of the tributaries of the Missouri and Snake Rivers and add immeasurably to the food supply obtained from those waters.

The attention of the Secretary is earnestly asked to the fact that the boundary of the Park is not marked, and only known by the description contained in the statute. I believe persons have hunted and trapped within the Park, and may again do so, through ignorance of its boundaries. A survey, a small slashing through the timber, and the piling of a few rocks in the open country is all that is necessary, and should cost very little.

If the guarding of the Park is to remain a military duty it should be settled by law as soon as possible and this station recognized as a military post. It is now considered a cantonment and the troops in cantonment. The temporary buildings are insufficient and not as comfortable as at other posts. Estimates for additional quarters are disapproved upon the grounds that the station of troops in the Park is temporary.

A suitable residence for the Superintendent is necessary, and if an appropriation could be obtained for such a building it would greatly relieve the pressure now felt by officers on duty in the Park.

The most embarrassing features of Park administration appear to be the want of any law except such as is vested in the Secretary of the Interior in establishing rules and regulations.

So far as the Superintendent is concerned he can make no distinction between the offense of breaking a small piece off a formation or breaking a tourist's head, carrying away a bit of incrustation or carrying away a tourist's trunk. I know little of civil law, and have no remedy to propose. I only suggest that something should be done, leaving the system to others of experience.

I have reasons to believe that schemes are on foot looking to the cutting off of a portion of the northeastern corner of the Park. If the preservation of the game of the Park is worthy of consideration this should be strongly opposed, as some of the principal winter ranges of elk and buffalo are in the part proposed to be cut off.

Inclosed herewith is a meteorological record of the post, kept at the post hospital; also an estimate of the cost of care and preservation of the Park under civil administration for fiscal year ending June 30, 1891. It will appear large, but I am confident a lesser number of employés can not, with the probable increase of travel, perform the duties to your satisfaction.

F. A. BOUTELLE,
Captain, First Cavalry,
Acting Superintendent Yellowstone National Park.

Meteorological record kept at Mammoth Hot Springs, Yellowstone National Park, from July 1, 1888, to June 30, 1889.

[Latitude, 44° 58′; longitude, 110° 41′ 8″; altitude of barometer above sea, 6,370 feet.]

JULY, 1888.

Date.	Self-registering thermometer. Maximum.	Minimum.	Mean.	Winds. Direction.	Force.	State of weather.	Remarks.
1888.	°	°	°				
July 1	71	46	58.50	S.	Fresh breeze	Fair	
2	67	41	54	W.	Gentle breeze	do	
3	73	49	61	SE.	Strong wind	do	Rain during night.
4	80	45	62.50	S	High wind	Clear	
5	77	47	62	NW.	Light breeze	Cloudy	Rain at night, thunder and lightning during night.
6	80	47	63.50	E.	Calm	do	
7	85	51	68	W.	Light breeze	Clear	10 to 10.20 a. m. rain
8	81	54	67.50	S.	do	Fair	Thunder-storm and rain during night.
9	91	49	70	W.	Gentle breeze	Clear	
10	91	51	71	S.	Light breeze	do	
11	95	54	74.50	W.	Gentle breeze	Fair	Rain at intervals.
12	72	57	64.50	S.	Light breeze	do	Do.
13	71	41	56	SW.	Gentle breeze	Clear	
14	78	44	61	S.	do	do	
15	73	45	59	SW.	do	do	
16	73	40	56.50	NW.	Light breeze	do	
17	74	38	56	NW.	do	Entire clear	
18	86	38	62		Calm	do	
19	90	47	68.50	SW.	Gentle breeze	Clear	
20	87	53	70	NW.	do	do	
21	83	54	68.50	NW.	Light breeze	do	
22	87	47	67	NE.	do	Fair	
23	81	55	68		Calm	Cloudy	Rain in the afternoon.
24	81	48	64.50	NW.	Gentle breeze	do	
25	82	52	67	SW.	do	do	3.30 to 7.30 p. m. thunder-storm, rain and hail.
26	85	48	56.60	SW.	do	Fair	Rain; thunder-storms in the afternoon.
27	84	46	65	S.	Light breeze	do	Rain and hail; thunder-storm passed at a distance 8 p. m.
28	85	49	67	NE.	Calm	do	Thunder and lightning during night.
29	87	51	69	SW.	Light breeze	Clear	
30	80	47	63.50	N.	do	Fair	
31	66	53	59.50	NW.	do	Entire cloudy	Rain from 11.20 a. m. to 2 p. m.

Summary for the month of July, 1888.

Thunder-storms, dates of, 5th, 8th, 25th, 26th, 27th, 28th. On the 26th, 3.30 p. m., distinct peals of thunder at a distance; temperature, 85°; 4.50 p. m., thunder-storm from westerly direction approaching; wind changed from southwest; light breeze to west gale; heavy rain; strong electrical detonations and numerous lightning; thermometer fell from 76° to 56° in twenty minutes; double rainbow observed southeast; 5.50 p. m. wind changed from west gale to southeast fresh breeze, with approach of thunder-storm; heavy rain ended at 6.30 p. m.

Average cloudiness (scale of ten)	3.28
Number of days on which cloudiness averaged eight or more	2
Number of days of rain	11
Number of days of hail	1

Temperature during the month: Highest, 95°, on the 11th; lowest, 38°, on the 17th and 18th; mean, 64.07°.

Barometer during the month: Highest, 24.172 inches, on the 21st; lowest, 23.602 inches, on the 1st.

Meteorological record kept at Mammoth Hot Springs, etc.—Continued.

AUGUST, 1888.

Date.	Self-registering thermometers. Maximum.	Minimum.	Mean.	Winds. Direction.	Force.	State of weather.	Remarks.
1888.	°	°	°				
Aug. 1	79	48	63.50	S.	Gentle breeze	Cloudy	Rain; thunder-storm.
2	75	46	60.50	S.	Fresh breeze	Fair	Do.
3	71	41	56	SW.	Light breeze	Cloudy	Sprinkling rain.
4	61	48	56	S.	Gentle breeze	Entire cloudy	Rain; thunder-storm.
5	64	43	53.50	NW.	do	Fair	Rain.
6	57	41	49	SE.	do	do	Rain at intervals; rainbow east 5.30 p. m., southeast 6.30 p. m.
7	65	38	51.50	NW.	do	do	
8	78	38	58	S.	Fresh breeze	Clear	
9	77	41	59	N.	do	Fair	Rain; thunder-storm.
10	79	43	61	W.	Gentle breeze	Clear	Rain 1 p. m. to 1.45 p. m.
11	80	46	66	NW.	Light breeze	do	
12	79	51	65	NW.	Gentle breeze	Fair	
13	84	49	66.50	S.	Fresh breeze	Clear	
14	66	53	59.50	NW.	High wind	Cloudy	
15	63	43	53	NW.	Brisk	Fair	Rain; thunder-storm 5.30 to 6.30 p. m.
16	72	35	53.50	NW.	Light	Clear	
17	75	39	57	SE.	Fresh	Fair	Rain; thunder-storm.
18	65	46	55.50	E.	Gentle	do	Do.
19	75	41	58	NW.	do	Clear	
20	81	42	61.50	N.	Light	do	
21	84	45	64.50	N.	do	do	
22	86	45	65.50	SE.	Gentle	do	
23	84	48	66	E.	Light	do	Thunder-storm.
24	89	48	68.50	SE.	Gentle	do	
25	90	49	69.50	N.	Light	do	
26	88	51	69.50	NW.	Gentle	Fair	Sprinkling rain; thunder-storm.
27	84	53	68.50	W.	Fresh	do	Rain; thunder-storm.
28	86	47	66.50	S.	Light	Clear	
29	85	46	65.50	NW.	do	do	
30	85	43	64	NW.	Calm	do	
31	82	45	63.50	W.	do	Entire clear	

Summary for the month of August, 1888.

Thunder-storms, dates of: 1st, 2d, 4th, 9th, 15th, 17th, 18th, 23d, 26th, 27th.

On the 1st, 2.30 p. m., wind changed from southerly gentle to westerly gale; 3 p. m., rain, thunder-storm with loud peals of thunder; rain ended during night. On the 2d, 1.30 p. m., thunder-storm passed at a distance; wind changed from southerly to southwesterly brisk; thunder-storm approaching from southwest accompanied by a heavy shower of rain; 4.56 p. m. wind changed from southwesterly to northwesterly high; thunder-storm with strong electrical detonations and numerous lightning. Heavy shower of rain; thermometer fell rapidly from 64° to 52°. On the 4th, thunder-storm passed at a distance from west to east; heavy shower of rain. On the 9th, thunder-storm passed at a distance from southwest to east. On the 15th, thunder-storm from southwest in easterly direction at a distance between 1 and 2 p. m. On the 17th, thunder-storm from west to northeast at a distance. On the 27th thunder-storm at a distance in easterly direction with numerous lightning.

Average cloudiness (scale of ten) 3.91
Number of days of rain and hail 11

Temperature during the month: Highest, 90°, on the 25th; lowest, 38°, on the 7th; mean, 59°.19.
Barometer during the month: Highest, 24.130 inches, on the 11th; lowest 23.826 inches, on the 4th.

Meteorological record kept at Mammoth Hot Springs, etc.—Continued.

SEPTEMBER, 1888.

Date.	Self-registering thermometers.			Winds.		State of weather.	Remarks.
	Maximum.	Minimum.	Mean.	Direction.	Force.		
1888.	°	°	°				
Sept. 1	82	43	62.50	NW.	Gentle	Entire clear	
2	83	41	62	NW.	do	Clear	
3	82	44	63	NE.	Light	Fair	
4	86	46	66	NW.	Brisk	do	
5	74	51	62.50	S.	High	do	Sprinkling rain; thunder-storm passed at a distance from west to east.
6	71	37	54	S.	Gentle	Clear	
7	79	39	59	N.	do	Entire clear	
8	84	40	62	SE.	Light	do	
9	81	47	64	SW.	Brisk	Clear	
10	74	42	58	NW.	do	do	
11	82	37	59.50	NE.	Calm	Entire clear	
12	85	43	64	S.	High	Clear	
13	78	54	66	S.	Light	do	Sprinkling rain.
14	75	33	54	NW.	Fresh	Entire clear	
15	85	34	59.50	SE.	Calm	Clear	
16	85	40	62.50	S.	Light	do	
17	83	47	65	S.	Fresh	do	
18	60	50	55	S.	Light	Cloudy	Rain at intervals.
19	67	43	55	NW.	do	Fair	
20	72	38	55	S.	do	Clear	
21	76	43	59.50	S.	Gentle	do	
22	77	40	58.50	SE.	Calm	do	Rain
23	78	38	58	NW.	Fresh	Clear	
24	70	35	52.50	NW.	Brisk	Entire clear	
25	77	33	55	NW.	Gentle	do	
26	68	35	51.50	NW.	Brisk	Clear	
27	72	34	53	NW.	Calm	do	Sprinkling rain.
28	69	35	52	NW.	Fresh	Entire clear	
29	72	34	53	NW.	Light	Clear	
30	74	40	57	NW.	Fresh	do	

Summary for the month of September.

Average cloudiness (scale of ten) 1.62
Number of days of rain 5

Temperature during the month: Highest, 86°, on the 4th; lowest, 33°, on the 14th and 25th; mean, 57.83.

Highest barometer, 24.212 inches, on the 24th; lowest barometer, 23.772 inches, on the 18th.

Meteorological record kept at Mammoth, Hot Springs, etc.—Continued.

OCTOBER, 1888.

Date.	Self-registering thermometers. Maximum.	Minimum.	Mean.	Winds. Direction.	Force.	State of weather.	Remarks.
1888.	°	°	°				
Oct. 1	74	38	56	NW.	Light	Clear	
2	73	35	54	NW.	Gentle	do	
3	69	32	51	NW.	Brisk	Fair	
4	54	41	47.50	NW.	Gentle	do	Rain during night
5	63	30	46.50	N.	Light	Entire clear	
6	68	30	48	N.	Calm	do	
7	62	28	45	SW.	Gale	Fair	Rain, hail, thunder-storm; at a distance 4.45 p. m. to 8.30 p. m.
8	52	38	45	S.	Fresh	do	
9	56	35	45.50	N.	Brisk	Clear	Rain; afternoon.
10	56	27	41.50	SW.	Gentle	Cloudy	
11	52	42	47	SW.	do	do	
12	62	39	50.50	S.	Light	do	Rain; double rainbow east at 5 p. m.
13	51	39	45	W.	Fresh	Fair	
14	49	28	38.50	S.	Brisk	Cloudy	Sprinkling rain and hail.
15	51	38	44.50	S.	do	Entire cloudy	Snow at intervals.
16	58	34	46	S.	Gentle	Cloudy	
17	54	32	43.50	SE.	Light	Fair	Rain; thunder-storm from westerly direction.
18	41	24	32.50	NW.	Fresh	Clear	Snow.
19	57	21	38	S.	Light	Fair	
20	46	31	38.50	NW.	Brisk	Clear	
21	42	23	32.50	NW.	Fresh	Cloudy	Snow at intervals
22	48	27	37.50	SW.	Gentle	Entire cloudy	Snow.
23	47	34	40.50	S.	Gale	do	Do.
24	48	31	39.50	S.	Fresh	Cloudy	Snow at intervals
25	36	24	30	S.	High	do	Snow.
26	35	22	28.50	N.	Calm	Fair	Do.
27	37	23	25	S.	Gentle	do	
28	53	31	42	S.	Brisk	do	
29	62	37	49.50	SE.	Fresh	do	
30	56	34	45	S.	High	Entire cloudy	Rain
31	41	40	3[illegible].50		Calm	do	Snow.

Summary for the month of October.

Thunder-storms, dates of: 7th, 17th.

Average cloudiness (scale of ten) 5.44
Number of days of rain and hail 7
Number of days of snow 1

The snow-fall was inappreciable on 8 days. Depth of snow-fall during the month, 2.7 inches.
Temperature during the month: Highest, 74°, on the 1st; lowest, 32°, on the 27th; mean, 49.97.
Barometer during the month: Highest barometer, 23.176 inches, on the 10th; lowest barometer, 23.420 inches on the 24th.

Meteorological record kept at Mammoth Hot Springs, etc.—Continued.

NOVEMBER, 1888.

Date.	Self-registering thermometers.			Winds.		State of weather.	Remarks.
	Maximum.	Minimum.	Mean.	Direction.	Force.		
1888.	°	°	°				
Nov. 1	34	20	27	SE.	Brisk	Cloudy	Snow at intervals.
2	39	28	33.50	SE.	High	Entire cloudy	Snow at intervals; rain in the afternoon.
3	41	30	35.50	NW.	do	do	Snow.
4	36	23	29.50	SE.	Calm	Fair	
5	30	13	21.50	S.	Fresh	do	Snow at night.
6	34	20	27	S.	High	Cloudy	Snow at intervals
7	33	20	26.50	NW.	Gentle	Fair	Do.
8	32	10	21	.....	Calm	Clear	
9	38	17	27.50	S.	Gentle	do	
10	39	13	26	SE.	Light	do	
11	42	17	29.50	SE.	do	do	
12	42	22	32	S.	Brisk	Fair	
13	38	25	31.50	S.	Light	Entire cloudy	Snow.
14	27	13	20	.....	do	do	Do.
15	17	−4	6.50	.....	Calm	Entire clear	
16	17	−4	6.50	.....	do	Fair	
17	36	17	26.50	SE.	Light	Cloudy	Do.
18	42	22	32	.....	Calm	Clear	
19	44	23	33.50	.....	do	do	
20	36	25	30.50	SE.	Gentle	Fair	
21	38	20	29	.....	Light	Clear	
22	39	22	30.50	SE.	do	Cloudy	
23	43	28	35.50	SE.	do	Fair	
24	43	18	30.50	SE.	Calm	Entire clear	
25	43	24	33.50	SE.	Light	Fair	
26	38	31	34.50	NW.	Calm	Entire cloudy	Do.
27	36	22	29	NW.	Brisk	Fair	Snow forenoon.
28	29	11	20	.....	Calm	do	
29	28	1	14.50	.....	do	Clear	
30	31	10	20.50	SE.	Light	do	

Summary for the month of November.

Average cloudiness (scale of ten)	4.63
Number of days of rain	1
Number of days of snow	11

Snow-fall on three days inappreciable; depth of snow-fall during the month, 10.8 inches.

Temperature during the month: Highest, 44°, on the 19th; lowest, −4°, on the 15th and 16th; mean temperature, 25°.45.

Barometer during the month: Highest, 24.032, on the 19th; lowest, 23.526, on the 6th.

Meteorological record kept at Mammoth Hot Springs, etc.—Continued.

DECEMBER, 1888.

Day of month.	Temperature.			Precipitation.				General direction of the wind.
	Maximum.	Minimum.	Range.	Time of beginning.	Time of ending.	Total precipitation.*	Depth of snow-fall.	
1888.	°	°	°			*Inches.*	*Inches.*	
Dec. 1	32	18	14	6.30 a. m.	During night.	.19	2.10	W.
2	32	13	19					
3	38	17	21					S.
4	46	29	17					S.
5	43	16	27					S.
6	40	21	19					SW.
7	39	21	18					S.
8	40	26	14	7.15 a. m.	8.45 a. m.	.01	0.15	SE.
9	39	31	8					S.
10	35	23	12	12.30 p. m.	8.15 p. m.	.06	0.60	S.
11	35	22	13	6.30 a. m.	9.30 a. m.	.05	0.55	SE.
12	40	27	13	During night.	11 a. m.	.10	1.05	S.
13	39	19	20					SE.
14	36	24	12	7.30 a. m.		.20	2.10	S.
15	36	24	12			.45	4.05	SE.
16	34	22	12		During night.	.25	2.60	S.
17	34	17	17					S.
18	27	14	13					SE.
19	40	13	27					SE.
20	38	15	23					S.
21	42	18	24					S.
22	39	23	16	9.30 a. m.; 5 p. m.	3 p. m.; during night.	.05; rain inappreciable.	0.70	S.
23	35	16	19	9.30 a. m.		.15	1.15	N.
24	18	1	17		1.30 p. m.	.06	0.80	
25	6	−11	17					
26	8	−13	21					S.
27	11	−9	20					
28	16	−6	22					SE.
29	16	−3	19					S.
30	14	6	20					
31	26	3	29					SE.

* Total precipitation, rain, melted snow, and hail.

Summary for the month of December.

Average cloudiness (scale of ten)	4.27
Number of days of rain	1
Number of days of snow	11
Depth of snow-fall during the month	15.85
Total precipitation ... inches	1.57
Total precipitation ... do	

Temperature during the month: Highest, 46°, on the 4th; lowest, −13°, on the 26th; mean, 27°.1.

Meteorological record kept at Mammoth Hot Springs, etc.—Continued.

JANUARY, 1889.

Day of month.	Temperature. Maximum.	Temperature. Minimum.	Temperature. Range.	Precipitation. Time of beginning.	Precipitation. Time of ending.	Precipitation. Total precipitation.	Precipitation. Depth of snow-fall.	General direction of the wind.
1889.	°	°	°			*Inch.*	*Inches.*	
Jan. 1	20	1	10					
2	20	−3	23					
3	21	−4	25					
4	30	10	20					
5	33	11	22					
6	29	20	9					S.
7	26	10	16					S.
8	15	−7	22					S.
9	25	5	20					W.
10	23	12	11	During night	11 a. m	0.15	2.25	SE.
11	31	16	15	1.10 p. m	During night	0.2	1.75	S.
12	25	10	15	10.30 a. m	11.20 a. m	Inappreciable.	Inappreciable.	NW.
13	18	2	16					E.
14	12	−5	17	During night.	7.20 p. m	0.45	4	
15	13	−4	17	7.30 a. m	6.10 p. m	0.2	2	
16	16	2	14					S.
17	16	6	10					SE.
18	18	3	15					SE.
19	21	3	18					SE.
20	23	11	12					S.
21	24	9	15					SE.
22	22	2	20					SW.
23	38	16	22	11.				NW.
24	38	16	22	11.30 a. m	12.10 p. m	0.05	0.4	SE.
25	31	11	20					W.
26	24	−2	26					NW.
27	30	7	23					SW.
28	33	10	23					
29	35	7	28					SE.
30	31	3	28					SE.
31	29	6	23					SW.

Summary for the month of January.

Number of days of snow 6
Total precipitation ..... inches.. 1.65
Depth of snow-fall ..... do.... 9.04

Temperature during month: highest, 38°, on the 24th; lowest, −7°, on the 8th; mean, 14°.7; mean range, 24°.9.

Meteorological record for the year at Mammoth Hot Springs [illegible]

[illegible] 1898

Day of month	Temperature			Precipitation				Prevailing direction of wind
	Maximum	Minimum	Range	Time of fall	Character	Depth of water	Depth of snow	
[illegible]								
[illegible]	[illegible]	[illegible]	[illegible]					
2	[illegible]	[illegible]	[illegible]					
3	[illegible]	[illegible]	[illegible]					
4	[illegible]	[illegible]	[illegible]					
5	[illegible]	[illegible]	[illegible]					
6	[illegible]	[illegible]	[illegible]					
7	[illegible]	[illegible]	[illegible]					
8	[illegible]	[illegible]	[illegible]					
9	[illegible]	[illegible]	[illegible]					
10	[illegible]	[illegible]	[illegible]					
11	[illegible]	[illegible]	[illegible]					
12	[illegible]	[illegible]	[illegible]					
13	[illegible]	[illegible]	[illegible]					
14	[illegible]	[illegible]	[illegible]					
15	[illegible]	[illegible]	[illegible]					
16	[illegible]	[illegible]	[illegible]					
17	[illegible]	[illegible]	[illegible]					
18	[illegible]	[illegible]	[illegible]					
19	[illegible]	[illegible]	[illegible]					
20	[illegible]	[illegible]	[illegible]					
21	[illegible]	[illegible]	[illegible]					
22	[illegible]	[illegible]	[illegible]					
23	[illegible]	[illegible]	[illegible]					
24	[illegible]	[illegible]	[illegible]					
25	[illegible]	[illegible]	[illegible]					
26	[illegible]	[illegible]	[illegible]					
27	[illegible]	[illegible]	[illegible]					
28	[illegible]	[illegible]	[illegible]					

Summary for the month of February.

Number of days of snow	18
Total precipitation	1.93
Depth of snow fell	17.5

Temperature for the month: Highest, [illegible] on [illegible]; lowest, 15 on the 16th; mean, 19.6

Meteorological record kept at Mammoth Hot Springs, etc.—Continued.

MARCH, 1889.

Day of month.	Temperature.			Precipitation.			
	Maximum.	Minimum.	Range.	Time of beginning.	Time of ending.	Total precipitation.	Depth of snow-fall.
1889.	°	°	°			*Inch.*	*Inch.*
Mar. 1	47	12	35				
2	46	14	32				
3	42	15	27				
4	46	13	33				
5	53	16	37				
6	54	20	34				
7	49	20	29				
8	45	19	26				
9	49	19	30				
10	49	28	21	During night	During night	0.05	0.6
11	48	25	23	5.20 p. m.	6.25 p. m.	0.03	
12	45	30	15	3.50 p. m.	During night	0.04	
13	45	30	16	7.25 a. m.	8.45 a. m.	Sprinkling	
14	48	22	26	5.25 p. m.	8 p. m.	0.05	
15	43	33	10	3.20 p. m.	5.15 p. m.	0.04	Melted as it fell
16	50	30	20	4.35 p. m.	5.10 p. m.		Inappreciable.
17	43	30	13	7.25 a. m.	7.50 a. m.		do
18	46	35	11	4.35 p. m.	5.15 p. m.	Inappreciable	
19	39	29	10				
20	44	17	27	During night 12.05 p. m.	7.45 a. m. 5.30 p. m.	0.06	0.9
21	44	16	28				
22	52	18	34				
23	54	23	31				
24	54	23	31				
25	52	33	19				
26	55	26	29				
27	57	28	29				
28	56	32	24				
29	55	31	24				
30	42	29	13	2.40 p. m. 6.10 p. m.	3.50 p. m. During night	0.04	
31	43	29	14	12.45 p. m. 4.30 p. m.	1.40 p. m. 5.15 p. m.	0.22	0.3

Summary for the month of March.

Number of days of snow .....
Number of days of rain .....
Total precipitation .....inches.
Depth of snow-fall .....do.

Temperature during the month: Highest, 57°, on the 27th; lowest, 12°, on the 1st; mean, 36°; mean range, 24°.19.

Meteorological record kept at Mammoth Hot Springs, etc.—Continued.

APRIL, 1889.

Day of month.	Temperature. Maximum.	Minimum.	Range.	Precipitation. Time of beginning.	Time of ending.	Total precipitation.	Depth of snowfall.	General direction of the wind.
1889						*Inch.*	*Inches.*	
Apr. 1	58	30	19	5.30 p. m.	During night	0.01		S.
2	55	40	15					NW.
3	60	37	23					S.
4	60	[illegible]	[illegible]					
5	49	[illegible]	12	12.15 a. m. / 5.30 p. m.	3.15 p. m. / During night	0.02		SW.
6	50	33	[illegible]			0.12		S.
7	55	32	23					NW.
8	51	28	23					NW.
9	55	25	30					N.
10	57	25	32					NW.
11	61	26	35					NW.
12	55	34	21					NE.
13	59	36	15	During night / 12.30 p. m.	7.15 a. m.	0.2		SE.
14	46	25	21	6.30 p. m.	8.37 a. m. / During night	0.20	2.2	SE.
15	43	26	17	1 p. m.	7.15 p. m.	0.04	0.2	NW.
16	43	25	18	During night	During night	0.04	0.3	S.
17	40	29	11	do	10.05 a. m.	0.1	0.7	NW.
18	46	19	27					E.
19	52	28	24					S.
20	61	34	27					S.
21	63	34	29					S.
22	57	34	13	12.25 p. m. / 6.45 p. m.	5.15 p. m. / During night	.18		W.
23	56	32	24			.05	.1	N.
24	62	32	30	11.7 a. m.	2.25 p. m.	Inappreciable.		S.
25	62	42	22					NW.
26	61	32	29					S.
27	61	32	31					S.
28	54	31	23	During night				NW.
29	49	29	20		7.30 a. m.	0.1	.1	NW.
30	51	29	22	2.15 p. m.	2.50 p. m.	Sprinkling.		NW.

Summary for the month of April.

Number of days of snow	6
Number of days of rain	7
Total precipitation	inches 0.92
Depth of snowfall	do 2.8

Temperature during month: Highest, 63°, on the 6th; lowest, 19°, on the 13th; mean, 42°.81; mean range, 21°.

Meteorological record kept at Mammoth Hot Springs, etc.—Continued.

MAY, 1889.

Day of month.	Temperature. Maximum.	Temperature. Minimum.	Temperature. Range.	Precipitation. Time of beginning.	Precipitation. Time of ending.	Precipitation. Total precipitation.	Precipitation. Depth of snow-fall.	General direction of the wind.
1889.	°	°	°			*Inches.*	*Inches.*	
May 1	54	26	28					NW.
2	63	27	36	During night				SE.
3	54	37	17		8.50 a. m	.04		S.
4	44	33	11	7.35 a. m	7.15 p. m	.33	.2	S.
5	51	33	18	During night	12.15 p. m	.08	.1	S.
6	49	33	16	At intervals	At intervals	.07	.1	SE.
7	43	31	12	8.30 a. m	11.10 a. m	.02		NW.
8	43	31	12	3 p. m	4.50 p. m	.03		NW.
9	45	32	13	During night	9.40 a. m	.11		NW.
10	56	32	24					NW.
11	61	29	32					NW.
12	68	31	37					S.
13	69	40	29	4.15 p. m	6.20 p. m	.03		SE.
14	57	39	18	During night	6.15 a. m	.15		NW.
15	43	30	13	9.35 a. m		.07	.1	N.
16	41	26	15		During night	.05	.2	NW.
17	49	21	28	8.25 p. m				S.
18	53	32	21		During night	.01		SE.
19	60	30	30					NW.
20	70	31	39					S.
21	77	41	36					S.
22	72	38	34					S.
23	64	37	27					NW.
24	65	40	25					NW.
25	70	38	32					NW.
26	74	37	37					SE.
27	64	46	18	10.35 a. m	3.10 p. m	.15		SE.
28	63	42	21	During night	During night	.06		NW.
29	77	41	36					S.
30	70	49	21	During night; 12.35 p. m	During night; 3.10 p. m	.17		SW.
31	65	34	31					S.

Summary for the month of May.

Number of days of snow		5
Number of days of rain		10
Total precipitation	inches	1.40
Depth of snow-fall	inch	.7

Temperature during month: Highest, 77°, on the 21st; lowest, 21°, on the 17th; mean, 46°.79; mean range, 24°.74.

Meteorological record kept at Mammoth Hot Springs, etc.—Continued.

JUNE, [illegible]

[illegible]

Summary for the month of June.

Number of days on which [illegible]

Total precipitation [illegible] inches [illegible]

Temperature [illegible] Range, [illegible]

REPORT

OF THE

SUPERINTENDENT OF THE YELLOWSTONE NATIONAL PARK

TO THE

SECRETARY OF THE INTERIOR.

1890.

WASHINGTON:
GOVERNMENT PRINTING OFFICE.
1890.

REPORT

OF THE

SUPERINTENDENT OF THE YELLOWSTONE NATIONAL PARK.

DEPARTMENT OF THE INTERIOR,
OFFICE OF THE SUPERINTENDENT
YELLOWSTONE NATIONAL PARK,
Mammoth Hot Springs, Wyo., June 30, 1890.

SIR: I have the honor to submit the following report of my administration of affairs in the Yellowstone National Park during the fiscal year ending June 30, 1890.

I assumed charge June 1, 1889, in the midst of the travel season, and was at once so busily engaged that I did not keep any systematic record of events, and I shall be obliged to rely principally upon memory of incidents referred to.

PROTECTION OF FORESTS.

Probably the most important subject I have to report upon is the protection of the Park from forest fires. Last season was probably the most dry known in the history of Montana and Wyoming. Forest fires raged uncontrolled on every side of the Park and destroyed millions of acres of valuable timber. Commencing about the middle of July, the troops under my command were employed almost constantly and at times worked harder than I ever before saw men work, except perhaps after some disaster. Many times they were required to ride all night and fight fire all the following day.

Seventy fires are known to have occurred in the Park, all of which except three, were extinguished. One of these was between the Yellowstone and Shoshone Lakes, and before it was discovered had gained such headway that it was impossible for any force to do anything with it. It was off all routes of travel and the burnt district will seldom be seen.

The area was large and to be deplored. It was probably started by lightning as no person was believed to have been in that neighborhood; it was not in the hunting or trapping season there were no inducements for people to penetrate that locality.

Another fire was started by some squatters just south of the Park boundary, which burned into the Park and did a great amount of damage. The other uncontrolled fire was the result of the grossest carelessness on the part of the lumbermen engaged in cutting lumber for the Lake Hotel. The fire spread from their camp fire and was three days under control and allowed to escape. It ran to the bank of the Yellowstone River and jumped it where it was 300 yards wide. This

ike crossed the road between the canon and the lake and has left a very unsightly mark.

At the time the two latter fires were burning, every available man was engaged on a fire in the Madison Cañon, doing work which approached the heroic. For three weeks officers (Capt. P. S. Bomus and Lieut. P. E. Traub) and men struggled with this fire, and in the end controlled it. If it had not been controlled it would have reached the Gibbon Cañon, and burned over one of the most beautiful drives in the Park.

An instance will illustrate the character of the work. A detachment of Troop K, First Cavalry, left this post at half past 1 o'clock one morning in August and by 6 o'clock was at a point in Gibbon Cañon 28 miles away, where it joined a detachment of Troop A, First Cavalry, which had been at work all the previous day on a fire on the top of one of the sides of the Gibbon Cañon. The climb to the work was so difficult that two men had epileptic fits from the effort. The fire was in the timber and the ground covered with fallen dry trees.

It took me just an hour to walk around it in making an examination with a view to determining whether it was possible to do anything with it. Concluding that it was worth the trial, I called up all available men—twenty-nine in number—and by night a clearing was made entirely around the fire. All combustible matter was scraped away to the earth. The fire was surrounded and controlled. There was no water on the height, and the only way to do anything was to keep the fire within bounds and let the interior burn out. High winds prevailed almost every afternoon while this fire was burning, and at times the flames would jump the cut-off and get beyond control, but as soon as the wind subsided another cut was made, and at the end of three weeks the fire was out.

If this fire had not been controlled the prevailing westerly wind would have swept it across Hayden Valley and destroyed the feed of the greatest winter range of the buffalo and elk.

Many times during the season the camps were so stripped of men that those remaining were obliged to do guard duty upon alternate days.

Up to a late date last season there was no fire equipment in the Park. The few axes and shovels supplied the troops for garrison purposes were the only tools available. Application was made for funds for the purchase of axes, shovels, and folding rubber buckets, but through some misunderstanding the authority was not promptly received, and the work was doubly hard from want of proper tools.

While at the hotel communicating with a fire party by telephone, an incident occurred which I think should be mentioned in this report. I was greatly troubled that I had not what was needed, and mentioned to a party of gentlemen that I did not know what I should do. I had exhausted all men and implements under my control and was afraid that the Park would burn in spite of every possible effort. I remarked that I had applied for rubber buckets and had failed to get them; that I supposed the Secretary had no funds, etc.; whereupon Mr. J. Lewis of Mauch Chunk, Pa., exclaimed that "if this great United States Government or the Secretary of the Interior has not money to buy you a few rubber buckets for the protection of this wonderful and beautiful country I have." He handed me $40 from his purse. In three days I was supplied with two dozen buckets, which were of incalculable service during the remainder of the season. Would that Congress would take such an interest in the protection of the Park before it is too late.

It is proper to state here, that on the 27th of July I tele[illegible] the Interior Department for permission to purchase buckets [illegible] for use in extinguishing fires. Prior to that time I had asked [illegible] sion to expend not exceeding $50 in extending a telephone line [illegible] the hotel at Mammoth Hot Springs to my office, and in putting [illegible] signs and placards marking routes of travel and objects of interest. [illegible] the 30th of July the Department directed me to expend not exceed[illegible] $200, which was considerably more than the specific sums asked for, "for the matters referred to, towards telephone connection, signs, and placards, buckets, axes, and other incidentals necessary to the good management of the Park."

It is probably generally understood that the troops in the Park are engaged in the protection of the curiosities. They are so employed, but the amount of such work performed cuts so small a figure compared with the work on fires as not to be worth mentioning.

The work is probably not a military duty and certainly not desirable, but none other than thoroughly organized and disciplined men could be called upon to ride all night and fight fire all the next day, as has been done and done cheerfully.

Your authority for the establishment of regular camping grounds, where all camp fires can be examined as soon as abandoned, will, I think, do much to lessen the number of fires. Fires are generally traceable to camping parties. I do not charge much willful carelessness to them, but many have had no previous experience in camping, and leave their camps believing they have taken all necessary precautions. They may have left a brand, which in the morning was perfectly harmless, but in the afternoon, under the influence of high wind, becomes an incendiary of the worst character. The country has been so moist this season that I have not found it necessary to place any restrictions on camping. I shall, however, establish camps as soon as it becomes advisable.

I repeat my recommendation of last year, that there be supplied at least two tanks and the necessary number of draught animals for the transportation of water. It very often happens that fire gets into the dead roots of trees, where it can not be reached by shovels or axes. Such fires have to be watched for days or until burned out, while a few buckets of water would extinguish them at once. Special reference is of course made to fire at too great a distance from streams for the water to be carried by hand.

So much has been ably said and written upon the subject of the preservation of the Yellowstone Park that it seems hardly worth while for me to trouble you with any recital of the many reasons why Congress should deal generously with it. Language and art have so far failed to properly paint the beauty of the Grand Cañon; a single fire would seriously mar its grandeur by destroying its fringe of forest. The shores of the Yellowstone Lake have already been disfigured by fires. A single fire would entirely destroy the beauty of what bids fair to be one of the most delightful summer-hotel sites in the world.

I am so concerned for the safety of the banks of the Yellowstone upon that I do not permit any camping below the upper falls.

WATER STORAGE.

Visitors to the Park invariably leave it with the impression that no reasonable expense should be spared in protecting its beauties and objects of interest, but beyond all these, which can only be enjoyed by

persons of means, should be considered the protection of the forest as a water-storage system. The irrigation of the arid regions of the country is attracting a great deal of attention, and vast sums will probably in the next few years be expended in some system of water storage. The time and talent of Congress is being exhausted in devising schemes for the benefit of the countries receiving their waters from this neighborhood. Yet this great natural reservoir seems to pass unnoticed. We have here about 3,400 square miles of territory, 83 per cent. of which is timbered. The altitude is great and the snow-fall enormous. The whole area is indented with natural reservoirs of from a few feet in dimension to the extent of the Yellowstone Lake. The snow in the timber clad mountains, protected as it is, melts slowly, and late in the season, after the spring rains have ceased, furnish water for irrigating purposes. The disastrous results of denuding the mountains of timber in China and other countries are too well known to require comment.

We have here the headwaters and water supply of two of the greatest mountain streams on the continent—the Yellowstone and the Snake. The freshets of the Missouri, which receives the waters of the Yellowstone, are now something terrible. The same may be said of the Snake, which has its early and later or June rise. What would be the result of only an early rise in the Snake? Simply destruction along its whole valley course. Later, when the water would be required for irrigation? Ruin to all those dependent upon a generous flow of the streams after the cessation of the spring rains. These results seem certain to follow the destruction of the forests of the Yellowstone National Park.

WILD ANIMALS.

I have every reason to believe that the protection of the wild animals in the Park has been perfect. I have no reason to believe that a single animal has been destroyed. The protection of the past few years has resulted in a great increase in all of the game animals. First in importance, on account of its almost extinction, comes the buffalo. As soon as the fires of the Park would allow me to leave the traveled routes I started out in an attempt to make something of an enumeration, but was not on their range two days before I became convinced that it was impossible. The animal, driven for safety, as he has been, to the mountain forests, seems to have entirely changed in his habits. In the summer season they are broken up into small bands and scattered over a wide area of timber-covered mountains. This I believe to be the result of the accidents of their lives. Probably when they first took to the forest they lost sight of each other, and in years adopted the habit of breaking up into families. In the winter the deep snows drive them to the open country for food. They are then found in large herds. The habit of dispersion and assembly seems to be very like the antelope.

The number of elk in the Park is something wonderful.

In the neighborhood of Soda Butte herds were seen last winter estimated at from 2,000 to 3,000. The whole open country of the Park seems stocked to its capacity for feeding. Other varieties of game animals are thought to be increasing rapidly.

As reported last year the herds of buffalo and elk do not seem to have enough calves. I am more than ever convinced that the bear and puma do a great deal of mischief and ought to be reduced in number. While they may be something of a curiosity to visitors to the Park, I hardly think them an agreeable surprise. Very few who come here "have lost any bear."

Visitors are sometimes a little incredulous as to the great number of large game animals in the Park and complain that they have seen nothing.

It is the habit of all animals which shed their antlers to seek the high points during the fly season, and while hundreds of elk and deer may be seen between the cañon and the lake in the first week of June, there are more at the end of the month. Very little expense would attend the inclosing of a band of elk at some point in Swan Lake Basin and of buffalo in Hayden Valley. I am sure they can be caught without any great trouble and inclosed so that all may at least see a sample.

The Park was visited last summer by Governor Francis E. Warren, of Wyoming, who manifested so lively an interest in the preservation of the game that after his departure I ventured to address him the following letter:

CAMP SHERIDAN, WYO., *November* 25, 1889.

DEAR SIR: We have, as you know, what is probably the last of the buffalo or bison left in the country. While in the Park they are comparatively safe from destruction, but, unfortunately, at certain seasons of the year they sometimes drift down into Wyoming and become a prey to the taxidermist hunter, who kills for the head.

The legislature of Montana at its last session enacted a law which will probably protect those which drift into Montana, as some occasionally do.

If you think well of it will you be good enough to ask your legislature for a similar bill? I believe the penalty should, however, be not less than $500 or six months' imprisonment, and when a fine can be collected one-half should go to the agent of the Territory or the informer.

Unless everything possible is done this last remnant of our greatest American game will certainly be obliterated.

I have addressed a letter upon this subject to the secretary of Idaho.

If both Territories will take action the Park will be as well protected by laws of the States and Territories surrounding it as by the authorities stationed within.

I am, sir, very respectfully, your obedient servant,

F. A. BOUTELLE,
Captain First Cavalry, Acting Superintendent.

Governor FRANCIS E. WARREN.

Governor Warren took prompt action on my recommendation and the legislature of Wyoming at its last session enacted a law which, if enforced, as I believe it will be, will protect all buffalo straying off the reservation in that direction.

A similar communication was addressed to the secretary of Idaho and a reply received saying that the governor would lay the matter before the legislature, but I have not learned that any action was taken.

FISH.

Reference was made in my last report to the barrenness of many streams and lakes in the Park, and the hope expressed that through Col. Marshall McDonald, United States Fish Commissioner, these streams might be stocked. I take great pleasure in reporting that that efficient officer visited the Park last season and at once decided to commence the stocking of its waters. He sent out 7,000 young trout which were planted in the west and middle forks of the Gardiner River above the falls, the Gibbon River above Virginia Cascade, and the Firehole River above Keppler's Cascade. He has now hatched and ready for shipment as soon as I telegraph him that the mountains are passable 150,000 trout and salmon for the lakes and rivers of the Park. This great work will probably be accomplished by the middle of July. It will probably be the greatest feat in moving large bodies of young fish ever attempted and will reflect a world of credit upon Colonel Mc-

Donald, through whose efforts in another direction the price of the laborers' pound of shad has been reduced from 10 to 3 cents.

Colonel McDonald while here though not in very robust health, was not willing to take anything on faith and made the trip on horseback over a very rough mountain trail to the Shoshone and Lewis Lakes and the outlet into Snake River, making examination of all the waters he proposed to stock.

It may not appear to all that the stocking of these waters is a matter of great importance, but, being an enthusiastic angler, it appears to me very desirable that all waters of this pleasuring ground for the people should be so filled with fish that all who come may enjoy the sport. The streams are full of fish-food and there can be no reasonable doubt of the success of the enterprise. Once stocked and protected, as they can readily be, until they begin to multiply, it will be impossible, in the short season the Park is accessible, to fish them out.

THE NATIONAL ZOOLOGICAL PARK.

During my visit to Washington last winter I had many conversations with Mr. W. T. Hornaday, at that time connected with the National Zoological Park, and had agreed to send to that institution living specimens of all of our wild animals. I told Mr. Hornaday that the energies of all under my command were at the disposal of any public enterprise or institution, but that some expense would attend the capture, care, and feeding of what I should be able to send. Mr. Hornaday thought that he would be able to place a small sum at my disposal to cover the expense of traps, food, etc. I have heard nothing from Mr. Hornaday's successor and conclude that he does not think well of the idea or that it has not been mentioned to him.

RIVERS AND BRIDGES.

The work done during the past year by the Engineer Corps under the immediate direction of Lieut. W. E. Craighill, Corps of Engineers, was of a very expensive character, it being principally in Gibbon Cañon and on a grade from the old to the new site of the hotel at Grand Cañon. Both works required retaining walls and many bridges.

About 16 miles of new road were constructed.

Some very groundless complaints have been made that more new roads were not opened by Lieutenant Craighill last season with the amount of money at his disposal. I believe he is following the proper system in building roads of a lasting character as he goes and that it would be bad policy to open any roads through the timber until all roots are removed and the road made smooth and comfortable. The journey through the Park is long and at best fatiguing. A large percentage of visitors are beyond the meridian of life and unable to endure any other than good roads. The appropriation bill for the next fiscal year, as prepared, requires all work to be done by contract. I am sure the person who advocated that proviso must have done so very thoughtlessly, or have been ignorant of the situation. Of course before any work can be done by contract, surveys must be made, specifications prepared, etc. The roads in the Park are in the spring crossed by many mountain torrents and many breaks occur. Some of these are of considerable extent, others too small to be considered in contract. The crust of the roads is soft and often broken through, requiring immediate

attention. Some drifts cross the roads which can only be removed by shoveling, etc.

As suggested in my telegram upon this subject, if the contract system is insisted upon, for the bulk of the work upon the roads and bridges a portion of the sum appropriated should be expended in repairs by day labor under the direction of the engineer officer in charge of the work.

About a month, with several engineers would have been necessary to make surveys and prepare contracts for repairs this spring. In the mean time the roads would have been closed, even to supplies for the hotels, and travel impossible. Visitors could not have made the tour of the Park before July 1.

The Park is a long way from the supply of labor and working material and equipment; consequently the competition on road work will be confined to a few who are now equipped. A ring will probably be formed and the work cost very much more than as now conducted.

In connection with appropriations for roads and bridges your attention is invited to the fact that preparations are being made for a great celebration in Chicago in 1893, which will probably bring to the United States more foreigners than any event in the history of the country. Liberal appropriations should be made in order that the roads through this National Park may be as nearly perfect as possible.

TRANSPORTATION.

The transportation in the Park, under the direction of Mr. George W. Wakefield, has been increased and carried nearly to perfection.

The coaches are as fine as human ingenuity can invent. In order that there may be perfect safety to passengers only perfectly gentle horses are purchased and used. They are obtained principally in Iowa, and cost about twice as much as the native horse of the country.

In the seven years Mr. Wakefield has been engaged in this business no passenger has ever received any injury.

Last year there was considerable complaint that passengers were not allowed stop-over privileges. I called Mr. Wakefield's attention to the matter and this year, besides the coaches, which make the regular trips, a daily stage leaves all the hotels for the accommodation of such as choose to stop over.

HOTELS.

I am sorry not to be able to report a better condition of affairs and progress in the matter of hotels.

The hotel at the Mammoth Hot Springs is about in character as when previous reports of superintendents were made.

The temporary shelter erected at Norris Basin after the destruction by fire of the hotel at that place in 1887 still represents a hotel with suitable first-class accommodations. Nothing has been done in the way of improvements. Not even common decencies have been provided.

Nothing has been done at either the Lower or Upper Basin hotels. At the latter point there is a very reasonable excuse for delay, as the law prohibits building upon the only suitable site in that basin. A bill now before Congress will, if it becomes a law, open this site to lease.

The two cottages at Lower Basin are very comfortable, but they will only accommodate comfortably 16 persons. When a greater number of visitors assemble at this point, all who can not be accommodated in

the cottages are lodged in the old hotel, where the partitions between the sleeping apartments are so thin that any conversation in one room is distinctly heard in all others in the immediate neighborhood. As an instance of this agreeable lodging, a few nights ago, two ladies occupied one of these rooms. Two gentlemen occupied an adjoining room, and amused each other with bawdy stories until midnight. No complaint was made, and it so happened that the manager knew nothing of it until morning, or he would have ejected the loafers from the building.

The association has thrown enough money in the direction of the Grand Cañon to erect and complete a fine hotel building, but through very bad management it is still in an unfinished condition, and through bad taste will, when completed, be an unsightly affair. When a new foundation is placed under it, it will, however, be a very comfortable and commodious house.

A good hotel is in course of erection at the Yellowstone Lake.

No adequate fire-escapes have been provided at the Mammoth Hot Springs hotel and none whatever at the Cañon hotel. A fire at either of these hotels would in all probability be attended by a loss of life.

Mr. T. B. Casey, acting president of the Yellowstone Park Association, has recently visited the Park and thoroughly examined all of the hotel buildings. He spoke very freely of the bad condition of affairs and will, I think, take active measures in the direction of reform and better hotel accommodations. I have recommended to him that the association complete the hotels at the cañon and the lake, provide common decencies at Norris and the Upper Basin, which will for the present and near future be dinner stations, and bend every energy upon a good hotel at Lower Basin in the neighborhood of the Fountain Geyser. This being done tourists will have good hotel accommodations at Mammoth Hot Springs, Lower Basin, the Grand Cañon, and the Lake, and not from necessity be obliged to spend any night at either Norris or Upper Basin hotels. Visitors spend two of the four nights usually spent in the Park at Lower Basin, and are, as before explained, very uncomfortable.

Mr. Casey's visit appears to be of great importance to all interested in the management. His attention was called to all imperfections in equipment and management; also, to the necessity for increased accommodations. I am not willing to believe that the gentlemen who form the Yellowstone Park Association are or have been indifferent to the comfort of the visitors, but they have other important business and have not known the necessity for giving the hotel business personal attention. It has been delegated to managers in the park and purchasing agents in the larger cities, some of whom have been unfortunate selections.

ELEVATOR AT GRAND CAÑON.

In compliance with your instructions of September 6, 1889, in company with Mr. Arnold Hague I made an examination of the Grand Cañon with a view to reporting upon the propriety of granting Mr. D. B. May, of Billings, Mont., a lease of ground with permission to erect an elevator or incline at the lower falls for the accommodation of visitors.

At the time the examination was made it was understood that the incline should follow the first gulch south of Point Lookout. If this had been required and no building permitted at the bottom of the cañon

the elevator would not have been so objectionable, but a lease has been granted permitting Mr. May to run in a direct line as near as may be and his plans indicate a straight line. The gulch has several turns, and, to run in a direct line from the top to the bottom of the cañon, it will be necessary to rear into view a very unsightly structure.

I regret that my report was not more full or that the lease was not referred to me before approval. Of course when I made my report I thought I had made a very thorough examination, but a further examination made this spring has convinced me that it was a mistake to approve of any elevator at the site mentioned, for it is impossible to put in an elevator to reach the bottom of the cañon without its coming in full sight and destroying the view from the head of the great falls. This is one of the grandest views on earth and doubly grand that the hand of man is nowhere visible

Mr. May has had no proper examination made and was not prepared to make application for a lease at the time he received it. He was instructed that before any lease was granted he must have a careful survey made and furnish plans and drawings of everything.

I recommend that the lease be either canceled or that the incline be made to conform to the changes of direction of the gulch, and that no building of any kind be required or permitted at the bottom of the cañon.

DEPREDATIONS.

There have been no depredations upon game in the Park so far as known during the past year.

A scheme was on foot to do some work last winter at the Lake hotel site, in which all of the principal employés of the Yellowstone Park Association were implicated. Guns, traps, and poison were to have been used, but the arrangement was well known in time and their plans came to naught. The matter has been fully reported in a special letter.

During the latter part of September there occurred one of the most outrageous acts of vandalism in the history of the Park. A man by the name of Rowley, who had been employed on the lake boat, visited the Upper Geyser Basin, and leaving the hotel at the dawn of day, before any other person was awake, he broke and carried away specimens from many of the geysers. The most material damage was done to the Sponge. Two pieces, half as large as a hand, were chipped from the inside of this formation. Generations will pass in repairing the damage done by this miscreant.

This is a strong illustration of the result of there being no law in the Park. If the scoundrel had not known that there was almost immunity he would never have thought of doing this mischief. As it was, he was on his way out of the Park, and the most that could be done to him was to hasten his departure a couple of hours and deprive him of his specimens.

I sincerely hope that Congress will soon provide a civil commissioner, before whom such law-breakers may be brought and properly punished.

The boundary of the Park is still unmarked and only known by the description contained in the organic act setting it aside. This is a very embarrassing situation. Hunters are liable at any time to get inside of the line through ignorance of its location. A survey, a small cut through the timber, and the piling of a few rocks in the open country is

all that is necessary and should not cost more than $10,000 or $12,000. Inclosed herewith please find a meteorological record of the station, kept by Hospital Steward Heinrick Vennemann, U. S. Army, stationed at Camp Sheridan, Wyoming.

As soon as suitable quarters are provided I shall ask General Greely, Chief Signal Officer, to order a member of the Signal Corps to duty in the Park.

Very respectfully, your obedient servant,

F. A. BOUTELLE,
Captain First Cavalry, Acting Superintendent.

The SECRETARY OF THE INTERIOR,
Washington, D. C.

Meteorological record, Mammoth Hot Springs (Wyoming), Yellowstone National Park, from July 1, 1889, to June 30, 1890.

JULY, 1889.

Date.	Self-registering thermometer. Maximum.	Minimum.	Range.	General direction of the wind.	Precipitation. Began.	Ended.	Quantity.	Depth of snowfall.	Remarks
	°	°	°						
1	69	45	24	NW.	During night	During night	...	...	
2	67	32	35	NW.	...	...	.02	...	Rain.
3	82	34	48	S.	...	...	...	...	
4	86	45	41	SW.	...	...	...	...	
5	84	49	35	S.	...	...	...	...	
6	76	52	34	S.	...	...	...	...	
7	70	38	32	NW.	...	...	...	...	
8	65	39	26	SW.	...	...	...	...	
9	76	36	40	NW.	...	...	...	...	
10	83	45	38	S.	...	...	...	...	
11	82	45	37	W.	...	...	...	...	
12	79	43	36	NW.	...	...	...	...	
13	81	52	29	W.	5 p. m.	5.20 p. m.	...	(*)	Sprinkling.
14	87	47	40	W.	...	...	...	...	
15	87	48	39	SE.	7.40 a. m.	8.10 a. m.	.01	...	Rain.
16	87	54	33	SW.	...	...	...	...	
17	84	52	32	NW.	During night 5.40 p. m.	During night 5.55 p. m.	.01	...	Do.
18	74	44	30	SW.	2.25 p. m. 5.10 p. m.	2.45 p. m. 6.30 p. m.	.25	...	Do.
19	73	43	30	SW.	1.10 p. m.	1.55 p. m.	.19	...	Do.
20	80	42	38	S.	12.50 p. m.	1.10 p. m.	.01	...	Do.
21	73	49	24	W.	During night.	During night	.07	...	Do.
22	76	46	30	NW.	...	...	...	...	
23	80	45	35	W.	...	...	...	...	
24	81	45	36	S.	...	...	...	...	
25	84	42	42	SE.	...	...	...	...	
26	87	44	43	W.	...	...	...	...	
27	85	50	35	SE.	...	...	...	...	
28	79	49	30	NW.	...	...	...	...	
29	81	44	37	SE.	...	...	...	...	
30	91	49	42	S.	...	...	...	...	
31	78	63	15	W.	...	...	...	...	

* Inappreciable.

Summary for the month of July.

Highest temperature, 91°, on the 30th; lowest temperature, 32°, on the 2d; mean temperature, 62.55°; mean range, 34.06°; total precipitation, 0.56 inches; number of days of rain, 7.

Meteorological record, Mammoth Hot Springs, Wyo.—Continued.

AUGUST, 1889.

Date.	Self-registering thermometer. Maximum.	Minimum.	Range.	General direction of the wind.	Precipitation. Began.	Ended.	Quantity.	Depth of snow-fall.	Remarks.
	°	°	°						
1	79	43	36	NW.					
2	79	44	35	NW.					
3	81	45	36	NW.					
4	89	46	43	W.					
5	87	48	39	SE.					
6	80	48	32	S.					
7	84	44	40	S.					
8	80	51	29	W.					
9	82	54	28	S.					
10	83	51	32	NW.					
11	87	52	35	S.	During night 4.15 p. m. 6.35 p. m.	During night 5.35 p. m. 6.55 p. m.	.09		Thunder-storm.
12	83	44	39	NW.					
13	81	50	31	NW.					
14	87	46	41	NW.					
15	91	49	42	S.					
16	84	57	27	SE.					
17	87	53	34	S.					
18	77	56	21	S.	1.05 p. m.	1.35 p. m.	.01		Do.
19	62	41	21	SE.	6.20 a. m. 7.55 a. m.	6.50 a. m. 1.40 p. m.	.51		Rain.
20	62	37	25	S.					
21	77	36	41	S.					
22	83	40	43	N.					
23	84	48	36	S.					
24	77	44	33	S.					
25	81	39	42	S.					
26	81	47	34	S.					
27	80	47	33	S.					
28	78	50	28	S.					
29	85	44	41	W.					
30	82	47	35	S.					
31	80	52	31	S.					

Summary for the month of August.

Highest temperature, 91°, on the 15th; lowest temperature, 36°, on the 21st; mean temperature, 64.01°; mean range, 34.29°; total precipitation, 0.64 inch; number of days of rain 4.

Meteorological record, Mammoth Hot Springs, Wyo.—Continued.

SEPTEMBER, 1889.

Date.	Self-registering thermometer. Maximum.	Minimum.	Range.	General direction of the wind.	Precipitation. Began.	Ended.	Quantity.	Depth of snow-fall.	Remarks.
	°	°	°						
1	53	33	20	N.	During night 7.55 a. m.	During night 8.25 a. m.	.13	(*)	Snow melted as it fell.
2	73	36	37	S.					
3	63	36	27	NW.					Heavy snow-fall on Bear Gulch Mountains, N. direction.
4	57	24	33	N.					
5	69	28	41	NW.					
6	74	42	32	NW.					
7	74	33	41	W.					
8	72	42	30	W.					
9	71	36	35	SE.					
10	62	47	15	SE.					
11	53	23	29	NW.					
12	61	27	34	NW.					
13	55	24	31	NW.					
14	52	30	22	N.					
15	64	37	27	S.					
16	63	35	28	NW.					
17	71	31	40	S.					
18	79	39	40	NW.					
19	78	42	36	NE.					
20	79	35	44	SW.					
21	69	50	19	S.	During night	During night	.01		
22	46	36	10	NW.	7.40 a. m. 11.35 a. m.	9.10 a. m. 12.40 p. m.	.35	(*)	Snow melted as it fell.
23	42	31	11	NW.	During night 8.15 a. m. 2.05 p. m.	During night 9.40 a. m. 3.40 p. m.	.05	.1	
24	42	28	14	NW.	During night 9.25 a. m.	During night 12.10 p. m.	.05	.1	
25	55	32	23	N.					
26	68	32	36	SE.					
27	74	36	38	S.					
28	69	37	32	S.					
29	62	42	20	S.					
30	69	51	18	S.					

* Inappreciable.

Summary for month of September.

Highest temperature, 79°, on the 10th; lowest temperature, 23°, on the 11th; mean temperature, 49.55°; mean range, 28.77°; total precipitation, .59 inch.; number of days of rain, 5; number of days of snow, 4; depth of snow-fall, 0.2 inch.

Meteorological record, Mammoth Hot Springs, Wyo.—Continued.

OCTOBER, 1889.

Date.	Self-registering thermometer. Maximum.	Minimum.	Range.	General direction of the wind.	Precipitation. Began.	Ended.	Quantity.	Depth of snow-fall.	Remarks.
	°	°	°						
1	73	44	29	S.	...	...	...	...	
2	70	41	29	S.	...	...	...	...	
3	72	40	32	SE.	...	...	...	...	
4	78	37	41	S.	...	...	...	...	
5	79	36	43	S.	...	...	...	...	
6	78	36	42	SE.	...	...	...	...	
7	72	42	30	S.	...	...	...	...	
8	71	43	28	SE.	...	...	...	...	
9	47	38	9	E.	10.45 a. m.	11.05 a. m.	(*)	...	Sprinkling.
10	46	31	15	SE.	7.35 p. m.	7.55 p. m.	(*)	...	Do.
11	50	30	20	S.	...	...	...	...	
12	49	39	10	SE.	11.45 a. m.	1.10 p. m.	.01	...	
13	57	21	36	E.	...	...	...	...	
14	55	25	30	SW.	...	...	...	...	
15	57	31	26	W.	...	...	...	...	
16	64	26	38	SE.	...	...	...	...	
17	50	31	19	SW.	...	...	...	...	
18	60	30	30	W.	6.35 p. m.	During night.	.48	...	
19	49	30	19	SE.	...	...	...	...	Sprinkling at intervals during day.
20	54	32	22	SE.	...	...	...	...	
21	51	38	13	SE.	7.30 p. m.	During night.	.19	...	
22	52	35	17	SW.	During night at intervals.	During night at intervals.	.32	...	
23	50	40	10	SE.	...	...	...	...	
24	49	36	13	SW.	...	...	...	...	
25	48	29	19	SE.	...	...	...	...	
26	55	33	22	S.	...	...	...	...	
27	47	26	11	SE.	...	...	...	...	
28	45	31	14	NW.	10.05 a. m.	10.55 a. m.	(*)	...	
29	37	18	19	SE.	During night 1.10 p. m.	6.35 a. m. 1.35 p. m.	.06	...	
30	36	23	13	SE.	During night 3.10 p. m.	9.55 a. m. 4.25 p. m.	.06	.6	
31	32	26	6	N.	6.05 p. m.	7.05 a. m.	.2	3.1	

* Inappreciable.

Summary for the month of October.

Highest temperature, 79°, on the 5th; lowest temperature, 18°, on the 29th; mean temperature, 44.53°; mean range, 22.74°; total precipitation, 1.32 inches; number of days of rain, 9; number of days of snow, 2; depth of snow-fall, 3.7 inches.

Meteorological record, Mammoth Hot Springs, Wyo.—Continued.

NOVEMBER, 1889.

Date.	Self-registering thermometer. Maximum.	Minimum.	Range.	General direction of the wind.	Precipitation. Began.	Ended.	Quantity.	Depth of snow-fall.	Remarks.
	°	°	°						
1	38	12	26	.....	.....	.....	.....	.....	
2	36	26	10	S.	10.40 a. m. 3.35 p. m.	1.20 p. m. 4.40 p. m.	.04	...	Snow melted as it fell.
3	29	16	13	NW.	5.55 p. m.	.....	.01	.1	Do.
4	33	8	25	N.	.....	During night.	.07	.7	Do.
5	42	16	26	SE.	.....	.....	..	..	
6	48	19	29	S.	.....	.....	...	...	
7	50	22	28	S.	.....	.....	...	...	
8	43	25	18	SE.	.....	.....	...	..	
9	33	21	12	SW.	.....	.....	...	...	
10	27	10	17	NW.	During night	8.20 p. m.	.78	7.5	Do.
11	32	21	11	NW.	.....	.....	..	...	
12	26	12	14	S.	During night 1.50 p. m.	During night 3.10 p. m.	.07	.7	Do.
13	27	9	18	SE.	.....	.....	...	...	
14	28	6	22	SE.	.....	.....	...	...	
15	39	8	31	SE.	.....	.....	...	...	
16	46	20	26	S.	.....	.....	...	...	
17	42	22	20	S.	.....	.....	..	...	
18	37	30	7	S.	During night 12.20 p. m. 5.55 p. m.	8.15 a. m. 3.05 p. m.	.04	.4	Do.
19	39	24	15	SE.	.....	During night.	...	...	
20	29	15	14	S.	12.45 p. m.	1.20 p. m.	(*)	(*)	Do.
21	29	13	16	S.	During night 9.50 a. m.	8.40 a. m.	.63	1.8	Do.
22	30	4	26	S.	.....	During night.	.13	.5	Do.
23	33	21	12	SE.	.....	.....	...	...	
24	35	19	16	SE.	.....	.....	...	...	
25	41	19	22	SE.	.....	.....	...	...	
26	44	23	21	S.	.....	.....	...	...	
27	49	26	23	SE.	.....	.....	...		
28	35	22	13	SE.	.....	.....	...	...	
29	39	24	15	S.	.....	.....	...	...	
30	41	21	20	S.	.....	.....	...	...	

* Inappreciable.

Summary for the month of November.

Highest temperature, 50°, on the 8th; lowest temperature, 4°, on the 25th; mean temperature, 27.13°; mean range, 19.07°; total precipitation, 2.14 inches; number of days of rain, 0; number of days of snow, 10; depth of snow-fall, 12.3 inches.

Meteorological record, Mammoth Hot Springs, Wyo.—Continued.

DECEMBER, 1889.

Date.	Self-registering thermometer. Maximum.	Minimum.	Range.	General direction of the wind.	Precipitation. Began.	Ended.	Quantity.	Depth of snow-fall.	Remarks.
	°	°	°						
1	42	34	8	SE.	During day	During day	.04	....	Sprinkling.
2	40	33	7	S.	9 a. m.	4 p. m.	.03	.1	Snowing at night.
3	38	32	6	SE.	.....	.....	....	....	
4	36	28	8	SW.	.....	.....	....	....	
5	42	32	10	SE.	.....	.....	....	....	
6	39	27	12	SE.	6.45 p. m.	During night	.39	.4	Snow melted during night.
7	34	23	11	S.	.....	.....	....	....	
8	34	25	9	SE.	During night	7.15 a. m.	.57	6.2	
9	34	17	17	SW.	9.30 a. m.	4.20 p. m.	.12	1.4	
10	29	19	10	SE.	At intervals during day.	At intervals during day.	.18	2.2	
11	39	27	12	SE.	do	do	.93	4.0	Rain and snow mixed.
12	34	26	8	÷	During night	During night	1.05	10.4	Snow melted partly during night; measured on platform.
13	37	27	10	NW.	During day	During day	.06	3.2	
14	38	26	12	S.	8.15 a. m. / 2 p. m.	10.10 a. m. / 4.50 p. m.	.06	....	Rain.
15	38	22	16	S.	During night	9.20 a. m.	.3	3.4	
16	33	11	22	S.	12.40 p. m.	8.10 p. m.	.18	2.2	The heat of the ground, caused by the subterranean hot springs of the vicinity, melts the snow to some extent by a temperature of below freezing; consequently, the snow in the gauge becomes moist and is partly melted before measuring; hence precipitation larger than on the assumption that 10 inches of snow are equal to 1 inch of water.
17	29	11	18	S.	During night	During night	.04	.4	
18	26	17	9	÷	.....	.....	....	....	
19	25	15	10	SE.	8.20 a. m.	During night	.75	3.2	
20	26	12	14	N.	11.10 a. m.	4.40 p. m.	.45	2.3	
21	18	7	11	SE.	8.20 a. m.	6 p. m.	.9	3.6	
22	28	14	12	S.	During night	2.50 p. m.	.7	2.8	
23	26	15	11	÷	do	During night	.5	4.6	
24	30	17	13	SE.	12.40 p. m.	do	.75	8.2	
25	34	14	20	S.	During night	do	.35	3.4	
26	31	15	16	S.	At intervals	At intervals	....	(*)	
27	35	18	17	S.	.....	.....	....	....	
28	29	10	19	N.	8.15 a. m.	11.10 a. m.	....	(†)	
29	16	— 5	21	SW.	.....	.....	....	....	
30	19	8	11	SE.	4.10 p. m.	6.20 p. m.	....	(*)	
31	18	9	9	SE.	2.20 p. m.	3.10 p. m.	....	(*)	

* Inappreciable. † Ground covered.

Summary for the month of December.

Highest temperature, 42°, on the 1st and 6th; lowest temperature, —5°, on the 29th; mean temperature, 25.17°; mean range, 12.5°; total precipitation, 8.89 inches; number of days of rain, 4; number of days of snow, 21; depth of snow-fall, 60.6 inches.

Meteorological record, Mammoth Hot Springs, Wyo.—Continued.

JANUARY, 1890.

Date.	Self-registering thermometer.			General direction of the wind.	Precipitation.				Remarks.
	Maximum.	Minimum.	Range.		Began.	Ended.	Quantity.	Depth of snow-fall.	
	°	°	°						
1	— 5	—16	11	N.	During night				
2	— 2	—18	16	N.		1.40 p. m	.2	2	
3	—13	—19	6	N.	During night	2.10 p. m	.6	6.4	
4	—11	—18	7	...	do	4.40 p. m	.45	4.4	
5	17	—15	33	SW.					
6	13	— 3	16	SE.	During night	During night	.2	2.2	
7	17	— 9	26	S.					
8	26	— 1	27	S.					
9	22	14	8	S.					
10	18	7	11	SW.					
11	9	— 7	16	SE.	During night	During night	.5	4.7	
12	6	— 9	15	SE.	do	do	.15	.9	
13	13	1	12	SW.					
14	11	— 8	19	SE.					
15	14	— 2	16	E.					
16	22	11	11	SW.	During night	During night	.8	3.5	
17	25	51	10	SE.	do	do	.6	2.4	
18	23	11	12	S.	do	do	.25	2.5	
19	12	— 5	17	SE.					
20	16	4	12	E.					
21	18	1	17	SE.					
22	17	4	13	SE.					
23	22	11	11	S.					
24	25	21	4	S.	8.50 a. m		.7	6.8	
25	31	24	7	SE.			1.2	9.4	
26	26	18	8	E.		7.40 p. m	.75	4.5	
27	31	4	27	SE.					
28	31	25	6	SE.					
29	32	21	11	NE.					
30	35	20	15	NE.	During night	4.20 p. m	.03	2.8	
31	27	12	15	SE.					

Summary for the month of January.

Highest temperature, 35°, on the 30th; lowest temperature, 19°, on the 3d; mean temperature, 10.03°; mean range, 14°; total precipitation, 6.7 inches; number of days of rain, —; number of days of snow 13; depth of snow-fall, 52.5 inches.

Meteorological record, Mammoth Hot Springs, Wyo.—Continued.

FEBRUARY, 1890.

Date.	Self-registering thermometer. Maximum.	Minimum.	Range.	General direction of the wind.	Precipitation. Began.	Ended.	Quantity.	Depth of snow-fall.	Remarks.
	°	°	°						
1	31	21	10	SE.	During night	During night	1.2	9.5	
2	38	31	7	SW.	do Rain	do Rain	.7 .2	— 1.5	.7 Rain since a. m.
3	40	34	6	S.			1.3		Rain.
4	39	30	9	NW.	7.30 a. m	6.50 p. m	.46 .55	 5.6	Do. Snow.
5	36	22	14	SE.					
6	37	19	18	SE.					
7	32	23	9	SE.					
8	36	23	13	SE.					
9	35	27	8	SE.					
10	29	16	13	⊕	8.10 a. m	8.30 p. m	.55	5.2	
11	29	— 3	32	SE.					
12	28	12	16	W.					
13	30	17	13	SE.					
14	23	12	11	SE.	8.20 a. m	11.10 p. m	(*)	(*)	
15	29	18	11	S.	12.50 p. m	7.30 p. m	.25	2.5	
16	34	22	12	SE.					
17	24	17	7	SE.					
18	21	— 2	23	N.	8.20 a. m	During night	.37	3.8	
19	22	—10	32	NE.					
20	31	— 5	36	SE.					
21	26	8	18	SE.					
22	38	10	28	SW.					
23	29	15	14	SE.	During night				
24	29	—15	44	N.		During night	.72	6.4	
25	—14	—26	12	N.			.35	2	
26	— 9	—30	21	SE.					
27	3	—26	29	SE.					
28	14	—11	25	S.					

The precipitation from 1st to 4th, inclusive, was continuous. On the 2d, in the morning, snow turned into rain; changed into snow during night. Snow turned into rain on the 3d, and rain turned into snow again 7.30 a. m. on the 4th.

* Inappreciable.

Summary for the month of February.

Highest temperature, 40°, on the 3d; lowest temperature, 30°, on the 28th; mean temperature, 17.66°; mean range, 16.44°; total precipitation, 6.65 inches; number of days of rain, 3; number of days of snow, 9; depth of snow-fall, 36.5 inches.

Meteorological record, Mammoth Hot Springs, Wyo.—Continued.

MARCH, 1890.

Date.	Self-registering thermometer. Maximum.	Minimum.	Range.	General direction of the wind.	Precipitation. Began.	Ended.	Quantity.	Depth of snow-fall.	Remarks.
	°	°	°						
1	21	—5	26	SW.					
2	29	12	17	SE.					
3	30	14	16	S.					
4	32	23	9	SE.					
5	45	29	16	SE.					
6	38	18	20	S.	During night	During night	.48	3.	
7	42	15	27	SE.	7 a. m.	9.40 a. m.	.1	.6	
8	46	22	24	SE.	During night	2.20	.46	2.4	
9	24	17	7	SE.	do		.75	5.4	
10		8		SE.		During night	.25	1.6	
11		4		S.	11.10 a. m.	11.50 a. m.	(*)	(*)	
12		14		SW.					
13		13		S.					
14		20		S.					
15		19		SE.					
16		31		SE.	2.20 p. m.		.4	1.2	
17		30		E.		11.10 a. m.	.45	2.8	
18		33		SE.	8.30 a. m.	7.20 p. m.	.11		Snow melted as it fell.
19		31		N.	During night	11 a. m.	.02		Do.
20		22		SE.	6 p. m. During night 12.35 p. m.	8 p. m. During night 2.20	.05 .07 .04	.3 .7	Do.
21		29		SE.					
22		33		S.					
23		26		SW.	During night		.07	.5	
24		15		SW.		During night	.07	.6	
25		12		NW.					
26		31		NW.	During night	During night	.12	1.1	
27		22		SE.	do	do	.06	.6	
28	38	24	14	S.	do	do	.04	.25	
29	37	20	17	N.	1.50 p. m.	29.20 a. m.	(*)	(*)	Do.
30	21	12	9	NW.		5.20 p. m.	1.1	7.6	
31	28	5	23	SE.					

* Inappreciable.

Summary for the month of March.

Highest temperature, 46° on the 8th; lowest temperature, —5° on the 1st; mean temperature 24.5° (13 days); mean range, 17.3° (13 days); total precipitation, 4.92 inches; number of days of rain, 6; number of days of snow, 18; depth of snowfall, 28.75 inches.

Meteorological record, Mammoth Hot Springs, Wyo.—Continued.

APRIL, 1890.

Date.	Self-registering thermometer. Maximum.	Minimum.	Range.	General direction of the wind.	Precipitation. Began.	Ended.	Quantity.	Depth of snow-fall.	Remarks.
	°	°	°						
1	48	5	43	SE.					
2	59	19	40	S.					
3	52	30	22	SW.	8 p. m				
4	51	31	20	NW.		During night	.04		Snow melted as it fell.
5	50	33	17	NW.	11.10 a. m		.11		
6	50	35	15	E.	12.20 p. m	During night	.41		
7	34	28	6	NW.		7.40 p. m	.2	1.4	
8	37	17	20	SE.					
9	47	24	23	SE.					
10	50	33	17	SE.					
11	51	30	21	NW.	1.20 p. m	2.10 p. m	(*)	(*)	Snow.
12	37	10	27	N.					
13	36	14	22	NW.					
14	42	13	29	NW.					
15	44	11	33	NW.					
16	50	24	26	W.					
17	56	28	28	NW.					
18	67	33	34	NW.					
19	55	35	20	N.	7.10 a. m	7.40 a. m	(*)	(*)	Sprinkling.
20	55	22	33	S.					
21	48	31	17	SW.	During night	9.20 a. m	.11	.3	Snow melted after falling.
22	57	29	28	SE.	do				
23	34	30	4	NW.		10.10 a. m	.52	2.2	23d, 7 a. m. The platform contained 2.2 inches of snow, while the contents of the snow gauge measured 0.52 inches. At 10 a. m there was no snow visible on the ground, temperature being 32°, while the surrounding trees carried the same quantity of snow as early in the morning.
24	46	26	20	SE.					
25	60	25	35	S.					
26	61	28	33	SE.					
27	64	33	31	SE.					
28	65	34	31	S.					
29	70	39	31						
30	77	34	43	S.	3.40 p. m	3.50 p. m	(*)	(*)	Sprinkling.

* Inappreciable.

Summary for the month of April.

Highest temperature, 77° on the 30th; lowest temperature, 5° on the 1st; mean temperature, 38.95°; mean range, 25.60°; total precipitation, 1.39 inches; number of days of rain, 4; number of days of snow, 5; depth of snow fall, 3.9 inches.

Meteorological record, Mammoth Hot Springs, Wyo.—Continued.

MAY, 1890.

Date.	Self-registering thermometer. Maximum.	Minimum.	Range.	General direction of the wind.	Precipitation. Began.	Ended.	Quantity.	Depth of snow-fall.	Remarks.
	°	°	°						
1	74	32	42	NW.	.....	.....	.....	.....	
2	64	41	23	NW.	During night 12.35 p. m. 4.20 p. m.	During night 1.10 p. m. 4.40 p. m.	.04 .16 .03	.....	12.35 to 1.10 p. m., thunder-storm passing at a distance; temperature fell from 52° to 48° during storm; 4.20 to 4.40 p. m., thunder-storm at a distance.
3	67	38	19	NW.	During night	During night	.03	.....	Thunder.
4	55	34	21	W.	8.50 a. m. 1.55 p. m.	10.25 a. m. 3.45 p. m.	.07	.....	
5	62	35	27	SE.	During night	During night	.05	(*)	Snow; melted as it fell.
6	72	32	40	W.	During night	During night	.04	.....	
7	77	36	41	SW.	.....	.....	.....	.....	
8	66	41	25	NW.	9.50 a. m. At intervals	3.40 p. m. At intervals	.05	.....	
9	53	40	13	NW.	10.20 a. m. 2.10 p. m. At intervals	11.40 a. m. 5 p. m. At intervals	.14 .16	.....	
10	60	35	25	NW.	During night	During night	.35 .12	.....	
11	47	32	15	N.	1 p. m.	12.20 p. m. 8.50 p. m.	.44	2.1	11th, 5 p. m., rain turned into hail; 5.35 p. m., hail turned into snow; snow measured at 7 a. m. (12th); had partly melted during night; lowest temperature, 26°; total precipitation, .44; melted snow in gauge; depth of snow on platform, 2.1 inches.
12	45	26	19	SW.	Intervals of short duration.	Intervals of short duration.	.02	(*)	Snow; melted as it fell.
13	62	32	30	SW.	.....	.....	.....	.....	
14	58	34	24	NW.	12.15 p. m.	5.20 p. m.	.02	.....	Sprinkling.
15	57	30	27	W.	During night	During night	.01	.....	
16	65	37	28	W.	4.50 p. m.	5.30 p. m.	.01	.....	Thunder-storm passed at a distance.
17	63	43	20	NW.	.....	.....	.....	.....	
18	63	36	27	NW.	.....	.....	.....	.....	
19	69	34	35	SE.	.....	.....	.....	.....	
20	64	36	28	SE.	.....	.....	.....	.....	
21	58	35	23	SW.	1.30 p. m. 3.20 p. m.	3.20 p. m. 3.35 p. m.	.11	(*)	1.30 to 3.20 p. m., rain; 3.20 to 3.35 p. m., snow; melted as it fell.
22	68	30	38	SE.	.....	.....	.....	.....	
23	66	43	23	S.	.....	.....	.....	.....	
24	70	40	30	SW.	.....	.....	.....	.....	
25	72	48	24	SE.	.....	.....	.....	.....	
26	74	34	40	S.	.....	.....	.....	.....	
27	71	46	25	W.	11.30 a. m.	11.45 a. m.	.....	(*)	
28	64	29	35	NW.	.....	.....	.....	.....	
29	59	26	33	SE.	.....	.....	.....	.....	
30	61	30	31	E.	During night	During night	.12	.....	
31	72	40	32	S.	During day at intervals.	During day at intervals.	.03	.....	

* Inappreciable.

Summary for the month of May.

Highest temperature, 77°, on the 7th; lowest temperature, 26°, on the 12th; mean temperature, 49.59°; mean range, 27.81°; total precipitation, 2 inches; number of days of rain, 16; depth of snow-fall, 2.1 inches; number of days of snow, 4.

Meteorological record, Mammoth Hot Springs, Wyo.—Continued.

JUNE, 1890.

Date.	Self-registering thermometer. Maximum.	Minimum.	Range.	General direction of the wind.	Precipitation. Began.	Ended.	Quantity.	Depth of snow-fall.	Remarks.
	°	°	°						
1	70	37	33	S. E.					
2	68	28	30	S. W.	During night	During night	.30		Rain and snow mixed.
3	54	32	22	N. W.	6 a. m.	6 p. m.	.16		
4	49	31	18	S. E.	During night	During night	.10		Melted snow in gauge.
5	57	30	27	W.					
6	69	30	39	S.					
7	75	39	36	S.					
8	80	43	37	S. E.					
9	82	45	37	S. W.	7 p. m.	8.30 p. m.	.20		Thunder-storm from 7 to 8.30 p. m.
10	78	43	35	S. E.					
11	79	41	38	S. E.					
12	73	39	34	N. W.					
13	58	31	27	N. W.					Sidewalks are covered with frost.
14	62	29	33	S. W.					Sidewalks and fences are covered with frost.
15	59	37	22	S. E.	During night	During night	.10		Sun-shower; rainbow observed in southeasterly direction.
16	66	34	32	S.	4.50 p. m.	6 p. m.	.04		
17	71	41	30	S. E.					
18	73	45	28	S.					
19	72	44	28	W.	At short intervals.	At short intervals.	.04		Sprinkling.
20	68	42	26	S.					
21	63	41	22	S. E.					
22	71	40	31	E.					
23	73	41	32	S. E.					
24	80	39	41	E.					
25	78	47	31	S.					
26	70	44	26	S. E.					
27	65	40	25	S. E.					
28	69	41	28	S. E.					
29	80	42	38	S.					
30	87	43	44	S. E.					

Summary for the month of June.

Highest temperature, 87°, on the 30th; lowest temperature, 28°, on the 14th; mean temperature 57.97°; mean range, 31°; total precipitation, 0.64 inches; number of days of rain, 4; number of days of snow, 2; depth of snow-fall, 0.26 inches of melted snow.

REPORT

OF THE

SUPERINTENDENT OF THE YELLOWSTONE NATIONAL PARK

TO THE

SECRETARY OF THE INTERIOR

36c

1891.

WASHINGTON:
GOVERNMENT PRINTING OFFICE.
1891.

REPORT OF SUPERINTENDENT OF YELLOWSTONE NATIONAL PARK.

DEPARTMENT OF THE INTERIOR,
OFFICE OF SUPERINTENDENT OF
YELLOWSTONE NATIONAL PARK,
Mammoth Hot Springs, Wyo., August 15, 1891.

SIR: Agreeably to your request under date of the 27th ultimo I have the honor to submit the following report of operations and events in the Yellowstone National Park since I assumed control:

Complying with Special Order, No. 17, c. s., Adjutant-General's Office, I reported in person to the Secretary of the Interior in January last for instructions, and a few days thereafter started for my post of duty, stopping en route at St. Paul for consultation with General Ruger, then commanding the Department of Dakota.

I arrived here on the 14th of February, and the next morning relieved Capt. F. A. Boutelle, First Cavalry, of the charge of the Park and at the same time assumed command of the troops stationed within its limits.

I presume Captain Boutelle will render a report of operations prior to this date.

Up to the date of my arrival but little snow had fallen, and the winter had been exceptionally mild and open; storms soon set in and within the next 6 weeks near 7 feet of snow fell. This comprised nearly the entire fall for the winter as against more than 17 feet for the previous season. The ground became bare early in April, and on May 1st I started on my first trip through the Park. As I rose to the higher levels I found plenty of snow remaining, but the roads were easily passable at least a month earlier than usual. The season thus began early and promised well, but June turned out a cold, wet, disagreeable month and travel received a check from which it has only recently recovered.

EXTENSION OF THE PARK.

On 30th March the President, under authority contained in the act for the repeal of the timber-culture laws, set apart as a timber reservation a tract of land bordering the Park on the east and south.

Under date of 14th of April this reserve was placed under my charge, "to assume control thereof and do any and all things as to this accession as you do in the Park itself;" there was thus added a strip 25 miles wide to the eastern and one about 8 miles wide to the southern side of the Park.

It has long been a matter of conjecture that there is a good deal of mineral wealth on and near the head of the Stinking Water, eastward of the Park. Last year these conjectures bore fruit in inducing a rush of mining men to that section; this year a steady stream of them has poured into the region, with what success is not yet known. Those best acquainted with the locality say there is no doubt that a part, at least, of the new district is within the limits reserved by the President's proclamation.

I have not as yet been in the country referred to, but hope to go there soon. Nothing, however, can safely be done to protect the place until it is definitely decided that it is within these limits.

As soon as the added district was placed under my charge I wrote requesting a careful and complete survey of the boundaries, and that they be plainly marked. This has now been ordered, and I hope will soon be accomplished. It is most important that the east line be run to definitely settle the position of these new mines; it is also important that the south line be run, and marked, for the protection of the large game that ranges in that part of the Park.

The west line is nearly coincident with the Wyoming-Idaho line, and its exact location must always be a matter of some doubt. I therefore recommend that the State line be marked instead. The question of cutting off a portion of the north end of the Park has often arisen, but I trust will never receive favorable consideration. The present line runs over the crest of a range of very high mountains and settlement on or near it is impossible.

One proposition is to make the north line the same as the Wyoming-Montana line; this would result in moving a collection of groggeries 2 miles nearer this place, which is most undesirable. The second proposition is to cut off all that part of the Park north of the Yellowstone, Lamar, and Soda Butte Rivers. This would throw out an extensive game country, especially the home of the mountain sheep, and permit settlements in dangerous proximity to a favorite winter range of all the larger animals.

PROTECTION OF FORESTS.

Thus far the season has been extremely wet and we have had very little trouble with forest fires; the few that have appeared have been extinguished by the patrols without calling out the troops for assistance. I sincerely trust the same good fortune will attend us to the end of the season, but it is scarcely probable. There are more camping parties than usual in the Park this year, and it requires ceaseless vigilance to compel them to *thoroughly* extinguish their fires. Other

sources of fires are carelessly thrown cigars and cigarettes, lightning, and probably even the rubbing together of partially fallen dead trees as they are swayed by the wind.

The serious consequences of a fire here can only be understood by those who have observed the almost impenetrable thickness of the pine forests with their dense masses of fallen and decaying trees.

OUTPOSTS IN THE PARK.

Up to the present time there has never been an outpost near the south line of the Park. As settlements are rapidly springing up near Jackson's and Henry's Lakes, and these regions are becoming the famed resorts of hunters and hunting parties, a permanent station somewhere near the junction of the Lewis and Snake Rivers will become a necessity.

It is too late to accomplish it this year, but I hope to send a small party there early in the spring with orders to build a hut for themselves and a stable for their horses, and arrange to put up a winter's supply of hay; they will then be in condition to spend the winter of 1892-93 there, and render needed protection to the immense herds of game in that vicinity. Unless I provide for a winter station at Riverside to watch the poachers from that region I do not see any necessity for further change in the arrangement of outposts; patrols continued late into the autumn will serve the purpose quite as effectually.

MILITARY QUARTERS.

Soon after my arrival here I was directed to report upon a selection of a site for new buildings for use of the troops. This site is on the plain southeast of the Mammoth Hot Springs Hotel, and quite near it. After approval the site was adopted, and the new buildings are now well under way, with a prospect of occupancy by 1st November at the latest.

At present provision is only being made for a single troop, but the plans are drawn for two, and I hope the second will be provided for next year. For several years past a second troop has been sent here from some neighboring post for temporary duty during the summer. This always involves no inconsiderable expense for transportation and a depletion of the garrison drawn upon. Since the extension of the Park demands increased detached service, especially in the hunting season late in the fall, I call your attention to the urgency of having this second troop made a part of the permanent garrison.

ROADS, ETC.

In 1890 the bill for improvement of the roads, etc., in the Park did not become a law until 30th August. This gave very little time for work before the winter set in, and most of the $75,000 appropriated was left unexpended.

The act for the present year—3d March, 1891—carries with it $75,000 and "the unexpended balance" of previous years.

The season opened early, but for some reason work on the roads was begun very late. During May and June great numbers of laboring men gathered in this vicinity, claiming to be waiting for work. They soon got out of provisions and money, and many of them were reduced to the last straits. As a protective measure I was finally forced to order them to leave the Park. Some left the country entirely, while others only went as far as Gardiner or Cinnabar, and there continued to wait. During this period my haystack was burned, undoubtedly by some one of this class who had sought a bed there for the night. Work finally started up some time in July, and the "tramp nuisance" was abated.

A location for a new road, according to the terms of the act of March 3, 1891, has been made between the "Fountain and the West Thumb of the lake." This road turns off the road to Shoshone Lake a short distance north of the Lone Star Geyser and runs, by easy grades, over the divide to the Thumb. There is a strong force at work on it, with good prospect of its being opened before winter sets in.

The road from the cañon to the Thumb, via the Lake Hotel, is also under construction, and is being rapidly pushed. I expect to be able to drive over the entire circuit within the next 30 days.

Lieutenant Chittenden, U. S. Engineers in charge of the work, is zealous, untiring, and remarkably efficient in its prosecution, and will certainly make a fine showing by the end of the year.

The roads already built have been kept in good repair, and the journey through the Park need no longer be contemplated with dread. When this large number of laborers is paid off and discharged at the end of the season there is some cause for fear of fires and various forms of disorders. These shall, however, receive my careful attention.

HOTELS.

I am glad to be able to report a most satisfactory state of affairs in so much as concerns hotel accommodations. The building at this point is in the same state it has been in for many years past. It is excellently managed and gives satisfaction in every particular. The lunch station at Norris is also excellently kept, and comfortable lodgings are provided for such tourists as elect to spend a night there; a few improvements have been made in the matter of wash rooms, closets, etc.—perhaps all that the use of the place will warrant.

The hotel at the Cañon is completed; is well and comfortably kept, but is a most unsightly edifice.

The Lake House has one wing completed, and this is all that will be needed until the tide of travel sets more in that direction. It is one of the pleasantest, best kept hotels in the Park, and deserves better

patronage than it has yet received. I regard it as the most desirable place in the Park for a prolonged stay.

The old hotel at the Lower Basin was vacated about the middle of June, and the new building at the Fountain was then occupied. It is the largest, best built, and in every way the finest building in the Park, and I doubt not is destined to become one of the most popular. It is not yet entirely completed, but I learn that the management expects to have the workman out of it by the end of this month.

It is very satisfactorily kept and I hear no complaints of it. There are no changes to report in the hotel at the Upper Basin; so long as the law prevents a valid lease for the site so long will the old shed remain rickety and unsatisfactory. The Trout Creek lunch station, under canvas, is quite the same as last year. On the whole I can report a very great improvement in hotel accommodations, with a most satisfactory state of management. Mr. W. G. Johnson, manager for the Yellowstone Park Association, is working hard and intelligently to remove from it the odium that has heretofore attached to it, and with a large measure of success. The complaints that have reached me have been few and trivial.

TRANSPORTATION.

Transportation in the Park has been carried on under the leases granted the Yellowstone Park Association. Mr. George Wakefield has managed it for a number of years, and he has as fine transportation as there is anywhere in the world; stages and harness are new, clean, and well kept; horses are gentle and in good condition; drivers sober, accommodating, and competent; there have been very few complaints of them, although perfection in this class of public servants is not always easy of attainment. A complaint has been made that stop-over privileges have not been freely accorded, but on representation to the manager the evil received prompt correction.

On the 1st of April last I was notified that the right of the Park Association to conduct transportation was revoked, to date from 1st November next, and that this right was, from that date, given to Mr. Huntley, of Helena, Mont.

Mr. Huntley came into the Park in June and remained a considerable time looking over the field. He has not in any way communicated with me, and I have no knowledge as to what preparations he is making for the conduct of affairs next season, but I trust the present high standard will be maintained.

BOAT ON THE LAKE.

The proposition to put a small steamer on the lake for the accommodation of tourists has been agitated for a good many years, but was only recently accomplished. Early in July an inspector came and gave the boat a license to carry 125 passengers. It is a smooth-running,

seaworthy little vessel and will add much to the attractiveness of the lake as a resort. I hope to see it made a part of the Park transportation, and used in ferrying tourists from the Lake Hotel to the West Thumb in their journey around the circuit.

In July the Engineer Corps, U. S. Army, put on a small boat which they use in supplying their road camps with forage and provisions and in hauling lumber from the mill to the various points where it is to be used. On invitation of Lieutenant Chittenden I accompanied him on a trip of exploration on the Upper Yellowstone, but for lack of sufficient depth of water we were only able to ascend the river a few miles.

TOURISTS.

The most ceaseless vigilance is needed to prevent tourists from mutilating the beautiful formations in the Park. I do not believe 10,000 men could *entirely* accomplish it. Ladies are the greatest specimen hunters, and often they do not carry their trophies farther than the hotels. By a careful supervision of the guides I have managed to keep this form of vandalism at a minimum. Another source of great annoyance is the persistence with which men will write their unlovely names on everything that is beautiful within their reach. This form of barbarism is confined almost entirely to *men*, and, if we may judge from the writing, to the boorish and illiterate.

About a week ago a stage coming into the Park from Beaver Cañon was held up and robbed about 20 miles beyond Park limits. I gave immediate orders for a careful search by all the patrols in that direction, but so far have got no trace of the thieves.

There is an unusually large number of people entering the Park with guns of various kinds. From those who are simply making a tour of the Park, with the purpose of returning this way, I take the arms and restore them to the owners on their exit. A great many parties, however, come this way with intention of going out by Riverside or Jackson's Lake. For such parties I can only seal the guns, with admonitions not to break seals within Park limits. This is only a measure of security with such people as would not hunt inside the Park in any event. If others get in unfrequented localities I fear temptation would prove too much for them.

I am constrained to recommend that sufficient notice be given that from a fixed date, say June 1, all carrying of guns within the Park will be strictly prohibited. Exceptions can then be made, and special permits granted by the Superintendent to people of undoubted reliability.

FISH.

For the most part the lakes and rivers of the Park are literally filled with trout; I have never seen so many fish elsewhere as there are in the shoal waters near the borders of the Yellowstone Lake. Two years ago the Fish Commission began stocking the streams that were desti-

tute of fish, and the work was continued last year. At the present time some members of the Commission are in the Park, making an examination of these plants. I hope they may yet stock some of the smaller lakes with black bass, and thus afford a variety of sport to the angler.

WORK DONE IN PARK.

The numerous camping parties that have gone through the Park, as well as the many teams employed in hauling supplies into the interior, have left unsightly groups of empty cans, bottles, and other débris. With the approval of the Secretary of the Interior I employed a team, driver, and two men to go over the routes of tourist travel and clean up these littered places.

The season is now so far advanced that I shall not undertake to go over it again before spring. The sign boards that have been placed to designate the various objects of interest, as well as those conveying warning notices, have become much obliterated by time. At the close of the season I shall have them taken down and repainted, and replaced before the opening of travel in the spring.

POACHERS.

So long as there is no law within the Park for the prevention of hunting and trapping, it will be a most difficult matter to break them up. Cook City, just off the northeast corner of the Park, is fed entirely on elk meat, and I doubt not a large proportion of it has been killed within the Park limits.

On my arrival here I was told that one Van Dyck was the principal hunter for that place, and that his hunting grounds were near Soda Butte. I sent out three separate expeditions for him before he was finally taken, in his camp near Lamar River, with beaver traps and other evidences of his trade in his possession. I kept him in custody for over a month awaiting the Secretary's orders, and then turned him loose after confiscating all his property. He is now in Cook City once more, but I hear that he is conducting his expeditions outside the Park. As the killing of elk in Montana is absolutely prohibited by law for a term of years, it seems strange that this traffic at Cook can not be broken up.

I am satisfied that both hunting and trapping are carried on within the limits of the Park from over the western border. I shall make an endeavor to "encourage" the majority of these trespassers by bringing a few of them to justice this fall.

Mr. Ed. M. Wilson, who has been a most invaluable man as a scout, guide, and hunter, mysteriously disappeared on 27th July and left no trace behind. It will be quite impossible to replace him, for there is no man in the region who at once has the intimate knowledge of the country, and of the hunters and their methods, that he had.

I learn of three or four buffalo heads that have been mounted in Bozeman, Livingston, and other neighboring towns within the past year. I doubt not all of these were killed within the Park, or very close to the line without it. Such specimens are become very rare, and fine ones are held at $400 to $1,000. Such prices tempt the cupidity of the border pirates who live near, and with small equipment they can enter the Park on foot and take their chances of capture and the confiscation of their small stock in trade.

The most effectual way to break up this business would be the prosecution of the taxidermists who purchase the specimens—possession of which is prohibited by the laws of all the adjoining States. I have abundant evidence, however, that the buffalo are contented and quiet in the park and that they are on the increase. Some tourists who went through the park in May saw a herd of about 30, with several small calves, near the Trout Creek lunch station. About the same time some employés of the Yellowstone Park Association saw what was probably the same herd, and I saw there an abundance of fresh signs the first week in June.

In July I sent Wilson out to observe the herd that ranges near the west line of the Park. He found two small bands of about 30 each, one with 12 or 15 calves; in addition he saw several single ones and small bunches. I do not think it is exaggeration to say there are 200, and probably there are 400, within the Park, and that they are thriving and increasing.

The elk have increased enormously, and most conservative estimates place their numbers at 25,000, and I have no doubts of the presence of that many. Their continuance in the Park is assured, and their overflow into adjoining territory will furnish abundant sport for the hunter.

Mountain sheep, deer, and antelope are tame, numerous, and on the increase; as they are hunted but little, if at all, they are certain to be preserved. There are a few moose in the extreme southern part of the Park, whose numbers I shall endeavor to approximate during a trip that I hope to make to that country in October.

I presume trapping of the fur-bearing animals is carried on across the Park lines, but careful watching and one or two arrests have reduced it to a minimum. One or two more examples like that of Van Dyck will put an end to it.

CAPTURE OF ANIMALS.

On my arrival here I found authority to capture animals for the National Zoological Gardens at Washington, D. C. The appointment as hunter was given to Mr. Elwood Hofer, the most competent man in the country. Owing to scarcity of funds with which to pay him he resigned his appointment after two months, but continued to collect specimens. He has caught and turned over to me, and I hold awaiting shipment, two black bear cubs, three young foxes, two elk, and a black-tailed deer.

I also had two antelope, but one night about two weeks since some carnivorous animal broke into their inclosure and killed and ate them When the time for shipment comes I can readily trap and add to the collection a number of the smaller animals, like wolverines, wolves, lynxes, martins, badgers, porcupines, beavers, etc. All can be shipped in one car, which should go under charge of an attendant.

Bears have become very troublesome at all the hotels, camps, slaughter-houses, and other places in the Park where there is anything for them to eat. They have not proved at all dangerous, but it is impossible to keep provisions anywhere within their reach.

I authorized the capture of one at the Fountain Hotel, but he died of a rupture of the heart in his struggles to escape. I had another caught in a trap there and he is now in the Washington gardens.

I have had 4 small bears caught; two I have still, one broke his chain and escaped, and one was eaten up by an old bear while he was chained in front of the house at Yancey's. As winter approaches I may find it necessary to kill an occasional one, especially if they become destructive of the game, or beef and mutton herds. By another season I hope to be able to supply specimens of all the animals native to the Park; their retention here during the season has proven very interesting to the tourists.

The Park is almost entirely within the State of Wyoming, and yet it is absolutely inaccessible from that State. If a part of the Government appropriation should be expended in making a road down the Snake River as far Jackson's Lake, I have no doubt connection would soon be made with it from some point on the Union Pacific Railroad, and thus a new and desirable route to the Park be opened. It is but a little more than a year before the opening of the World's Fair in Chicago. This will bring visitors here in numbers heretofore unknown.

No expenditure can be made of the revenues of the Government that will bring more satisfactory return than liberal, generous appropriations for the improvement of the Park. I venture to recommend an appropriation of at least $100,000 for construction and repair of roads, with a suggestion that it be made available as early in the year as possible, that it may be expended while work on the roads is yet possible in the autumn. The amount of money at the disposal of the Superintendent is ridiculously inadequate. In place of the few hundreds that he has annually, he should have at least $10,000 to be expended in policing camps, clearing up fallen timber, renewing sign boards, and the many objects properly under his care.

LAW IN THE PARK.

It seems hardly necessary to call your attention to the need of *laws* for the government of the Park. Senate bill 491, first session Fifty-first Congress, as amended and referred to the House Calendar, has much to commend it, and with a few modifications would effect all that can

be desired. For convenience the jurisdiction of the court should be on the Montana side, and the railroad charter (section 11) should by all means be omitted. Otherwise the bill is as nearly perfect as may be, and I trust the passage of it, or one similar to it, may be pressed and accomplished.

My thanks are due to Capt. F. A. Edwards, First Cavalry, for the earnest and intelligent support he has given me in the conduct of affairs near his camp.

I accompany this report with a transcript of the meteorological record of the post, kept under direction of the post surgeon.

I am, sir, yours, most respectfully,

GEO. S. ANDERSON,
Captain Sixth Cavalry,
Act'g Supt. Y. N. P.

The SECRETARY OF THE INTERIOR.

Meteorological record Fort Yellowstone, Yellowstone National Park, Wyo., from July 1, 1890, to June 30, 1891.

JULY, 1890.

[Mean temperature 65°.9.]

Date.	Self-registering thermometers.			General direction of the wind.	Precipitation.				Remarks.
	Maximum.	Minimum.	Range.		Began.	Ended.	Quantity.	Depth of snowfall.	
							Inches.	*Inches.*	
1	83	47	36	S.	During night		.10		Rain.
2	75	45	30	E.	12.45 p. m.	1.40 p. m.	.24		Thunderstorm, rain, and hail.
3	85	47	38	SE.					
4	88	45	43	S.					
5	80	57	23	SE.					
6	72	57	15	SW.	At intervals		(*)		Sprinkling.
7	79	41	38	SE.					
8	83	43	40	W.					
9	86	53	33	SE.	At intervals		(*)		Sprinkling.
10	80	51	29	SW.					
11	77	44	33	SE.					
12	82	52	30	W.					
13	79	44	35	E.					
14	84	44	40	SE.					
15	83	52	31	SE.					
16	86	46	40	SE.					
17	89	53	36	SW.					
18	86	50	36	SE.	At intervals		.02		Sprinkling.
19	89	54	35	SE.					
20	79	54	25	S.	During night. 1.30 p. m.	2.30 p. m.	.45		Thunderstorm; rain.
21	79	55	24	E.	During night		.16		
22	88	45	43	SE.					
23	86	51	35	SE.					
24	89	50	39	S.	1 p. m.	1.30 p. m.	(*)		Sprinkling.
25	90	54	36	W.	12.40 p. m.	12.55 p. m.	.02		Strong wind and thunder storms tearing down flagstaff and trees.
26	91	50	41	NW.	2.15 p. m.	2.35 p. m.			
27	87	49	38	NE.					
28	83	44	39	SE.					
29	81	47	34	W.					
30	80	41	39	SW.					
31	84	39	45	SE.					
Mean	83	48.50	35						

* Inappreciable.

AUGUST, 1890.

[Mean temperature 60°.59.]

1	82	52	30	SW.					
2	77	44	33	W.					
3	79	39	40	SE.					
4	81	45	36	S.					
5	88	48	40	SE.					
6	87	46	41	E.					
7	80	47	33	NW.					
8	84	39	45	SE.					
9	84	50	34	NW.	7 p. m.	During night.	.12		Rain.
10	70	52	18	E.	7.30 a. m.	10 a. m.	.04		Sprinkling.

Meteorological record Fort Yellowstone, Yellowstone National Park, Wyo., from July 1, 1890, to June 30, 1891—Continued.

AUGUST, 1890—Continued.

[Mean temperature 60°.50.

Date.	Self-registering thermometers. Maximum.	Minimum.	Range.	General direction of the wind.	Precipitation. Began.	Ended.	Quantity.	Depth of snowfall.	Remarks.
							Inches.	*Inches.*	
11	74	50	24	SE.	1.25 p.m. 8.30 p.m.	2.15 p.m. During night.	.14 .24	.....	Thunderstorm passing. Rain.
12	72	40	32	SW.	.....	.....	.....	.....	
13	78	42	36	.....	.....	.....	.....	.....	
14	84	41	43	NW.	5.00 p.m.	6.00 p.m.	0.02	.....	
15	74	48	26	NW.	6.00 p.m. During night	8.20 p.m.	0.21 0.09	.....	Rain.
16	74	45	29	SE.	5.00 p.m.	6.00 p.m.	0.04	.....	Rain.
17	74	41	33	SW.	10.15 a.m. 1.30 p.m.	11.00 a.m. 2.45 p.m.	(*) 0.23	.....	Thunder storm; temperature fell rapidly from 70° to 47°; high wind, rain and hail.
18	64	43	21	W.	11.50 a.m.	12.20 p.m.	0.02	.....	Thunder at a distance.
19	64	36	28	SW.	During night. 7.30 a.m.	7.30 a.m. 9.00 a.m.	0.29 0.04	.....	Rain.
					During night		0.02		
20	74	37	37	SE.	.....	.....	.....	.....	
21	83	41	42	S.	.....	.....	.....	.....	
22	80	52	28	E.	.....	.....	.....	.....	
23	73	39	34	SE.	.....	.....	.....	.....	
24	65	37	28	W.	.....	.....	.....	.....	
25	70	37	33	.....	.....	.....	.....	.....	
26	80	37	43	.....	.....	.....	.....	.....	
27	81	40	41	.....	.....	.....	.....	.....	
28	80	51	29	.....	2.50 p.m.	3:10 p.m.	(*)	.....	Sprinkling; thunderstorm passing in southwest direction.
29	85	43	42	.....	.....	.....	.....	.....	
30	78	49	29	.....	During night		0.04	.....	Rain.
31	75	50	25	.....	During night		0.23	.....	Thunderstorm; rain.
Mean.	77.25	43.9	33.35						

SEPTEMBER, 1890.

[Mean temperature, 52°.58.]

1	74	47	27	SE.	During night		.02	.....	Rain.
2	69	37	32	NW.	.....	.....	.....	.....	
3	71	31	40	SW.	.....	.....	.....	.....	Frost; sidewalks and fences covered.
4	75	36	39	SE.	.....	.....	.....	.....	
5	70	42	28	SW.	During night		0.17	.....	Rain.
6	45	28	17	SW.	4.30 p.m.	5.30 p.m.	(*)	(*)	Snow; ground covered.
7	57	23	36	S.	.....	.....	.....	.....	
8	68	35	33	SE.	.....	.....	.....	.....	
9	71	30	41	S.	.....	.....	.....	.....	
10	72	30	42	SW.	.....	.....	.....	.....	
11	65	31	34	SE.	5.30 p.m.	6.20 p.m.	(*)	(*)	Snow.
12	65	20	45	SE.	.....	.....	.....	.....	
13	69	28	41	.....	.....	.....	.....	.....	
14	70	43	27	S.	.....	.....	.....	.....	
15	76	37	39	SE.	.....	.....	.....	.....	
16	77	41	36	W.	.....	.....	.....	.....	
17	79	41	38	SE.	.....	.....	.....	.....	
18	64	38	26	E.	.....	.....	.....	.....	
19	72	34	38	S.	.....	.....	.....	.....	
20	71	36	35	SW.	.....	.....	.....	.....	
21	72	31	41	W.	.....	.....	.....	.....	
22	71	33	38	SE.	.....	.....	.....	.....	
23	75	34	41	SE.	.....	.....	.....	.....	
24	75	34	41	S.	.....	.....	.....	.....	
25	71	35	36	E.	.....	.....	.....	.....	

* Inappreciable.

Meteorological record Fort Yellowstone, Yellowstone National Park, Wyo., from July 1, 1890, to June 30, 1891—Continued.

SEPTEMBER, 1890—Continued.

[Mean temperature 52°.58.]

Date.	Self-registering thermometers. Maximum.	Minimum.	Range.	General direction of the wind.	Precipitation. Began.	Ended.	Quantity.	Depth of snowfall.	Remarks.
							Inches.	*Inches.*	
26	72	34	38	SW.	2 p. m.	2.20 p. m.	(*)	.....	Sprinkling.
27	76	36	40	.....	.....	.....	.....	.....	
28	79	38	41	S.	.....	.....	.....	.....	
29	73	39	34	SE.	.....	.....	.....	.....	
30	64	46	18	SE.	.....	.....	.....	.....	
Mean	70.26	34.90	35.36						

OCTOBER, 1890.

[Mean temperature, 38°.45.]

1	56	41	15	SE.	During night	.....	.04	.....	Rain.
					3.25 p.m.	4.50 p.m.	.05	.....	
2	45	34	11	NW.	7 p. m.	5 p. m.	.30	.....	Rain.
3	44	24	20	NW.	6.20 p. m.	During night.	.15	1.5	Snow.
4	42	19	23	E.	11.30 a. m.	2.30 p.m.	(*)	(*)	Snow.
5	44	30	14	SE.	During night	.....	.04	.....	Rain.
6	46	30	16	SE.	During night.	10 a. m.	.06	(*)	Snow; melted as it fell.
7	44	36	8	SW.	.....	.....	.....	.....	
8	40	25	15	SE.	9 a. m.	6 p. m.	.04	(*)	Snow at intervals; melted as it fell.
9	33	20	13	E.	During night.	.....	.....	.....	
10	31	23	8	W.	.....	3.30 p.m.	.3	4.	Snow.
11	45	22	23	SW.	.....	.....	.....	.....	
12	34	28	6	SE.	8 a.m.	During night.	.4	(*)	Snow; melted as it fell.
13	42	19	23	NW.	.....	.....	.....	.....	
14	35	28	7	SE.	12 m.	1.30 p.m.	.15	1.00	Snow.
15	33	16	17	E.	During night	.....	(*)	(*)	Snow.
16	45	24	21	S.	.....	.....	.....	.....	
17	42	29	13	SW.	.....	.....	.....	.....	
18	57	28	29	S.	.....	.....	.....	.....	
19	50	38	12	SE.	11.30 a.m.	5.20 p.m.	.07	.....	
20	42	26	16	NE.	During night	.....	.08	.....	Rain.
21	52	33	19	SE.	.....	.....	.....	.....	
22	48	35	13	SE.	.....	.....	.....	.....	
23	49	35	14	S.	.....	.....	.....	.....	
24	56	33	23	SW.	.....	.....	.....	.....	
25	59	26	33	S.	.....	.....	.....	.....	
26	58	32	26	SE.	.....	.....	.....	.....	
27	60	32	28	SE.	.....	.....	.....	.....	
28	65	31	34	SW.	.....	.....	.....	.....	
29	63	29	34	SE.	.....	.....	.....	.....	
30	62	28	34	E.	.....	.....	.....	.....	
31	60	28	32	W.	.....	.....	.....	.....	
Mean.	47.8	20.1	19.35						

* Inappreciable.

† At intervals.

Meterological record Fort Yellowstone, Yellowstone National Park, Wyo., from July 1, 1890, to June 30, 1891--Continued.

NOVEMBER, 1890.

[Mean temperature 32°.75.]

Date.	Self-registering thermometers.			General direction of the wind.	Precipitation.				Remarks.
	Maximum.	Minimum.	Range.		Began.	Ended.	Quantity.	Depth of snowfall.	
							Inches.	*Inches.*	
1	56	25	31	SE.					
2	54	24	30	SW.					
3	58	28	30	S.					
4	56	38	18	SE.					
5	34	24	10	NE.	8 a. m.	4.30 p. m.	.06	.75	Snow.
6	23	14	9	E.					
7	24	2	22	SE.					
8	31	8	23	NW.	3.15 p. m.	5.30 p. m.	(*)	(*)	Snow.
9	32	22	12	SW.	9 a. m. 11.45 a. m.	11 a. m. 4 p. m.	.05	(*)	Snow; melted as it fell.
10	32	14	18	SE.					
11	33	24	9	E.	10.30 a. m.	4.15 p. m.	.12	1.02	Snow.
12	31	8	23	SE.					
13	30	20	10	SW.	4.15 p. m.	6 p. m.	.12	.9	Snow.
14	30	15	15	SE.	During night		.12	1.0	Snow.
15	32	10	22	W.					
16	42	14	28	S.					
17	38	25	13	SW.					
18	40	25	15	SE.					
19	49	20	29	S.					
20	50	24	26	SE.					
21	44	18	20	E.					
22	49	23	26	S.					
23	45	23	22	SW.					
24	48	24	24	SE.					
25	47	17	30	SW.					
26	49	20	29	W.					
27	50	21	29	SE.					
28	48	19	29	E.					
29	47	25	22	SW.					
30	50	26	24	SW.					
Mean	43.50	20	27.15						

DECEMBER, 1890.

[Mean temperature 27°.72.]

1	45	24	21	SE.					
2	39	29	10	E.	During night.	4 p. m.	(*)	(*)	Snow.
3	32	20	12	NE.	9 a. m. During night	5.30 p. m.	.10 .18	.50 2.50	Snow. Snow.
4	30	18	12	SE.					
5	27	9	18	SW.					
6	30	6	24	W.					
7	25	2	23	SE.					
8	29	6	23	E.					
9	35	18	17	SW.					
10	37	23	14	SE.					
11	40	28	12	S.					
12	47	23	24	SE.					
13	37	28	9	E.					
14	37	26	11	SE.	During night		.06	(*)	Snow.
15	33	22	11	SE.	During night, 11 a. m.		.05	(*)	Snow.
16	35	20	15	SW.					
17	37	13	24	W.					
18	42	15	27	SE.					
19	37	27	10	E.	During night		.2	(*)	Snow, melted as it fell.
20	34	21	13	SE.					
21	28	18	10	S.	8.20 a. m.	2.10 p. m.	.05	0.2	

* Inappreciable.

Meterological record Fort Yellowstone, Yellowstone National Park, Wyo., from July 1, 1890 to June 30, 1891—Continued.

DECEMBER, 1890—Continued.

[Mean temperature, 27°.72.]

Date.	Self-registering thermometers.			General direction of the wind.	Precipitation.				Remarks.
	Maximum.	Minimum.	Range.		Began.	Ended.	Quantity.	Depth of snowfall.	
							Inches.	*Inches.*	
22	35	24	11	S.	.....	.....	.....	.....	
23	37	22	15	SW.	.....	.....	.....	.....	
24	35	24	11	SW.	.....	.....	.....	.....	
25	35	27	8	E.	.....	.....	.....	.....	
26	36	24	12	SE.	.....	.....	.....	.....	
27	37	16	21	SE.	.....	.....	.....	.....	
28	40	20	20	SW.	.....	.....	.....	.....	
29	41	20	21	SE.	.....	.....	.....	.....	
30	36	23	13	NW.	10.20 a. m.	7.20 p. m.	.25	2.8	Snow.
31	32	23	9	W.	.....	.....	.....	.....	
Mean	35.48	19.97	15.52						

JANUARY, 1891.

[Mean temperature, 20°.43.]

1	25	7	18	NW.	.....	.....	.....	.....	
2	27	18	9	SE.	.....	.....	.....	.....	
3	30	20	10	SE.	8.40 a. m.	4.20 p. m.	(*)	(*)	Snow.
4	32	18	14	E.	.....	.....	.....	.....	
5	37	16	21	E.	.....	.....	.....	.....	
6	39	21	18	SE.	4.10 p. m.	During night.	.06	.6	Snow.
7	25	9	16	SE.	.....	.....	.....	.....	
8	19	−5	24	E.	.....	.....	.....	.....	
9	24	−4	28	0	.....	.....	.....	.....	
10	19	−4	23	E.	.....	.....	.....	.....	
11	21	−1	22	SE.	During night.....		(*)	Trace	Snow.
12	26	3	23	E.	.....	.....	.....	.....	
13	32	10	22	SE.	.....	.....	.....	.....	
14	31	12	19	SE.	.....	.....	.....	.....	
15	25	10	15	NW.	.....	.....	.....	.....	
16	29	20	9	SE.	.....	.....	.....	.....	
17	37	14	23	SE.	.....	.....	.....	.....	
18	33	19	14	SE.	.....	.....	.....	.....	
19	37	23	14	SW.	.....	.....	.....	.....	
20	45	25	20	SW.	During night.....		.04	.4	Snow.
21	31	15	16	SE.	.....	.....	.....	.....	
22	33	15	18	SE.	4.50 p. m.	During night.	.02	.2	Snow.
23	33	8	25	NW.	.....	.....	.....	.....	
24	36	16	20	SE.	.....	.....	.....	.....	
25	27	21	6	SE.	At intervals.....		.04	0.6	Snow.
26	31	22	9	S.	9.20 a. m.	3.00 p. m.	.05	0.8	Snow.
27	30	15	15	SE.	.....	.....	.....	.....	
28	23	6	23	.....	During night....		.03	0.7	Snow.
29	26	9	17	.....	do.....		.02	0.5	Snow.
30	25	15	10	SE.	do.....		.02	0.2	Snow.
31	11	1	10	SE.	9.20 a. m.	6.00 p. m.	.20	3.3	Snow.
Mean	29	11.87	17.13						

* Inappreciable.

Meteorological record Fort Yellowstone, Yellowstone National Park, Wyo., from July 1, 1890, to June 30, 1891—Continued.

FEBRUARY, 1891.

[Mean temperature 14°.25.]

Date.	Self-registering thermometers.			General direction of the wind.	Precipitation.				Remarks.
	Maximum.	Minimum.	Range.		Began.	Ended.	Quantity.	Depth of snowfall.	
							Inches.	*Inches.*	
1	7	−16	23	SE.	During night.	2.20 p.m.	.19	3.4	Snow.
2	11	−22	33	SE.					
3	20	− 2	22	N.					
4	27	4	23	NW.					
5	28	15	13	S.					
6	27	17	10	S.					
7	14	− 2	16	SE.	During night.	9 a. m.	.08	1.2	Snow.
8	15	−12	27	E.	7 p. m.				
9	12	− 1	13	SE.		During night.	.12	1.8	Snow.
10	19	7	12	SE.					
11	20	3	17	SW.					
12	23	16	7	W.	7 a. m.	5.10 p. m.	.12	11.2	Snow.
13	39	22	17	SW.					
14	35	28	7	SW.	At intervals		.11	*1.1	Snow.
15	30	12	18	SE.	During night		.06	9.-	Snow.
16	22	0	22	SE.	During night		.55	9.0	Snow.
17	10	− 9	28	W.	9 a. m.	4 p. m.	.26	3.5	Snow.
18	23	6	17	SE.					
19	25	− 4	29	E.	10 a. m.	2 p. m.	(*)	(*)	Inappreciable.
20	22	8	14	SW.					
21	25	5	20	SE.					
22	33	18	15	E.	During night.	2.40 p.m.	.12	4.-	Snow.
23	40	33	7	W.	During night, at intervals.		.09	*9.0	Snow; melted as it fell.
24	33	1	32	SE.	During night.	11 a. m.	.02	4.0	Snow.
25	22	− 3	25	SE.					
26	25	9	16	S.					
27	17	− 5	22	SE.	During night	8.20 a. m.	.35	4.3	Snow.
28	27	10	17	NE.					
Mean	23.57	4.93	18.64						

MARCH, 1891.

[Mean temperature, 22°.17.]

1	33	4	29	NW.	At intervals		.25	3.2	Snow.
2	7	− 7	14	SE.					
3	27	−10	37	SE.					
4	28	10	10	W.	9 a. m.		.22	2.4	Snow.
5	17	− 9	26	E.		During night.	.01	1.6	Snow.
6	16	−15	31	SE.					
7	22	− 3	25	SE.	During night		.12	1.4	Snow.
8	25	6	19	SE.	At intervals		.02	2.7	Snow.
9	32	20	12	NW.					
10	30	10	20	NE.					
11	23	− 9	31	E.					
12	30	6	24	SW.					
13	41	5	36	S.					
14	39	18	21	SW.					
15	46	24	22	SW.					
16	40	28	12	SE.	4 p. m.	During night.	.22	1.5	Snow.
17	37	21	16	SE.					
18	49	14	35	E.	8 a. m.	5 p. m.	.20	1.-	Hail and snow.

* Approximated.

Meteorological record Fort Yellowstone, Yellowstone National Park, Wyo., from July 1, 1890, to June 30, 1891—Continued.

MARCH, 1891—Continued.

[Mean temperature, 22°.17.]

Date.	Self-registering thermometers.			General direction of the wind.	Precipitation.				Remarks.
	Maximum.	Minimum.	Range.		Began.	Ended.	Quantity.	Depth of snowfall.	
							Inches.	*Inches.*	
19	35	18	17	W.					
20	41	19	22	NW.	At intervals		.25	1.5	
21	40	27	13	SE.	10 a. m.	4 p. m.	.30	1.5	
22	40	10	30	E.					
23	30	19	11	NE.					
24	38	10	28	SE.					
25	44	9	35	E.	4 p.m				
26	45	23	22	SE.	During night		.2	1.	
27	43	30	13	SE.	2.30 p.m	4 p. m	.1	(*)	Snow melted as it fell.
28	37	21	16	N.	At intervals		.15	.5	Snow.
29	35	22	13	SW.					
30	38	16	22	SE.	During night		.10	.5	Snow.
31	29	6	23	SE.					
Mean	33.35	11	22.30						

APRIL, 1891.

[Mean temperature 41°.]

1	32	6	26	SW.					
2	43	6	27	S.					
3	41	19	22	W.					
4	45	8	37	SE.					
5	54	18	36	SE.					
6	60	26	34	S.					
7	49	32	17	W.					
8	41	26	15	SE.					
9	43	20	23	SW.					
10	58	25	33	SE.					
11	60	30	30	SE.					
12	52	32	20	SW					
13	57	27	30	E.					
14	59	29	30	S.	2 p. m.	4.50 p. m.	.02		Rain.
15	52	33	19	SE.	4 p. m.	5 p. m.	.06	(*)	Snow and hail mixed; melted as it fell.
					During night		.05		Rain.
16	50	30	20	SW.					
17	60	26	34	SW.					
18	55	28	27	SE.					
19	52	36	16	W.					
20	57	32	19	E.					
21	54	28	26	SW.					
22	62	31	31	SE.					
23	69	38	31	S					
24	65	43	22	SE.					
25	59	32	27	SE.	At intervals during night.		.03 .02	(*) Trace	Snow and rain mixed. Snow.
26	52	21	31	NE.					
27	66	32	34	SE.					
28	68	38	30	SW.					
29	59	41	18	W.					
30	51	29	22	SE.					
Mean	54.6	27.4	26.73						

*Inappreciable.

Meteorological record Fort Yellowstone, Yellowstone National Park, Wyo., from July 1, 1890, to June 30, 1891—Continued.

MAY, 1891.

[Mean temperature, 49°.80.]

Date.	Self-registering thermometers. Maximum.	Minimum.	Range.	General direction of the wind.	Precipitation. Began.	Ended.	Quantity.	Depth of snowfall.	Remarks.
							Inches.	*Inches.*	
1	57	37	20	SE.	At intervals		.08	.....	Rain.
2	60	25	35	S.	.....	.....	.....	.....	
3	67	22	45	SW.	.....	.....	.....	.....	
4	73	33	40	S.	.....	.....	.....	.....	
5	78	43	35	S.	.....	.....	.....	.....	
6	78	45	33	SE.	.....	.....	.....	.....	
7	70	44	26	SW.	4 p. m.	4.30 p. m.	.06	.....	Rain; thunderstorm passing.
8	49	34	15	NW.	During night		.04	.....	Rain.
					11.50 a. m.	1 p. m.	.04	.....	Rain.
9	53	26	27	W.	.....	.....	.....	.....	
10	63	25	38	SE.	.....	.....	.....	.....	
11	61	23	38	SE.	.....	.....	.....	.....	
12	70	30	40	SE.	.....	.....	.....	.....	
13	78	35	43	S.	During night		.03	.....	
14	69	37	32	SW.	.....	.....	.....	.....	
15	68	39	29	SE.	.....	.....	.....	.....	
16	74	35	39	SE.	During night		.02	.....	
17	72	44	28	W.	11 a. m.	11.30 a. m.	.02	.....	Thunderstorm.
					1 p. m.	2.15 p. m.	.08		
					During night		.17		
18	65	37	28	SE.	8.30 a. m.	9 a. m.	(*)	.....	
19	52	32	20	W.	8 a. m.	11 a. m.	.50	†.5	Snow; melted as it fell.
20	59	30	29	SE.	During night		.10	.1	Do.
21	54	30	24	SE.	.....	.....	.....	.....	
22	62	29	23	E.	During night		.08	.....	Rain and hail.
23	59	39	20	NE.	.....	.....	.....	.....	
24	67	34	33	SE.	3.50 p. m.	5 p. m.	.14	.....	Rain.
25	70	32	38	W.	.....	.....	.....	.....	
26	70	39	31	SW.	.....	.....	.....	.....	
27	70	40	30	SE.	5 p. m.	During night.	.10	.....	Thunderstorm.
28	69	39	30	SW.	12.30 p. m.	6 p. m.	.41	.....	
29	62	40	22	SE.	During night at intervals.		.17	.....	
							.08	.....	
30	56	37	19	E.	.....	.....	.....	.....	
31	63	35	28	SE.	.....	.....	.....	.....	
Mean	65.10	34.50	30.60						

JUNE, 1891.

[Mean temperature 51°.20.]

1	56	38	18	SE.	12.40 p. m.	1.20 p. m.	.11	.....	Rain.
					6.30 p. m.	During night.	.55	.....	
2	53	37	16	E.	At intervals		.13	.....	
3	54	39	15	NW.	During night.	10.20 a. m.	.21	.....	
					2.10 p. m.	4.20 p. m.	.12	.....	
4	61	41	20	SW.	2.10 p. m.	3 p. m.	.08	.....	Rain and hail
5	70	39	31	SW.	.....	.....	.....	.....	
6	70	41	29	SE.	6.25 p. m.	.....	.....	.....	
7	64	46	18	W.	.....	During night.	.21	.....	Rain.
8	69	32	37	E.	7.10 p. m.	.....	.20	.....	Rain turned into snow during night, which melted as it fell.
9	45	31	14	W.	.....	1.20 p. m.	.08	.....	Snow.
10	64	30	34	SW.	4.20 p. m.	5.10 p. m.	.02	.....	
11	64	41	23	SE.	2.15 p. m.	3 p. m.	.01	.....	
12	68	42	26	NW.	At intervals		.08	.....	

* Inappreciable.

† At intervals.

Meteorological record Fort Yellowstone, Yellowstone National Park, Wyo., from July 1, 1890, to June 30, 1891—Continued.

JUNE, 1891—Continued.

[Mean temperature, 51°.20.]

Date.	Self-registering thermometers.			General direction of the wind.	Precipitation.				Remarks.
	Maximum.	Minimum.	Range.		Began.	Ended.	Quantity.	Depth of snowfall.	
							Inches.	*Inches.*	
13	62	38	24	W.	During night		.49	.....	
					7 a. m.	3 p. m.*	.01	.....	
14	58	37	21	NW.	1.20 p. m.	7 p. m.	.19	.....	
15	59	37	22	SE.	2.10 p. m.	4 p. m.	.01	.....	
16	70	37	33	SE.	.....	.....	.....	.....	
17	78	40	38	SE.	During night.	2.30 p. m.	.07	.....	Rain and hail at intervals.
18	62	48	14	SE.	During night at intervals.		.....	.....	
19	60	40	20	SE.	.....	During night.	.08	.....	
20	56	38	18	SE.	At intervals		.02	.....	Snow and rain mixed.
21	67	37	30	E.	.....	.....	.....	.....	
22	63	40	23	NW.	.....	.....	.....	.....	
23	58	36	22	SW.	.....	.....	.....	.....	
24	66	30	36	SE.	.....	.....	.....	.....	
25	76	44	32	SE.	At intervals		.08	.....	Rain.
26	62	44	18	E.	11 a. m.	3 p. m.	.15	.....	Rain.
27	66	41	25	S.	At intervals		.12	.....	Rain.
28	64	38	26	SE.	.....	.....	.....	.....	
29	71	34	37	SW.	.....	.....	.....	.....	
30	85	45	40	SE.	.....	.....	.....	.....	
Mean	63.70	38.70	25.00						

* At intervals.

REPORT

OF THE

SUPERINTENDENT

OF THE

YELLOWSTONE NATIONAL PARK

TO THE

SECRETARY OF THE INTERIOR.

1892.

WASHINGTON:
GOVERNMENT PRINTING OFFICE.
1892.

REPORT

OF THE

SUPERINTENDENT OF THE YELLOWSTONE NATIONAL PARK.

DEPARTMENT OF THE INTERIOR,
OFFICE OF SUPERINTENDENT OF
YELLOWSTONE NATIONAL PARK,
Mammoth Hot Springs, Wyo., August 15, 1892.

SIR: Complying with your request of the 21st ultimo, I respectfully submit the following report of operations and events in the Yellowstone National Park during the past year.

The tourist season, that opened so well in June, 1891, fell off greatly in July, probably owing to the long continued wet weather. Rains occurred almost daily until July 15, and many people were deterred from entering the park by cold and wet and the condition of the roads incident thereto. In August the records show an increase of travel again, but this was partly due to several large excursion parties. The season continued good until about the 20th of September, when an early fall of snow abruptly terminated travel.

The winter was very severe and much snow fell; a backward spring made it almost impossible to open the park at the advertised time—June 1.

The roads were very bad from washouts and mud, and several coaches were overturned, but fortunately with no serious results. All the new road from the Canyon to the Upper Basin, via the lake, was impassable, and I was obliged to put on a large force to open it.

That road was completed last autumn, about the close of the season, and was not well settled when the snow fell. In consequence it washed badly and became very boggy when the snow melted. It is one of the most picturesque drives in the park and will become very popular. By its use all doubling of route is avoided, except between here and Norris. To derive from it the fullest and greatest advantage a new hotel on the site of the present one at the Upper Basin is an essential. As the law stands that site is forbidden, and were it not so I don't believe the necessary capital can be obtained to erect it under existing conditions.

This spring the June travel was good, with a slight falling off in

July, and an upward tendency again in August. I doubt not many people are waiting to make this trip in conjunction with a visit to the World's Fair in 1893.

BOUNDARY LINES OF THE PARK.

The subject of park boundaries has long been in agitation. As now fixed by the President's proclamation of last year, they seem to be thoroughly satisfactory. There is little or no wealth, vegetable or mineral, within the park limits, and nothing that should tempt man's cupidity. On the west, the boundary should be made coincident with the Wyoming line. On the south, the new addition takes in one of the best game preserves in the world, and it should be permanently retained and protected.

On the east the addition may include mineral deposits on the head of the Stinking Water. If so, a modification of this line might be made, so as to throw the mineral belt outside the park. The more recent reports, however, indicate very little wealth in this section.

Continued observation has convinced me that the north line should remain exactly where it is. To cut off all down to the Wyoming line would allow very undesirable settlements in the valley of the Gardiner within 2 miles of this place, and destroy the great mountain sheep, elk, and antelope range on Mount Everts. To make the Yellowstone, Lamar, and Soda Butte rivers the line would be to destroy 25 and perhaps 50 per cent of the game in the park, as this valley is their most extended winter range.

If access to Cooke City by rail is imperative, I believe it will be had from the east or north, without crossing or interfering with the park. If a line through the park is essential, then a right of way confined to the *north* bank of the streams is unquestionably preferable to a cut-off. Should liberal appropriations be made for the construction of roads in the park, I advise that enough of it be used on the Cooke City road to put it in the condition of a first-class commercial thoroughfare. This, I believe, will quiet the agitation that has been going on for so many years.

PROTECTION OF FORESTS.

Since my last report there have been a great many fires started within the park, but by great good fortune all have been extinguished before any damage has been done. A ceaseless and numerous system of patrols has found men ever present to extinguish fires before they have obtained headway. One south of Shoshone Lake this present month assumed greater proportions than any previous one, and was extinguished with difficulty, but it was kept confined to fallen, dead timber, and really did no damage.

Many of these fires are set by lightning, but some are the work of careless campers. In these cases I exact a rigid enforcement of the regulations, and expulsion inevitably follows detection.

OUTPOSTS IN THE PARK.

I have continued the same system of outposts that proved effective last year, and added to it one at the Thumb, and have established one near the south boundary, on Polecat Creek, that I shall occupy when the hunting season opens. This one I shall keep garrisoned by a dismounted party, with snowshoes, all winter. I fully realize that poaching in that vicinity needs increased attention, and I shall look to it the coming fall.

MILITARY QUARTERS.

The new post, on the plateau facing the Mammoth Hot Springs Hotel, was occupied last autumn after the close of the season. A system of water supply and sewerage has just been completed, and small works of improvement are constantly going forward. The post makes a sightly and attractive addition to the place. Another company in garrison is much needed. The single cavalry troop here is kept constantly occupied with its patrol work. A company of infantry should be added, from which details could be made to watch the "formations" and occupy the outposts in winter with snowshoe parties.

I asked of the War Department an allotment sufficient to add accommodations for another company, and it was disapproved on the ground that there was not money enough available. In view of the great necessity for this extra company, I venture to suggest that barracks, kitchen, and outhouses for an infantry company, and stables for quartermaster's animals be added now, and the balance of the buildings be added afterwards. I can manage to accommodate the officers elsewhere for a season.

ROADS.

Last spring found nearly the entire appropriation for two years, amounting to about $120,000, available for road work. All the existing roads were put in condition, and an excellent new road opened from the canyon to the Upper Basin, via the lake. This 52 miles of road is destined to become one of the most popular, as it is one of the most beautiful, drives in the park.

There are places where it is not entirely completed, but I assume such will not long be the case. A road that urgently needs rebuilding is the one from below the Gibbon Falls to the Lower Basin; at present this is the worst, most tedious, and least interesting drive in the park. I also renew and emphasize my recommendation of last year, that a road be opened from the Upper Basin to the south line of the park, on Snake River. A road over Mount Washburn from the Canyon to Yancey's is very desirable, but with existing appropriations, I can see no immediate chance for it. Short driveways should also be opened to the Great Fountain Geyser, the Biscuit Basin, the Black Sand Basin, the Lone Star Geyser, Inspiration Point, and several other at present inaccessible points of interest.

I urgently recommend that the disbursement of this money be put under the control of the superintendent of the park instead of under a nonresident engineer, the work to be planned and superintended by an officer of the Corps of Engineers, ordered to report to the park superintendent for this purpose. At the opening of travel this spring it was found that the entire appropriation had been expended and absolutely nothing left for the repairs that such roads always need after a severe winter. From his more limited horizon the park superintendent can far better judge of such matters and will be present to execute that judgment.

I wish again to mention the zeal, ability, and conscientious devotion to duty of Lieut. Chittenden, United States Engineers, in charge of the work. It is safe to say that no greater amount of work was ever accomplished within the park with the same amount of money.

HOTELS.

As a rule the hotels were very satisfactorily conducted last year, and I believe there is an improvement this summer. There have been no changes, except that the old Trout Creek station has been abandoned, because there is no longer any travel over that route, and the same establishment is satisfactorily conducted at the Thumb. The old Norris lunch station was burned in May, and is now being conducted under canvas. The management aims to give satisfaction, and I hear a great deal in its praise and very little complaint. Mr. J. H. Dean, manager in charge, is courteous and efficient, and very deservedly popular. A good hotel should be built at the Upper Basin; the Norris lunch station should be rebuilt, and have a few rooms for the accommodation of such parties as desire to spend the night there. A similar building should be erected at the Thumb, and when Yancey's present lease expires a more suitable establishment should be opened and operated at that point. For the great number of travelers that are expected next year, the present accommodations will, I fear, prove inadequate, but it is too late now to remedy the defect.

TRANSPORTATION.

Last year the transportation business of the park was successfully and satisfactorily conducted by the Yellowstone Park Association under the management of Mr. Wakefield. Their right to carry passengers expired, by orders from you, on the closing of the season last fall. A new transportation company, with Mr. S. S. Huntley as head and manager, has been conducting the business since the beginning of the present season. The plant is in every way adequate and excellent. The main complaint that comes to me is lack of stop over privileges. There is much to be said on both sides of this question. In the first place it is desirable that all tourists should have all the time they desire in which to make the trip; but it is equally due the transportation company that,

except in unusual cases, they should know at the beginning of a tour how long the party expected to be in making it; otherwise it will be almost impossible to properly provide against crowding and unsatisfactory service. Perhaps, for many people with plenty of time, the most satisfactory way of seeing the park is with a camping party. These parties often give a good deal of trouble from the rubbish they leave behind in their camps, and the number of fires they start and do not extinguish; however, it is proper that these parties be given the greatest latitude consistent with proper park management. The question of their transportation then comes up for consideration. I do not think such established institutions as the Wiley tours should be permitted. It is true that they originate and advertise their business outside the park, but the conduct of the business is wholly within it. They establish permanent or semipermanent camps, and to the greatest extent possible conduct their business outside of the control or supervision of the superintendent of the park. The instructions recently received on this subject will have my careful attention.

BOAT ON THE LAKE.

The steamer on the lake has been running successfully for a year or more, and adds much to the pleasure of a trip through the park. It is commodious and comfortable, and I believe perfectly safe. It is now made a part of the park transportation, and carries passengers, at their option, from the Thumb to the Lake Hotel, thus relieving them of 18 miles of tedious staging. I believe the boat company has enough small boats for the demands of fishing parties, but I think prices might be lowered where boats are used continuously for several hours.

TOURISTS.

Tourists continue to gather specimens when not watched, and write their very commonplace names over nature's most exquisite beauties. No amount of vigilance can entirely prevent this, for, unfortunately, the majority of the transgressors have no conception of the enormity of their offenses. Quite recently one reverend vandal excused himself for the offense of gathering specimens by saying that owing to a want of badge or uniform on the party who stopped him, he did not recognize him as having authority. There is still much to be desired in the way of regulations concerning the carrying of firearms within the park. Of course, all arms passing here or any outpost are sealed, and confiscated if afterwards found with seals broken, but it is impossible to carefully watch all the country, and I fear some of the seals get broken before the boundary is crossed. I recommend an absolute prohibition of firearms within the park, leaving, with the superintendent the right to make carefully considered exceptions. I have removed several camping parties from the park for leaving their camp fires unextinguished, and have sent several men back over long distances to rub and wash out names which they had written on the formations.

FISH.

The fish in lakes and rivers remain undiminished in numbers, notwithstanding the multitudes that have been caught. Prof. Everman, of the Fish Commission, visited the park last year and found most of the stock brought here by the Commission thriving beyond his most sanguine expectations. The following is a list of the distribution made by the Commission:

IN 1889.

East Fork of Gardiner, above falls, 1,000 black spotted trout.
Gibbon River, above Virginia Cascade, 990 Rainbow trout.
Madison River, above Keppler's Cascade, 995 Loch Leven trout.
Gardiner River, above falls, 4,975 brook trout.
Yellowstone River, above falls, 2,000 whitefish.
Twin Lakes, 1,000 whitefish.

IN 1890.

Shoshone Lake, 21,012 lake trout.
Shoshone Lake, 3,350 Loch Leven trout.
Lewis Lake, 12,013 lake trout.
Lewis Lake, 3,350 Loch Leven trout.
West Fork of Gardiner, above falls, 7,850 brook trout.
Nez Percé Creek, 9,850 Von Behr trout.
Yellowstone River, above falls, 10,000 whitefish.

I have had these plants carefully examined recently, and find them all thriving splendidly, except the whitefish, of which not a trace remained. I believe all have now become sufficiently established to permit fishing under proper restrictions. The altitude is perhaps too great for the successful introduction of black bass, but I should like to see the effort made in some of the suitable lakes near the hotels—like Grebe and Goose lakes; should they thrive, they would add greatly to the sport afforded enthusiastic anglers.

WORK DONE IN THE PARK.

In June I sent a working party through the park and policed it pretty thoroughly, and opened ways to good camping places off the main roads; for this purpose $1,000 was allotted me, and nearly the entire amount expended. There are now so many camping parties in the park, with more arriving daily, that it will be impossible to keep up a state of thorough police, so I do not recommend any further expenditure in this line until the close of this season or the opening of the next. I was also authorized to renew the signs obliterated by time, and this work is progressing satisfactorily and is nearing completion. Owing to want of money to repair the roads this spring, a large amount of such work was done by the troops, and without it long sections of the road would have remained impassable.

POACHERS.

Trouble with poachers continues to be one of the greatest annoyances the superintendent has to contend with. There is gradually settling about the park boundaries a population whose sole subsistence is derived from hunting and trapping. All of these people are thoroughly cognizant of the location of the boundary lines, but only respect them in the presence of some member of the park force. Live elk, deer, antelope, and bears are caught and sold; the various fur bearing animals are trapped for their pelts, and hunting parties are guided into the best game region. So long as these operations are conducted without the park they are unobjectionable, and the park, acting as a reservoir, contributes largely to them. But it is when the park is invaded that the damage begins. It is a serious matter that so simple and much-needed a statute as the one granting legal force to park regulations can not be passed. It can antagonize no interests except those of the poachers, with whom no friend of the park can have sympathy.

During the month of June last, on my return from the East, I was informed that one Pendleton, a butcher and poacher from Cooke City, had captured two buffalo calves on specimen range, and had taken them across the north end of the park; that one had died near the mouth of Crevice Creek, and the other had died just outside the park. It was certain that these calves were captured within the park, as there are none found without it. Pendleton claimed, however, that they were caught on Upper Hell Roaring Creek, and he was released. On investigating the case I determined to forbid him the park, under rule 10, except that he might pass backward and forward from Cooke to Cinnabar, along the main road, which he was not, under any circumstances, to leave farther than 100 yards. This order was delivered to him by Sergt. Kellner, in charge at Soda Butte, but Pendleton, in absolute defiance of it, proceeded to roam at will over that portion of the park, and he was arrested and brought in here on July 9 and confined in the guardhouse. I was absent at the time, and he was held awaiting my return. On questioning him a few days since, he said he caught the buffalo on Hell Roaring Creek, and that he would make affidavit to that fact, but when confronted with the notary he changed his mind about the affidavit. There should certainly be some law by which to deal with cases like this. Every bit of property found on such men is at once claimed by their partners and confederates, on real or fraudulent bills of sale, and confiscation, if made, hurts the transgressors very little. Expulsion from the park is no punishment, for they can return immediately and incur no additional risk. However, I interpret the regulations of the Secretary as having the force of law (see declaratory statute), and I act as vigorously as possible under them. Two other men were caught in the act of taking young elk on Mount Everts, and their horses and outfit confiscated and they expelled from the park.

Soon afterwards they broke open the stable one night and stole the ponies that had been taken from them, and their other belongings were valueless. These are a few of the many instances of this kind that have arisen in the course of the year, and they afford a very discouraging picture. I trust that their mere recital will sufficiently emphasize the need of definite statute law for the park.

GAME.

Buffalo.—Very careful and frequent observations of the bison herds in the park have convinced me that there are certainly not less than four hundred here; of these about 20 per cent were calves last year. This year, also, the calves seem numerous and prosperous. The great value placed upon them by sportsmen and taxidermists makes their protection difficult, but I devote my best energies to it. Their perpetuity within the park is thoroughly assured, and a steady and gradual increase may be looked for.

Moose.—There are still a very few of these fine animals in the extreme south of the park, but as they range beyond the line, I fear their protection will be impossible.

Mountain sheep.—There are several large bands of sheep remaining, mostly near the northern line. If the park is cut off down to the East Fork and Soda Butte Creek, one of their best ranges will be thrown out, and of course they will soon disappear. There is a fine herd that winters on Mount Everts, and they are frequently seen near the road between here and Gardiner.

Elk.—The elk are extremely numerous, and I am not disposed to revise in the least my estimate of 25,000 made last year. The very severe winter was extremely hard on them, and I judge that from 2,000 to 5,000 perished. This is not an alarming mortality among so many when it is considered that the deaths the previous winter were unusually few. The worst feature of it is that owing to the starved condition of the mothers this spring a very large proportion of the calves perished. There are still as many as the winter grazing will accommodate, and loss of the old ones is not to be considered an evil.

Bears.—The bears are becoming very numerous and in some places quite troublesome, but as they are not in the least dangerous and their presence near the hotels is a source of great amusement, I do not recommend the destruction of any.

Other game.—Antelope, deer, and the numerous kinds of smaller animals and birds are all thriving, increasing, and becoming tame. Their appearance near the routes of travel is a source of much interest to tourists.

Of late I have seen evidences of great numbers of beaver. I hope and believe that they are increasing and that I shall be able to protect and preserve them. A few examples like the recent case of Pendleton will contribute powerfully to this end.

CAPTURE OF ANIMALS.

Under your authority I have continued to capture animals for the National Zoölogical Garden in Washington. Two full-grown bears, a grizzly and a cinnamon, have already been shipped, and added to the collection there. I now have on hand, awaiting funds for their transportation, two black bears, two elk, two foxes, one black tail deer, one beaver, one badger, and one porcupine. I have also two bears, two elk, and an antelope that are too young for present shipment. It would be an easy matter for me to add to this collection, but thus far I have had to bear most of the expense of their keeping out of my private funds, and this does not give the enterprise very great encouragement. If more liberal allotments are made me, I can guarantee to provide almost any animal that is native to the park. It is, however, too late in the season to make captures of most of them; they should be taken when very young, as they are more easily caught and trained at that period. Their presence here is a source of unending interest to tourists.

RECOMMENDATIONS.

I take the liberty to make the following recommendations:

First. The passage of an act defining the boundaries of the park as they now exist, including the timber reserve added by Presidential proclamation, except that the Wyoming line should be made the west boundary.

Second. The enactment of a law establishing a system of government within the park, with appropriate machinery for its execution and prescribed penalties for violation of its provisions

Third. A careful survey of its boundaries, with well-defined markings throughout their whole extent.

Fourth. A transfer to the superintendent of the control of the appropriations for the building and repair of roads.

Fifth. The construction of a good wagon road from Cinnabar to Cooke, or so much of it as may fall within the park.

Sixth. The construction of a good road from the Upper Basin to the southern line of the park, on Snake River.

Seventh. The addition of accommodations for a company of infantry, to be made part of the permanent garrison here.

Eighth. A small appropriation for policing the park and capturing and caring for wild animals while awaiting shipment to Washington.

Ninth. Completion of the road system of the park by the construction of the road from the canyon to Yancy's at the earliest practicable day. If liberal appropriations should be made for this object by the Congress at its next session, the road could be made passable before the end of the next tourist season and very many people thus enjoy the delights of this incomparable bit of scenery.

I wish to record my thanks due to Capt. George L. Scott, Sixth Cavalry, for the efficient aid rendered by him and his troop.

A meteorological record, kept under the direction of the post surgeon, is hereunto appended.

Yours, very respectfully,

GEO. S. ANDERSON,
Captain Sixth Cavalry, Acting Superintendent
Yellowstone National Park.

THE SECRETARY OF THE INTERIOR.

Meteorological register kept at Fort Yellowstone, Wyo., from July 1, 1891, to July 31, 1892.

JULY, 1891.

Day of month.	Temperature. Maximum.	Temperature. Minimum.	Temperature. Range.	Precipitation. Time of beginning.	Precipitation. Time of ending.	Precipitation. Total precipitation.	Precipitation. Depth of snowfall.	General direction of the wind.
	°	°	°			*Inches.*	*Inches.*	
July 1	82	42	40	.....	.....	.....	.....	SW.
2	85	44	41	.....	.....	.....	.....	SE.
3	88	47	41	.....	.....	.....	.....	S.
4	85	55	30	4 p. m.	5:20 p. m.	.05	.....	SE.
5	81	47	34	.....	.....	.....	.....	S.
6	71	44	30	.....	.....	.....	.....	SW.
7	75	41	34	4:15 p. m.	5:30 p. m.	.12	.....	SE.
8	70	40	30	3:20 p. m.	5:40 p. m.	.18	.....	E.
9	57	41	16	7:40 a. m.	Storm	.22	.....	E.
10	67	36	31	.....	.....	.....	.....	SW.
11	56	46	11	During night	During night	.41	.....	E.
12	72	39	13	2:15 p. m.	4:20 p. m.	.41	.....	
13	73	37	36	9:00 a. m.	10:30 a. m.	.06	.....	NW.
14	74	40	34	.....	.....	.....	.....	S.
15	79	41	35	.....	.....	.....	.....	NW.
16	79	45	34	During night	During night	.13	.....	NW.
17	81	50	31	.....	.....	.....	.....	NW.
18	80	46	40	1:30 p. m.	1:50 p. m.	.04	.....	SW.
19	82	47	35	During night	During night	.24	.....	NW.
20	75	43	32	5:45 p. m.	6:30 p. m.	.06	.....	NW.
21	76	40	36	.....	.....	.....	.....	SW.
22	79	40	39	.....	.....	.....	.....	SE.
23	77	42	35	.....	.....	.....	.....	NW.
24	84	46	38	1:30 p. m.	5:10 p. m.	.08	.....	NW.
25	88	48	40	.....	.....	.....	.....	S.
26	83	49	34	.....	.....	.....	.....	S.
27	77	49	28	4:10 p. m.	5:10 p. m.	.16	.....	SW.
28	82	41	41	.....	.....	.....	.....	SW.
29	76	47	29	7:15 p. m.	8:20 p. m.	.12	.....	SE.
30	74	56	18	8:20 p. m.	During night	.42	.....	SW.
31	78	44	34	.....	.....	.....	.....	NW.
Total	25.72	13.67	1,001	.....	.....	3.15	.....	NW.
Mean	66.48	44.10	32.39	.....	.....	.....	.....	SW.

Monthly mean 60.29.

Meteorological register kept at Fort Yellowstone, Wyo., etc.—Continued.

AUGUST, 1891.

Day of month.	Temperature. Maximum.	Minimum.	Range.	Precipitation. Time of beginning.	Time of ending.	Total precipitation.	Depth of snowfall.	General direction of the wind.
	°	°	°			*Inches.*	*Inches.*	
Aug. 1	81	49	32					S.
2	84	46	38					NW.
3	82	49	33	1:50 p. m.	2:40 p. m.	.14		SE.
4	81	50	31	4:55 p. m.	5:10 p. m.	.11		S.
5	87	50	37					S.
6	49	46	33					SW.
7	65	42	23	1:25 p. m.	5:50 p. m. (Storms)	.44		S.
8	73	41	32					NW.
9	81	39	42					NW.
10	83	40	43					SE.
11	79	41	38	5:15 p. m.	5:25 p. m.	.08		S.
12	85	46	39					S.
13	89	46	43					NW.
14	85	55	30	5:10 p. m.	5:26 p. m.	.09		S.
15	81	50	31					S.
16	82	48	34					SE.
17	83	46	37					SE.
18	81	49	32					SE.
19	82	44	38	2:30 p. m.	3:20 p. m.	.10		S.
20	70	43	27	During night.	During night.	.08		S.
21	68	43	25	8:20 p. m.	8:50 p. m.	.09		SE.
22	74	35	39	During night.	During night.	.01		NW.
23	84	43	41					NW.
24	81	44	37					NW.
25	75	42	33	During night.	During night.	.02		S.
26	67	42	25					SE.
27	81	37	44					SE.
28	80	39	41					SE.
29	86	41	45					S.
30	84	44	40	2:20 p. m.	3:10 p. m.	1.02		SW.
31	82	51	31	1:40 p. m.	4 p. m.	.04		SE.
Total	2,425	1,361	1,064			2.22		
Mean	29.84	44.55	35.29					S.

Monthly mean, 62.19.

SEPTEMBER, 1891.

Day of month.	Maximum.	Minimum.	Range.	Time of beginning.	Time of ending.	Total precipitation.	Depth of snowfall.	General direction of the wind.
Sept. 1	73	49	29					SW.
2	76	30	46					W.
3	75	41	34	8:20 p. m.	9:15 p. m.	0.26		S.
4	75	38	37					S.
5	70	40	30					SW.
6	73	41	32	5:10 p. m.	During night.	.28		SE.
7	60	46	14	Showers	Showers	.08		NE.
8	74	39	35					SE.
9	72	46	26					S.
10	64	44	20	11:40 a. m.	4:50 p. m.	.35		NW.
11	60	36	24					N.
12	71	37	34					SW.
13	76	42	34					S.
14	74	42	32					SE.
15	74	35	39					SE.
16	60	41	19	During night.	During night.	.12		SW.
17	61	41	20	During night.	During night.	.16		W.
18	69	36	33					SW.
19	65	38	27					S.
20	70	40	30					SW.
21	69	38	31	During night.	During night.	.10		N.
22	62	38	24	During night.	During night.	.05		NW.
23	52	40	12					N.
24	59	25	34					NW.
25	69	28	41					S.
26	70	32	38					SW.
27	54	37	17	8:10 a. m.	10:20 a. m.	.05		NE.
28	60	25	35					SW.
29	60	38	22					S.
30	38	24	14	During night.	During night.	.30		N.
Total	1,999	1,129	872			1.74		
Mean	65.66	37.56	25.80					SW.

Monthly mean, 52.11.

Meteorological register kept at Fort Yellowstone, Wyo., etc.—Continued.

OCTOBER, 1891.

Day of month.	Temperature. Maximum.	Minimum.	Range.	Precipitation. Time of beginning.	Time of ending.	Total precipitation.	Depth of snowfall.	General direction of the wind.
	°	°	°			*Inches.*	*Inches.*	
Oct. 1	29	19	10	During night	10 a. m.	.78	7.60	N.
2	34	17	17					W.
3	36	23	13	9:10 a. m.				SW.
4	49	21	28		During night	.25	2.80	S.
5	48	29	19					W.
6	63	27	26					SW.
7	63	30	33					SW.
8	69	30	39					SW.
9	67	33	34					SE.
10	64	34	30	6 a. m.	3:30 p. m.	.10	1.00	SE.
11	39	24	15					NW.
12	39	24	15					N.
13	51	20	31					SW.
14	58	19	39					SE.
15	44	31	13	7:30 a. m.	10:30 a. m.	.01	.10	E.
16	43	31	12	During night	During night	.10	1.00	W.
17	50	20	30					SE.
18	62	25	37					S.
19	64	32	32					S.
20	59	32	27					SE.
21	64	31	33					W.
22	69	35	34					SW.
23	64	43	21					S.
24	64	43	21					W.
25	59	39	20					SW.
26	62	38	24					S.
27	64	35	29					SE.
28	66	34	32					W.
29	46	34	12	7:20 a. m.	5 p. m.	.20	Sleet	W.
30	42	24	18					NW.
31	38	17	21					SE.
Total	1,669	894	775			1.44	12.50	
Mean	53.84	28.84	25.00					S.

Monthly mean, 41.34

NOVEMBER, 1891.

Day of month.	Maximum.	Minimum.	Range.	Time of beginning.	Time of ending.	Total precipitation.	Depth of snowfall.	General direction of the wind.
Nov. 1	46	18	28					W.
2	49	27	22					S.
3	48	31	17					SW.
4	60	38	22					SE.
5	59	40	19					SW.
6	48	30	18	During night	During night	.30		W.
7	34	28	6	During night	During night	.05	.50	N.
8	34	11	23					NW.
9	38	17	21					SE.
10	28	25	3	4 p. m.	During night	.13	1.30	W.
11	26	—1	27					SE.
12	32	6	26					E.
13	30	5	25					E.
14	31	9	22	During night	During night	.17	1.50	NE.
15	21	10	11					NW.
16	14	—16	30					W.
17	31	4	27					SW.
18	29	13	16	During night	During night	.20	2.00	E.
19	31	20	11					E.
20	28	20	8	9:30 a. m.	During night	.25	2.10	SE.
21	25	14	11					SE.
22	33	9	24	1:15 p. m.	During night	.35	2.25	S.
23	34	28	6					NW.
24	32	12	20					S.
25	37	16	21	During night	4 p. m.	.20	1.15	S.
26	39	34	5	10 a. m.	5 p. m.	.45	2.25	SW.
27	40	19	21					S.
28	42	32	10					S.
29	45	12	33					S.
30	42	30	12					S.
Total	1,102	545	557			2.00	13.05	
Mean	36.73	18.16	18.57					S.

Monthly mean, 27.44.

Meteorological register kept at Fort Yellowstone, Wyo., etc.—Continued.

DECEMBER, 1891.

Day of month.	Temperature. Maximum.	Minimum.	Range.	Precipitation. Time of beginning.	Time of ending.	Total precipitation.	Depth of snowfall.	General direction of the wind.
	°	°	°			*Inches.*	*Inches.*	
Dec. 1	42	30	12	During night	11.30 a. m.	.05	.50	S.
2	36	16	20					SE.
3	32	7	25					S.
4	26	5	21					S.
5	24	3	21	During night	During night	.06	.50	SW.
6	21	5	26					S.
7	14	2	12					SW.
8	24	9	15	During night				S.
9	28	20	8		9.15 a. m.	.90	7.90	SW.
10	34	11	23					W.
11	27	4	31					NW.
12	16	4	20					SW.
13	26	5	21					S.
14	30	6	24					W.
15	29	6	23					S.
16	32	12	20					SW.
17	35	20	15	During night				S.
18	35	24	11		2.30 p. m.	.50	4.50	SW.
19	34	23	11	6.30 a. m.	5.15 p. m.	.25	2.30	S.
20	30	21	9					NW.
21	30	12	18					W.
22	26	7	19					SW.
23	28	11	17	2 p. m.	During night	.17	1.70	S.
24	35	−7	−42					N.
25	32	−24	56					N.
26	29	−22	51	9 p. m.				N.
27	33	5	28		12 m.	.50	4.00	NE.
28	32	14	18					S.
29	33	6	27	12 m.	5 p. m.	.10	1.00	W.
30	35	7	28					S.
31	31	9	22	8 a. m.	6 p. m.	.24	2.30	NE.
Total	919	225	694			2.77	24.70	
Mean	29.65	7.26	22.39					S.

Monthly mean, 18.46.

JANUARY, 1892.

Jan. 1	20	7	13					S.
2	30	15	15					SW.
3	32	26	6					S.
4	30	19	11					S.
5	25	4	21					SW.
6	19	−5	24					SW.
7	25	15	10					S.
8	24	10	14					S.
9	14	4	10	9 a. m.	During night	.40	4.00	S.
10	5	−19	24					S.
11	2	−22	24					SW.
12	4	−8	12					SE.
13	10	−8	18					N.
14	18	6	12					S.
15	25	15	10					SW.
16	26	13	13	8 a. m.	10 a. m.	.20	2.00	S.
17	9	2	7					S.
18	18	0	18	9 a. m.	10 a. m.	.10	1.00	S.
19	26	17	9	During night	During night	.50	5.00	S.
20	25	11	14					S.
21	26	12	14					S.
22	22	9	13					S.
23	29	5	24					S.
24	36	15	21					S.
25	37	11	26					S.
26	39	17	22					SW.
27	30	22	8					W.
28	26	14	12					SW.
29	40	25	15					SE.
30	39	28	11	During night	10 a. m.	.20	2.00	S.
31	25	22	3					S.
Total	736	282	454			1.40	14.00	
Mean	23.74	9.10	14.65					S.

Monthly mean, 16.42.

Meteorological register kept at Fort Yellowstone, Wyo., etc.—Continued.

FEBRUARY, 1892.

Date of month.		Temperature. Maximum.	Temperature. Minimum.	Range.	Precipitation. Time of beginning.	Precipitation. Time of ending.	Total precipitation.	Depth of snow fall.	General direction of the wind.
		°	°	°			*Inches.*	*Inches.*	
Feb.	1	26	18	8	During night	During night	.20	2.00	S.
	2	25	12	13	6 p. m.	7 p. m.	.05	.50	S.
	3	39	8	31					S.
	4	28	7	21					S.
	5	30	15	15					S.
	6	25	10	15					S.
	7	24	9	15					NW.
	8	23	4	19					NW.
	9	14	9	5					SE.
	10	35	16	19	10 a. m.	6 p. m.	.40	4.00	SE.
	11	35	24	11	6 a. m.	9 a. m.	.20	2.00	S.
	12	32	25	7	7 p. m.	During night	.50	5.00	S.
	13	24	16	8					S.
	14	22	5	17	10:10 a. m.	5 p. m.	.40	4.00	SE.
	15	27	10	17					SE.
	16	35	15	20					S.
	17	32	26	6					S.
	18	34	25	9					S.
	19	34	26	8					S.
	20	37	27	10					S.
	21	40	33	7					S.
	22	36	30	6					S.
	23	34	13	21	During night	9 a. m.	.35	3.50	S.
	24	36	5	31					S.
	25	39	13	26					S.
	26	36	17	19					S.
	27	35	20	15					S.
	28	38	23	15					S.
	29	42	26	16					S.
Total		917	487	430			2.10	21.00	
Mean		31.62	16.79	14.82					S.

Monthly mean, 24.20.

MARCH 1892

Date of month.		Temperature. Maximum.	Temperature. Minimum.	Range.	Precipitation. Time of beginning.	Precipitation. Time of ending.	Total precipitation.	Depth of snow fall.	General direction of the wind.
Mar.	1	41	30	11	10 a. m.	6 p. m.	.75	7.50	S.
	2	32	28	4	6 p. m.	During night	.50	5.00	S.
	3	42	29	13					S.
	4	35	23	12					S.
	5	40	12	28					S.
	6	36	13	23					S.
	7	43	25	18					S.
	8	45	31	14					S.
	9	35	19	16					S.
	10	49	20	29					S.
	11	48	29	19					S.
	12	48	32	16					S.
	13	46	35	11					S.
	14	26	21	5					S.
	15	27	11	16	7 p. m.	During night	.10	1.00	NW.
	16	32	2	21					S.
	17	38	2	36					S.
	18	48	17	31					S.
	19	26	16	10	1 p. m.	6 p. m.	.30	3.00	N.
	20	22	13	9	6 p. m.	do	.60	6.00	N.
	21	32	8	24					N.
	22	38	13	25	During night	During night	.15	1.50	S.
	23	35	24	11					SW.
	24	30	20	10	During night	During night	.20	2.00	N.
	25	25	14	11					N.
	26	20	7	13					N.
	27	43	19	24					S.
	28	39	28	11					S.
	29	30	17	13	During night	During night	.15	1.50	S.
	30	38	24	14	10 a. m.	1 p. m.	.20	1.00	S.
	31	25	23	2	During night	8 a. m.	.20	2.00	N.
Total		1,115	603	512			3.05	30.50	
Mean		35.97	19.45	16.52					S.

Monthly mean 27.11.

Meteorological register kept at Fort Yellowstone, Wyo., etc.—Continued.

APRIL, 1892.

Day of month.	Temperature. Maximum.	Minimum.	Range.	Precipitation. Time of beginning.	Time of ending.	Total precipitation.	Depth of snowfall.	General direction of the wind.
	°	°	°			Inches.	Inches.	
Apr. 1	29	10	19					S.
2	32	20	12					S.
3	39	21	18					S.
4	35	25	16					W.
5	38	17	21					S.
6	44	31	13					S.
7	28	22	6					W.
8	40	3	37					S.
9	42	30	12					S.
10	43	31	12					S.
11	41	29	12					S.
12	38	24	14					S.
13	44	18	26					S.
14	50	27	23					S.
15	51	34	17					S.
16	47	31	16					S.
17	40	29	11					S.
18	39	28	11	6 p. m.	During night.	.15	1.50	N.
19	38	21	17					N.
20	40	19	21					S.
21	44	18	26					S.
22	50	29	21					S.
23	38	32	6					S.
24	39	26	13					S.
25	36	28	8	During night.	During night.	.20	2.00	S.
26	39	26	13	During night.	During night.	.05	.50	S.
27	34	16	18	During night.	During night.	.10	1.00	S.
28	44	20	24					S.
29	45	33	12	6 p. m.				S.
30	40	31	9		During night.	.42		S.
Total	1,207	729	478			.92	5.00	
Mean	40.22	24.30	15.93					S.

Monthly mean, 32.26°.

MAY, 1892.

Day of month.	Maximum.	Minimum.	Range.	Time of beginning.	Time of ending.	Total precipitation.	Depth of snowfall.	General direction of the wind.
May 1	35	28	7	During night.	6 p. m.	.40	4.00	S.
2	39	25	8	7 p. m.	During night.	.20	2.00	N.
3	41	21	20					N.
4	30	24	6	During night.	6 p. m.	.40	4.00	N.
5	32	20	12	During night.	During night.	.30	3.00	N.
6	47	16	31	5 a. m. 1 p. m.	7 a. m. 6 p. m.	.25	2.50	N.
7	34	27	7					NE.
8	43	20	23					N.
9	51	26	25					S.
10	47	33	14					N.
11	41	29	12	During night.	11.20 a. m.	.32	3.25	S.
12	39	30	9					N.
13	48	25	23					N.
14	54	26	28					S.
15	61	35	26					S.
16	58	38	20					S.
17	60	36	24	During night.	During night.	.02		S.
18	59	29	30					N.
19	58	39	19					N.
20	56	27	29					S.
21	70	28	42					S.
22	68	36	32					S.
23	69	38	31					S.
24	65	38	27					S.
25	71	40	31					S.
26	73	39	34					N.
27	65	43	22	During night.	During night.	.03		N.
28	67	44	23	6 p. m.	During night.	.02		N.
29	60	39	21	7 p. m.	During night.	.10		N.
30	56	33	23	3 p. m.	5 p. m.	.02		N.
31	58	29	29					N.
Total	1,649	961	688			2.06	18.75	
Mean	53.19	31.00	22.19					N.

Monthly mean, 42.10°.

Meteorological register kept at Fort Yellowstone, Wyo., etc.—Continued.

JUNE, 1892.

Day of month.	Temperature. Maximum.	Temperature. Minimum.	Temperature. Range.	Precipitation. Time of beginning.	Precipitation. Time of ending.	Precipitation. Total precipitation.	Precipitation. Depth of snowfall.	General direction of the wind.
	°	°				*Inches.*	*Inches.*	
June 1	61	38	24	4 p. m.	6.30 p. m.	.20		S.
2	53	41	12	7 p. m.	8 p. m.	.01		S.
3	33	30	3	11 a. m.	5 p. m.	.20	2.00	W.
4	49	32	17					W.
5	63	30	33					S.
6	73	37	36					S.
7	74	42	32					S.
8	60	42	18					W.
9	63	35	28	During night. 11 a. m.	During night. 5 p. m.	.10		S.
10	49	41	8					W.
11	39	34	5	7 a. m.	6 p. m.	.13		W.
12	49	32	17	During night.	12 m.	.26		W.
13	66	35	31	1 p. m.	2 p. m.	.02		S.
14	64	41	23					S.
15	55	40	15					W.
16	61	40	21	2 p. m.	5 p. m.	.04		S.
17	62	41	21					S.
18	68	45	23	2 p. m.	6 p. m.	.25		S.
19	70	40	30					S.
20	72	50	22					S.
21	65	35	30					S.
22	65	38	27					S.
23	61	35	26					W.
24	68	35	33	1.30 p. m.	5.15 p. m.	.06		S.
25	74	41	33	During night.	During night.	.08		S.
26	80	40	40					S.
27	78	41	37					S.
28	83	44	39					S.
29	86	48	38					S.
30	83	50	33	3.45 p. m.	6 p. m.	.24		S.
Total	1,927	1,173	754			1.46	2.00	
Mean	64.23	39.10	25.13					S.

Monthly mean, 51.66°.

JULY, 1892.

Day of month.	Maximum.	Minimum.	Range.	Time of beginning.	Time of ending.	Total precipitation.	Depth of snowfall.	General direction of the wind.
1	55	40	15	During night.	During night.	.10		N.
2	62	45	17					S.
3	66	41	25					S.
4	81	46	35					S.
5	84	52	32					SW.
6	81	51	30	3.00 p. m.	4.45 p. m.	.13		S.
7	70	52	18					NW.
8	76	46	30					SW.
9	76	57	19	6.30 p. m.	7.00 p. m.	.75		S.
10	76	46	30					S.
11	68	52	16					S.
12	72	50	22					S.
13	74	50	24					NW.
14	74	49	25					NW.
15	81	54	28					SW.
16	82	51	31					SW.
17	72	61	11					SW.
18	81	50	31					SW.
19	88	63	25					S.
20	89	51	38					S.
21	85	50	35					S.
22	80	50	30					SW.
23	74	38	36					SE.
24	75	42	33					S.
25	78	39	39					S.
26	81	46	35					S.
27	62	45	17					N.
28	72	36	36					S.
29	78	45	33					W.
30	80	44	36					S.
31	86	47	39					SW.
Total	2,359	1,498	861			.98		
Mean	76.10	48.32	27.77					S.

Monthly mean, 62.20°. Heavy hail, rain, and thunder storm on 9th.

REPORT

OF THE

SUPERINTENDENT OF THE YELLOWSTONE NATIONAL PARK

TO THE

SECRETARY OF THE INTERIOR.

1893.

WASHINGTON:
GOVERNMENT PRINTING OFFICE.
1893.

REPORT

OF THE

SUPERINTENDENT OF YELLOWSTONE NATIONAL PARK.

DEPARTMENT OF THE INTERIOR,
OFFICE OF SUPERINTENDENT OF
YELLOWSTONE NATIONAL PARK,
Mammoth Hot Springs, Wyo., July 27, 1893.

SIR: Complying with your request of the 18th instant, I respectfully submit the following report of operations and events in the Yellowstone National Park during the past year:

The tourist season experienced the usual vicissitudes. Following closely on the date of my last report came a substantial increase in travel, and the month of August, 1892, showed a larger volume than any preceding month. September opened well, but cold weather coming about the middle of the month kept tourists back, and the last ten days of the season travel was very slight.

During the winter more snow fell than usual. On June first I started through the Park ahead of the first load of regular visitors. The road was fairly good to the Upper Basin via the Fountain; it was absolutely impassable over the divide towards the Thumb. I made an effort to reach the canyon via Norris, but was obliged to turn back on the evening of June 3, when I was within 3 miles of the hotel.

At that time the snow averaged 3 feet deep over 8 miles of this road, and a repair party had been shoveling on it for three days. The first vehicle got to the canyon on the evening of June 4, and soon afterwards the hotel at that place was stocked and opened. A few days later the lake was reached, and that hotel was opened, but travel to it remained light until the way was cleared for the circuit via the Thumb. Early in June I instructed Capt. Scott, then in his camp at Lower Basin, to use every effort to open the road across the divide. He made several unsuccessful attempts, but finally, about June 20, he sent me word that he had been able to reach the Lake with a working party and a heavy wagon. I immediately started out, and was the first to pass over the road in a light vehicle, on June 25. The next day the road was formally opened for stage travel, and has been in use ever since.

I recall to your honor that snow was still found on the roadside on July 20, when you passed over it.

Notwithstanding an unusual fall of snow and a consequent late season, the travel for June was far better than ever before in that month. Doubtless the World's Fair has much to do with this, for the hotel registers show a large majority of foreigners from every quarter of the globe. I am sorry to have to report a very great falling off for this month.

There are several large excursions due in August, which will, I hope, restore the previous high average. In looking back over past reports and records I find that July has always been disappointing. Perhaps the financial situation of the country has somewhat to do with the falling off this year.

The regular travel last year amounted to 3,645. This, however, is independent of camping parties, of which no record is kept. With more general information about the beauties and wonders to be seen here the number of tourists should multiply many fold. In Germany the pupils of the common schools are taught of this Park, and the result is abundantly shown in the large number of Germans who annually visit it. Perhaps a wide distribution of some public document, giving a popular description of the Park and its wonders, would have the same effect in this country. I recommend the preparation and publication of such a pamphlet.

LEASES IN THE PARK.

The question of leases and franchises in the Park has come forward very prominently within the past year. The Yellowstone Park Association has reduced its plant somewhat, and now has hotels at four points only, viz: Mammoth Hot Springs, Fountain, Lake, and Canyon; and lunch stations at Norris, Upper Basin, and the Thumb.

Under the present law the association may only hold 10 acres of land under lease. This much it already has, so it could not, if it would, extend its accommodations. The benefits to the traveling public of a series of hotels under the same management must be apparent to all. No monopoly is created, for it can not be called monopoly when every charge is regulated by your Department. There is need of a hotel at Norris; perhaps one with twenty or thirty rooms, with ample kitchen and dining-room space, would answer for the immediate future. The old hotel at Upper Basin is this year used as a lunch station only. All tourists have to return for the night to the Fountain, and on the following morning make their third trip over this 10 miles. The obvious remedy is a good hotel at the Upper Basin, and this should be provided for without delay. The site of the present hotel is incomparably the best in the whole Basin, but unfortunately it is within the legal limit of "Old Faithful."

When the law was passed prohibiting the erection of any hotel within one-fourth of a mile of any geyser or other object of interest, it was the fear of Congress that people or corporations would obtain proprietary rights within the Park and charge visitors for the privilege of viewing its wonders. The progress of time has removed all that fear, and the law might well be repealed in general, or at least for this spot in particular. I also recommend the repeal of the law prohibiting leases for more than 10 acres to a single corporation. With these changes I should hope for an increase of accommodations that would add greatly to the pleasure and comfort of tourists.

The leases of the Yellowstone Park Association already cover all the ground to which they are legally entitled. The cottage hotel at this place is under their management, but not on their lease. It has been well managed, and serves a most useful purpose. The association should in some way be confirmed in its rights thereto. A lease for the site at the Fountain should be made out and delivered to it.

I recommend proceedings in condemnation, with a view to obtaining possession, for the government of the two frame cottages near the

mouth of Nez Perce Creek. They are much needed for the shelter of the troops stationed at that point each summer. The old barn and stable on the south side of the plateau, facing the hotel at this place, should be removed and placed at the foot of the bluff back of the hotel, as should also the old blacksmith shop and other old buildings near it. As at present situated they form a very unlovely foreground to an otherwise beautiful view. The old barn back of the cottage hotels with its surroundings is most unsightly. A slight expenditure for renovation would greatly add to its appearance. The Transportation Company has under lease all the ground to which it is legally entitled. Like the Park Association it has need of more, and this I hope may be granted. The company has leases and rights within the Park which are accompanied by corresponding obligations. Their lease requires them to keep transportation in full quantity, and at all times, for all the Park travel. They are required to keep all material of first quality; horses gentle and well broken; drivers sober, courteous, and capable. It would seem that under these circumstances they should be protected in their rights to the most of the Park travel.

I have had before me applications by the score for permits to carry on transportation business within the Park. I am well acquainted with many of these applicants, and others I know by repute. Several of them have regular "runners" at Livingston and on the trains between there and Cinnabar who make false promises about what their own line will do for tourists and false statements about what the regular line does do. The result is that at the present time they are getting a large percentage of the travel, and giving, as a rule, very poor service. I very often hear complaints on this score, but up to the present time I have been powerless to help it. Everyone who has traveled knows what a nuisance the hackman becomes about a depot or landing. These on the Park border are no exception to the rule. They do not carry any forage; their teams must either make the trip on what little grass they can gather during the night, or they get their grain by collusion with soldiers or employés within the Park.

There are, of course, people of limited means who wish to make a tour of the Park cheaply, and others who prefer to make a camping tour. I see no objection to allowing one or two approved parties to carry on this kind of business; but I recommend that licenses be refused all others, or that they be placed under such careful and close supervision as will abate the present nuisance. There is no municipality that does not license and arbitrarily supervise its cab service, and such supervision is doubly necessary at this place.

The leases of Mr. F. Jay Haynes and Mr. John Yancy will soon expire. Mr. Haynes has few equals as a photographer in this country. He has improved and beautified his grounds here, and has conducted his business very satisfactorily. I have recommended that his lease be extended.

There is also satisfactory reason for approving the extension to Mr. Yancy. He keeps a very primitive kind of a place, but it gives the necessary accommodations to the fishing parties that go there, as well as to travelers on the Cooke City road. When the projected road over Mount Washburn is completed a hotel near Tower Falls will be needed; but that should be independent of, and different in character from, the one now kept by Mr. Yancy.

I have recently approved the application of Mr. French for lease of certain parcels of land here, at Yancy's, and at Soda Butte. These are of no benefit to the Park or to Park travel, but are only of use in con-

nection with his contract to carry the mail to Cooke City. Should anything cause the mail route to be abandoned, these leases should all be canceled. Right to keep a small store, with such articles as are generally needed by tourists, should be granted. Such a store, with very limited stock, is now satisfactorily conducted by the postmaster, Mrs. George Ash. There has been no change in regard to the boat company's leases, and none is recommended. I think, however, that authority might be granted to some one to maintain one or more naphtha launches on the Lake. It seems to me that there should be some profit in the venture. Applications for a few other minor permits have been sent you with my approval.

BOUNDARY LINES OF THE PARK.

After an existence of more than twenty-one years the boundaries of the Park still remain unmarked. I have submitted for the consideration of the Department a question concerning the northern boundary. There is a question as yet undecided relative to the western boundary. Once these are finally settled the work of actually locating and plainly marking the entire line should be prosecuted with vigor. The timber reservation on the east and south of the Park has been placed under the "same rules and regulations as obtain within the Park;" in fact, it has become a part of the Park. A contract has been let for a survey of the lines of this addition. No work more useful for the protection of the Park has yet been undertaken. I hope another season will see the north and east lines carefully run and marked, and the greatest obstacle to the control and protection of the Park thus eliminated.

There are those who wish to cut off portions of the Park whenever selfish or mercenary interests ask it. As now constituted, including the timber reserve, it is devoted to the pleasure, the instruction, and the benefit of the whole people. The slightest encroachment upon its limits but opens the door to further dismemberment. I am positively opposed to all of these schemes, and particularly to the one known as the "segregation" bill, which proposes to hand over to the hundred or less inhabitants of Cooke City the most valuable section in the north part of the Park. I still adhere to the remarks on this subject in my report for the last year, to which I invite your attention. No more visionary scheme was ever conceived than that of running a railroad from Cinnabar to Cooke City for the poor mineral prospect that exists there.

The "promoters" of this scheme say that the mineral wealth of the district is "generally conceded," but no mining expert of reputation and character has ever reported otherwise than against it. The sworn testimony of Mr. T. F. Oakes, president of the Northern Pacific Railroad, on page 226, House Report No. 1956, first session Fifty-second Congress, says: "There is nothing in Cooke City mines, and we don't want a railroad there;" and further, that it would not be profitable to build a road there, and that he "did not want it." If such a concession is ever made, I trust it will be coupled with a condition that no part of the land shall be given over to other than railroad uses, and that it shall revert to the Park if the road is not completed within two years at the furthest. When the contractor for the survey of the timber reserve reaches here I purpose going with him to the initial point of his survey, "the easternmost point of Yellowstone Lake." I shall also go, if practicable, to the point 10 miles east of there, where he begins his boundary line. These points I desire should be well monumented, as it is not likely that any future dismemberment of the Park will change them.

PROTECTION OF FORESTS.

After two summers of remarkably good fortune in dealing with forest fires I have this year to report a most disastrous one. During the month of June the rainfall was but 0.38 inch, which is less than ever before recorded. In July, thus far, there has been practically no rain. The result is, all vegetation is dead and dry and ready for a conflagration on the slightest exposure. On July 10, about 1:20 p. m., I had a telegram from the corporal stationed at Norris, saying a fire had started there and he needed a half dozen men to help extinguish it. Lieut. Nance was at drill with the troop. I immediately stopped drill, and in less than half an hour a sergeant and six men were en route to the scene. Just as they left the post I received a supplementary telegram saying the fire was beyond control. I then ordered the balance of the troop to start at once, and ordered Capt. Scott down from the Lower Basin with his troop. All the available men of both troops have been watching and fighting this fire for more than two weeks night and day. It is, I believe, under control, and unless the wind should bring it up anew, I hope to be able to withdraw the soldiers in a day or two.

Capt. Scott and Lieut. Nance, with their men, deserve hearty thanks for energy and perseverance in fighting against it. How it started is not definitely known. It occurred on the roadside, about half a mile north of the Norris station. Capt. Scott, who has investigated the matter, believes it originated with the party building the new road at that point. The party had left work and gone to their dinner when the fire was discovered in the place they were last working. It is possible, however, that it originated in a cigar carelessly thrown from a coach by a passing tourist. Unless rains soon come there is grave danger of a repetition of the case, and should more than one fire rage at a time, it would be impossible to control them, and the entire Park would be liable to destruction.

It has been reported to me that men have been heard to say that they would burn over the entire Park in return for my opposition to the segregation scheme. I know there are men in the country of just such character, yet I have small fear that they will actually carry out their threats.

The country recently burned over is very irregular in outline, and extends northeast from the Norris Station about 7 miles, and in places is 2 miles or more in width. There have been other fires started, but all were extinguished before serious damage occurred. This experience has taught me the necessity of strictly enforcing the penalty of expulsion against everyone who fails to absolutely extinguish his fires.

OUTPOSTS.

The system of outposts is the same as last year, with slight addition of force at some of them. I am sorry to say that poaching has gone on in spite of them, but I have no doubt they have done much good. My great trouble is to get noncommissioned officers to put in charge of them who are able and disposed to cope with the class of men who form the poaching population. A few very well-known transgressors living near the south and west boundaries need close watching. I need at least two more scouts for this purpose, and a trip to that country by a special agent of the Department, sent out for the purpose, would be productive of great good.

MILITARY QUARTERS.

Since my last report the only change in the military quarters here is the erection of a hospital, which is now approaching completion. Troop D, Sixth Cavalry, was retained during the winter and contributed much toward the efficient protection of the Park. I renew my suggestion that barracks, mess room, and stables be erected, and that the garrison be increased by the addition of a company of infantry. I have already made application for this to the War Department, and I hope your influence will be exerted to accomplish the end.

ROADS.

Of the roads I can say but little, as I have no voice in their construction or maintenance. Late last autumn about a mile of new road was begun immediately to the north of Norris. I think this road will soon be completed.

A road was laid out and begun which passed for a short distance down the Gibbon River, and thus avoided the Canyon Creek hill. It will be a great improvement on the old road, and I hope will soon be taken up again and pushed to completion. Nothing of importance has been done on it yet this year.

Some small repairs have been put on the road between the Upper Basin and the Thumb, but the important part, the causeway along the lake, is as yet untouched.

The new road is being cleared of timber from the Thumb towards Lewis Lake, and I presume will soon be in condition to be driven over, although still far from being a good road. In the present very meager state of the appropriations I do not think anything more should be done to it for the present.

About half a mile of very beautiful road was located and begun last fall, passing by the brink of the Upper Falls. It is now being prosecuted slowly, and I presume will be open to travel by the close of the season. Lieut. Chittenden promised last October that it should be completed last June, but some unfortunate changes have operated to delay it. A third of a mile of driveway has also been opened near the Grand Canyon at Inspiration Point. These, I believe, comprise about all the improvements made from last year's appropriation.

At the opening of the season this year we were again confronted with a lack of funds for road repairs. This is one of the great evils of leaving the distribution of the money to one who resides so far from the work. The officer now in charge of road work has made, officially, a slighting remark about the "engineering experience" and "business methods essential to the economical and efficient expenditure of large sums of money." In face of all this I prefer to still remain the "police" officer, but to have some little say as to the direction in which the money shall be expended. A more leisurely reading of my last annual report would have shown that this is all I then asked for. The unfortunate relief of Lieut. Chittenden last spring has been a most serious blow to road building here. He was greatly interested in his work, tireless in his attentions to it, and ably equipped for it.

I renew the recommendation that the acting superintendent of the Park be given the control of the work, and that an officer of the Corps of Engineers be detailed to report to him to superintend it, make the detailed plans, and disburse the appropriations. The benefits that would result are too apparent to need explanation.

HOTELS.

The hotels are again managed by Mr. J. H. Dean, who has proved himself thoroughly fitted for the position. Considering the distance they are from the markets and the distance many of them are from the railroad, I regard them as excellent. The rates at all are fixed by the Department at $4 per day. After six days this rate is made $3 by the hotel management, with a view of inducing people to remain longer than the time necessary for the straight tour. But few take advantage of this reduction, as people generally arrive with their plans made for a trip of definite duration, and find it difficult to change these plans after they get here. The rooms are clean and comfortable, and the fare, though plain, is very good. The prices are lower than obtain in any of the first class summer resorts of the country, and I see no reason why a "stay in the Park," rather than a "tour of the Park," should not be the rule. There is certainly much to interest and instruct the visitor at every one of its hotels.

TRANSPORTATION.

The company of which Mr. S. S. Huntley is manager still has the lease for transportation privileges. Notwithstanding this fact outside parties by their system of "runners," giving false information and bad advice, secure a large share of the travel. The regular company has remarkably fine transportation. Their horses are well fed, well broken and safe, and vehicles and harness are excellent and well kept. Drivers as a rule are competent, courteous, and sober. So long as this company is required to have an abundance of transportation of this kind for all the travel they should be protected in their rights to it. As stated previously, it can not be regarded as a monopoly when prices and conditions are arbitrarily imposed by the Department. The vexed question of stop-over privileges has been quite satisfactorily arranged by the stages starting out for the trip with a certain percentage of vacant seats, ready to pick up any passengers who may have remained behind on a previous tour. This has much reduced the complaints heretofore prevalent on this point. A tourist now has simply to notify the company of the day on which he wants to go forward, and a seat is provided for him.

A good many people continue to reach the Park via Beaver Canyon, on the Utah Northern Railroad (Union Pacific). Transportation on this route is furnished mainly by the Bassett Brothers. They hold no leases within the Park, nor have they, as I am aware, any authority under which their business is carried on. It is best for all interested that some one should hold a regular lease for transportation from that point to and through the Park; that he be required to have the same class of transportation as the regular company now has, and that he be protected in his efforts to maintain a high standard by having an exclusive right, with prices adjusted by the Department to a moderate rate of profit. To many, the most enjoyable way of seeing the Park is with a camping party. Others can not afford to see it in any other way. Hence, well-equipped and organized camping transportation is a necessity. Mr. Wylie has established such a line, and advertises regular excursions with fixed dates of start and return. To this part of his business I see no possible objection. He has, however, made application for leases to plots of ground in various parts of the Park whereon to establish permanent camps. The great objection to granting these

leases is the fact that a permanent camp is only a step removed from a shanty or a "shack," and it would be a desecration of the Park to allow such to spring up. Furthermore, we should recognize the right of those who come with their own transportation to use any unoccupied bit of ground for their camps.

I have recently posted a notice requiring camping parties to thoroughly police their camp grounds before leaving, but it has not been satisfactorily observed as yet. Perhaps a few expulsions for nonobservance will act as a stimulus.

BOAT ON THE LAKE.

The steamer continues to be satisfactorily run, and is greatly enjoyed by all tourists who make the trip on it. There are complaints that an extra fare is charged for the ride, but people who do not care to pay it have the option of going on the Lake Hotel from the Thumb in the regular coaches without extra price. If the amount of travel on the boat would warrant a reduction of fare, and the transportation company could make a small refund to those who used the boat, I believe all cause of complaint would be removed. The boat company keeps small boats and fishing-tackle enough to accommodate all who wish to make use of them to enjoy the unequaled sport on the lake. The addition of one or more launches would be a convenience, and probably prove remunerative.

ELEVATOR AT THE CANYON.

Mr. D. B. May has renewed his application for leave to place an incline or elevator in the Canyon, enabling people to make a descent to the bottom near the foot of the lower falls. To this project I am very strongly opposed. The elevator will be an unsightly object against the beautiful walls of the Canyon, will land its passengers where they can not get an extended view in any direction, and in my opinion will not prove a profitable venture. On inquiry I find more tourists who would not go down it if paid to do so than I find willing to pay for the trip.

TOURISTS.

Last year all names written or scratched on the beautiful geyser formations were erased. That made it possible to detect any new ones, and to apply needed discipline to the perpetrators of this foolish vanity. Several parties were arrested and sent back to erase their names, and the influence of these examples was excellent. It is worthy of note that a great majority of the names thus written are in a hand exhibiting lack of familiarity with writing implements. Specimen hunters also continue their vandalism, but with the careful watch kept by the soldier guards about the formations this trouble is kept at a minimum.

After the close of the Upper Basin Hotel last October someone—probably one of the help from the hotel, or one of the drivers who brought them out—broke a piece from the beautiful edge of the "Sponge geyser." I made every effort to discover the perpetrators, but without success. A remedy I should apply in future would be to prohibit any of these parties from ever again taking service within the Park. Camping parties continue to leave their fires unextinguished.

and for this, under a wise regulation, they are expelled from the Park. Several cases of the kind have occurred this year, and I have rigidly exacted the penalty.

I find tourists who complain, sometimes with reason, but oftener without a show of it. As an example of the latter class I cite a case that has just occurred. A man came through on a pass covering railroad and stage transportation and hotel bills. This was given him, I understand, because he was to write up the Park for some paper with which he was connected. At the lake he wandered off to fish, and when his stage was ready he was nowhere to be found. After a wait and a search the stage drove to the Canyon without him, but did take his baggage. He hired a conveyance for $2.50 from outside parties to take him to the Canyon, and then demanded that this money be repaid him by the regular transportation company. I doubt if any other case has occurred quite as illustrative as this one.

I have also to note that since this report was begun I have discovered a way of "scalping" Park tickets. A man buys a ticket for the tour at $60 from Livingston. One of the proprietors of outside transportation meets him and offers to take him through with a camping party and accepts the ticket for pay. The ticket is then held by the man who takes it up, until he finds a party who declines to go through with him. To this man he offers the regular ticket for $50. The result of this is that the "scalper" gets $50 for taking a man through with a camping outfit, and has a double chance at tourists. I have forbidden all persons caught at this work doing any further business within the Park.

The regulation promulgated last January forbidding firearms being carried in the Park without the written permission of the acting superintendent has been productive of much good, and its beneficial effects will increase as time goes on. Its execution adds much to the work of this office and of the outposts, but the result is worth the trouble. Some parties manage to escape detection until their tour is nearly or quite completed, but a room full of surrendered arms is testimony to the fairly efficient execution of the rule. Last summer Lieut. Chittenden collected some very interesting statistics which should come to your attention and receive publicity. To get an accurate expression of opinion, he took from the hotel register each day the name of one tourist at random, except that he never took one whom he knew personally. He thus got people from all parts of the country, from all stations in life, and of all occupations.

On October 22 he addressed to these people the three following questions:

First. What was the principal drawback to the enjoyment of your tour of the Park?

Second. From the experience of your own tour would you advise your friends to visit the Park?

Third. Assuming that there were a complete system of thoroughly macadamized or graveled roads, so constructed as to largely eliminate the mud and dust nuisance, and on which there would be no hills so steep that teams could not ascend them at a trot, and assuming also that there were a well-equipped electric railway covering substantially the same route, by which method would you prefer to make the tour of the Park—by coach or car?

Everybody took the greatest interest in giving full answers, and often went to some length to emphasize their disapproval of any scheme to put railroads of any kind in the Park. In nearly every letter other members of the party took occasion to add their views, so Lieut. Chit-

fenden got a good many more answers than he sent letters. About thirty letters never found their destination and were returned. The following is the vote:

First question, drawbacks: Roads, 91; hotels, 26; Upper Basin and Norris complained of; transportation, 17; mosquitos and flies, 17; weather, 2; water, 2; steamboat charges, 2; no guides, 1; geysers failed, 1; no drawback, 24; no answer, 1.
Second question, advice as to visiting Park: Yes, 135; no, 2; no answer, 1.
Second question, coach or car: Coach, 145; car, 25.

A great many, however, said that they voted for the coach only on the condition of having roads as specified. With a majority of 6 to 1 against it, I believe the project for an electric road very undesirable.

FISH.

During the season fish are taken in the lakes and rivers in numbers almost passing belief. I would question the propriety of permitting the sport to go unchecked, were it not for the fact that their numbers are apparently undiminished.

All streams heretofore stocked with trout now furnish excellent fishing; probably no better exists anywhere.

Some months since I wrote the Commissioner of Fish and Fisheries concerning the advisability of stocking certain waters with black bass. In reply he informed me that a temperature of 65° was necessary for the spawn to hatch. I have had temperatures taken in these waters, showing temperatures in excess of 65°, and now have a promise from the Commissioner that the plant will be made as soon as he can arrange for it. He has also promised to make plants of the Eastern brook trout in Moose and Shoshone creeks.

WORK DONE IN THE PARK.

Few people would credit the fact that in my management of the Park I have only an allowance of a few hundred dollars each year for all expenses. Since my last report I have had authority to expend just $500, of which sum $150 still remains to my credit. All expended so far this year has been for policing camping places near the traveled roads. Last year I made some expenditures for repainting signboards and some for opening roads, but the meager allowance this year will not permit of such luxuries. There is, as you know, an appropriation for "constructing and repairing roads," but with this I have nothing to do. The only money allowed me for the complete management of the Park is the small rents collected from those who hold leases here. This, I believe, aggregates less than $1,000 per year. Such a sum annually for the protection of an area larger than the State of Connecticut is an absurdity that one needs only to mention. No State or city in the land would thus neglect the smallest of its public parks or reservations.

I trust you will find it in your power to secure from Congress an allowance with which I can make a beginning on the many bits of work that need attention. A great deal of work of all kinds is done by the troops, but it is neither right nor just that it should be so. Their duties are sufficiently numerous and onerous in protecting the Park from poachers and guarding the formations from the vandalism of specimen hunters, etc.

POACHERS.

As the game diminishes in the adjacent States, professional hunters and trappers become more bold and more active. Montana, Idaho, and Wyoming all have stringent game laws, but in spite of them the game grows rapidly less. In Montana no conviction has yet been had under the law, and I do not believe one is possible. In Idaho it is much the same. In Wyoming the law is more strictly enforced, and arrests and convictions frequently occur. A stringent law, with severe penalties, is one of the most urgent needs of the Park. In this immense area, surrounded by a very rough and densely timbered country, it is impossible to give our large game the protection that it should have. With the addition of two men as scouts and an occasional trip about the Park borders by a special agent of the Department much good could be accomplished. Nothing but a law with severe penalties will entirely break up the evil. Confiscation of the outfit, under existing regulations, has but little effect, as the outfit is generally worthless.

Bears are being trapped near all the boundaries. Beaver are still being trapped in all parts of the Park. Parties come into the Park in the spring on the pretense that they are seeking work on the roads or looking for team work. During the long wait involved they devote their time to trapping the fur-bearing animals, and it is almost impossible to catch them at it. I suggest as a remedy that no one, except those having leases or contracts in the Park, be allowed to camp in one place for more than two days. Of course exceptions could be made in cases of well-proven necessity. I have pretty reliable information that about a dozen buffalo were killed last winter, and it is not improbable that even more shared that fate. The heads of these were mounted by taxidermists in Livingston and Bozeman, notwithstanding the law that declares the possession of such parts prima facie evidence that the possessor killed the animals within the State. It would be a great assistance to me in the preservation of the game if some authorized person would begin prosecution of these dealers. Conviction probably would not be had, but the annoyance to them and the publicity of the cases would have good effect.

GAME.

Buffalo.—The buffalo have been seen often during the year, and they appear to be doing well. In all the herds a fair proportion of calves is found. Those killed have been mostly bulls, so the capacity of the herds for increase has not been diminished. Late in June a herd of fifty to sixty crossed the road from west to east near the Riverside Geyser. Thirteen calves were counted. They were very tame, and not the least scared by the soldiers who went among them. The estimate of four hundred placed on their number last year is surely not too high.

Moose.—Within the past year a good many moose have been seen near the outpost on Snake River. In June a band of seven, with three calves, was seen in that vicinity, and others have been seen all along the south line. The establishment of that station has done much to protect them.

Mountain sheep.—These animals are found in several parts of the Park, but the most of them are near the north line. A fine bunch winters each year on Mount Everts, not more than 2 miles from this point. I saw them several times last winter, and one day in February

I drove within 75 yards of about a dozen, and they paid not the slightest attention to me. Segregation would result in the destruction of the herd in the northeast corner of the Park, which is probably the largest one anywhere remaining.

Elk.—For some reason the elk did not winter in the Hayden Valley in the same numbers as formerly. There were abundant signs of them in the autumn, and they reappeared again in the spring. Perhaps many of them staid in the open valley of the Pelican. The usual large herd wintered in the valley of the East Fork, between Yancy's and Soda Butte. I still believe that there are 25,000 in the Park. While fighting the fire at Norris a few days ago the men saw a herd of about eighty with a large number of calves.

Bears.—The bears do not appear so numerous this year as formerly, although they are constantly being seen near the hotels. It is quite probable that the camping parties to which I have referred have trapped some of them out.

Antelope.—A herd of about four to five hundred wintered on Mount Everts and became very tame. They often approached the town of Gardiner to within a few hundred yards. There were one or two smaller herds in other parts of the Park.

Deer.—This spring I saw more deer than usual, and they are very tame. They are doubtless increasing rapidly.

Beaver signs are multiplying, and over large areas they receive fair protection. A beaver trap is so easy to set, and so difficult for one not knowing its whereabouts to find, that complete protection is impossible. The skins have become so valuable as to make this industry very remunerative.

Wolverines, badgers, porcupines, otters, and other animals are increasing rapidly and are often very tame. Ducks and geese breed in the Park in great numbers, and are not scared by the near approach of travelers.

CAPTURE OF ANIMALS.

The animals mentioned in my last report, with several others collected later, were sent to the National Zoölogical Park in Washington last November. I now have awaiting shipment four elk, one deer, three beavers, one badger, and one porcupine, besides a cage of smaller animals. During the season I hope to secure enough to quite fill a car. It would be a matter of great interest to tourists if I had the funds with which to erect an inclosure and put into it some specimens of the game animals here native. Some provision would have to be made for feeding them in the winter, but the expense would be very small. Elk, deer, and buffalo could easily be secured, and probably antelope, moose, and mountain sheep.

RECOMMENDATIONS.

First. The passage of an act defining the boundaries as recommended last year.

Second. The enactment of a law giving the Park a system of government.

Third. Complete the survey and the marking of the boundary lines.

Fourth. Transfer to the superintendent at the disposal of the funds for road work.

Fifth. Liberal appropriations with which to complete the road system as approved.

Sixth. Appropriations for clearing out dead timber, collecting and keeping wild animals and in general for all means of preserving, protecting, and beautifying the Park.

Seventh. Provide accommodations for a company of infantry, to be made a part of the permanent garrison here.

These recommendations are for the most part a repetition of those made last year. My estimate of their importance leads me to again call your attention to them. I anticipate much benefit to the Park from your recent tour of it.

I extend my thanks to Capt. Scott, Sixth Cavalry, for the deep interest manifested by him in all that concerns the Park, and for his constant and tireless labors for its protection.

I am indebted to Surg. C. M. Gandy, U. S. Army, for the meteorological record hereto appended.

Yours, very respectfully.

GEO. S. ANDERSON,
Captain Sixth Cavalry,
Acting Superintendent Yellowstone National Park.

The SECRETARY OF THE INTERIOR.

Meteorological register.

JULY, 1892.

Date.	Maximum.	Minimum.	Range.	Winds.	Precipitation.	Remarks.
1	55	40	15	N.	0.10	Rain.
2	62	45	17	S.	.....	
3	66	41	25	S.	.....	
4	81	46	35	S.	.....	
5	84	52	32	SW.	.....	
6	81	51	30	S.	0.15	Rain.
7	70	52	18	NW.	.....	
8	76	46	30	SW.	.....	
9	76	57	19	S.	0.75	Rain.
10	76	56	20	S.	.....	
11	68	52	16	S.	.....	
12	72	50	22	S.	.....	
13	74	50	24	NW.	.....	
14	75	49	25	NW.	.....	
15	81	53	28	SW.	.....	
16	82	51	31	SW.	.....	
17	72	61	11	SW.	.....	
18	81	50	31	SW.	.....	
19	88	63	25	S.	.....	
20	89	51	38	S.	.....	
21	85	50	35	S.	.....	
22	85	53	30	SW.	.....	
23	74	38	36	SE.	.....	
24	75	42	33	S.	.....	
25	76	39	39	S.	.....	
26	82	46	35	S.	.....	
27	62	45	17	N.	.....	
28	72	36	36	S.	.....	
29	78	45	33	W.	.....	
30	80	34	34	S.	.....	
31	86	47	39	SW.	.....	
Total	2,369	1,498	872	.....	.....	
Mean	76.39	48.32	27.77	S.	0.98	

Maximum, 89, 20th instant; minimum, 36, 28th instant; monthly mean, 62.20; total precipitation, 0.98; wind, south.

AUGUST, 1892.

Date.	Maximum.	Minimum.	Range.	Winds.	Precipitation.	Remarks.
1	90	54	36	S.	.....	
2	82	55	27	S.	.....	
3	86	51	35	SW.	.....	
4	87	53	34	S.	0.07	Rain.
5	82	46	36	S.	.....	
6	83	49	34	S.	0.06	Rain.
7	81	53	28	S.	0.27	Rain.
8	62	48	14	SW.	0.07	Rain.
9	75	38	37	SW.	.....	
10	83	44	39	S.	.....	
11	82	57	25	S.	.....	
12	76	56	20	SW.	.....	
13	85	44	41	S.	.....	
14	87	50	37	S.	.....	
15	93	49	42	S.	.....	
16	85	54	47	S.	.....	
17	73	53	19	N.	.....	
18	83	36	44	S.	.....	
19	73	49	24	N.	.....	
20	65	41	24	N.	.....	
21	79	38	41	N.	.....	
22	70	47	23	NE.	0.02	Rain.
23	80	37	43	S.	.....	
24	62	44	18	N.	.....	
25	65	42	23	N.	.....	
26	74	32	42	S.	.....	
27	59	39	15	N.	0.15	Rain.
28	55	32	23	NW.	.....	
29	75	50	25	S.	.....	
30	77	32	35	S.	.....	
31	79	41	38	S.	.....	
Total	2,372	1,366	974	.....	.....	
Mean	76.52	45.03	31.49	S.	0.61	

Maximum, 93, 15th instant; minimum, 30, 29th instant; mean, 60.77; total precipitation, 0.61; wind, south.

Meteorological register—Continued.

SEPTEMBER, 1892.

Date.	Maximum.	Minimum.	Range.	Winds.	Precipitation.	Remarks.
1	73	47	26	S.	0.60	Rain.
2	55	42	13	NW.	0.08	Rain.
3	65	37	28	W.	.....	
4	75	38	37	S.	.....	
5	77	37	40	S.	.....	
6	76	46	30	S.	.....	
7	62	38	24	N.	.....	
8	72	32	40	S.	.....	
9	68	42	26	N.	.....	
10	64	41	22	NW.	.....	
11	75	29	46	S.	.....	
12	78	37	41	S.	.....	
13	79	36	43	S.	.....	
14	79	37	42	S.	.....	
15	82	39	43	S.	.....	
16	78	42	36	S.	.....	
17	71	43	28	S.	.....	
18	75	41	34	S.	.....	
19	78	39	27	S.	.....	
20	55	43	12	S.	.....	
21	60	38	22	S.	.....	
22	55	40	15	S.	0.25	Rain.
23	54	47	7	S.	0.16	Rain.
24	50	30	20	N.	0.40	Snow.
25	67	40	27	S.	.....	
26	74	40	34	SW.	.....	
27	74	43	30	SW.	.....	
28	76	40	36	S.	.....	
29	75	51	24	S.	.....	
30	73	47	26	S.	0.11	Rain.
Total	2,691	1,202	889	.....	.....	
Mean	69.70	40.07	29.63	S.	01.00	

Maximum, 82, 15th instant; minimum, 29, 11th instant; mean, 54.79; total precipitation, 1.60; wind, south.

OCTOBER, 1892.

Date.	Maximum.	Minimum.	Range.	Winds.	Precipitation.	Remarks.
1	50	45	5	SW.	0.22	Rain.
2	66	35	31	S.	0.02	Rain.
3	71	35	36	S.	.....	
4	69	34	35	SW.	.....	
5	68	38	30	S.	.....	
6	66	39	27	SW.	.....	
7	68	31	37	S.	.....	
8	71	39	32	S.	.....	
9	69	40	29	SW.	.....	
10	51	40	11	SW.	.....	
11	34	30	4	NW.	0.41	Sleet.
12	41	28	13	N.	0.10	Snow.
13	54	25	29	N.	.....	
14	59	31	28	SW.	.....	
15	51	30	21	SW.	.....	
16	39	29	10	N.	.....	
17	30	20	10	S.	.....	
18	34	26	8	S.	.....	
19	46	29	17	N.	0.02	Snow.
20	51	19	32	S.	0.02	
21	53	22	31	S.	.....	
22	58	23	35	S.	.....	
23	54	23	31	N.	.....	
24	52	20	32	SW.	.....	
25	52	21	31	N.	.....	
26	61	24	37	S.	.....	
27	60	31	29	S.	.....	
28	57	27	30	S.	.....	
29	54	30	23	S.	.....	
30	57	23	34	S.	.....	
31	41	31	10	SW.	.....	
Total	1,671	911	760	.....	.....	
Mean	53.90	29.39	24.52	S.	.79	

Maximum, 71, 8th instant; minimum, 18, 20th instant; mean, 41.65; total precipitation, 0.79; wind south.

Meteorological register—Continued.

NOVEMBER, 1892.

Date.	Maximum.	Minimum.	Range.	Wind.	Precipitation.	Remarks.
1	46	25	21	N.	0.14	Snow.
2	35	20	15	N.	0.05	Snow.
3	37	29	8	N.	0.20	Snow.
4	46	35	11	S.	.....	
5	47	34	13	S.	0.32	Rain.
6	28	24	4	N.	0.05	Snow.
7	28	8	20	S.	.....	
8	27	19	8	S.	0.07	Snow.
9	40	14	26	S.	.....	
10	41	31	11	S.	.....	
11	49	33	16	S.	.....	
12	45	35	10	N.	.....	
13	37	21	16	S.	.....	
14	31	28	3	N.	.....	
15	24	15	9	SW.	.....	
16	21	19	2	N.	.....	
17	25	8	17	SW.	.....	
18	32	19	13	S.	.....	
19	40	31	9	S.	.....	
20	35	21	14	S.	.....	
21	40	31	9	S.	.....	
22	46	35	11	S.	.....	
23	41	38	3	SW.	0.17	Rain.
24	28	10	18	N.	0.35	Snow.
25	20	6	14	NE.	.....	
26	23	13	10	S.	.....	
27	26	19	7	S.	.....	
28	32	24	8	S.	.....	
29	38	30	8	E.	0.40	Snow.
30	41	33	8	S.	0.15	Snow.
Total	1,050	707	343	.....	.....	
Mean	35.00	23.57	11.43	S.	1.90	

Maximum, 49, 11th instant; minimum, 6, 25th instant; mean, 29.28; total precipitation, 1.90; wind, south; total depth of snow fall, 14.25 inches.

DECEMBER, 1892.

Date.	Maximum.	Minimum.	Range.	Wind.	Precipitation.	Remarks.
1	30	18	12	SW.	0.35	Snow.
2	35	20	15	S.	.....	
3	40	33	7	S.	.....	
4	33	28	5	S.	0.10	Snow.
5	25	16	9	N.	.....	
6	18	2	16	N.	0.12	Snow.
7	13	4	17	N.	.....	
8	19	5	14	S.	.....	
9	18	3	15	S.	.....	
10	17	7	10	S.	.....	
11	11	−7	18	SW.	.....	
12	27	3	14	SW.	.....	
13	15	5	10	N.	.....	
14	11	8	19	N.	.....	
15	19	9	10	S.	0.10	Snow.
16	16	13	3	N.	0.20	Snow.
17	15	−1	16	N.	.....	
18	20	11	9	S.	0.25	Snow.
19	10	4	6	N.	0.12	Snow.
20	−2	13	11	N.	.....	
21	−6	−14	8	E.	0.10	Snow.
22	25	−10	35	W.	0.16	Snow.
23	31	24	10	S.	.....	
24	38	33	5	S.	.....	
25	36	32	4	S.	.....	
26	37	25	12	S.	.....	
27	36	30	6	S.	.....	
28	22	16	6	N.	0.07	Snow.
29	21	19	2	S.	.....	
30	19	4	15	S.	.....	
31	23	15	8	S.	.....	
Total	665	318	347	.....	.....	
Mean	21.45	10.26	11.19	S.	2.17	

Maximum, 40, 3d instant; minimum, −14, 21st instant; mean, 15.85; total precipitation, 2.17; wind, south; total depth of snowfall, 20.05 inches.

Meteorological register—Continued.

JANUARY, 1883.

Date.	Maximum.	Minimum.	Range.	Wind.	Precipitation.	Remarks.
1	32	19	13	W.	.....	
2	31	21	10	W.	.....	
3	36	24	12	SW.	.....	
4	40	26	14	SW.	.....	
5	34	18	16	W.	.....	
6	35	19	16	N.	.....	
7	24	8	16	N.	.....	
8	36	15	21	S.	.....	
9	30	9	21	SE.	.....	
10	29	24	5	SW.	0.09	Snow.
11	23	19	4	N.	.....	
12	24	6	18	S.	.....	
13	19	11	8	N.	0.11	Snow.
14	12	4	8	N.	.....	
15	4	−13	17	NW.	.....	
16	12	−10	22	N.	.....	
17	17	−3	20	NW.	.....	
18	24	13	11	S.	.....	
19	22	8	14	S.	.....	
20	25	8	17	S.	.....	
21	28	13	16	S.	.....	
22	30	18	12	SE.	.....	
23	31	20	11	S.	.....	
24	28	19	9	SW.	.....	
25	20	1	21	N.	0.18	Snow.
26	29	−10	39	S.	.....	
27	33	−5	38	S.	0.15	Snow.
28	19	−14	33	S.	0.62	Snow.
29	21	12	9	SE.	0.17	Snow.
30	18	5	13	SE.	0.20	Snow.
31	9	28	37	SE.	.....	
Total	779	258	521	.....	.....	
Mean	25.13	8.32	16.81	S.	1.62	

Maximum, 40, 4th instant; minimum, 28, 31st instant; mean, 16.72; total precipitation, 1.82. Wind south; total depth of snowfall, 16.35 inches.

FEBRUARY, 1883.

Date.	Maximum.	Minimum.	Range.	Wind.	Precipitation.	Remarks.
1	10	16	26	SE.	.....	
2	9	2	7	SE.	.....	
3	33	5	28	S.	0.20	Snow.
4	31	22	9	S.	0.15	Snow.
5	23	15	8	S.	0.12	Snow.
6	17	−5	22	N.	.....	
7	23	1	22	SW.	.....	
8	20	7	13	SW.	0.10	Snow.
9	22	12	10	SE.	.....	
10	25	14	11	S.	.....	
11	27	3	24	S.	.....	
12	32	22	10	S.	.....	
13	19	14	5	N.	.....	
14	15	11	26	SW.	.....	
15	26	9	17	S.	.....	
16	29	16	13	S.	.....	
17	35	17	18	S.	.....	
18	33	12	21	SW.	.....	
19	36	12	21	S.	.....	
20	38	13	25	S.	0.10	Snow.
21	24	21	3	N.	.....	
22	31	12	19	N.	.....	
23	28	14	15	S.	.....	
24	20	5	15	SW.	.....	
25	29	5	24	N.	.....	
26	11	4	7	N.	0.12	Snow.
27	10	−10	20	N.	.....	
28	11	−7	18	N.	.....	
Total	667	267	400	.....	.....	
Mean	23.83	10.43	7.21	S.	0.79	

Maximum, 38, 20th instant; minimum, 10, 1st instant; mean, 20.12; total precipitation, 0.79; Wind, south; total depth snowfall, 8 inches.

Meteorological register—Continued.

MARCH, 1888.

Date.	Maximum.	Minimum.	Range.	Wind.	Precipitation.	Remarks.
1	37	18	19			
2	38	8	30			
3	39	7	32			
4	37	4	33			
5	29	7	22	SW.	0.10	Snow.
6	36	20	16			
7	36	5	31			
8	33	11	22			
9	29	25	4			
10	29	17	7			
11	29	15	14			
12	25	20	5			
13	26	9	17			
14	32	4	36			
15	33	11	22			
16	27	10	17			
17	32	12	20		0.17	Snow.
18	35	19	16	SW.		
19	28	21	7			
20	32	9	23			
21	28	21	7	SW.	0.32	Snow.
22	32	15	17	N.	0.15	Snow.
23	33	16	17			
24	35	18	17			
25	33	23	10			
26	36	26	10			
27	37	16	21		0.10	Snow.
28	50	28	22			
29	54	36	18			
30	47	38	9			
31	35	25	10	S.	0.12	Snow.
Total	1,013	479	534			
Mean	32.68	15.45	17.23	S.	0.96	

Maximum, 54, 29th instant; minimum, -4, 14th instant; mean, 24.06; total precipitations, 0.96, wind south, total depth of snowfall, 9.75 inches.

APRIL, 1888.

Date.	Maximum.	Minimum.	Range.	Wind.	Precipitation.	Remarks.
1	33	23	10		0.25	Snow.
2	45	31	14			
3	42	31	11			
4	45	31	12			
5	52	32	20			
6	43	31	12			
7	28	24	4			
8	35	23	12			
9	33	18	15	SW.		
10	37	20	17			
11	33	25	8	E.	0.12	Snow.
12	31	19	12		0.07	Snow.
13	35	17	18		0.02	Snow.
14	38	23	15			
15	37	13	24			
16	43	20	23			
17	44	29	15			
18	31	20	11			
19	35	12	23			
20	46	26	20		0.20	Snow.
21	33	8	25			
22	51	36	15			
23	46	37	9			
24	32	23	9			
25	40	23	17		0.16	Snow.
26	38	29	9			
27	28	23	5		0.15	Snow.
28	40	12	28			
29	41	16	25			
30	48	18	30			
Total	1,103	667	476			
Mean	38.77	22.96	15.87	N.	0.97	

Maximum, 52, 5th instant; minimum, 8, 25th instant; mean, 30.87; total precipitation, 0.97, winds, north; total depth of snowfall, 9.50 inches.

Meteorological register—Continued.

MAY, 1893.

Date.	Maximum.	Minimum.	Range.	Wind.	Precipitation.	Remarks.
1	50	24	26	S.	.....	
2	45	30	18	S.	.....	
3	35	33	2	N.	0.23	Rain
4	46	27	19	S.	.....	
5	40	26	14	S.	.....	
6	54	28	26	N.	.....	
7	65	27	38	S.	.....	
8	72	41	31	S.	.....	
9	60	47	23	S.	0.05	Rain.
10	43	35	8	N.	0.08	Snow.
11	61	28	33	S.	...	
12	67	37	30	S.	.....	
13	65	32	33	S.	.....	
14	72	34	38	S.	.....	
15	75	37	38	S.	.....	
16	76	45	31	S.	.....	
17	65	46	29	S.	.....	
18	40	33	7	N.	.....	
19	51	26	25	N.	.....	
20	53	34	19	N.	...	
21	40	35	5	N.	.....	
22	50	31	19	N.	.....	
23	30	29	10	N.	0.20	Snow.
24	37	28	9	N.	.....	
25	33	27	6	N.	.....	
26	48	22	26	S.	.....	
27	60	25	35	S.	.....	
28	61	31	30	S.	.....	
29	51	39	12	S.	0.18	Rain.
30	58	28	30	S.	0.27	Snow.
31	51	28	23	S.	.....	
Total	1,671	980	691	.....	.....	
Mean	53.90	31.61	22.29	S.	1.01	

Maximum, 76.10th instant; minimum, 22.26th instant; mean, 42.65; total precipitation, 1.01; wind, south; total depth of snowfall, 4.70 inches.

JUNE, 1893.

Date.	Maximum.	Minimum.	Range.	Wind.	Precipitation.	Remarks.
1	58	36	22	NW.	.....	
2	50	36	14	NW.	0.07	Rain.
3	51	30	24	N.	0.05	Rain.
4	52	22	30	N.	.....	
5	62	34	28	W.	.....	
6	76	36	40	NW.	.....	
7	68	37	31	W.	.....	
8	65	39	26	W.	.....	
9	71	46	25	SW.	.....	
10	80	52	28	S.	.....	
11	75	61	14	W.	...	
12	47	19	28	N.	.....	
13	51	38	13	NW.	0.20	Rain.
14	57	40	17	NE.	.....	
15	67	49	18	E.	.....	
16	77	51	26	W.	.....	
17	79	46	33	S.	.....	
18	76	50	26	SW.	...	
19	72	40	32	NE.	.....	
20	65	35	30	W.	.....	
21	68	33	35	S.	0.06	Rain.
22	77	38	39	SW.	.....	
23	77	41	36	W.	.....	
24	68	36	32	W.	.....	
25	76	38	38	S.	.....	
26	79	46	33	S.	.....	
27	76	42	34	S.	.....	
28	65	40	25	SW.	.....	
29	65	40	25	SW.	.....	
30	75	36	39	S.	.....	
Total	2,043	1,213	830	.....	.....	
Mean	68.10	40.37	28.33	W.	0.38	

Maximum, 80, 16th instant; minimum, 22, 4th instant; mean, 54.73; total precipitation, 0.38; wind, west.

REPORT

OF THE

ACTING SUPERINTENDENT

OF THE

YELLOWSTONE NATIONAL PARK

TO THE

SECRETARY OF THE INTERIOR.

1894.

WASHINGTON:
GOVERNMENT PRINTING OFFICE.
1894.

REPORT

OF THE

SUPERINTENDENT OF YELLOWSTONE NATIONAL PARK.

DEPARTMENT OF THE INTERIOR,
OFFICE OF THE SUPERINTENDENT
YELLOWSTONE NATIONAL PARK,
Mammoth Hot Springs, Wyo., August 13, 1894.

SIR: Complying with your request of the 14th ultimo, I submit the following report of operations and events in the Yellowstone National Park during the past year:

The tourist season of last year was the most peculiar of any in the history of the Park. My last report bears date of the 27th of July. From that time on, until the end, the falling off that I then noted continued and increased. The regular travel only amounted to 3,076, as against 3,645 for the year previous. Camping parties and irregular outfits suffered more from the depression than did the regular stage and hotel business. This was doubtless due to two causes—the Columbian Exhibition and the financial condition of the country. There was never a season when the hotel registers showed such a cosmopolitan list of names. Nearly every country in the world was represented, and it was no unusual thing to find in the arrivals of a single day people from ten or twelve different foreign nations. Had it not been for this foreign contingent, business in the Park would have proved ruinous; I doubt if any of the companies having franchises here made any money, and it is probable that nearly all found the balance against them at the end of the season.

The travel during the month of June is mostly from the West. Extensive washouts on that part of the railroads, occasioned by the rapid melting of the very heavy snow of last winter, kept tourists out.

From June 26 until July 20 there were no trains running over the railroads, owing to the strikes; thus one-half of the season was passed with no profitable business. This is particularly to be regretted, as the hotel, stage, and boat companies were in better shape than ever before to care for tourists, and the Park was in many ways unusually attractive. There is now little prospect of a prosperous ending of the season, and 1894 will probably stand as the most disastrous to business interests of any in the history of the Park. People who had planned to make the tour at even later dates than this have become alarmed at the interference with travel and have abandoned their trip.

The road over the divide was opened on June 20, the same date as last year; but at the opening it was in much better condition than ever before at this period. With small expenditures for repairs the road will be one of the best, as it is one of the most interesting, in the whole circuit.

A more thorough and exact system of registry will enable me to report in future the number of tourists who go through in their own conveyances and in camping parties. There is no more satisfactory way of seeing the Park than on horseback and with a camp equipment. To many who live near here, and to people of limited means, this affords a cheap and delightful excursion. Such parties are, however, the source of many annoyances in park management:

(1) They are often careless about leaving fires. (2) They leave their camping places unpolliced. (3) They are more inveterate specimen hunters than any other class. (4) They are more apt to disfigure the Park by inscribing their names on all available places.

The proposition made by some parties to establish semipermanent camping places has not received my approval, nor that of the Department, for the reason that they would soon degenerate into ill-kept, unsightly structures, fit breeding places for vermin of all kinds.

LEASES.

The leases of the Yellowstone Park Association are the same as last year. As I write, the papers bring the news that a bill has been passed regulating leases in the Yellowstone National Park. As I understand the bill, it is an excellent measure, and contains several much-needed changes. The main points are: The extension from 10 to 20 acres of the limit allowed under a single lease, not more than 10 acres of which may be held at any one place. Under existing law no lease may be granted within a quarter of a mile of a geyser or other object of interest. The new law very properly reduces this distance to one-eighth of a mile. The immediate effect of this act will be the authorization of a hotel at the Upper Geyser Basin, on the site now occupied, but illegally, by the lunch station at that place. A hotel here has long been one of the greatest needs of the Park, and should the Park Association be able to raise the money and complete the building it would add much to the attractiveness of the tour.

So far there have been no changes in the leases within the Park, excepting the lease of Mr. F. J. Haynes, the photographer, which expired some months since and has been renewed, as has also that of Mr. Yancey.

Under the new law it will be possible for the Yellowstone Park Association to cover by their leases all the ground now occupied by them.

I renew my recommendation of last year that proceedings be had by the Government for the acquirement of the two frame cottages near the forks of the Fire Hole, for use by the troops there stationed during the summer.

The blacksmith's shop and saddler's shop on the plateau facing this office have been removed. There still remains, however, the unsightly barn pertaining to the Yellowstone Park Association. Were it not for the trouble and expense attending its removal, I should recommend that it be put in a position near the base of the hill to the north of the hotel.

The transportation company has improved all of its sites, and kept them in thorough order. I do not believe that they will need any changes in their holdings under the new law. Since my last report, travel has been so slack that they have had no trouble whatever in handling it. Their plant is the finest I have ever seen.

Applications from outside parties for licenses to carry on transportation business in all forms continue to pour into this office. When I

consider the obligations the regular company has assumed and the bonds that it has given for their faithful performance, I have not felt justified in recommending approval in more than one or two cases, and these were to parties who would furnish good accommodations for the cheaper class of travel. Most of the people who have been barred out of the Park business have made bitter complaints at being deprived of this form of livelihood, but a regulated system here is even more of a necessity than is a licensed cab system in a large city. The extent of the country and the difficulty of watching and guarding it make it doubly essential that none but well-known, reputable, and responsible parties be allowed to conduct this form of business here.

Mr. French, who for several years past has carried the mail from this point to Cooke City, has not received the contract this year, and he desires to transfer his holdings at Yancey's and Soda Butte to the man who succeeds him. There is no objection to this transfer, and I shall recommend its approval.

An application by Mr. George Ash, postmaster, for the lease of a small plot on which to erect a post-office and store, should be approved, as many travelers find themselves in need of such small articles as he keeps for sale.

Within the past year two important decisions relating to the boundaries of the Park have been rendered from your office. The first of these is, that the east and west line through the mouth of the Gardiner River is the north boundary of the Park, notwithstanding the fact that it at one time included a part of the Crow Reservation. The other decision is to the effect that what is now known as "Shoshone Lake," is the one from which the west boundary line is to be established, although in the act of dedication it is called "Madison Lake."

The old project to segregate the northern portion of the Park, in the interests of a few mercenary speculators, was again revived with renewed intensity. It is to be hoped that Congress will adjourn without this bill having a place on the statute books.

A bill that on its face might seem harmless has been introduced in Congress to permit the passage of a railroad through the Park on any line which its projectors may select. In every respect this is the most vicious bill that has been introduced within my knowledge. Six months from the entrance of the first locomotive within the limits of the Park there will not be left one acre of its magnificent forests unburned. The line of this road would of necessity pass near the Yellowstone Lake. The great amount of moisture furnished by the lake and its numerous tributaries give a mantle of snow that will average 15 feet in depth, and with the strong winds prevailing in this mountainous country no railroad could be kept running during the six months of winter without being entirely inclosed in snow sheds, which would prove destructive to the natural beauty of the Park.

Mr. Gallagher, who last year had the contract for running the boundary of the timber reserve, did not begin his work at the most easterly portion of the lake, nor did he make his line continuous from the point where it should have begun, to the north line of the Park, nor did he properly and conspicuously mark the line. If it should be found practicable to have an officer of the Corps of Engineers report to me for temporary duty, I could have the line carefully run and so marked that it would be instantly recognized wherever crossed. The Park now has no greater need than that the boundary line shall be everywhere conspicuous. Last season an accurate determination was made of the latitude and longitude of a point near the lake. A granite

monument has been placed to mark the spot, and a base line measured from it as an origin. This will give a point from which the boundaries of the Park can be accurately located.

PROTECTION OF FORESTS.

In my last report the fire near Norris Basin was reported as under control, but not yet entirely extinguished. From first to last it continued over twenty days, and burned over a very irregular tract about 6 miles long and varying from a few feet to a mile or more in width. During the entire summer fires were being started, through the carelessness of camping parties and in other ways, and it is no exaggeration to say that the thorough system of patrol which I have inaugurated, saved the Park from destruction.

I arrived at the Fountain Hotel, on my trip through the Park about four weeks since, and discovered smoke arising from the timber near by. Word was instantly sent to the troop of cavalry camped two miles from there. The soldiers arrived without delay, and by dint of very hard labor, succeeded in getting the fire under control before it reached the tree tops. Ten minutes more headway would probably have put it in a condition to have resisted all efforts at extinction, and I can put no limit short of the lake to its probable extension. I was on the spot very soon after it originated, and made a careful examination of the surroundings and could find no apparent cause of its origin.

This season there are many people making the tour of the Park on foot, as regular tramps. They leave no sign of their camping places, and if they were to start a fire by their pipes or by other means they could easily escape detection by walking quickly off into the timber. This is not only a possible but a very probable origin of several of our recent fires. I am happy to state, however, that none of them have been at all destructive.

OUTPOSTS.

Our system of outposts remains the same as at the date of my last report. The one established on Snake River two years ago has not proven the success that I had hoped it would. It is too far away to be easy of supervision. It is located in a part of the country much frequented by hunting parties, and the section under its protection is too extended and too rough to permit very effective scrutiny. Another station near the mouth of Thoroughfare Creek would materially aid in the protection of this portion of the Park, but the smallness of force under my command, and the distance from the base of supplies, make it impossible for me to establish one there at present.

A soldier from the station at Riverside started for the Lower Basin on snow shoes one day last March and has not since been seen or heard of. He unquestionably perished in the forest, whether from the cold or from some accident, of course no one can tell.

The Park, with the timber reserve, contains an area greater than the State of Connecticut. This is to be protected from fires, from the vandalism of specimen hunters, and from depredations of poachers, by two small companies of troops, who at the same time are required to perform all of their ordinary military duties. I have but one citizen scout to aid in this work. I had a citizen packer who was useful as an assistant, but by orders from superior authority have recently been obliged to discharge him.

MILITARY POST.

The only improvements made at the military post during the year are the completion of the post hospital and the erection of quarters for the hospital steward. A building to be used as a jail and office for the U. S. commissioner is now under contract and work is just being commenced upon it. It is hoped that it will be ready for occupancy before winter.

ROADS.

The same vicious system of construction and maintenance of roads continues, with small likelihood of change. Each spring finds the appropriation for roads entirely exhausted and the most necessary repairs left to the labor of soldiers or to voluntary contributions from the transportation company. Nearly one-half the appropriation for roads in the last fiscal year was used in the partial completion of a single bridge over a dry ravine near the Canyon, where an intelligent estimate for a proper bridge was less than $2,000. As this bridge is not yet completed, travel over this bit of road is impossible and will remain so for the balance of the year. I renew my recommendation of last year that the control of the appropriation for Park improvement be given to the acting superintendent of the Park. I have no doubt this would result in a saving of at least 25 per cent of the money granted.

HOTELS.

The hotels pertaining to the Yellowstone Park Association, under the able management of Mr. J. H. Dean, have shown a marked improvement. Increase of rates to $5 per day, authorized by the Department, has resulted in bringing them up to a very high standard. A reduction of rate to $3 per day after a stay of ten days in the Park has induced many people to prolong their trip. I hear nothing but praise of their cleanliness, neatness, and the excellent manner in which they are genally conducted.

In addition to the need of a hotel at the Upper Basin, of which I have already spoken, a small hotel, with a few rooms, should be put at Norris. This would fill all the needs of the Park until the construction of the road over Mount Washburn, when one should be placed near the mouth of Tower Creek.

TRANSPORTATION.

The Huntley Company still conducts the regular transportation in a satisfactory manner, with an excellent plant. Transportation from Beaver Canyon, on the Union Pacific Railroad, is conducted by the Bassett Brothers, but without definite license from the Department. The new form of license, which has received your approval, should be made applicable to this line, and the proprietors be required to contribute to the support of the Park. The license of $5 for each wagon required from such parties is not excessive and does not more than compensate for the expenditure made in cleaning up their abandoned camping grounds and making necessary repairs on the road over which they travel.

The question of stop-over privileges, which has heretofore been a vexed one in Park management, has not, within the last year, presented any difficulties. This is possibly due to the very small travel.

I would recommend that instead of a temporary license some responsible party be given a definite lease for a transportation line over the route from Beaver Canyon, and that they be held to requirements similar to those now imposed upon the Huntley Company. Should this recommendation be approved, I see no reason for permitting any other parties to do transportation business within the Park, excepting those who furnish accommodations to campers. The licenses granted during the past year were but two in number, one to Mr. Dixon and the other to Mr. W. W. Wiley, both of whom cater mostly to those who wish to camp out, and who without this privilege would not be able to see the Park. Many parties still visit the Park in transportation belonging to themselves, or hired in places so distant from the Park that it is not practicable to settle the question of ownership or deny them the privilege of proceeding. The old trouble of camping grounds, unpoliced and unsightly from the rubbish left by camping parties, still continues unabated, in spite of my utmost endeavors to correct it.

The boat company has suffered quite as much as other industries in the Park from lack of patronage. The boat has been put in excellent condition, and it furnishes one of the most delightful bits of travel on the tour. The proposition to put a few small steam or naphtha launches on the lake has not been carried out, but I believe it would prove remunerative and certainly would be a great accommodation to tourists.

FISHING.

Within the Park proper there are but two species of fish, trout and grayling. Prior to 1889 but one species of trout existed, and that was the Oregon trout with black spots. In both 1889 and 1890 the U. S. Fish Commission stocked several of the streams of the Park with four other varieties, and they have multiplied to an almost inconceivable extent. It is the general verdict of all who have fished here that no better fishing can be found anywhere in the world. It is not considered necessary to limit the period of fishing within the Park, because it is sufficiently limited by climatic conditions. A year ago I requested the Commissioner of Fisheries to supply some black bass for plant in some lakes that were believed to be suitable for them, but the plant was not received until December, when the temperature was far below zero, and they all perished before reaching their destination. I have renewed the request for the plant, and have the assurance of the honorable Commissioner that it will be granted.

WORK DONE.

Work done in the Park can be classified under three separate heads: (1) that done by the troops as a military organization; (2) that performed under the direction of the Engineer Corps of the U. S. Army, and (3) that performed under the direction of the superintendent of the Park for the Interior Department. The first is under proper military scrutiny and is reported through proper channels to the War Department. The second is not in the least under my control, and so far as I know has never been supervised or properly inspected. Under the third heading the superintendent of the Park is allowed to spend the revenues coming from the leases in the Park for the current year. This year he is allowed the munificent sum of $250, nearly all of which has to be expended in picking up filth left in the camping places along the traveled roads. It is a fact which I think should be brought to the

notice of the Department, that for years the private funds of the superintendent have been drawn upon to cover the ordinary and necessary expenses of the most frugal Park management. As a case in point I will cite a very recent example. In March last a desperate poacher was captured in the act of removing scalps from buffalo, which he had recently slaughtered. The capture was effected by a party on snow shoes, sent out under the legal orders of the Park superintendent. It was impossible for this party to carry rations. The War Department declines, under its well-known regulations, to approve accounts for provisions furnished at the hotels, because there were more than two in the party, and commutation is not allowed to parties of greater number. The Interior Department declines to audit the account, although the expense was incurred in the proper "management" of the Park, for the reason that these bills were incurred by people in military service, and hence should be paid by the appropriation for the Army. A consequence of such rulings must be to dishearten and discourage any superintendent, who, no matter what his enthusiasm may be, will naturally feel averse to paying a tax on his own efficiency.

POACHERS.

Unfortunately, I am not able to report any diminution of poaching during the last year, although I have devoted my best efforts to its suppression. A fortunate capture of a poacher last March deserves more than passing notice, in view of the consequences that followed it. Sometime in February I sent a scouting party across the Yellowstone and into the Pelican Valley to look after the herds of buffalo and elk that usually winter there. On the return of this party they reported to me that they had found an old snowshoe and toboggan trail, but that they were unable to follow it. It apparently headed in the direction of Cooke City. While this party was still out, word came to me that Ed. Howell, a notorious poacher of Cooke City, had passed the Soda Butte Station one stormy night and had gone on into Cooke for supplies, but that he had not carried any of his trophies with him. A few days after this the sergeant in charge of the Soda Butte Station reported the finding of a trail of this same party with his toboggan and followed it as far as the Park line. I then determined on a plan which resulted in the capture of Howell. I waited until I thought it was about time for him to be back in the Pelican country, and then sent out a large search party, with Capt. Scott in charge. This party arrived at the Lake Hotel on the evening of March 11. Next day Burgess and Sergt. Troike of the Sixth Cavalry went over into the country previously indicated by me, and made their camp.

On the morning of the 13th, very soon after starting, they came across some old snowshoe tracks which they could scarcely follow, but by continuing in the direction of them they soon came across a cache of six bison scalps suspended above the ground, in the limbs of a tree. Securing these trophies, the party continued on down Astringent Creek to its mouth and then turned down the Pelican. They soon came across a newly-erected lodge, with evidences of occupation, and numerous snowshoe tracks in the vicinity. Soon after this they were attracted by the sight of a man pursuing a herd of bison in the valley below them, followed by several shots from a rifle. After completing the killing, the culprit was seen to proceed with the removal of the scalps. While thus occupied with the first one my scouting party ran upon him and made the capture. It turned out, as I had anticipated, to be Howell, who

coolly remarked that if he had seen the party sooner they could never have captured him, meaning, of course, that he could have shot them before they were near enough to make effective the small pistol, which was the only weapon they carried. They brought him into this place as a prisoner, reaching here on the evening of the 16th of March.

I at once made full report of the affair and it was widely noted in the newspapers of the country. A suitable recognition, in the way of a certificate, was made of the coolness and bravery of Burgess and Troike. The scalps, as far as they could be saved, were brought in and properly prepared by a competent taxidermist and placed at the disposal of the Department. The feeling aroused in the minds of the public by this act of vandalism stirred Congress to prompt action, so that on May 7 an act for the protection of game in the Park received the President's signature. In order that it may receive wider distribution, I inclose a copy to be printed with this report. Howell denied having killed any bison but those found near him, but I feel sure that he did kill the six found in the cache, and it is quite probable that he killed others which we did not find. In one sense it was the most fortunate thing that ever happened to the Park, for it was surely the means of securing a law so much needed and so long striven for. On April 25 Howell was released from confinement in the guardhouse by your order and removed from the Park, and directed never again to return without proper permission. On the evening of July 28 I found him coolly sitting in the barber's chair in the hotel at this point. I instantly arrested him and reconfined him in the guardhouse, had him reported to the U. S. attorney for this district, and on the evening of August 8 he received the first conviction under the law which he was instrumental in having passed. He was convicted before the U. S. commissioner of returning after expulsion, in violation of the tenth of the Park regulations, and sentenced to confinement for one month and to a fine of $50.

With this conviction as a precedent and a strong determination to make other arrests under the new law whenever it is violated, I believe the days of poaching in the Park are nearly at an end. The dead bodies of 13 bison have been discovered in their winter range. I at first believed this to have been the work of poachers, but investigation shows that no parts of them were taken; it also failed to reveal any bullet marks, though these might easily have escaped observation. I am now thoroughly convinced that they perished from natural causes. I had abundant evidence that beaver were being trapped in this vicinity last autumn; but with the most careful watching I failed to capture the culprits, although I pretty well knew who they were. A fishing party from the post found a large beaver in a trap, freshly caught. Another fishing party found a set trap with nothing in it. The same parties are yet operating in this vicinity, and I do not believe can much longer escape the vigilance of my scouts.

GAME.

Buffalo.—Buffalo have been more carefully watched and more accurately counted than ever before. After deducting the losses from all causes, I feel disposed to reduce my estimate of those remaining to 200, and I believe this to be very close to the mark. A few were seen in their winter range as late as the middle of June, and these had calves with them. They have not been pursued into their summer range, and no accurate statement as to the number of calves can be made.

Moose.—Reports from the outpost on Snake River show an increasing number of moose. They are seen so frequently in that vicinity that I believe they have been well protected and are certain to be preserved. Howell informed me, when I ordered him from the Park, that he had a moose scalp cached near the south line of the Park, and that if I would have him put out at that point he would give me this scalp. Of course, I declined his proposition.

Mountain sheep.—Mountain sheep continue to winter on Mount Everts in considerable numbers. Bands numbering from 10 to 30 can be seen almost any time in winter within a few yards of the roadside between here and Gardiner. As their winter habitat is in the portion of the Park within the State of Montana, the so-called "segregation act" would result in their extinction.

Elk.—The elk wintered well and all reports show a large number of young this spring. A party sent out to Yancey's to investigate the subject in March last saw at least 3,000 of them at one time from a single point of view. This is also in the portion of the Park to be cut off by the segregation bill. The valley of the East Fork of the Yellowstone winters more of them than any other portion of the Park, and should it be cut off, it is safe to say that their numbers would be diminished by at least one-half.

Antelope.—The usual herd of 500 wintered on Mount Everts, which is their only winter range. Should it be cut off, their extinction would follow within a year.

Deer.—Although deer are not as numerous as other varieties of game, we still see many of them during the winter, and they become very tame. From November until June it was easy to count 100 of them any day within a mile or two of this place.

Bears.—Bears are numerous in the vicinity of all the hotels and have become very tame. I recently shipped to the Washington Zoological Park an enormous grizzly bear, which was captured at the slaughter house 4 miles distant. After the passage of the act of March 7, I became doubtful of my authority to continue furnishing animals to the Washington Park. This question I duly presented to you, and, after reference to the Attorney-General, it was decided that I still had such authority; but before the decision had arrived it became too late to capture the young ruminants, and I will therefore have a smaller contribution to make this year than any previous one, although my zeal in the matter has not abated. In March or April last I was requested by the secretary of the Smithsonian Institution to select a site, and obtain proposals for erecting an inclosure in which to retain the wild animals here native. As soon as the conditions of the country permitted I made an inspection of a number of sites and selected one or two which I thought would best fulfill the conditions. I then drew designs and asked for proposals. On submitting these proposals to the acting secretary I was informed that the figures were so far beyond his estimate that nothing would probably be done in the matter.

GEYSERS.

I find there is a general belief in the minds of tourists that there is some measure of regularity in the period of eruptions of most if not all of the geysers. At various times during the last three years I have had records made by the guards of the observed eruptions. Of course, these do not include all of the geysers, nor have all of the eruptions of any one of them been noted. I inclose for publication as an appendix

to this report, a table made of observations upon them during the last three years. A casual inspection of it reveals the fact that none but Old Faithful has the slightest pretense to regularity.

I suggested in my last report that a work be written in popular style, thoroughly describing the Park, and giving in brief a history of the early explorations here. My idea was that this work should be written by some one in the Government service and printed and offered for free distribution by the Department. I have an assurance that such a work is now in course of preparation and will soon be issued, but will not be a Government publication, and, as it can only be had by purchase, it will not have the large circulation that I would wish for it.

RECOMMENDATIONS.

First. A complete survey of the Park boundaries, with an actual marking of the same, so that they may be instantly recognized wherever crossed.

Second. A transfer to the superintendent of the control of the appropriations for Park improvement.

Third. Liberal appropriations with which to complete the road system.

Fourth. The addition to the military post of accommodations for another company.

I am indebted to all the officers of the post for their zealous cooperation in all that tends to the welfare of the Park and for their cordial assistance in all of the duties pertaining to its management.

The meteorological record kept under the direction of Surgeon C. M. Gandy, U. S. Army, is hereto appended.

Yours very respectfully,

GEO. S. ANDERSON,
Captain, Sixth Cavalry, Acting Supt. Yellowstone National Park.

The SECRETARY OF THE INTERIOR.

AN ACT to protect the birds and animals in Yellowstone National Park, and to punish crimes in said park, and for other purposes.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That the Yellowstone National Park, as its boundaries now are defined, or as they may be hereafter defined or extended, shall be under the sole and exclusive jurisdiction of the United States; and that all the laws applicable to places under the sole and exclusive jurisdiction of the United States shall have force and effect in said park: *Provided, however*, That nothing in this Act shall be construed to forbid the service in the park of any civil or criminal process of any court having jurisdiction in the States of Idaho, Montana, and Wyoming. All fugitives from justice taking refuge in said park shall be subject to the same laws as refugees from justice found in the State of Wyoming.

SEC. 2. That said park, for all the purposes of this Act, shall constitute a part of the United States judicial district of Wyoming, and the district and circuit courts of the United States in and for said district shall have jurisdiction of all offenses committed within said park.

SEC. 3. That if any offense shall be committed in said Yellowstone National Park, which offense is not prohibited or the punishment is not specially provided for by any law of the United States or by any regulation of the Secretary of the Interior, the offender shall be subject to the same punishment as the laws of the State of Wyoming in force at the time of the commission of the offense may provide for a like offense in the said State; and no subsequent repeal of any such law of the State of Wyoming shall affect any prosecution for said offense committed within said park.

SEC. 4. That all hunting, or the killing, wounding, or capturing at any time of any bird or wild animal, except dangerous animals, when it is necessary to prevent them from destroying human life or inflicting an injury, is prohibited within the limits of

said park; nor shall any fish be taken out of the waters of the park by means of seines, nets, traps, or by the use of drugs or any explosive substances or compounds, or in any other way than by hook and line, and then only at such seasons and in such times and manner as may be directed by the Secretary of the Interior. That the Secretary of the Interior shall make and publish such rules and regulations as he may deem necessary and proper for the management and care of the park and for the protection of the property therein, especially for the preservation from injury or spoliation of all timber, mineral deposits, natural curiosities, or wonderful objects within said park; and for the protection of the animals and birds in the park, from capture or destruction, or to prevent their being frightened or driven from the park; and he shall make rules and regulations governing the taking of fish from the streams or lakes in the park. Possession within the said park of the dead bodies, or any part thereof, of any wild bird or animal shall be prima facie evidence that the person or persons having the same are guilty of violating this Act. Any person or persons, or stage or express company or railway company, receiving for transportation any of the said animals, birds, or fish so killed, taken, or caught shall be deemed guilty of a misdemeanor, and shall be fined for every such offense not exceeding three hundred dollars. Any person found guilty of violating any of the provisions of this Act or any rule or regulation that may be promulgated by the Secretary of the Interior with reference to the management and care of the park, or for the protection of the property therein, for the preservation from injury or spoliation of timber, mineral deposits, natural curiosities or wonderful objects within said park, or for the protection of the animals, birds and fish in the said park, shall be deemed guilty of a misdemeanor, and shall be subjected to a fine of not more than one thousand dollars or imprisonment not exceeding two years, or both, and be adjudged to pay all costs of the proceedings.

That all guns, traps, teams, horses, or means of transportation of every nature or description used by any person or persons within said park limits when engaged in killing, trapping, ensnaring, or capturing such wild beasts, birds, or wild animals shall be forfeited to the United States, and may be seized by the officers in said park and held pending the prosecution of any person or persons arrested under charge of violating the provisions of this Act, and upon conviction under this Act of such person or persons using said guns, traps, teams, horses, or other means of transportation such forfeiture shall be adjudicated as a penalty in addition to the other punishment provided in this Act. Such forfeited property shall be disposed of and accounted for by and under the authority of the Secretary of the Interior.

SEC. 5. That the United States circuit court in said district shall appoint a commissioner, who shall reside in the park, who shall have jurisdiction to hear and act upon all complaints made, of any and all violations of the law, or of the rules and regulations made by the Secretary of the Interior for the government of the park, and for the protection of the animals, birds, and fish and objects of interest therein, and for other purposes authorized by this Act. Such commissioner shall have power, upon sworn information, to issue process in the name of the United States for the arrest of any person charged with the commission of any misdemeanor, or charged with the violation of the rules and regulations, or with the violation of any provision of this Act prescribed for the government of said park, and for the protection of the animals, birds, and fish in the said park, and to try the person so charged, and, if found guilty, to impose the punishment and adjudge the forfeiture prescribed. In all cases of conviction an appeal shall lie from the judgment of said commissioner to the United States district court for the district of Wyoming, said appeal to be governed by the laws of the State of Wyoming providing for appeals in cases of misdemeanor from justices of the peace to the district court of said State; but the United States circuit court in said district may prescribe rules of procedure and practice for said commissioner in the trial of cases and for appeal to said United States district court. Said commissioner shall also have power to issue process as hereinbefore provided for the arrest of any person charged with the commission of any felony within the park, and to summarily hear the evidence introduced, and, if he shall determine that probable cause is shown for holding the person so charged for trial, shall cause such person to be safely conveyed to a secure place for confinement, within the jurisdiction of the United States district court in said State of Wyoming, and shall certify a transcript of the record of his proceedings and the testimony in the case to the said court, which court shall have jurisdiction of the case: *Provided*, That the said commissioner shall grant bail in all cases bailable under the laws of the United States or of said State. All process issued by the commissioner shall be directed to the marshal of the United States for the district of Wyoming; but nothing herein contained shall be construed as preventing the arrest by any officer of the Government or employee of the United States in the park without process of any person taken in the act of violating the law or any regulation of the Secretary of the Interior: *Provided*, That the said commissioner shall only exercise such authority and powers as are conferred by this Act.

SEC. 6. That the marshal of the United States for the district of Wyoming may appoint one or more deputy marshals for said park, who shall reside in said park, and the said United States district and circuit courts shall hold one session of said courts annually at the town of Sheridan in the State of Wyoming, and may also hold other sessions at any other place in said State of Wyoming or in said National Park at such dates as the said courts may order.

SEC. 7. That the commissioner provided for in this Act shall, in addition to the fees allowed by law to commissioners of the circuit courts of the United States, be paid an annual salary of one thousand dollars, payable quarterly, and the marshal of the United States and his deputies, and the attorney of the United States and his assistants in said district, shall be paid the same compensation and fees as are now provided by law for like services in said district.

SEC. 8. That all costs and expenses arising in cases under this Act, and properly chargeable to the United States, shall be certified, approved, and paid as like costs and expenses in the courts of the United States are certified, approved, and paid under the laws of the United States.

SEC. 9. That the Secretary of the Interior shall cause to be erected in the park a suitable building to be used as a jail, and also having in said building an office for the use of the commissioner, the cost of such building not to exceed five thousand dollars, to be paid out of any moneys in the Treasury not otherwise appropriated upon the certificate of the Secretary as a voucher therefor.

SEC. 10. That this Act shall not be construed to repeal existing laws conferring upon the Secretary of the Interior and the Secretary of War certain powers with reference to the protection, improvement, and control of the said Yellowstone National Park.

Approved, May 7, 1894.

RULES AND REGULATIONS OF THE YELLOWSTONE NATIONAL PARK.

DEPARTMENT OF THE INTERIOR,
Washington, D. C., August 1, 1894.

The following rules and regulations for the government of the Yellowstone National Park are hereby established and made public pursuant to authority conferred by section 2475, Revised Statutes United States, and the act of Congress approved May 7, 1894:

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 inscription or otherwise; or to throw any substance into the springs or geyser vents; or to injure or disturb, in any manner, or to carry off any of the mineral deposits, specimens, 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 shall 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, and any one failing to comply therewith shall be peremptorily removed from the Park.

5. Hunting or killing, wounding, or capturing of any bird or wild animal, except dangerous animals, when necessary to prevent them from destroying life or inflicting an injury, is prohibited. The outfits, including guns, traps, teams, horses, or means of transportation used by persons engaged in hunting, killing, trapping, ensnaring, or capturing such birds or wild animals, or in possession of game killed in the Park under other circumstances than prescribed above, will be forfeited to the United States, except in cases where it is shown by satisfactory evidence that the outfit is not the property of the person or persons violating this regulation and the actual owner thereof was not a party to such violation. Firearms will only be permitted in the Park on written permission of the superintendent thereof. On arrival at the first station of the Park guard parties having firearms will turn them over to the sergeant in charge of the station, taking his receipt for them. They will be returned to the owners on leaving the Park.

6. Fishing with nets, seines, traps, or by 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. Fishing may be prohibited by order of the superintendent of the Park in any of the waters of the Park, or limited therein to any specified season of the year, until otherwise ordered by the Secretary of the Interior.

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 in his discretion, and no pack trains shall be allowed in the Park unless in charge of a duly registered guide.

8. The herding or grazing of loose stock or cattle of any kind within the Park, as well as the driving of such stock or cattle over the roads of the Park, is strictly forbidden, except in such cases where authority therefor is granted by the Secretary of the Interior.

9. No drinking saloon or barroom will be permitted within the limits of the Park.

10. Private notices or advertisements shall not be posted or displayed within the Park, except such as may be necessary for the convenience and guidance of the public, upon buildings on leased ground.

11. 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.

Any person who violates any of the foregoing regulations will be deemed guilty of a misdemeanor and be subjected to a fine, as provided by the act of Congress approved May 7, 1894, "To protect the birds and animals in Yellowstone National Park and to punish crimes in said Park, and for other purposes," of not more than $1,000 or imprisonment not exceeding two years, or both, and be adjudged to pay all costs of the proceedings.

HOKE SMITH,
Secretary of the Interior.

METEOROLOGICAL RECORD.

JULY, 1893.

Date.	Maximum.	Minimum.	Range.	Winds.	Precipitation.	Remarks.
1	73	36	39	S.	.....	
2	72	32	34	S.	.....	
3	72	30	42	S.	0.09	Rain.
4	72	30	42	S.	.....	
5	72	39	33	W.	.....	
6	72	39	33	NW.	.....	
7	73	36	37	NW.	0.05	Rain and hail.
8	67	26	41	S.	.....	
9	71	33	38	S.	.....	
10	76	31	45	S.	.....	
11	83	30	53	S.	.....	Heavy wind storm; thermometer broken.
12	.....	.....	.....	S.	.....	
13	.....	.....	.....	S.	.....	
14	.....	.....	.....	S.	.....	
15	.....	.....	.....	SW.	.....	
16	.....	.....	.....	S.	.....	
17	.....	.....	.....	S.	.....	
18	.....	.....	.....	S.	.....	
19	.....	.....	.....	S.	.....	
20	.....	.....	.....	NE.	.....	
21	.....	.....	.....	S.	.....	
22	.....	.....	.....	S.	.....	
23	.....	.....	.....	S.	.....	
24	.....	.....	.....	S.	.....	
25	.....	.....	.....	S.	0.15	Rain.
26	.....	.....	.....	S.	.....	
27	.....	.....	.....	S.	.....	
28	.....	.....	.....	S.	0.25	Rain and hail.
29	.....	.....	.....	S.	0.40	Rain and hail.
30	.....	.....	.....	S.	0.05	Rain and hail.
31	.....	.....	.....	.....	.....	
Total	.....	.....	.....	.....	0.99	
Mean	.....	.....	.....	S.	.....	

No thermometer.

Maximum, 83 on 12th; minimum, 30 on 1st, 7th, and 31st; total precipitation 0.99 inch; prevailing wind south.

AUGUST, 1893.

Date.	Maximum.	Minimum.	Range.	Winds.	Precipitation.	Remarks.
1	89		.....	S.	.....	
2	91		.....	S.	.....	
3	87		.....	SW.	.....	
4	89		.....	S.	.....	
5	87		.....	SW.	.....	
6	86		.....	SW.	.....	
7	85		.....	W.	.....	
8	81		.....	S.	.....	
9	80		.....	S.	0.05	Rain.
10	74		.....	W.	.....	
11	81		.....	S.	.....	
12	80		.....	S.	0.01	Rain.
13	78		.....	S.	.....	
14	78		.....	S.	.....	
15	78		.....	NW.	.....	
16	77		.....	NW.	0.01	Rain.
17	83		.....	S.	0.05	Rain.
18	78		.....	S.	0.05	Rain.
19	78		.....	S.	0.27	Rain.
20	79		.....	S.	0.49	Rain.
21	73		.....	NW.	.....	
22	73		.....	SW.	0.03	Rain.
23	71		.....	SW.	0.14	Rain.
24	69		.....	S.	.....	
25	76		.....	W.	.....	
26	74		.....	SW.	.....	
27	72		.....	S.	.....	
28	70		.....	W.	.....	
29	73		.....	W.	.....	
30	73		.....	W.	.....	
31	73		.....	W.	.....	
Total	2,465		.....	.....	1.06	
Mean	77.58		.....	S.	.....	

No thermometer.

Maximum, 91, 2d instant; average maximum, 77.58; total precipitation, 1.06 inches; wind, south.

SEPTEMBER, 1893.

Date.	Maximum.	Minimum.	Range.	Winds.	Precipitation.	Remarks.
1	73		.....	W.	.....	
2	80		.....	E.	.....	
3	81		.....	SE.	.....	
4	84		.....	NW.	.....	
5	76		.....	W.	0.20	Rain.
6	80		.....	E.	.....	
7	81		.....	S.	.....	
8	75		.....	E.	0.25	Rain.
9	57		.....	S.	.....	
10	61		.....	E.	.....	
11	74		.....	E.	.....	
12	73		.....	N.	.....	
13	49		.....	NE.	.....	
14	44		.....	NE.	.....	
15	65		.....	N.	.....	
16	70		.....	N.	0.09	Rain.
17	67		.....	E.	0.32	Rain.
18	52		.....	E.	.....	
19	51		.....	NE.	0.15	Rain.
20	67		.....	NE.	.....	
21	61		.....	N.	0.27	Snow.
22	41		.....	N.	.....	
23	61		.....	NE.	.....	
24	59		.....	W.	.....	
25	65		.....	W.	.....	
26	61		.....	W.	.....	
27	71		.....	W.	.....	
28	62		.....	S.	.....	
29	55		.....	SW.	0.19	Sleet.
30	49		.....	N.	0.06	
Total	1,958		.....	.....	1.44	
Mean	65.27		.....	E.	.....	

No thermometer.

Maximum, 84, 4th instant; average, 65.27; total precipitation, 1.44 inches; prevailing wind east.

OCTOBER, 1893.

Date.	Maximum.	Minimum.	Range.	Winds.	Precipitation.	Remarks.
1	45	No thermometer.	.....	N.	0.25	Rain.
2	43		.....	N.	.....	
3	38		.....	NW.	.....	
4	39		.....	N.	.....	
5	48		.....	E.	.....	
6	46		.....	N.	.....	
7	58		.....	W.	0.17	Rain.
8	53		.....	S.	0.02	Rain.
9	40		.....	N.	0.16	Snow.
10	37		.....	N.	0.20	Snow.
11	48		.....	S.	.....	
12	43		.....	S.	.....	
13	64		.....	S.	.....	
14	65		.....	S.	.....	
15	52		.....	SE.	.....	
16	38		.....	SE.	.....	
17	51		.....	S.	.....	
18	62		.....	S.	.....	
19	64		.....	S.	.....	
20	63		.....	SE.	.....	
21	44		.....	N.	.....	
22	42		.....	N.	0.09	Snow.
23	36		.....	N.	.....	
24	39		.....	N.	.....	
25	41		.....	S.	0.30	Snow.
26	45		.....	S.	.....	
27	57		.....	SE.	.....	
28	61		.....	SE.	.....	
29	51		.....	SE.	.....	
30	47		.....	E.	0.15	Rain.
31	43		.....	S.	.....	
Total	1,535		.....	.....	.....	
Mean	49.52		.....	S.	1.34	

Maximum, 82, 16th instant; average, 49.52; total precipitation, 1.34 inches; prevailing wind, south; total depth of snow fall, 5.00 inches.

NOVEMBER, 1893.

Date.	Maximum.	Minimum.	Range.	Winds.	Precipitation.	Remarks.
1	27	No thermometer.	.....	N.	0.60	Snow.
2	26		.....	N.	.....	
3	34		.....	N.	.....	
4	43		.....	S.	.....	
5	15		.....	S.	0.23	Rain.
6	45		.....	S.	.....	
7	42		.....	SE.	.....	
8	46		.....	S.	.....	
9	44		.....	S.	.....	
10	37		.....	N.	.....	
11	36		.....	N.	.....	
12	41		.....	S.	0.20	Snow.
13	35		.....	S.	.....	
14	41		.....	S.	.....	
15	46		.....	S.	.....	
16	36		.....	N.	0.15	Snow.
17	23		.....	N.	.....	
18	30		.....	N.	.....	
19	34		.....	S.	.....	
20	36		.....	N.	.....	
21	31	15	16	N.	0.09	Snow.
22	23	2	21	S.	.....	
23	22	5	17	S.	.....	
24	35	21	14	S.	.....	
25	34	27	7	S.	0.22	Snow.
26	36	25	11	S.	.....	
27	37	29	8	S.	.....	
28	36	29	7	S.	0.32	Snow.
29	37	28	9	S.	.....	
30	28	0	28	N.	0.40	Snow.
Total	1,066	181	138	.....	.....	
Mean	35.53	6.03	4.16	S.	2.51	

Maximum, 46, 15th instant; minimum, 0, 30th instant; mean, 8.33, from 21st to 30th; total precipitation, 2.51 inches; prevailing winds, south; depth of snow fall, 22.90 inches.

DECEMBER, 1893.

Date.	Maximum.	Minimum.	Range.	Winds.	Precipitation.	Remarks.
1	38	27	11	S.	0.15	Snow.
2	39	26	13	S.	.....	
3	30	16	14	SE.	.....	
4	37	25	12	S.	.....	
5	33	5	28	SW.	.....	
6	31	18	13	SW.	.....	
7	35	27	8	S.	0.05	Snow.
8	36	25	11	S.	.....	
9	34	24	10	S.	.....	
10	36	29	7	S.	0.25	Snow.
11	35	18	17	N.	.....	
12	32	11	21	SE.	.....	
13	35	28	7	S.	0.35	Snow.
14	34	25	9	NW.	0.90	Snow.
15	25	10	15	S.	0.14	Snow.
16	33	17	16	S.	.....	
17	35	20	15	S.	.....	
18	29	16	13	SE.	.....	
19	31	11	20	S.	.....	
20	38	18	20	S.	.....	
21	33	21	12	S.	0.07	Snow.
22	36	25	11	SE.	.....	
23	31	18	13	N.	.....	
24	19	3	16	S.	.....	
25	23	5	18	S.	.....	
26	29	14	15	S.	.....	
27	18	0	18	N.	.....	
28	19	14	5	N.	.....	
29	18	5	13	N.	.....	
30	19	11	8	S.	.....	
31	30	18	12	S.	.....	
Total	951	530	421	.....	.....	
Mean	30.68	17.10	13.58	S.	1.91	

Maximum, 39, 2d instant; minimum, 0, 27th instant; mean, 23.89; total precipitation, 1.91; prevailing winds, south; depth of snow fall, 20.25 inches.

METEOROLOGICAL RECORD—Continued.

JANUARY, 1894.

Date.	Maximum.	Minimum.	Range.	Winds.	Precipitation.	Remarks.
1	35	25	10	S.	.....	
2	31	23	8	S.	.....	
3	30	6	24	N.	.....	
4	15	3	12	N.	.....	
5	3	21	24	N.	.....	
6	5	8	13	N.	.....	
7	15	4	11	N.	.....	
8	14	5	19	N.	.....	
9	13	10	23	S.	.....	
10	25	10	15	S.	.....	
11	24	11	13	SE.	0.41	Snow.
12	32	22	10	SE.	.....	
13	40	29	11	S.	.....	
14	43	32	11	S.	.....	
15	30	34	4	S.	0.21	Sleet.
16	36	27	9	S.	.....	
17	29	9	20	N.	0.40	Snow.
18	25	0	25	N.	.....	
19	22	1	21	NW.	.....	
20	25	11	14	S.	0.22	Snow.
21	28	15	13	N.	.....	
22	29	12	17	N.	.....	
23	10	25	35	N.	.....	
24	20	11	31	N.	.....	
25	20	11	9	SE.	.....	
26	28	18	10	S.	.....	
27	24	14	10	S.	.....	
28	30	18	12	S.	0.21	Snow.
29	33	21	12	S.	.....	
30	31	14	17	S.	.....	
31	17	5	12	N.	0.37	Snow.
Total	770	295	475	.....	1.82	
Mean	24.84	9.52	15.32	S.	.....	

Maximum, 43, 14th instant; minimum, -25, 23d instant; mean, 17.18; total precipitation, 1.82; prevailing winds, south; depth of snow fall, 16.35 inches.

FEBRUARY, 1894.

Date.	Maximum.	Minimum.	Range.	Winds.	Precipitation.	Remarks.
1	23	7	30	S.	.....	
2	20	8	12	S.	.....	
3	21	11	32	S.	.....	
4	27	2	25	S.	.....	
5	28	0	28	S.	.....	
6	25	9	16	N.	.....	
7	31	19	12	SW.	0.15	Snow.
8	30	8	22	N.	.....	
9	14	5	9	N.	.....	
10	5	15	20	N.	0.05	Snow.
11	14	20	34	N.	.....	
12	20	1	19	S.	.....	
13	21	4	17	S.	.....	
14	25	0	25	S.	.....	
15	34	17	17	S.	.....	
16	28	12	16	N.	.....	
17	19	4	15	SE.	0.41	Snow.
18	19	0	19	N.	.....	
19	15	17	32	N.	0.31	Snow.
20	—4	22	21	N.	.....	
21	6	24	30	N.	.....	
22	16	15	31	N.	.....	
23	29	6	35	S.	.....	
24	32	12	20	S.	.....	
25	36	14	22	S.	.....	
26	33	16	17	S.	.....	
27	33	17	16	S.	0.20	Snow.
28	41	26	15	S.	.....	
Total	644	37	607	.....	1.12	
Mean	23.00	1.32	21.68	S.	.....	

Maximum, 41, 28th instant; minimum, -24, 21st instant; mean, 12.41; total precipitation, 1.12; prevailing winds, south; depth of snow fall, 11.25 inches.

MARCH, 1894.

Date.	Maximum.	Minimum.	Range.	Winds.	Precipitation.	Remarks.
1	35	22	13	S.	.....	
2	41	24	17	S.	0.07	Snow.
3	39	26	13	S.	0.13	Snow.
4	30	12	18	N.	0.20	Snow.
5	20	5	15	N.	.....	
6	28	15	13	N.	.....	
7	24	13	11	S.	.....	
8	30	11	19	S.	0.50	Snow.
9	29	23	6	S.	0.35	Snow.
10	25	10	15	N.	.....	
11	32	18	14	E.	.....	
12	44	30	14	E.	.....	
13	43	32	11	S.	.....	
14	36	31	5	S.	0.20	Snow.
15	42	30	12	S.	.....	
16	44	30	14	S.	0.05	Rain.
17	31	22	9	S.	.....	
18	32	15	17	N.	.....	
19	31	23	8	N.	.....	
20	25	12	13	N.	.....	
21	19	8	11	N.	.....	
22	40	5	45	S.	.....	
23	44	16	28	S.	.....	
24	38	14	24	S.	0.21	Snow.
25	36	15	21	N.	.....	
26	47	22	25	S.	0.31	Snow.
27	41	22	19	N.	.....	
28	48	8	40	S.	.....	
29	47	37	10	S.	0.11	Snow.
30	41	31	10	S.	0.06	Snow.
31	39	12	27	S.	.....	
Total	1,101	584	517	.....	2.30	
Mean	35.52	18.84	16.68	S.	.....	

Maximum, 48, 28th instant; minimum, -5, 22d instant; mean, 27.18; total precipitation, 2.30; prevailing winds, south; depth of snow fall, 22.65 inches.

APRIL, 1894.

Date.	Maximum.	Minimum.	Range.	Winds.	Precipitation.	Remarks.
1	47	31	16	S.	.....	
2	44	34	10	N.	0.60	Snow and rain.
3	32	20	12	N.	.....	
4	38	8	30	S.	.....	
5	46	18	26	S.	.....	
6	52	32	20	S.	.....	
7	48	30	18	N.	0.14	Sleet.
8	36	13	23	S.	.....	
9	42	21	21	S.	.....	
10	56	29	26	S.	.....	
11	51	30	21	N.	0.72	Snow.
12	42	18	24	N.	.....	
13	46	26	20	S.	.....	
14	45	29	16	S.	.....	
15	44	27	17	S.	0.05	Snow.
16	41	25	16	N.	0.02	Snow.
17	42	21	21	N.	.....	
18	40	28	12	N.	.....	
19	54	22	32	N.	.....	
20	63	30	33	S.	.....	
21	64	32	32	S.	.....	
22	55	38	17	S.	0.21	Rain.
23	52	37	15	S.	.....	
24	50	36	14	W.	.....	
25	65	29	36	SW.	.....	
26	66	33	33	S.	0.04	Snow and rain.
27	51	28	23	N.	.....	
28	46	32	14	N.	.....	
29	55	27	28	NW.	.....	
30	52	29	23	S.	.....	
Total	1,463	812	651	.....	1.87	
Mean	48.76	27.06	21.70	S.	.....	

Maximum, 66, 26th instant; minimum, 8, 4th instant; mean, 38.86; total precipitation, 1.87; prevailing winds, south; depth of snow fall, 5.60 inches.

MAY, 1894.

Date.	Maximum.	Minimum.	Range.	Winds.	Precipitation.	Remarks.
1	46	28	18	N.	0.76	Snow and rain.
2	46	22	24	N.	0.06	Rain.
3	47	25	22	SW.	.....	
4	46	36	10	E.	.....	
5	52	37	15	E.	0.32	Rain.
6	60	38	22	S.	.....	
7	61	33	28	S.	.....	
8	62	40	22	S.	.....	
9	56	25	31	W.	.....	
10	57	21	36	SW.	.....	
11	67	38	29	S.	.....	
12	69	39	30	S.	0.09	Rain.
13	72	45	27	S.	.....	
14	71	41	30	S.	.....	
15	65	36	29	N.	0.15	Rain.
16	45	31	14	NE.	0.45	Snow and rain.
17	56	33	23	NE.	.....	
18	72	32	40	W.	.....	
19	70	42	28	S.	.....	
20	71	36	35	S.	.....	
21	66	38	28	S.	0.35	Rain.
22	55	39	16	E.	0.10	Rain.
23	68	39	29	S.	.....	
24	71	38	33	S.	.....	
25	75	37	38	W.	.....	
26	73	38	35	S.	.....	
27	76	43	33	NW.	.....	
28	78	40	38	S.	.....	
29	76	39	37	S.	.....	
30	76	43	33	E.	.....	
31	71	43	28	SE.	0.03	
Total	1,976	1,115	861	.....	2.26	
Mean	63.74	35.97	27.77	S.	.....	

Maximum, 78, 28th instant; minimum, 21, 10th instant; monthly mean, 49.86; total precipitation, 2.26; prevailing winds, south.

JUNE, 1894.

Date.	Maximum.	Minimum.	Range.	Winds.	Precipitation.	Remarks.
1	74	48	26	W.	.....	
2	76	62	14	W.	0.05	Rain.
3	82	73	9	W.	0.01	Rain.
4	80	50	30	W.	.....	
5	85	54	31	SE.	.....	
6	79	53	26	SE.	0.16	Rain.
7	63	53	10	S.	0.60	Rain and hail.
8	51	46	5	SW.	.....	
9	54	46	8	NW.	.....	
10	44	40	4	N.	0.65	Rain and snow.
11	58	47	11	N.	0.11	Rain and snow.
12	57	46	11	N.	0.24	Rain and snow.
13	51	42	9	N.	0.23	Rain, hail, and snow.
14	59	43	16	S.	.....	
15	70	49	21	NW.	.....	
16	75	49	26	S.	0.03	Rain.
17	75	49	26	S.	0.02	Rain and hail.
18	72	48	24	S.	.....	Slight storms.
19	61	50	11	N.	0.28	Rain.
20	60	52	8	N.	0.05	Rain and hail.
21	67	48	19	S.	0.03	Rain.
22	68	47	21	SW.	0.07	Rain and hail.
23	62	52	10	W.	0.05	Rain.
24	70	53	17	S.	0.02	Rain and hail.
25	73	48	23	S.	0.04	Rain.
26	61	50	11	S.	0.05	Rain.
27	60	50	10	SW.	0.02	Rain.
28	60	53	7	S.	0.05	Rain.
29	70	50	20	S.	0.22	Rain.
30	67	50	17	S.	0.12	Rain and hail.
Total	1,984	1,501	483	.....	3.10	
Mean	66.13	50.03	16.10	S.	.....	

Maximum, 85, 5th instant; minimum, 42, 13th instant; mean temperature for the month, 58.08; total precipitation, 3.10 inches; prevailing winds, south.

Observed eruptions of geysers at Upper Basin, Yellowstone National Park.

JUNE, 1891.

		Beehive.	Castle.	Giant.	Giantess.	Grand.	Lion.	Riverside.	Splendid.
1	A. M.								
	P. M.								
2	A. M.								
	P. M.								
3	A. M.								
	P. M.								
4	A. M.								
	P. M.								
5	A. M.								
	P. M.								
6	A. M.								
	P. M.								
7	A. M.								
	P. M.								
8	A. M.								
	P. M.		3.35						
9	A. M.								
	P. M.								
10	A. M.	9.30							
	P. M.				4.30				
11	A. M.								
	P. M.	3.00				12.45			
12	A. M.		11.35						
	P. M.								
13	A. M.		7.00						
	P. M.						12.13		
14	A. M.								
	P. M.								
15	A. M.		6.00						
	P. M.								
16	A. M.								
	P. M.		6.05						
17	A. M.					8.45			
	P. M.		10.25						
18	A. M.			11.35					
	P. M.		5.35						
19	A. M.								
	P. M.		10.30						
20	A. M.								
	P. M.							2.55	
21	A. M.		7.05						11.55
	P. M.	2.35							
22	A. M.								
	P. M.								
23	A. M.								8.05, 10.35, 11.55
	P. M.								1.05, 3.25, 5.55
24	A. M.					11.30			
	P. M.	12.05	10.25						
25	A. M.			11.05					
	P. M.	12.08							
26	A. M.		3.30						
	P. M.	3.40							
27	A. M.								
	P. M.		10.25						
28	A. M.		3.35				8.45, 10.05, 11.45		
	P. M.	1.25					2.05, 5.10		
29	A. M.								7.05, 10.35
	P. M.		2.15			3.15			1.05, 4.25
30	A. M.								
	P. M.	3.45	4.35						

Observed eruptions of geysers at Upper Basin, Yellowstone National Park—Continued.

JULY, 1891.

		Beehive.	Castle.	Giant.	Grand.	Splendid.
1	A. M.					
	P. M.	5.30	6.30			
2	A. M.					
	P. M.	2.45			1.05	
3	A. M.					8.30
	P. M.	1.30	2.15			
4	A. M.	11.30	8.30		11.40	
	P. M.					
5	A. M.					
	P. M.	1.45	12.40	12.45		
6	A. M.					7.10
	P. M.	3.00				
7	A. M.					
	P. M.	1.05	7.30			
8	A. M.				6.30	7.25, 10.15
	P. M.		12.25			12.30
9	A. M.					
	P. M.		5.25			
10	A. M.					
	P. M.		5.05			
11	A. M.				5.05	
	P. M.					
12	A. M.					
	P. M.					
13	A. M.					
	P. M.		8.05			
14	A. M.		10.10			
	P. M.					9.20, 10.20
15	A. M.		9.00			
	P. M.					4.10, 7.10
16	A. M.					8.20, 10.20
	P. M.	1.05	2.30			12.05
17	A. M.					
	P. M.	3.25	6.05			
18	A. M.				4.25	7.15, 9.40, 11.30
	P. M.	5.30				2.40, 5.45
19	A. M.	9.05				
	P. M.					5.15
20	A. M.		10.15			7.05
	P. M.	1.05				1.45, 8.10
21	A. M.		10.05		6.30	
	P. M.	2.15				
22	A. M.					10.00
	P. M.	2.30	2.00			4.10, 7.30
23	A. M.					7.00
	P. M.	1.15			12.45	
24	A. M.			6.05		
	P. M.	2.10				6.15
25	A. M.		8.30			9.00
	P. M.	3.15				12.30, 3.00, 5.10
26	A. M.					
	P. M.	3.20	1.15			
27	A. M.					
	P. M.		2.10			3.15
28	A. M.					7.30
	P. M.	12.15	1.45			12.05, 2.15
29	A. M.					
	P. M.	12.45	3.15			
30	A. M.			5.55		
	P. M.	3.00				1.00, 4.15, 7.00
31	A. M.					
	P. M.	3.20				

Observed eruptions of geysers at Upper Basin, Yellowstone National Park—Continued.

JULY, 1893.

		Artemisia.	Beehive.	Castle.	Giant.	Giantess.	Grand.	Oblong.	Splendid.
1	A. M.		6.10	11.55	9.30			9.30	
	P. M.		11.00					3.30	
2	A. M.		6.00						
	P. M.			3.15					
3	A. M.								
	P. M.			5.20					
4	A. M.			6.00					
	P. M.								
5	A. M.			9.05			6.10		
	P. M.							2.20	
6	A. M.						10.00	8.10	5.10, 8.30, 10.00, 11.45
	P. M.			1.30					1.15, 6.20
7	A. M.								
	P. M.			7.00					
8	A. M.				11.00		11.05		
	P. M.	1.30		2.05				2.30	
9	A. M.								
	P. M.								
10	A. M.			5.00				10.05	
	P. M.							1.00	
11	A. M.			4.00					
	P. M.								
12	A. M.								
	P. M.			9.30					
13	A. M.								
	P. M.			6.00					
14	A. M.	9.00			3.15				
	P. M.			7.05					
15	A. M.						10.00	9.00	
	P. M.			7.35					
16	A. M.								
	P. M.								
17	A. M.		6.00	9.30			9.30		
	P. M.		1.20, 10.00			6.30		4.00	
18	A. M.								
	P. M.			1.00					
19	A. M.								
	P. M.			7.00					
20	A. M.								
	P. M.			12.05					
21	A. M.								
	P. M.			3.25				6.05	
22	A. M.			5.20	7.05				
	P. M.								
23	A. M.	10.30							
	P. M.								
24	A. M.			11.30					
	P. M.								
25	A. M.						7.00		
	P. M.							2.30	
26	A. M.			11.00					
	P. M.								
27	A. M.							10.00	
	P. M.			1.00					
28	A. M.								
	P. M.								
29	A. M.						6.00		
	P. M.							6.05	
30	A. M.							10.05	
	P. M.			1.15					
31	A. M.			6.00			9.30	6.00	
	P. M.								

Observed eruptions of geysers at Upper Basin, Yellowstone National Park—Continued.

AUGUST, 1893.

		Artemisia.	Beehive.	Castle.	Giant.	Giantess.	Grand.	Oblong.	Splendid.
1	A. M.		8.30					8.00	
	P. M.			9.05	12.05		9.00		
2	A. M.							11.40	
	P. M.								
3	A. M.			7.20			7.20	8.10	
	P. M.							3.20	
4	A. M.			9.30			9.30	10.00	
	P. M.	5.00							
5	A. M.			6.20			6.20	7.30	
	P. M.							2.30	
6	A. M.							11.00	
	P. M.			4.20			4.20		
7	A. M.							6.20	
	P. M.							2.15	
8	A. M.			6.10			6.10		
	P. M.		3.20, 11.30		11.30		3.20		
9	A. M.							6.20	
	P. M.		2.10					3.10	
10	A. M.	8.00		11.20			11.20	8.00, 11.30	
	P. M.							3.00	
11	A. M.							10.00	
	P. M.			2.00			2.00		
12	A. M.							6.00	
	P. M.		3.15						
13	A. M.							7.30	
	P. M.		3.00	8.00			8.00	6.00	
14	A. M.							9.00	
	P. M.	5.25						5.55	
15	A. M.						8.10		
	P. M.			8.10				4.05	
16	A. M.							11.58	
	P. M.								
17	A. M.			7.30			7.10	6.30	
	P. M.			6.00	9.00		6.30	3.45	
18	A. M.	9.05		4.30			7.00	7.00	
	P. M.						6.00		
19	A. M.			10.00			8.00	3.00	
	P. M.	5.40						8.00	
20	A. M.							7.00	
	P. M.			4.00			7.05		
21	A. M.							9.05	
	P. M.			9.20				5.30	
22	A. M.						8.00	6.30	
	P. M.	3.00	2.20				7.00	3.50	
23	A. M.			2.30					
	P. M.			10.00			7.05	3.00	
24	A. M.						8.00	6.55	
	P. M.							5.00	
25	A. M.	8.05		9.00				8.00	7.00, 9.15, 11.20,
	P. M.		2.30		8.00			1.00, 3.20	3.45
26	A. M.			3.00		8.00	7.10	6.00	
	P. M.						3.15	3.00	
27	A. M.								
	P. M.		1.40					6.00	
28	A. M.		11.30				8.00	7.00	
	P. M.	6.25		12.30			7.00	5.30	
29	A. M.			5.20			9.10	8.00	
	P. M.								
30	A. M.	10.32			11.45		7.20		
	P. M.						8.00	3.45	
31	A. M.			8.30				7.00	
	P. M.						6.00	5.30	

Observed eruptions of geysers at Upper Basin, Yellowstone National Park—Continued.

SEPTEMBER, 1893.

		Artemisia.	Beehive.	Castle.	Giant.	Giantess.	Grand.	Oblong.	Splendid.
1	A. M.								
	P. M.			12.15				6.45	
2	A. M.						7.30	7.30	
	P. M.	5.30		2.00			6.00	3.00	
3	A. M.			7.30			10.00	10.00	
	P. M.						7.00		
4	A. M.			5.55			6.00	7.00, 11.00	
	P. M.	6.00						6.00	
5	A. M.							6.00, 11.30	
	P. M.			1.58	11.45			3.00	
6	A. M.			5.00				6.00	8.00, 10.00
	P. M.	6.30					7.00	4.00	12.15, 3.15, 5.10, 7.00 9.00, 11.30.
7	A. M.						8.00	8.10	
	P. M.	7.00	7.20				6.00	4.00	
8	A. M.						10.00	6.00	
	P. M.	6.10		1.10				1.30, 7.30	
9	A. M.			6.20			7.00	8.00	
	P. M.	6.30					4.00	4.00	
10	A. M.						8.10	8.00	
	P. M.	4.20		2.05			6.30	3.10, 9.15	
11	A. M.			7.25			8.00	7.45	
	P. M.							5.00	
12	A. M.			1.30				6.10, 11.10	
	P. M.		2.00				6.00	5.20	
13	A. M.			8.15				8.00	
	P. M.	6.15					2.10	6.15	
14	A. M.						8.15	8.45	
	P. M.		2.25		8.30		7.10	2.40	
15	A. M.			6.10			9.00	7.15	
	P. M.	5.10						3.45	
16	A. M.			11.30				7.30	
	P. M.						7.15	6.10	
17	A. M.			5.10			8.30	8.00	
	P. M.	6.30					5.30	7.00	
18	A. M.						8.10	8.10	
	P. M.			12.52		5.10		3.15	
19	A. M.		2.15						
	P. M.	4.20	1.10	1.15			7.45	3.10	
20	A. M.						8.15	6.00	
	P. M.	5.00	3.30, 9.20	11.30			7.10	2.00, 9.15	
21	A. M.						7.30	5.00, 11.20	
	P. M.	6.30			9.25		5.15	8.10	
22	A. M.			7.50			7.50	7.30	
	P. M.	3.05						5.10	
23	A. M.	10.00		4.00			6.00	8.00	
	P. M.						5.00	5.00	
24	A. M.			11.00				7.00	
	P. M.	5.04					12.40	4.20	
25	A. M.						9.00	6.00, 11.30	
	P. M.			4.50				7.00	
26	A. M.						6.30	7.10	
	P. M.	4.20		11.45			5.00	5.15	
27	A. M.								
	P. M.			9.20			2.45		
28	A. M.	6.15		10.30	9.15		7.10	9.00	
	P. M.						5.00	6.30	
29	A. M.						8.10	7.15	
	P. M.	7.05					6.20	1.15, 6.30	
30	A. M.			2.40			8.45	7.10	
	P. M.							3.45	

Report

OF

The Acting Superintendent

OF THE

Yellowstone National Park

TO THE

Secretary of the Interior.

1895.

WASHINGTON:
GOVERNMENT PRINTING OFFICE
1895.

REPORT

OF THE

ACTING SUPERINTENDENT OF THE YELLOWSTONE NATIONAL PARK.

DEPARTMENT OF THE INTERIOR,
OFFICE OF THE SUPERINTENDENT
YELLOWSTONE NATIONAL PARK,
Mammoth Hot Springs, Wyo., July 25, 1895.

SIR: Complying with your request of the 1st instant, I submit a report of operations and events in the Yellowstone National Park during the last fiscal year.

Beginning my fifth annual report, I wish to make a résumé of the improvements in the Park since my arrival here in February, 1891.

The Yellowstone Park Association has added a hotel near the Fountain Geyser, which is the largest and best of their buildings. The log buildings which constituted their hotel at the Lower Basin have been removed. The old hotel at Norris was consumed by fire, and the lunch station at that place has, since the spring of 1892, been conducted under canvas. In November of last year the old hotel at the Upper Geyser Basin was destroyed by fire. It has been replaced by a temporary structure better adapted than was the old one for the purposes of a lunch station, but without the means of accommodating tourists over night.

The new transportation company, which succeeded the old one in the spring of 1892, has added somewhat to their plant, and at every station the company has improved its buildings.

The road system has been extended to make possible a tour from the lake to the Upper Basin without passing over any portion of the route a second time. At Mammoth Hot Springs a new post has been built to accommodate one troop of cavalry, with the necessary administrative buildings. Nearly a mile of board sidewalk has been laid connecting the principal buildings of the post with the hotel. In addition to this, many minor improvements have been made, which will find notice in subsequent parts of the report.

The prediction made in my last report of the complete failure of travel during the balance of the season was abundantly verified. Tours which may have been planned and arranged for before the railroad strike were probably abandoned before the strike was over, and the season continued to the end the poorest ever known in the history of the Park.

The past winter was exceedingly mild and there was but little snow fall. As a consequence, it was possible to make a complete tour of the Park at the opening of the season, June 1, a thing never before known.

All the hotels were on that date ready to receive and accommodate guests. From all sources came abundant promise of heavy travel, but for some reason this promise has failed of fulfillment. The record of tourists from 1890 to date will show how great is the falling off. The number during June of this year registering at the hotels for the complete tour is but 100 greater than last year, when travel was paralyzed by the financial depression, the washouts on the railroad, and the strikes which prevented the movement of trains.

Record of tourists, 1890–1895.

Month.	1890.	1891.	1892.	1893.	1894.	1895.
June	598	527	718	832	320	426
July	1,400	1,016	849	752	263	956
August	1,284	1,225	1,495	726	735	1,088
September	712	809	583	706	317	.....
Total	3,994	3,577	3,645	3,076	1,635	2,470

It is not easy to assign a reason for the diminished travel through the Park, where there are so many wonders and beauties to be seen and where so much is done for the accommodation and comfort of the traveler. It is certain that the volume of travel to Europe is constantly increasing, while that to the Park is barely holding its own, or even going backward. We are constantly informed by visitors that they had no idea of what there was to be seen here; how many attractions the Park trip presented, or how many superior accommodations were offered them. In Germany much of what the Park contains is taught in the public schools, while in this country but little is known of it, even to the educated and the well informed. I would again suggest that some means be adopted for bringing the mass of the people to realize what a store of wonders and beauties they have within their boundaries. It would be valuable to them as a part of an education, even if they should not be able to see the Park for themselves.

As will be seen by the table printed, there were 1,635 tourists who last year made the regular trip, stopping at the hotels. From my system of registry I estimate that there were 1,170 who went through in camping parties with their own or hired transportation for some kind of trip, either longer or shorter than the regular tour. These camping parties have commenced earlier than usual this year, and there is prospect of greatly increased travel in this way. The system of registry established last year has enabled me to keep better account of them and to watch them more closely, and the result has been that I have suffered less from the annoyances that I then complained of.

LEASES.

Under the law of last year new leases have been granted to the Yellowstone Park Association for the sites occupied by it at the Mammoth Hot Springs, at the Fountain, at the Lake, and at the Canyon, and the old leases held at these places were surrendered. Surveys were also made of sites at Norris, the Upper Basin, the Thumb, and at Tower Creek. I believe it is the intention of the association to ask for leases at these points as soon as business will warrant it in erecting structures there for the accommodation of travelers. The passage of this law has extended to 20 acres the limit which may be held under lease by any

corporation or individual, and has diminished to one-eighth of a mile the distance by which leased ground must be separated from any object of interest. As thus modified it is a great improvement on the old law, and surely at no distant time will be taken advantage of by the Yellowstone Park Association, or some other corporation willing and able to expend the necessary funds.

No action has yet been taken on my recommendation, several times repeated, that the Government acquire the two frame cottages owned by the Yellowstone Park Association at the Lower Basin. They are of absolutely no use to the association at the present time, and are much needed for the accommodation of troops that are camped near them every summer and probably will be so quartered for many seasons to come.

A lease for premises to be occupied as a store and post-office by Mrs. Ash has been authorized, and, I presume, will soon be issued. The plans for the building have been forwarded approved. The site is midway between the Mammoth Hotel and the Cottage. A store such as Mrs. Ash proposes to keep is quite a necessity here, as without it there is no place nearer than Gardiner where notions and small articles so necessary to travelers can be procured, and even there the stock is meager and not wholly adapted to the needs of tourists.

A lease has also been authorized for a plat of ground on which Mr. Ole A. Anderson proposes to erect a neat building in which to conduct the business of coating specimens. This will be situated midway between the Cottage Hotel and the building erected last year as a jail, and used also as a residence by the United States commissioner. For this latter building the Government appropriated $5,000. The contract was awarded late in July, and the building was finished in time for occupancy in the early autumn. It is a substantial, well-constructed, secure building and the only one in the Park built of stone. It is situated about 150 yards from the Liberty Cap and about the same distance from the old McCartney building, and at the base of the hill which skirts the Cottage Hotel. Mr. Anderson's lease covers the ground now occupied by his tents.

As soon as Mrs. Ash shall have constructed the building on the ground leased by her I shall expect her to remove the old unsightly log building which now serves her as a residence, store, and post office.

The transfer by Mr. French of his interest in the property near Yancey's and at Soda Butte to his successor as mail carrier has received the approval of the Department. These buildings are now occupied by Mr. Roseborough. I have also permitted him to erect a small building at the Mammoth Hot Springs to be used in connection with his mail contract, to be removed at any time when so ordered by the acting superintendent.

The old trouble concerning licenses granted to outside parties to carry tourists through the Park has not been renewed this year, on account of the wise decision of the Department to only permit such licensees to conduct camping parties. Such licenses have been granted to twelve different parties for from two to five vehicles each, and all seem to be doing a fairly prosperous business. I doubt not that there will be many more applications of this kind received, as the season for camping parties is not yet fairly on. Bassett Brothers have a license for ten wagons, but their route connects with the Utah and Northern Railroad at Beaver Canyon and is over a field not covered by the regular company's coaches, so they in no way interfere, and they are permitted to take passengers to the hotels.

It is a pleasure to note that the various bills for the segregation and dismemberment of the Park were killed in the last Congress through the adverse report of the Secretary of the Interior, in which the committees concurred. It is to be hoped that this wise course will be pursued by coming Congresses, as all such bills are directed to personal gain and not to public interest.

It is not known here what action has been taken in regard to the payment of Mr. Gallagher for his survey of the boundary of the timber reserve. It is certain, however, that his work has no value. He neither began at the initial point of any one of the lines nor did he conspicuously mark these lines. The greatest need of the Park at the present time is that these lines be run with accuracy and be so marked that they would be instantly discoverable by any person who might cross them. So long as the law of the 7th of May, 1894, does not extend to the timber reserve, I would urge that means be taken to survey and locate the lines of the Park itself. While the Park regulations are made to cover the timber reserve, there are no penalties attached to violations of them outside of the Park boundaries proper. I suggest that an effort be made to have a bill passed at the coming session of Congress extending the provisions of this most satisfactory law to the timber reserve.

Two years ago an accurate determination of latitude and longitude was made at a point near the lake outlet by parties sent out by the Coast Survey. No report has yet been received of the result of these observations. I would request to be informed of the correct latitude and longitude of this point, in order that they may be inscribed on the monument already erected there. As this monument is plainly visible from all the distant peaks surrounding the lake, it will be easy to conduct a system of triangulation and accurately locate the lines of the Park astronomically. I would also suggest that monuments be authorized at the easternmost point of the Yellowstone Lake, its most southerly point, and the westerly point of Shoshone Lake, as these are by law the initial points of three of the boundaries of the Park. There will be small expense attached to monumenting these points, and they will serve a definite purpose in properly fixing the lines. I would also endeavor to have inscribed on the monument spoken of the correct altitude of that point, based on a series of levels connecting with the Northern Pacific Railroad survey at Cinnabar.

PROTECTION OF FORESTS.

I have heretofore gone into the subject of protection of forests at such length as to leave but little to say at this time. Last season was noted for the frequency of light rains, which no doubt aided in the prevention of fires. I have once more to report that none of any material consequence occurred during the entire year. I have, therefore, but the one serious fire of July, 1893, to report as occurring since my arrival, and that one I find upon careful examination to have been much less extensive than previously reported. The system of daily patrols from my numerous outposts has done much to prevent fires. My rule is to have a man start every morning from each of these stations, carrying with him a bucket and a shovel with which to thoroughly extinguish any smoldering embers that may be found in the abandoned camps of tourists. These patrols continue on their way until they meet similar patrols from the neighboring station, when, after a short halt, they retrace their steps in the afternoon to their own proper home. In this way

many serious fires are undoubtedly prevented, and to the thoroughness of the system I feel sure most of the good results are due. Whenever camping parties, by their carelessness, leave fires which endanger the forests, arrests are promptly made and the parties brought into this station, where they are tried by the United States commissioner for violation of the Park regulations. Convictions had are freely talked of among the tourists, with the result of making subsequent parties more careful. There have already been twelve convictions for violations of the law of May 7, 1894.

OUTPOSTS.

The work done by the patrols from the various outposts that I have established has continued to give the greatest satisfaction. The duty is hard, involving much riding in summer, exposure to heat and to cold, much snowshoe work in winter, and the incurring of many dangers. I find the freedom and the ease of the life makes this duty very popular with the better class of soldiers, and I have no difficulty in obtaining from the best of men applications for this sort of service.

I have not established any new stations for summer service, but during last winter I added one, which was occupied by a sergeant and three men near the Mud Geyser. The object of this new station was the protection of the bison that winter in the Hayden Valley.

In my last report I noted the death of Private Mathews, of Troop D, Sixth Cavalry, while on detached service from the Riverside Station, going to the Lower Basin for the mail. A most thorough search for his remains was continued for at least six months after his disappearance. His body was found early in June of this year on the south side of the Gibbon River, about 3 miles from its junction with the Firehole. It was evident that he became lost, and while in that condition became crazed and perished from cold.

For this season's work I have been authorized to expend a portion of the appropriation for Park improvement in the employment of additional scouts. As soon as the poaching season fairly begins, I will make such use of this fund as I feel sure will result in important captures, and a few convictions will have a most salutary effect upon game protection.

MILITARY POST.

Although there have been no important additions to the military post, yet many small improvements have been made, and the buildings now constitute a sightly group, as viewed from the porch of the Mammoth Hot Springs Hotel.

It is especially desirable that accommodations for an extra company should be erected at the new post. If it be not found practicable to obtain sufficient funds for the completion of all these buildings within one year, I would urge that at least the barracks for the soldiers and the stables for the horses be erected at once, while the quarters for the officers may await a further allotment.

ROADS.

Soon after my last report was rendered, the control and management of the road work were turned over to me by an order from the Secretary of War. It was then too late in the season to inaugurate any extensive system of road building. Repairs, resulting in material betterment, were, however, instituted. The arch bridge near the Upper Falls of the Yellowstone was completed, and the road at that point thus made pass-

able for travel, but not before the end of the tourist season. The road at the foot of the Virginia Cascade, which had entirely washed out in the spring of last year, was put in a condition to withstand any rise in the water that the springtime might bring. About 2 miles of road in the Gibbon Canyon, which had so washed out as to be almost impassable, were put in a thorough state of repair. A mile of new road was built between here and Gardiner, replacing the old road, which was rendered impassable by the destruction of the bridge over the Gardiner River about a mile and a half below here. By this new road the heavy grades of the old one are entirely avoided, and the experience of this season has shown that it is a much superior thoroughfare.

With the beginning of this season I began work in earnest on the road system. My first object was to put the roads in a thorough state of repair. To this end I made a liberal use of the road machine, filling up the ruts cut by heavy freight wagons in the wet and softened road bed. Following these machines was a man who removed from the track all small stones which were found there, thus saving the jolt caused by them. This, in many places, at small expense, converted a very bad road into a good one.

A new road of full width and easy grades has been constructed down the brink of the Grand Canyon from a point over the Lower Falls to Inspiration Point. I have also had protecting railings put on both Point Lookout and Inspiration Point. The trails leading down to the Lower Falls have been improved, and the dangerous places guarded by hand rails. A new road has been finished from a point on the old road just south of the Alum Creek Bridge, passing round Sulphur Mountain, and joining the old road again near Antelope Creek. A roadway has been opened from the Lake Hotel to the Natural Bridge, so that it now is passable for light wagons. A crew has been working for about a week on the road which was projected along the shore of the lake, near the Thumb, but not heretofore completed. As about 2 miles of this part of the road is very heavy from the covering of loose beach sand, I shall have to surface it with some clayey material, which will not be an inexpensive piece of work. I hope, however, to have it completed within a few days. The road from the Old Faithful to the Upper Crossing of the Firehole has been remade, and a driveway to the Lone Star Geyser opened. I have also made a road passable from the Fountain Hotel around the Constant, or Black Warrior Geyser, and back by way of the Great Fountain. A bridge will soon be completed over the Firehole River just south of the Excelsior Geyser, permitting teams to cross the river at this point and join the direct road in the edge of the woods opposite. A bridge has also been constructed at the old ford near the mouth of the Gibbon Canyon. I have located a new road connecting a point on the old road at the top of the hill beyond the Gibbon Canyon with the same road on the flat about a mile north of the Firehole cottages. This road is already completed for more than half its length, and by August 1 I hope to have it in use. I will also connect this road at its nearest point with the road down the Madison, at the junction of the Gibbon and the Firehole. The balance of this road down the Madison Canyon I shall survey this year, but will leave the construction of it for another season.

In a few days a surveying party will proceed down the Snake River to complete the roadway to Jackson Lake, begun two years ago. As soon as the surveying party can be spared from this last named work it will be put to work locating the proposed road from the Grand Canyon to Yancey's, over Mount Washburn.

When some of the crews now engaged in road repairs can be spared from that work, I shall place them on the road near Cooke City to open out and improve the road in that vicinity.

All of this work is done under the direction of the Secretary of War, but I embody a mention of it in this report in order that you may be informed of the progress made. Of one thing I feel certain, and that is, that the transfer of the control of the road work from a nonresident officer to the acting superintendent has resulted in great saving of appropriation and in much improvement to the roads.

HOTELS.

Mr. J. H. Dean continues to manage the hotels for the Park Association in the same manner as for the last three years. The high standard set by him has not been lowered, but rather improved. Throughout they are neat, clean, and excellently managed. He deserves the greatest praise for the manner in which they have been conducted. The rates, which were $5 per day last year, have been lowered to $4 for this year, with a reduction to $3 after a seven days' stay in the Park. Of course there is an urgent need of a hotel to accommodate tourists at the Upper Geyser Basin, but so long as this property has failed to be remunerative I see but little chance of obtaining the much-desired improvement. A hotel containing a few rooms should also be erected at Norris, and when the road over Mount Washburn is completed a hotel near the mouth of Tower Creek will be a necessity.

TRANSPORTATION.

The only change to be noted in the transportation is the refusal of the Department to grant licenses to any but the Park Transportation Company to take tourists to the hotels. Many licenses are issued, but they are all, except the Bassett Bros., restricted to camping parties. So long as the regular company maintains its very high standard of excellence, it is right and proper that it should be protected in this manner. It has, and is required to have, an expensive plant, always ready to accommodate the greatest volume of travel. Its whole equipment of horses, harness, vehicles, and drivers is of the best. It has a large sum of money invested in this plant and is under bonds to the Government for the faithful execution of its lease and contract. The fact that its prices are fixed by the Department makes it impossible for just complaint of it as having a monopoly. During all of last year the travel was so slight as to make its business a losing one. Thus far this year it has not been much better.

The satisfaction given by it has been so general, the fault found has been so small, that I am constrained to speak of it in the highest terms. So long as the company has not deemed it worth its while to establish a line of coaches to Beaver Canyon, I have thought it best to offer the license over that route to the Bassett Bros., who have satisfactorily done the business for so many years, and they are at present conducting it under the old form of license, a form which is now only used in their case.

One act of the transportation company has met with very general approval, and that is a very liberal extension of stop-over privileges. The company no longer makes an effort to dictate to any passenger by what route, by what means of conveyance, or during what hours he shall make the tour, no matter how impractical, inconvenient, or absurd the various requests may be.

One difficulty in regard to licensed transportation I have not been able to entirely overcome, and that is the hiring by tourists of vehicles from livery establishments. It is often easy for them to pass through with such means of conveyance, claiming them as their own.

I have had less trouble than usual with camping parties leaving unsightly rubbish behind them in their abandoned camps. This is possibly due to the constant warning given them as they stop to register at the point where they enter the Park.

The Boat Company this season is obtaining a large percentage of the travel. It enables parties to reach the Lake Hotel several hours earlier than they would if they remained in the stages, besides furnishing a delightful trip over one of the most beautiful sheets of water in the world. The boat is safe, is clean, and is capable of carrying as many passengers as will ever desire to use it, and is deserving of patronage. The complaints that I have heard in regard to it are principally with regard to high charge, which is unavoidable on account of the small amount of patronage and the great expense of conducting the enterprise. It is a pity that this boat can not be made a part of the regular Park transportation, and be used or not at the will of tourists, without extra expense. At present there seems no good way of accomplishing this result. Mr. Waters, the manager of the Boat Company, is courteous and attentive to the wants and the interests of his passengers. The complaints against him are mostly from overcharge for damage done fishing tackle, and other minor items furnished by him. During the last year he has been granted a license by the Department to sell candies, nuts, and small groceries to camping parties, to do blacksmithing for the same, as well as to take parties to the Natural Bridge by vehicle or on horseback. It was quite necessary that some one should conduct these small enterprises at this point, and Mr. Waters seemed to be the only person desirous of undertaking them, and so far, I believe, has conducted them satisfactorily.

FISHING.

I have little to add to my previous reports on the subject of fishing in the Park. The enormous number taken here by all parties who take the time to cast a line surpasses all belief. The plants of trout put by the Fish Commission in the Gardiner and Willow Creek, in the Firehole and the Nez Perces, now furnish the rarest of sport to those wishing to try the brook trout, the Loch Leven, or the Von Behr. The plant made by the Fish Commission in Shoshone Creek two years ago has prospered, and the stream is now filled with small ones. The only plant that does not seem to have succeeded is that of the rainbow trout in the Gibbon River, above Virginia Cascade. An occasional fish is seen in this part of the river, but they are nearly all large, indicating that for some cause or other they have not propagated satisfactorily.

The black bass sent out by the Commission in December, 1893, reached here at a time when the thermometer was 22 degrees below zero. By the time they reached Norris they were apparently all dead, but they were thrown into the Gibbon River at that point. I have recent reports from a crew building a bridge over the Gibbon near the mouth of the canyon that several had been seen at that point. I had hoped that they were all dead, as it was not my desire to have them in streams where trout either were, or might be planted.

The plant of bass promised for last year was not sent, but about ten days ago five hundred were received at Cinnabar one morning at 11

o'clock, and before night I had them distributed in the lakes which were their destination, more than 50 miles distant from the point where they were received from the car. Every one of this number was healthy and in good condition, and I have strong hopes of soon adding bass fishing to the other pleasures of the Park tour.

Professor Jordan, who had already made several trips through the Park under the auspices of the Fish Commission, passed through last month as a tourist. He was much interested in the progress of the plant which he had been instrumental in making. He said that he believed the large number of trout taken in the Yellowstone Lake did no harm and that those that remained were improved by it. The opinion of this high authority is conclusive as to the fact that there is no need of protection to fish in the lake and the waters of the Yellowstone. It has occurred to me that protection might be needed for those planted in the Gardiner and the Firehole. It is gratifying to note that they were more numerous this year than ever before in both these streams, but, inasmuch as the volume of tourist travel last year was small, perhaps some restrictive measures will be necessary in the future. I do not suggest a closed season, but rather that a regulation be made requiring all fish under a certain length to be returned to the stream. I suggest 6 inches as a minimum length for any fish permitted to be taken in the streams so stocked. Of course the plant of bass will be protected until they have sufficiently increased in numbers to permit of their being taken without endangering their numbers.

WORK DONE.

The work done within the Park during the past year has been confined principally to repairs and construction of roads; of this I have already spoken at some length. As it is now about the middle of the road-making season, it is not easy to exactly specify what has been done. A good deal of it is under way and in a more or less advanced stage of completion. Before the close of this season I wish to have the circuit of the roads as now traveled by tourists under complete construction. I shall also have a beginning made on the Madison Canyon road, and the balance of this road under survey. I shall make a beginning of 5 or 6 miles on the road near Cooke City, working this way. I shall also have opened a road down Snake River to connect with the Wyoming roads, already completed this side of Jacksons Lake as far as the Park line. Lack of funds will prevent my beginning construction of the road over Mount Washburn, but it will be carefully surveyed and the timber cut from at least a portion of it, and it will be ready for the graders when the next appropriation shall become available. Until this road is finished it is useless to think of attempting to macadamize the present roads, unless Congress is far more liberal in its appropriations. If $100,000 were allowed each year for three years it is believed that the roads could be put in such shape that travelers would not be inconvenienced by either mud or dust, and the yearly amount required for repairs would be materially lessened. Until the surveys are completed and I have the reports of the engineers, I shall not be able to estimate the cost of the new roads still needed.

POACHING.

The act of May 7, 1894, seems to have had a most healthy effect upon the poachers who surround and prey upon the Park. I believe that those of the north, the east, and the south sides have nearly or quite

ceased troubling it. I can not say as much as this for the Idaho border. There is a section of country beginning at Henrys Lake and extending south for about 25 miles inhabited by a merciless and persistent lot of head and skin hunters. In most civilized countries the occupation of such vandals as these is held in merited contempt, but it is not so in the region of which I have made mention. The laws of Idaho are extremely deficient in game protective measures. I believe it is a fact that the bison, now so nearly extinct, is not protected at all. So long as the only herd of wild bison now existing in the United States is on the border of this State, liable at any time to cross within its dominion, it would seem that the State would pass the laws necessary to protect them with the most vigorous of punishments. Extended inquiry into various rumors of the killing of bison, either in the Park near the Idaho line or across it within that State, has convinced me that this last remaining herd is in danger of extinction by these people of whom I have made mention. I have good evidence of the killing of at least ten less than two years ago near the State line, but probably outside the Park. This was prior to the passage of the protection act, which has nearly put an end to depredations within the Park. I have undoubted evidence of the capture of three calves this spring by a resident of Henrys Lake. He claims that this capture was made outside the Park. There are rumors of a herd of nearly one hundred having been seen in Idaho outside the Park within the last two or three months. The Park act can afford no protection to these animals after they cross its boundary. I trust every influence will be brought to bear to induce the Idaho authorities to pass a protective law, and to this end I will exert my best endeavor.

A single conviction of a poacher under the law of May 7, 1894, will act as a powerful deterrent on these criminals, and I have no doubt will go far toward settling the question of incursions by depredators for all time.

The only other way in which the Park is liable to be troubled by poachers is in the capture of the fur-bearing animals. It is so easy to place poison or set traps where the eye of the most expert scout can not find them; it is so easy to pack the pelts out of the Park without detection, that it has seemed to me one of the most difficult problems that I have been called upon to handle. Of course the constant system of patrols has done much to enforce the law and the regulations on this subject, and I am pleased to state that the effect has been the best. Evidences multiply on all hands of the constant increase of all of these animals. Four years ago I considered the extinction of the beaver imminent. I now find them multiplied many fold in all of the suitable streams in the Park. Of course some of them fall a victim to the trappers who hang around the borders, but the large central area of the Park is as thoroughly protected as though poachers were nonexistent.

The few elk, deer, antelope, bear, etc., that may fall victims to the hunter's rifle within the Park limits will not in any material sense diminish their numbers, and except, as a matter of example, it would not be worth the trouble of pursuing the poacher who confines his depredations to this kind of game.

GAME.

Last winter there was less snow than ever before known within the Park. It was possible for the larger game, such as bison and elk, to pass at will over most parts of it during the entire winter. For that

reason, perhaps, the bison that have heretofore wintered in the Hayden Valley were not massed there this year. The most seen there in a single bunch at any one time was about thirty. Small herds of from three or four to ten were seen in widely separated localities where they have not usually wintered. I feel sure that many of them did not leave their summer range along the Idaho line. How many of them may have been killed or captured I can not determine, but I fear that their number has not increased, although I am still disposed to adhere to my estimate of last year that two hundred still remain. There has been placed at my disposal by Professor Langley, of the Smithsonian Institution, $3,000 with which to build an inclosure and provide food for so many as can be driven within it during the coming winter. If this plan should succeed we will be able to retain a small herd and keep them nearly in a state of nature. I hope to have this inclosure built by the middle of September.

On account of the mildness of the winter and the early disappearance of the snow it was a particularly favorable season for the rearing of young, and all of the wild animals seen this spring are accompanied by an exceptional number of vigorous and healthy offspring.

From reports received from the station on Snake River, it seems that the moose in that region are rapidly increasing. I have no doubt they are thoroughly protected, and in time will form an important element among the game preserved within the Park.

Of the mountain sheep I have nothing new to report. Their summer habitat is not within my observation, but the usual herds wintered on Mount Everts and were seen almost daily by travelers on the road between here and Gardiner.

The elk have quite held their own or increased in numbers, and have been seen almost daily by tourists up to the present date. They exist within the Park in such great numbers that the question of their preservation is not one that causes any concern. A succession of open winters like the last would possibly make them more numerous than the food supply could well support. That they breed and winter within the Park and wander outside of it to furnish sport for hunters is not an evil, and is perhaps one of the very excuses for game protection within its limits.

The antelope have increased very materially. Certainly eight hundred of them wintered on the flat this side of the town of Gardiner, where this most shy of all wild animals became nearly as tame as domestic cattle.

The deer seem to have increased more rapidly than any other variety of game. I have seen within the last twelve months double the number that I have ever before seen in a similar period. During the winter and the early spring they wander unterrified over the grassy slopes at this point and pass within a few feet of the houses and barracks, exposed to the gaze of the officers and soldiers, without exhibiting the slightest fear.

Bear are as plentiful and as tame as ever, visiting most of the hotels nightly, where they are a source of amusement and entertainment to the tourists. Although they have increased notably, I do not think it is desirable to diminish their numbers. They are not dangerous to human life, and the Park can well spare whatever of the other game they may consume for their sustenance.

The only contributions made to the National Zoological Park at Washington last year were ten beaver, a few of the smaller animals, and some birds. This was, of course, largely due to the fact that I was uncertain

as to whether I would be permitted under the new law to capture and ship them. An affirmative decision on this point came too late in the season to be of any value, for the young were then too large to be captured. I am arranging to make some captures for shipment this autumn.

GEYSERS.

I have had observations made on the eruptions of the geysers covering only such hours of the day as the men stationed thereat were on duty. Eruptions occurring during the night were, as a rule, not observed or included in the report I append for publication. A list of these observations was made last season and published in my last report with a view of counteracting the prevailing opinion that there is a general law of periodicity in their action. Old Faithful, which years ago was carefully observed during all of its eruptions for nearly a month, was found to have a nearly uniform interval of about sixty-eight minutes. It is probable that this interval has slightly increased, but that it is still measurably uniform from one eruption to the next is quite certain. The Fountain Geyser also has a fairly regular action with an interval of about five hours at the present time. This interval seems to be dependent somewhat upon the surface-water supply, being greater in dry months late in the season than in the spring when the supply of surface water is larger. A fairly regular interval has also been noted for the Great Fountain. At the present time its interval is about eight hours.

PROPRIETARY RIGHTS IN THE PARK.

There are still three claims of private citizens for locations and improvements made within the Park limits before the act of dedication. These claims have all been made the subject of special legislation introduced in Congress, but have not so far become laws.

The claim of Mr. J. C. Baronett is for a bridge built by him in 1871 over the Yellowstone River. The amount of the claim is $5,000. I do not regard this figure as excessive, and I recommend that the passage of this act receive your approval.

Mr. James C. McCartney has also a claim for $3,000 for improvements made at this point. It is reasonable and just, and I recommend it to your favorable consideration.

Mr. Matthew McGuirk has a claim for $4,000. I do not believe his improvements were extensive enough to warrant the entire amount of this claim. I have considered the value of these improvements in a special report heretofore made to you. If his claim were reduced to a suitable amount, I would recommend that it receive your approval.

If these bills should pass and the parties receive a proper remuneration for their improvements, it would remove from the Park limits the last vestige of proprietary interest.

RECOMMENDATIONS.

To make a résumé of the recommendations contained in this report, I would request:

First. A special effort to obtain an accurate and complete survey of the boundaries, with a system of blazing or marking, so that they could be instantly recognized wherever crossed.

Second. Liberal appropriations with which to complete the road system, as now approved, and for the most part under construction.

Third. A continuance of these appropriations until the roads are put in such condition as to reduce to a minimum the trouble from mud and dust.

Fourth. The addition to the military post of accommodations for another company.

I wish to extend my thanks to all the officers on duty in the Park for intelligent and zealous assistance in all that tends to its welfare. I wish particularly to acknowledge my indebtedness to Capt. G. L. Scott for the valuable assistance rendered by him.

The meteorological record kept under the direction of Surg. C. M. Gandy is appended, as is also a record of the geyser eruptions at the Upper Basin, kept under the direction of Captain Scott.

Yours, very respectfully,

GEO. S. ANDERSON,

Captain, Sixth Cavalry, Acting Supt. Yellowstone National Park.

The SECRETARY OF THE INTERIOR.

METEOROLOGICAL RECORD.

JULY, 1894.

Date.	Maximum.	Minimum.	Range.	Winds.	Precipitation.	Remarks.
1	80	48	32	S.	.....	
2	71	54	17	W.	0.02	Rain.
3	70	52	18	W.	.03	Rain.
4	74	55	19	W.	.01	Rain.
5	69	53	16	W.	.05	Rain.
6	75	50	22	S.	.....	
7	81	52	29	S.	.....	
8	83	54	29	S.	.....	
9	85	57	28	S.	.....	
10	90	66	24	S.	.....	
11	69	65	4	SW.	.07	Rain.
12	68	56	12	W.	.....	
13	73	52	21	S.	.01	Rain.
14	87	52	35	S.	.04	Rain.
15	83	53	30	W.	.16	Rain.
16	81	52	29	W.	.....	
17	68	57	11	NW.	.....	
18	76	52	24	NW.	.....	
19	83	50	33	W.	.....	
20	84	57	27	S.	.....	
21	84	57	27	S.	.....	
22	84	50	34	S.	.....	
23	88	55	33	S.	.03	Rain.
24	81	56	25	S.	.....	
25	82	54	28	S.	.02	Rain.
26	76	53	23	SW.	.10	Rain.
27	64	48	16	W.	.....	
28	77	47	30	SW.	.20	Rain.
29	83	54	29	S.	.....	
30	85	60	25	S.	.25	Rain.
31	76	52	24	SW.	.....	
Total	2,434	1,685	749	.....	.99	
Mean	78.52	54.36	24.16	S.	.....	

Maximum, 90 on 10th instant; minimum, 47 on 28th instant; total precipitation, 0.99; prevailing winds, south.

AUGUST, 1894.

Date.	Maximum.	Minimum.	Range.	Winds.	Precipitation.	Remarks.
1	76	52	24	W.	.....	
2	76	57	19	W.	.....	
3	79	51	28	W.	.....	
4	85	57	28	S.	.....	
5	81	61	20	W.	.....	
6	78	57	21	S.	0.22	Rain.
7	78	57	21	S.	.....	
8	80	53	27	S.	.....	
9	79	52	27	SW.	.....	
10	83	54	29	S.	.07	Rain.
11	74	57	17	SW.	.....	
12	79	57	22	S.	.....	
13	79	51	27	S.	.04	Rain.
14	75	55	20	SW.	.....	
15	80	49	31	S.	.....	
16	81	50	31	S.	.01	Rain.
17	83	54	29	S.	.....	
18	87	51	36	S.	.....	
19	79	58	21	SW.	.....	
20	83	53	30	S.	.....	
21	86	59	27	S.	.07	Rain.
22	88	56	32	S.	.....	
23	83	58	25	S.	.....	
24	86	58	28	S.	.....	
25	88	56	32	S.	.....	
26	86	57	29	S.	.....	
27	89	54	35	S.	.....	
28	89	56	33	S.	.....	
29	85	55	30	S.	.75	Rain.
30	78	51	27	SW.	.28	Rain.
31	68	58	10	SW.	.31	Rain.
Total	2,520	1,704	816	.....	1.75	
Mean	81.29	54.97	26.32	S.	.....	

Maximum, 89 on 27th instant; minimum, 51 on 30th instant; total precipitation, 1.75; prevailing wind, south.

SEPTEMBER, 1894.

Date.	Maximum.	Minimum.	Range.	Winds.	Precipitation.	Remarks.
1	73	57	16	S.	0.03	Rain.
2	58	57	1	W.	.04	Rain.
3	59	47	12	SW.	.....	
4	65	46	19	SW.	.....	
5	63	50	13	SW.	.....	
6	57	51	6	NW.	.07	Rain.
7	57	51	6	NW.	.....	
8	69	44	25	W.	.....	
9	65	55	10	W.	.....	
10	73	49	24	S.	.....	
11	72	59	13	S.	.08	Rain.
12	62	51	11	SE.	.....	
13	45	42	3	E.	.....	
14	50	40	10	E.	.....	
15	54	47	7	SE.	.....	
16	55	40	15	N.	.....	
17	60	43	17	SW.	.....	
18	72	50	22	S.	.....	
19	68	42	26	S.	.....	
20	68	47	21	N.	.....	
21	68	53	15	N.	.....	
22	53	38	15	N.	.....	
23	54	38	16	N.	.....	
24	73	36	37	S.	.....	
25	74	52	22	S.	.....	
26	69	53	16	NW.	.22	Rain.
27	53	42	11	NW.	.....	
28	44	42	2	N.	.....	
29	55	36	19	NW.	.27	Rain, snow.
30	65	43	22	NW.	.....	
Total	1,853	1,401	452	.....	.71	
Mean	61.77	46.70	15.07	S.	.....	

Maximum, 73 on 1st instant; minimum, 36 on 29th instant; total precipitation, 0.71; prevailing wind, south.

OCTOBER, 1894.

Date.	Maximum.	Minimum.	Range.	Winds.	Precipitation.	Remarks.
1	65	43	22	NW.	.....	
2	65	42	23	NW.	0.02	Rain.
3	55	44	11	W.	.....	
4	65	44	21	S.	.....	
5	65	49	16	S.	.....	
6	54	36	18	N.	.....	
7	48	26	22	N.	.....	
8	54	26	28	N.	.....	
9	51	29	22	NW.	.....	
10	55	27	28	NE.	.....	
11	52	29	23	N.	.....	
12	65	27	38	S.	.....	
13	67	.....	.....	S.	.....	
14	56	.....	.....	N.	.....	
15	56	.....	.....	N.	.....	
16	73	.....	.....	S.	.....	
17	63	.....	.....	S.	.....	
18	57	.....	.....	SW.	.....	
19	49	41	8	N.	.14	Rain.
20	39	35	4	N.	.12	Snow.
21	39	.....	.....	N.	.....	
22	43	.....	.....	S.	.....	
23	63	.....	.....	S.	.....	
24	58	.....	.....	SE.	.25	Rain.
25	50	.....	.....	N.	.....	
26	53	.....	.....	S.	.....	
27	44	.....	.....	N.	.21	Snow.
28	34	.....	.....	N.	.....	
29	30	.....	.....	N.	.....	
30	45	30	15	S.	.15	Snow.
31	39	29	10	N.	.....	
Total	1,661	557	309	.....	.89	
Mean	53.88	34.80	19.03	N.	.....	

Maximum, 73 on 16th instant; minimum, 21 on 8th instant; total precipitation, 0.89; prevailing wind, north; depth of snowfall, 4.05 inches.

NOVEMBER, 1894.

Date.	Maximum.	Minimum.	Range.	Winds.	Precipitation.	Remarks.
1	44	28	16	S.	.....	
2	44	30	14	S.	.....	
3	45	32	13	S.	.....	
4	43	17	26	SE.	.....	
5	55	25	30	S.	.....	
6	57	33	24	SW.	.....	
7	47	39	8	N.	.....	
8	58	38	20	S.	.....	
9	57	39	18	S.	.....	
10	57	30	27	S.	.....	
11	58	33	25	S.	.....	
12	57	38	19	E.	.....	
13	57	27	30	S.	.....	
14	59	39	13	SW.	.....	
15	23	22	1	N.	0.10	Rain.
16	24	—1	25	N.	.....	
17	32	20	12	NW.	.....	
18	42	26	16	NW.	.....	
19	44	32	12	SW.	.....	
20	39	21	18	NW.	.....	
21	36	21	15	NW.	.....	
22	30	10	20	NW.	.....	
23	34	20	14	SW.	.....	
24	44	29	15	S.	.....	
25	49	35	14	S.	.....	
26	52	42	10	S.	.....	
27	46	34	12	SW.	.05	Snow.
28	36	30	6	SW.	.....	
29	35	23	12	W.	.....	
30	33	23	10	W.	.....	
Total	1,328	835	493	.....	.15	
Mean	44.27	27.83	16.43	S.	.....	

Maximum, 58 on 11th instant; minimum, —1 on 16th instant; mean, 36.05; precipitation, 0.15; prevailing winds, south.

DECEMBER, 1894.

Date.	Maximum.	Minimum.	Range.	Winds.	Precipitation.	Remarks.
1	29	7	22	NW.	.....	
2	31	5	26	NW.	.....	
3	33	2	31	N.	.....	
4	38	21	17	W.	.....	
5	38	19	19	W.	.....	
6	39	31	8	SW.	0.40	Snow.
7	27	12	15	SW.	.....	
8	30	15	15	SW.	.....	
9	23	13	10	W.	.10	Snow.
10	26	9	17	W.	.....	
11	23	13	10	SW.	.....	
12	28	10	18	SW.	.....	
13	34	8	26	SW.	.30	Snow.
14	38	14	24	SW.	.20	Snow.
15	25	24	1	W.	.....	
16	28	24	4	W.	.....	
17	35	25	10	W.	.....	
18	39	28	11	W.	.03	Rain.
19	43	23	20	W.	.....	
20	35	33	2	SW.	.....	
21	36	15	21	W.	.....	
22	41	14	27	W.	.20	Snow.
23	26	19	7	W.	.10	Snow.
24	17	3	14	W.	.....	
25	16	—1	17	NW.	.....	
26	11	—7	18	NW.	.....	
27	9	—17	26	NW.	.....	
28	12	—13	24	NW.	.....	
29	12	5	7	W.	.01	Snow.
30	24	—1	25	S.	.....	
31	25	8	17	S.	.....	
Total	871	362	509	.....	1.34	
Mean	28.10	11.68	16.42	W.	.....	

Maximum, 43 on 19th instant; minimum, —17 on 27th instant; mean, 19.89; precipitation, 1.34; prevailing winds, west.

METEOROLOGICAL RECORD—Continued.

JANUARY, 1895.

Date.	Maximum.	Minimum.	Range.	Winds.	Precipitation.	Remarks.
1	26	12	14	SW.	.....	
2	21	16	5	SW.	0.40	Snow.
3	33	2	35	SW.	.70	Snow.
4	33	26	7	SW.	.50	Snow.
5	30	28	2	SW.	.10	Snow.
6	22	15	7	SW.	.....	
7	19	2	17	NW.	.....	
8	24	8	16	NW.	.01	Snow.
9	36	18	18	W.	.....	
10	34	24	10	W.	.....	
11	41	26	15	S.	.03	Snow.
12	40	27	13	W.	.....	
13	38	26	12	W.	.....	
14	22	10	12	N.	.....	
15	10	— 15	25	N.	.....	
16	29	6	23	N.	.40	Snow.
17	30	12	18	NW.	1.60	Snow.
18	30	21	9	NW.	.....	
19	31	24	7	NW.	.40	Snow.
20	26	7	19	NW.	.01	Snow.
21	26	7	19	NW.	.02	Snow.
22	36	15	21	W.	.....	
23	33	23	10	W.	.....	
24	33	11	22	W.	.....	
25	26	— 2	28	NW.	.10	Snow.
26	16	5	11	N.	.....	
27	15	— 23	38	N.	.....	
28	14	— 14	28	N.	.01	Snow.
29	16	2	14	N.	.10	Snow.
30	21	8	13	N.	.30	Snow.
31	22	1	21	N.	.02	Snow.
Total	893	322	511	.....	4.76	
Mean	26.87	10.39	16.50	N	.....	

Maximum, 41 on 11th instant; minimum, — 23 on 27th instant; mean, 18.63; precipitation, 4.76; prevailing winds, north.

FEBRUARY, 1895.

Date.	Maximum.	Minimum.	Range.	Winds.	Precipitation.	Remarks.
1	19	3	16	NW.	0.01	Snow.
2	30	16	14	NW.	.....	
3	32	22	10	NW.	.02	Snow.
4	31	19	12	NW.	.....	
5	28	19	9	N.	.10	Snow.
6	31	13	18	N.	.....	
7	32	— 2	34	N.	.....	
8	28	11	17	N.	.....	
9	23	— 8	31	N.	.....	
10	18	— 19	37	N.	.....	
11	0	— 26	26	N.	.....	
12	14	— 21	35	N.	.....	
13	10	— 10	20	N.	.....	
14	2	— 20	22	N.	.....	
15	25	— 12	37	NW.	.....	
16	27	6	21	NW.	.....	
17	24	10	14	W.	.....	
18	34	17	17	W.	.20	Snow.
19	35	25	10	SW.	.....	
20	39	26	13	SW.	.....	
21	38	30	8	SW.	.....	
22	43	31	12	SW.	.....	
23	42	32	10	SW.	.....	
24	44	24	20	SW.	.....	
25	40	17	23	SW.	.....	
26	42	13	29	SW.	.....	
27	42	22	20	SW.	.....	
28	42	22	20	SW.	.01	Snow.
Total	815	260	555	.....	.34	
Mean	29.11	9.29	19.82	.....	.....	

Maximum, 44 on 24th instant; minimum, — 26 on 11th instant; mean, 19.21; precipitation, 0.34; prevailing winds, northwest and southwest.

MARCH, 1895.

Date.	Maximum.	Minimum.	Range.	Winds.	Precipitation.	Remarks.
1	36	21	15	SW.	.....	
2	25	2	27	SW.	.....	
3	31	— 2	33	W.	.....	
4	28	— 3	31	W.	.....	
5	35	1	34	SW.	.....	
6	31	7	24	S.	.....	
7	36	16	20	S.	.....	
8	44	21	23	S.	.....	
9	44	16	28	SW.	.....	
10	Thermometer broken.	20	.....	W.	.....	
11		24	.....	NW.	.....	
12		5	.....	N.	0.75	Snow.
13		— 8	.....	N.	.35	Snow.
14		— 17	.....	N.	.....	
15		— 10	.....	N.	.....	
16		8	.....	S.	.....	
17		13	.....	SW.	.....	
18		13	.....	SW.	.....	
19		12	.....	N.	.....	
20		19	.....	S.	.....	
21		21	.....	S.	.13	Snow.
22		24	.....	S.	.65	Snow.
23		11	.....	N.	.....	
24		23	.....	S.	.....	
25		33	.....	S.	.....	
26		31	.....	S.	.20	Snow.
27		38	.....	S.	.....	
28		39	.....	S.	.....	
29		27	.....	NW.	.....	
30		18	.....	W.	.71	
31		12	.....	W.	.....	
Total	310	431	295	.....	2.79	

Maximum, 44 on 8th instant; minimum, — 17 on 14th instant; mean, 13.90; total precipitation, 2.79; prevailing winds, south.

APRIL, 1895.

Date.	Maximum.	Minimum.	Range.	Winds.	Precipitation.	Remarks.
1	.....	24	.....	S.	.....	
2	.....	31	.....	SW.	.....	
3	.....	27	.....	SW.	.....	
4	.....	27	.....	SW.	.....	
5	.....	14	.....	N.	.....	
6	.....	11	.....	N.	.....	
7	.....	19	.....	SW.	.....	
8	.....	24	.....	S.	.....	
9	.....	29	.....	S.	.....	
10	.....	32	.....	S.	.....	
11	.....	28	.....	SE.	.....	
12	.....	26	.....	SE.	.....	
13	.....	33	.....	S.	0.33	Rain.
14	.....	39	.....	S.	.....	
15	.....	31	.....	S.	.....	
16	.....	29	.....	N.	.....	
17	.....	39	.....	S.	.....	
18	.....	33	.....	S.	.....	
19	.....	31	.....	S.	.....	
20	.....	32	.....	S.	.....	
21	.....	21	.....	N.	.15	Rain.
22	.....	28	.....	N.	.....	
23	.....	32	.....	S.	.....	
24	.....	32	.....	S.	.....	
25	.....	33	.....	S.	.....	
26	.....	38	.....	S.	.....	
27	.....	36	.....	S.	.....	
28	.....	38	.....	S.	.09	Rain.
29	.....	39	.....	S.	.....	
30	.....	38	.....	NW.	.04	Rain.
Total	.....	884	.....	.....	.61	
Mean	.....	29.47	.....	S.	.....	

Maximum, broken; minimum, 11 on 6th instant; mean of minimum 29.47; precipitation, 0.61; prevailing winds, south.

MAY, 1895.

Date.	Maximum.	Minimum.	Range.	Winds.	Precipitation.	Remarks.
1	.....	36	.....	N.	.....	
2	.....	42	.....	NW.	.....	
3	.....	35	.....	NW.	.....	
4	.....	31	.....	N.	0.01	Rain.
5	.....	32	.....	SE.	.01	Rain.
6	.....	36	.....	SE.	.05	Rain.
7	.....	46	.....	S.	.....	
8	.....	35	.....	N.	.....	
9	.....	29	.....	NW.	.01	0.10 snow.
10	.....	20	.....	NW.	.01	0.10 snow.
11	.....	21	.....	NW.	.....	
12	.....	32	.....	NW.	.....	
13	.....	40	.....	NW.	.....	
14	.....	40	.....	W.	.....	
15	.....	31	.....	W.	.....	
16	.....	28	.....	W.	.....	
17	.....	31	.....	W.	.....	
18	.....	32	.....	S.	.....	
19	65	38	27	SW.	.....	
20	64	35	29	S.	.10	Snow and rain.
21	65	42	23	SW.	.31	Rain.
22	60	36	24	SW.	.....	
23	61	31	30	E.	.....	
24	61	33	28	SW.	.....	
25	68	37	31	SW.	.....	
26	67	42	25	E.	.61	Rain.
27	52	32	20	NW.	.53	Rain and snow.
28	48	26	22	NW.	.01	Snow and rain.
29	47	32	15	SW.	.....	
30	49	36	13	NW.	.....	
31	50	37	13	NW.	.13	Rain.
Total	757	1,052	300	.....	1.68	
Mean	.....	33.93	.....	NW.	.....	

Maximum, broken until 19th instant; minimum, 20 on 10th instant; mean of minimum, 33.93; precipitation, 1.68; prevailing winds, northwest.

JUNE, 1895.

Date.	Maximum.	Minimum.	Range.	Winds.	Precipitation.	Remarks.
1	49	35	14	SW.	0.14	Rain and snow.
2	53	30	23	NW.	.....	
3	54	37	17	NW.	.....	
4	67	33	34	W.	.....	
5	70	43	27	S.	.01	Rain.
6	62	33	29	NW.	.03	Snow and rain.
7	38	30	08	N.	.22	2.20 snow.
8	42	29	13	NW.	.20	2 snow.
9	64	29	33	W.	.....	
10	64	32	32	SW.	.....	
11	66	36	30	S.	.01	Rain.
12	70	36	34	S.	.....	
13	73	48	25	S.	.....	
14	70	42	28	S.	.01	Rain.
15	56	41	15	S.	.....	
16	46	31	15	NW.	.10	1 snow.
17	52	28	24	W.	.06	Snow and rain.
18	60	31	29	W.	.....	
19	65	41	24	W.	.01	Rain.
20	70	40	30	NW.	.13	Rain.
21	78	38	40	SW.	.....	
22	76	43	33	SW.	.01	Rain.
23	79	45	34	W.	.....	
24	65	46	19	NW.	.02	Rain.
25	76	33	43	NW.	.....	
26	79	38	41	NW.	.21	Rain.
27	70	40	30	NW.	.....	
28	79	41	38	NW.	.....	
29	81	46	35	N.	1.55	Rain, hail; heavy thunder storm.
30	75	47	28	SW.	.....	
Total	1,947	1,120	825	.....	.....	
Mean	64.90	37.40	27.50	NW.	.....	

Maximum, 81 on 29th instant; minimum, 29 on 9th instant; mean of maximum, 64.90; mean of minimum, 37.33; total precipitation, 2.71; prevailing winds, northwest.

Observed eruptions of geysers at Upper Basin, Yellowstone National Park.

JUNE, 1894.

		Artemisia.	Beehive.	Castle.	Giant.	Giantess.	Grand.	Oblong.	Splendid.
1	a. m.								
	p. m.								
2	a. m.								
	p. m.								
3	a. m.								
	p. m.								
4	a. m.								
	p. m.	5.20						4.30	8.40
5	a. m.		11.20						
	p. m.	4.15		8.20			5.20	3.30	
6	a. m.			3.20					
	p. m.	5.10	3.15					8.00	
7	a. m.			5.30					
	p. m.							7.30	
8	a. m.								
	p. m.	6.30	4.00						
9	a. m.			7.40					
	p. m.							2.00	
10	a. m.								
	p. m.								3.15
11	a. m.	8.50						9.30	
	p. m.			3.15					
12	a. m.							8.00	
	p. m.								
13	a. m.			6.30					
	p. m.							3.15	
14	a. m.			1.20		a 8.30			
	p. m.	2.15	2.35					5.20	
15	a. m.			9.05					
	p. m.							9.00	
16	a. m.								
	p. m.							7.45	
17	a. m.	10.00	9.00						
	p. m.			12.30				10.45	7.00
18	a. m.			7.20					
	p. m.							7.15	
19	a. m.								
	p. m.								
20	a. m.			10.40					
	p. m.								
21	a. m.	6.30							
	p. m.							5.00	
22	a. m.								
	p. m.								
23	a. m.								
	p. m.	11.45	1.00	12.45				2.30	
24	a. m.								
	p. m.			6.50					
25	a. m.						3.00		
	p. m.		2.30					6.30	
26	a. m.								
	p. m.								5.15
27	a. m.	9.00		9.10					
	p. m.								
28	a. m.							10.30	
	p. m.								
29	a. m.			10.00					
	p. m.		3.10						
30	a. m.								
	p. m.								

a Thirteen hours.

Observed eruptions of geysers at Upper Basin, Yellowstone National Park—Continued.

JULY, 1894.

		Artemisia.	Beehive.	Castle.	Giant.	Giantess.	Grand.	Oblong.	Splendid.
1	a. m.			10.15					
	p. m.	2.30				a 10.45			
2	a. m.		5.00	6.45					
	p. m.							9.50	
3	a. m.		6.30						
	p. m.		5.40	3.30					
4	a. m.	12 m.							
	p. m.			8.00					
5	a. m.								
	p. m.		3.15	8.30	3.45			6.30	
6	a. m.								8.00
	p. m.	1.10		2.30					
7	a. m.								
	p. m.							4.00	
8	a. m.			3.40					
	p. m.								
9	a. m.			11.15					
	p. m.								
10	a. m.	7.00							
	p. m.			5.25				11.15	7.45
11	a. m.								
	p. m.								
12	a. m.			11.45					
	p. m.								
13	a. m.								
	p. m.	4.30							
14	a. m.				5.00			2.00	
	p. m.		4.45	12.30					
15	a. m.								0.00
	p. m.			4.45					
16	a. m.								
	p. m.		4.30	10.15					
17	a. m.								
	p. m.	3.30						6.00	
18	a. m.								
	p. m.		1.50						
19	a. m.								
	p. m.	6.30		12.05					
20	a. m.								
	p. m.		2.00					10.00	
21	a. m.					b 11.35			
	p. m.								
22	a. m.	11.20	8.45	10.55					
	p. m.		8.50					3.30	
23	a. m.						7.10	10.00	
	p. m.			1.30					
24	a. m.								
	p. m.	7.45			8.45		7.20	5.15	
25	a. m.							8.15	
	p. m.	4.15	2.15				9.15	4.00	2.15, 4.30, 6.30, 8.15
26	a. m.								
	p. m.			7.40				8.20	
27	a. m.	8.20						8.15	
	p. m.						8.20		
28	a. m.			11.00					
	p. m.	7.00	2.30					3.10	
29	a. m.			4.30			7.45		
	p. m.							4.15	
30	a. m.							11.30	
	p. m.	9.00	3.15					3.45	
31	a. m.							7.30	
	p. m.	7.15	3.20				9.30	4.50	

a Twenty-one hours. b Fourteen hours.

Observed eruptions of geysers at Upper Basin, Yellowstone National Park—Continued.

AUGUST, 1894.

		Artemisia.	Beehive.	Castle.	Giant.	Giantess.	Grand.	Oblong.	Splendid.
1	a. m.							8.20	
	p. m.	5.30		5.20			10.45	4.15	
2	a. m.								
	p. m.				10.00				
3	a. m.		11.30				6.30	7.20	7.15, 11.30
	p. m.	6.15		5.30					3.45, 7.30
4	a. m.							8.00	6.30, 9.00
	p. m.		12.50						
5	a. m.			10.00					
	p. m.	6.00	1.15				9.00	8.00	
6	a. m.		10.30						
	p. m.	5.30		5.30			8.00	7.00	
7	a. m.		11.30	11.30				8.00	
	p. m.						6.30	3.45	
8	a. m.		11.40				7.15		7.00, 10.00
	p. m.	4.30						4.30	1.30, 5.15
9	a. m.								
	p. m.		1.30				8.20	6.45	
10	a. m.			8.15			7.15	8.00	
	p. m.	7.15	3.00					5.00	
11	a. m.	8.45					7.10	7.00	
	p. m.			6.30					
12	a. m.		11.00		8.30			7.30	7.30, 9.30
	p. m.			7.15			9.30	6.00	3.10, 6.00
13	a. m.								
	p. m.	7.00	1.15						
14	a. m.						6.30	7.30	
	p. m.	6.00	2.00	1.15				4.00	
15	a. m.	7.15	3.15				8.00	8.15	
	p. m.							3.45	
16	a. m.		10.45	10.15			7.30	7.15	
	p. m.								
17	a. m.	8.15	11.15	4.30			6.00	8.00	7.15, 10.00, 12.00, 2.00, 4.00, 6.15
	p. m.							5.15	
								7.30	
18	a. m.			4.00					
	p. m.						11.45		
19	a. m.							7.15	
	p. m.		12.45						
20	a. m.								
	p. m.	6.15	1.50	12.45					
21	a. m.			7.45	7.10				
	p. m.		3.00			a 5.30		3.00	5.15, 7.15, 9.00, 11.15
22	a. m.			6.00					7.15, 9.00, 11.30
	p. m.		7.50						
23	a. m.			11.30				7.10	
	p. m.						7.15	5.00	
24	a. m.								
	p. m.	7.10		5.10			8.00	6.00	
25	a. m.							8.15	
	p. m.	6.30		11.15				3.45	
26	a. m.						7.30		
	p. m.	5.15			3.30			3.30	3.15, 5.00, 7.15, 9.30, 7.30
27	a. m.			8.30				9.00	
	p. m.	6.00							
28	a. m.			3.15				7.15	
	p. m.	8.15	2.00	9.00				5.10	
29	a. m.			6.00			8.00	9.10	
	p. m.	7.00						4.15	
30	a. m.			9.00			9.15		
	p. m.	6.30							3.15, 5.00, 6.45, 9.15, 7.00, 9.00, 11.00
31	a. m.					b 3.30		6.30	
	p. m.	4.15	2.30	4.30				5.10	

a Eight hours. *b* Fourteen hours.

Observed eruptions of geysers at Upper Basin, Yellowstone National Park—Continued.

SEPTEMBER, 1894.

		Artemisia.	Beehive.	Castle.	Giant.	Giantess.	Grand.	Oblong.	Splendid.
1	a. m.								
	p. m.	5.10	11.30	9.00					
2	a. m.								11.30
	p. m.	6.15		5.15	10.15				
3	a. m.						7.15		
	p. m.								
4	a. m.			10.00					
	p. m.	7.00	11.30				8.00		
5	a. m.						6.30		9.15
	p. m.			9.00					
6	a. m.								
	p. m.	5.30							
7	a. m.			11.00			7.15		
	p. m.	3.45							
8	a. m.			7.00			9.45		
	p. m.								
9	a. m.								
	p. m.	6.00							
10	a. m.			6.00					
	p. m.				4.15		8.45	1.30	
11	a. m.								
	p. m.	5.15	5.00	3.15			7.00	3.00	
12	a. m.		2.15	8.15		a 1.00		8.00	12 m.
	p. m.	7.00	8.00					3.15	
13	a. m.							11.00	
	p. m.		3.15	2.30				8.00	
14	a. m.						6.30		
	p. m.	5.15		8.30				7.30	
15	a. m.			7.30					
	p. m.	7.00	10.30						
16	a. m.								
	p. m.	8.00		4.30	5.30				
17	a. m.						8.00	7.00	
	p. m.	4.30							
18	a. m.			10.00				2.30	
	p. m.	7.30					8.30	9.15	9.00, 10.45
19	a. m.			8.15					8.00
	p. m.	6.00						2.30, 8.00	
20	a. m.							11.30	
	p. m.	5.10					7.00		
21	a. m.								
	p. m.			2.30				4.30	
22	a. m.			11.15				8.45	
	p. m.							5.00	
23	a. m.		11.30			b 9.15		10.00	
	p. m.	3.15		2.30				3.00	
24	a. m.		10.30					9.30	
	p. m.			3.15					
25	a. m.				9.00				
	p. m.						5.15	8.00	
26	a. m.			9.00					8.00
	p. m.							3.15	
27	a. m.			8.15			8.00		11.30
	p. m.								(c)
28	a. m.			7.15					11.30
	p. m.						4.30	2.00	3.10, 6.00
29	a. m.			6.30					
	p. m.	5.10					6.15	3.15	
30	a. m.			3.30					
	p. m.	6.00		10.10					

a Forty-two hours. b Eight hours. c 1.00, 3.15, 5.00, 7.00, 9.15.

Observed eruptions of geysers at Upper Basin, Yellowstone National Park—Continued.

JUNE, 1895.

		Artemisia.	Beehive.	Castle.	Giant.	Giantess.	Grand.	Oblong.	Splendid.
1	a. m.								
	p. m.								
2	a. m.								
	p. m.								
3	a. m.								
	p. m.								
4	a. m.			9.15					
	p. m.	6.30							
5	a. m.		4.00	6.10					4.15
	p. m.	5.15			9.30				
6	a. m.			1.15		3.30			
	p. m.	5.10	11.30	4.15					
7	a. m.								
	p. m.	2.30							
8	a. m.						5.15		
	p. m.	4.30							
9	a. m.						6.30		
	p. m.	3.00		1.00			11.15		
10	a. m.								3.30
	p. m.								
11	a. m.			4.00			4.30		
	p. m.	3.15		9.15	8.30				
12	a. m.						8.20		9.15
	p. m.	4.15							1.30
13	a. m.			9.15					7.30
	p. m.	5.10							6.30
14	a. m.						5.30		12.30
	p. m.	3.45		8.30					8.00
15	a. m.						7.15		
	p. m.	4.50					5.00		
16	a. m.			11.30					
	p. m.	7.30							
17	a. m.	9.15							
	p. m.			11.45			6.30		
18	a. m.				8.30	11.30			
	p. m.			5.45					6.30
19	a. m.		5.30	8.45			6.30		9.30
	p. m.	6.30	4.00						7.00
20	a. m.		7.30				7.00		
	p. m.	5.00	5.30						
21	a. m.						7.30		11.30
	p. m.	6.15		12.15					
22	a. m.								
	p. m.	7.00							
23	a. m.			4.30					
	p. m.	5.15							
24	a. m.			4.00			7.00		7.30
	p. m.	4.00			2.30				6.45
25	a. m.			6.30			7.15		1.30
	p. m.	5.30							7.15
26	a. m.			5.30			6.30		
	p. m.	6.00	5.30						2.30
27	a. m.						7.15		10.30
	p. m.	5.00		12.30					
28	a. m.						6.00		
	p. m.	3.45							
29	a. m.	7.15		8.45					11.45
	p. m.				2.30				
30	a. m.						9.00		9.30
	p. m.	8.30							

X

REPORT

OF THE

ACTING SUPERINTENDENT

OF THE

YELLOWSTONE NATIONAL PARK

TO THE

SECRETARY OF THE INTERIOR.

356

1896.

WASHINGTON:
GOVERNMENT PRINTING OFFICE.
1896.

REPORT

OF THE

ACTING SUPERINTENDENT OF THE YELLOWSTONE NATIONAL PARK.

YELLOWSTONE NATIONAL PARK,
OFFICE OF THE SUPERINTENDENT,
Mammoth Hot Springs, Wyo., August 11, 1896.

SIR: Complying with your request of the 2d of July, I submit a report of the operations in the Yellowstone National Park during the fiscal year ended June 30, 1896.

Since my fifth annual report, made under date of July 25, 1895, there have been no changes in the accommodations offered by the park association. The hotel at the Canyon was insecure as to its foundation and settled unequally in different parts, which caused the plastering to loosen and fall off. In the early autumn the foundation was replaced, and this spring the building was entirely replastered and made more presentable; it is now one of the best hotels in the park.

Owing to the financial embarrassment of the Northern Pacific Railroad, which is a large stockholder in the Park Association, there have been no extensive improvements made. The lunch station at Norris should be replaced by a structure capable of affording accommodations for a few guests. A good, substantial hotel should be erected at the Upper Geyser Basin. A hotel is also needed at the Thumb of the Lake, and owing to the considerable travel down Snake River it should have a capacity of twenty or thirty guests. I am led to believe, from conversation with officers of the park association and of the Northern Pacific Railroad, that there is a prospect of better accommodations at all of these places in the near future.

The educative influence of a tour of the park is such as to make it desirable that all should enjoy it. Its distance from the centers of population, of course, makes this impossible; it requires too much time and too large an expenditure of money to reach this spot. But all those who can afford to reach the park should be enabled to make the complete tour, and at a minimum cost. The poorer portion of the public is now satisfactorily looked after by parties who conduct camping tours. There always has been and always will be great difficulty in properly supervising this industry. The conductors are careless about cleaning up their abandoned camp grounds; they are careless about extinguishing their fires, and as a rule they have no sentimental regard for the preservation of the wonders and objects of beauty in the park. The

that the Department should this year limit the number of licenses to the needs of the traveling public, but with the granting of a license to one of the parties this rule was broken, and the desires of all who wished to be allowed to make a living at this business had to be recognized.

A letter just received from D. A. Curry, of Ogden, Utah, who conducts this kind of transportation, contains the statement that he had been advised by one of the officers of the Union Pacific Railroad not to pay the license fee. He says he shall do so under protest, and intimates that the license required is in the interest of the regular hotel and transportation companies, and against the rights and interests of campers. The last party taken through under his guidance registered several complaints against him. There were complaints of unfulfilled promises, of unnecessary delays, and of insufficient food and bad cooking. In order to properly regulate this branch of the business I suggest that Mr. Curry and those who do the business for him be prevented from entering upon it another year.

Up to the present date this year there have been fewer travelers with the licensed teams than at any time during the last four years. This may be accounted for by the fact that the class of people who come in this way have been more embarrassed by the hard times than those who can afford the regular tour, stopping at the hotels.

For Bassett Brothers I have given a license which permits them to take tourists to the hotels, and they are the only ones who have such a one.

By the vigorous disapproval of the Secretary of the Interior all of the bills for the segregation and dismemberment of the park have been killed. These various schemes come up at each successive session of Congress, and some of them may ultimately succeed. It is to be hoped, however, that the good sense of the American people will forever protect this "pleasuring ground" of the nation from the greed of those who would devote it to private gain.

At my request the Secretary of War directed an officer of the Engineer Corps, United States Army, to determine and mark the boundaries of the park. I have for years regarded this as the most important work yet to be accomplished. In obedience to this order, Lieutenant Bromwell reported to me on July 1, and is now engaged in finding and marking the east and south boundary lines. Before he stops work in the autumn I shall have the west boundary line found and the points marked by enduring monuments. I hope in time to have all of the boundaries so marked that they may be recognized wherever crossed.

The correct latitude and longitude of a point near the Lake has been given to me from the Coast Survey, and I am having them carved upon the monument there. I have had a monument erected to mark the east point of the Yellowstone Lake, its south point, and the west point of Shoshone Lake, as well as the initial point of each of the four boundaries of the park. After the season closes I shall have the correct altitude taken and recorded on each of the mileposts, and also upon the monument near the lake.

PROTECTION OF FORESTS.

Last year was the driest in my experience in the park. Early in July all vegetation was so burned that even the grass could be set on fire with a match. I was in a state of great uneasiness until after the first snowfall in September. That there was no serious destruction of the forests was due, I am confident, to the constant vigilance of the

patrols. Many of them discovered campers careless about extinguishing their fires. A few parties were arrested and brought before the United States commissioner and tried and sentenced; a number of others were cautioned, and the effect was magical. More than one hundred smoldering fires were extinguished, any one of which might have caused much damage. The United States Forestry Commission visited the park recently, and at the request of the chairman I drew up for them a résumé of the means taken by me for the protection of our extensive forests from conflagrations. This season has been so moist that we have as yet had no trouble from this cause, but I shall not feel safe until the ground is again covered with snow.

OUTPOSTS.

I have no change to report in the number or location of my outposts. The difficult work of these men on stations has been done for the most part to my entire satisfaction.

By the opening of the road down Snake River in August last I was able for the first time to send a wagon with supplies to the squad stationed there. Up to that date everything had to be carried on the backs of mules. The hut they occupied was built of logs, without a floor. I am happy that I am now able to make them more comfortable.

MILITARY POST.

Notwithstanding my urgent request, no improvement has been made in the military post here. At the present time I am asking for an appropriation for one set of new barracks and one stable at the new post. The cost will not be very great, and the troops here are so constantly in the field during the summer that they deserve good and comfortable quarters for the winter. The troop that is in camp during the tourist season at the Lower Geyser Basin returns here for quarters in October. We are obliged to place it in the old barracks, which is so far distant from the balance of the troops that it is difficult to properly supervise it. I trust your influence will be exerted to secure an appropriation for the needed extension of this post.

ROADS.

Since my last report much progress has been made in the construction of new roads, as well as in repairs of those already in existence. Besides putting existing roads in a thorough state of repair at the beginning of the season, I caused surveys to be made as follows:

First. For a new road from the last crossing of the Gibbon to the Firehole, and up the Firehole to the mouth of the Nez Perce.

Second. Down the Firehole to the mouth of the Gibbon, thence down the Madison to Riverside.

Third. From the Canyon Hotel to Yanceys, over Mount Washburne.

Fourth. From Lewis Lake down the Snake River to the south boundary of the Timber Reserve.

Fifth. From the east boundary of the park near Cooke City to Soda Butte.

At the present time, the first of these roads is entirely completed and is in excellent condition, and a vast improvement over the one previously used.

The second has been fully constructed to the mouth of the Gibbon. A good bridge has been built there, and the timber has been grubbed

out as far as Riverside. The only crossing of the Madison has been bridged, and before work is suspended for the fall 5 miles of the road will have been graded.

Of the third, 9 miles have been grubbed. This includes nearly all of the timber along the route. I expect to have from 5 to 10 miles of this road graded before the close of the present season.

The fourth is completely grubbed. The lower crossing of the Snake River is now being bridged, and by the close of the season I shall have 5 miles of the southern end of the road graded and in good condition. It is already easily passable, and will afford no difficulties whatever after the completion of the bridge. This bridge is absolutely necessary, because Snake River is not usually fordable at this place before the middle of July.

The fifth of these sections has been graded and grubbed for 4 miles, and by the end of the season I hope to have 6 miles of it in use.

The volume of travel by camping parties from points in Wyoming is rapidly increasing. The old road from Cooke City to this point was the worst in the park. Every mile of road constructed here is immediately available for travel. At the present time the condition of the three approaches to the park is: that from the west nearly completed and in very good condition; that from the south open and good, but will require considerable work to finish; that from the east in advanced state, and will be graded as far as Soda Butte before work ceases there. Later in the season I shall have surveys made and definite location established between Yanceys and this point.

My repair crews have done several jobs of new work, resulting in lessening the grades at the very steep pitches on the old roads. This policy will be continued until all of the difficult places are removed. Very many of the old bridges had become insecure, and many of the old culverts were stopped up and failed to perform their function. I have had these replaced over the entire system of roads now in use.

The area of the park is larger than the State of Connecticut. For the improvement and protection of this large domain but $30,000 per year has been appropriated for the several years past. For this season $35,000 has been given. With this very inadequate sum I am expected to keep the existing roads in best repair, to vigorously push the work of construction, to make extensive surveys, and to protect the park from poachers and vandals. There is not an impoverished community occupying a similar area within the limits of the United States that does not yearly devote more money to the single work of road repairs. By the expenditure of $100,000 per year for two years the roads as planned could be completed, all of the approaches to the park could be made good, and all of the prominent points of interest off the regular roads could be made accessible by roads suitable for light vehicles. As soon as this is accomplished every mile of the main road in the park should be surfaced with stone, which would entirely eliminate the discomforts of travel due to mud and dust. The rock which is found everywhere in the park is sufficiently hard and durable for this purpose, as there is but little heavy traffic and the season is very short. I believe that this could be accomplished at the rate of not exceeding $1,000 per mile, or, say, $200,000 for the entire park. With the roads in this condition, all demand for the "trolley" or other "electric" line would cease, and the traveling public would be as thoroughly accommodated as though the tour were made by car.

I have in contemplation the establishment of a bridge across the Yellowstone River above the Upper Falls. The length of span has been

determined, and an architect is now engaged in making the plans. If the expenditure should not prove to be too great, I shall endeavor to have a sightly steel or iron structure erected, over which tourists may pass to view the canyon from the eastern bank.

HOTELS.

For the last five years the management of the hotels of the Yellowstone Park Association has been particularly satisfactory, and each year there is a noticeable improvement. In every part they are thoroughly neat and clean; the service is in every respect excellent. I have heard no complaints of any kind about the way they are conducted, while they are the subject of almost universal praise. To Mr. J. H. Dean, the very efficient manager, every credit is due. It is much to be regretted that they are each year run to a considerable loss to the company. That they furnish such accommodations as are required by the better class of tourists, at the rates charged at watering places near the larger cities, is a matter of much surprise to most visitors. Could the volume of travel be doubled they would be remunerative, and it is hoped that this condition will soon arrive. I do not think that it is desirable that the accommodations should be less, or that the prices should be lowered, yet it seems unlikely that any corporation will continue to indefinitely conduct a losing business.

In addition to the hotels previously mentioned as being needed, one must be put near Tower Falls, or at Yanceys, as soon as the road over Mount Washburne is completed. Yanceys is not kept at a standard which would attract guests; it is where very many of the tourists who stop over a few days at this point would like to visit.

I believe more people would view the beauties of Soda Butte Canyon if accommodations were provided for them at Soda Butte station. I also believe that a small hotel, with accommodations for fifteen or twenty guests, near Snake River would prove profitable to the keeper. These hotels would depend for patronage almost entirely on the people who desire to spend a large part of the summer in the park rather than hasten through it, as do the six-days tourists. Each year, as various new points near the route become accessible, tourists remain longer at each place in order to visit them.

I shall endeavor, before the close of the season, to make a road down the canyon 5 or 6 miles below Inspiration Point, and thus open up a beautiful bit of scenery at present enjoyed by those only who can make the trip on horseback. This will prompt many people to remain an extra day at the Canyon Hotel.

TRANSPORTATION.

In every respect the transportation is conducted the same as last year. Horses, harness, and vehicles are the best procurable in the country. They are kept clean and in thorough repair and running order. There is no overcrowding; there are no avoidable discomforts. An occasional complaint is made of the lack of stop over privileges. The one of most serious nature was made to the Department direct and has been the subject of a special report. I believe that the business is conducted at a profit, and it is the only enterprise in the park that has so far reaped any material reward. It is only natural that the company should object to granting excessive stop-overs, as it materially increases expenses. In every other respect I have nothing but praise of the company and its management.

YELLOWSTONE LAKE BOAT COMPANY.

The boat company is conducted under the same management and by the same parties as last year. The trip is most satisfactory to all who make it, and a very large percentage of tourists use it on their tour. The usual complaint is that parties are obliged to surrender their seat in the stage and to pay extra for the ride on the boat.

Last autumn Mr. Waters, the manager, applied for authority to construct small landing places at several points on the shore of the Lake,—one on Dot Island and one for "ways" near the site of his present landing in front of the hotel. All of these have had my approval.

Mr. Waters has put on Dot Island a few bison, mountain sheep, and elk. Upon each trip he lands the passengers at this point in order that they may see the game, and I believe that it adds not a little to their enjoyment. All these animals were obtained outside the park and shipped into it by Mr. Waters.

FISH.

Since my last report but one plant of fish has been made. In July last year I received word from the United States Fish Commissioner that 1,000 Rainbow trout would be sent me within sixty days. They finally came in December, at a time when the thermometer was nearly zero and when there was 4 to 6 feet of snow on the road over which they had to be transported. I knew the Rainbow trout to be of a kind that sought deep water, so I had them taken to De Lacy Creek, where I knew they would seek the water of Shoshone Lake. I have had no report of them as yet, but from the plant of lake trout sent here in 1889–90, and of brook trout put in Shoshone Creek two years ago, we find there an abundant number.

Until last week no wagon had ever been driven to the shores of this lake, but now that it is accessible I predict it will become one of the most popular resorts that is not on the regular tourist route. The driveway was opened from a point about 5 miles from the Thumb, on the Snake River road, to the outlet of the lake, and I doubt not it will soon be much used by enthusiastic fishermen.

Although thorough search has been made for the black bass planted last July, none have been found. I have no doubt they are thriving, but the 500 sent me would make a small showing in the four large lakes into which they were distributed. I have every hope that they will yet be found.

In all of the streams heretofore stocked I find the fish have multiplied beyond conception. These streams have so many branches leading into canyons far from the line of travel that protective measures are not thought to be necessary. I would, however, suggest that a regulation be made establishing the minimum length for fish that may be taken; 5 or 6 inches would seem to be a proper minimum.

MINOR REGULATIONS.

In the course of five and one-half years' service here the necessity for the publication of a set of minor regulations has become very apparent to me. These regulations need not have the force of those already in existence, nor need they be made subject for judicial cognizance before the Commissioner, but they should contain advice to campers on the subject of extinguishment of their fires, of cleaning up their abandoned camps, cautions about too free use of the mineral water in the park for drinking purposes, directions to make their

camps at such a distance from the road that the tents and other articles about them would not frighten horses, and very many other items useful for them to know and tending to the orderly management and conduct in the park. I shall, as these things occur to me, jot them down, and in time submit a copy of them for your approval.

CLAIMS FOR IMPROVEMENTS IN THE PARK.

Soon after my arrival here in the spring of 1891 I was called upon to make a report regarding the claims of citizens for improvements made prior to the act of dedication. In this report I carefully considered the claims of McCartney, Baronett, and McGuirk. In each Congress since that time a bill has been introduced to reimburse these men for improvements made and taken from them by order of the Government. During the present Congress this bill has passed the Senate and has had a favorable report in the House of Representatives. It is much to be hoped that this measure of relief may become a law, and that these long overdue claims may be settled. The bill as it stands awards Mr. Baronett $5,000, Mr. McCartney $4,000, and Mr. McGuirk $1,000. These sums are equitable and just, and payment of them should not be longer delayed. A proposition has been made to pay the Baronett claim out of the current appropriation for "improvement and protection" of the park, but to this I could not assent, for the reason that the old bridge is now in a state of decay and would not under any circumstances be considered as a work of "improvement." The claim for it and for its use for the last twenty-five years is, however, a just one.

POACHING.

One year ago the Secretary of War authorized the expenditure of $2,000 for the protection of the park. I regarded it as available for the protection of the game from the vandalism of poachers. I at once organized three parties for operations against the merciless freebooters of the Henrys Lake country. One party consisted of two men acting as detectives among the suspected element; another party, also of two men, operated near the Idaho line, and often outside the park; the third party was under the personal charge of Lieutenant Lindsley. The ground covered by the buffalo in their summer range was most thoroughly gone over. Carcasses, or at least a portion of about ten buffaloes were found, all of which had been killed within three or four months. One party of poachers was encountered, but they escaped by flight in the darkness. Unfortunately they were not discovered until near dusk and the pursuit had to be soon discontinued. Soon after this I obtained information that certain parties from that region were offering buffalo scalps for sale in the city of Butte. I had a careful watch kept, and finally arrested James Courtenay, who had in his possession the scalps of four buffaloes. He was brought to this place and had his trial before the United States commissioner. Possession of the trophies was prima facie evidence of his guilt, but no one saw the killing done, and hence no one could swear positively that it was done within the limits of the park. He testified for himself, and his brother, his father-in-law, and a partner in crime testified most positively that the killing was done in Idaho, and without the park. With this positive but untruthful evidence before him the commissioner felt obliged to acquit, but there is not, nor has there been, any doubt in my mind of Courtenay's guilt. The trial, however, proved so expensive to the marauders that its effect upon his neighbors has been excellent.

Later in the season word came to me that several of the citizens of Livingston and Gardiner were killing game near the north line of the park. After a survey of the situation four arrests were made. The principal defense made by these parties was that the killing was done in the 2-mile strip north of the Wyoming line, over which they claimed the United States had no jurisdiction. The decision of the Attorney-General, which was obtained some years since through your office, was decisive on that point. The parties, however, were treated most leniently and let off with a fine of $50 each. The effect of these trials and convictions has been most salutary, and depredations will hereafter be less numerous. Poachers will be more cautious in the future, as they are well aware that they will not again escape with so slight a punishment.

I am now considering and putting into execution plans for the protection of the game the present year, but the trouble has been much lessened by these convictions. For the first time since my residence here the authorities of Wyoming and Montana seem desirous of cooperation in game protection. I gladly lend my aid, and will do all in my power to prevent the promiscuous slaughter which has come so near extinguishing the American big game.

In Idaho nothing has as yet been done, and the authorities seem inclined to encourage this form of lawlessness rather than to aid in its repression.

GAME.

The game continues to increase, and all varieties, excepting the bison, are found in great numbers. During the spring months the elk are found in their several winter ranges in herds of thousands. Deer wander through the post, going within a few feet of the buildings and often as near to the men, who are about their work. The usual herds of mountain sheep and antelope have wintered on Mount Everts and show great increase of number. The carnivora have also increased and have proved objects of interest to tourists.

In the winter coyotes hereabout become so numerous that I at last felt obliged to order the destruction of some of them, but I confined this duty to the authorized scout. I find the young of all of the ruminants especially numerous and in good condition, so that I expect a large increase for the year. I made many collections during the year for the National Zoological Park in Washington, but they were mostly of birds. I have ready now for shipment in the autumn 6 elk, 6 antelope, 4 beaver, and 2 black bear cubs. I will doubtless be able to have enough more by November to fill a car, and thus reduce the relative cost of transportation.

The corral built last fall for the purpose of inclosing a portion of the buffalo herd was visited many times during January and February by a small herd of about eight, and also by many elk. It was intended to shut the herd up and retain them, but it was not done because it was hoped that more would eventually winter there. They did not do so, however, and in course of time this small herd wandered away and was not captured. For some reason the main herd did not winter in Hayden Valley as usual, and on the extensive scouts made by my order during the winter months only about a dozen in all were seen. They were scattered singly and in small bunches over a large portion of the park. Some of them were in positions where they would most likely die before the winter was over. Within the last month I have had several parties out looking for the remnant of the band. One party reported a small bunch of 3 in one place, and of 12 in another.

A second party reported a bunch of 3 in a valley in a distant part of the park, and tracks of a herd of 8 or 9 more, but this herd was not seen. From reports received I feel confident that the majority wintered in the extreme southwest corner of the park, in the Falls River meadows; and I also feel sure that there are now a considerable number east of the Yellowstone River. Taken altogether there is fair certainty of the existence of 25 or 30, and possibly of 50. Whether or not I shall be able to save them remains a doubtful problem. The forces of nature and the hands of man are alike against them, and they seem to be struggling against an almost certain fate.

GEYSERS.

I have the guards keep a table of geyser eruptions. Of course this is not complete, as they take no account of eruptions during the hours of darkness. I have appended it to this report as principally useful in showing that there is very little regularity of period among any of them except Old Faithful.

EXTRA PAY FOR THE ACTING SUPERINTENDENT.

As it is not probable that I shall remain here long enough to receive benefit from next year's appropriations, I do not consider it indelicate to recommend that an extra allowance be made to the superintendent of the park. This principle was recognized many years ago in the extra rations given to post commanders, and especially at certain posts where the burden of entertaining was great. More recently it has been recognized by extra rank, pay, or allowances given to certain officers stationed at West Point, the Military Prison, and at the Carlisle Indian School. Last year the Adjutant-General of the Army made such a recommendation in his annual report, but no further notice was taken of it. The superintendent here has letters of introduction sent him by the hundreds, and the smallest measure of hospitality requires the expenditure of his entire pay in very meager entertaining. There is no station in the Army where so much is expected of an officer, and I trust you will call attention to the necessity for some relief.

RECOMMENDATIONS.

First. I recommend an appropriation of at least $100,000 a year until the road system is completed.

Second. The continuance of this appropriation until the roads are macadamized and put in such condition as to obviate the mud and dust nuisances.

Third. The extension of the military post at this point to accommodate another company.

Fourth. The completion of the work now begun of locating and marking the boundaries. This I regard as one of the most important objects yet to be obtained.

My thanks are due to all the officers on duty in the park for willing and intelligent cooperation, and especially to Capt. G. L. Scott, Sixth Cavalry, for valuable assistance rendered by him.

The meteorological record kept under the direction of Assistant Surgeon Bradley is appended.

GEO. S. ANDERSON,
Captain Sixth Cavalry,
Acting Superintendent Yellowstone National Park.

The SECRETARY OF THE INTERIOR.

METEOROLOGICAL RECORD.

JULY, 1895.

Date.	Maximum.	Minimum.	Range.	Winds.	Precipitation.	Remarks.
1	82	48	34	S.	0.02	Rain.
2	86	50	36	S.	.....	
3	76	55	21	S.	.....	
4	76	50	26	S.	.....	
5	68	42	26	NW.	.01	Rain.
6	60	35	25	NW.	.....	
7	55	35	20	NW.	.02	Rain.
8	61	33	28	SE.	.12	Rain.
9	60	38	22	N.	.03	Rain.
10	65	35	30	NW.	.02	Rain.
11	71	36	35	NW.	.....	
12	78	40	38	S.	.....	
13	79	44	35	NW.	.....	
14	80	46	34	W.	.....	
15	83	49	34	NW.	.....	
16	86	42	38	SW.	.....	
17	79	53	26	N.	.....	
18	69	37	32	SW.	.....	
19	74	41	33	NW.	.01	Rain.
20	75	35	40	W.	.....	
21	72	35	37	NW.	.....	
22	80	44	36	N.	.....	
23	83	43	40	N.	.....	
24	87	52	35	W.	.01	Rain.
25	82	49	33	W.	.....	
26	83	47	36	W.	.....	
27	86	48	38	W.	.....	
28	86	49	37	N.	.01	Rain.
29	80	48	32	NW.	.04	Rain.
30	83	54	29	N.	.06	Rain.
31	84	49	35	W.	.22	Rain.
Total	2,363	1,360	1,003	.....	.57	
Mean	76.23	43.87	32.35	NW.	.....	

Maximum, 87° on 14th instant; minimum, 33° on 8th instant; mean, 60.05°; total precipitation, 0.57; prevailing winds, northwest.

AUGUST, 1895.

Date.	Maximum.	Minimum.	Range.	Winds.	Precipitation.	Remarks.
1	82	54	28	N.	0.02	Rain.
2	80	44	36	N.	.....	
3	77	51	26	S.	.....	
4	80	47	33	N.	.....	
5	81	47	34	N.	.....	
6	85	47	38	S.	.....	
7	76	49	27	S.	.14	Rain, hail.
8	77	38	39	N.	.....	
9	70	37	33	W.	.....	
10	87	36	51	SW.	.....	
11	82	40	42	S.	.....	
12	84	41	43	S.	.....	
13	82	54	28	N.	.....	
14	83	38	45	S.	.....	
15	84	48	36	NW.	.01	Rain.
16	82	47	35	NW.	.....	
17	81	49	32	W.	.....	
18	74	42	32	SW.	.....	
19	83	43	40	SW.	.....	
20	85	43	42	S.	.....	
21	76	53	23	SW.	.....	
22	74	45	29	SW.	.....	
23	76	42	34	SW.	.....	
24	78	44	34	S.	.....	
25	82	44	38	S.	.50	Rain.
26	80	40	40	S.	.....	
27	68	37	31	W.	.....	
28	68	44	24	W.	.05	Rain.
29	71	44	27	S.	.....	
30	75	45	30	S.	.....	
31	79	40	39	S.	.....	
Total	2,442	1,373	1,069	.....	.72	
Mean	78.77	44.29	34.48	S.	.....	

Maximum, 87° on 10th instant; minimum, 36° on 10th instant; mean, 61.53°; precipitation, 0.72; prevailing winds, south.

SEPTEMBER, 1895.

Date.	Maximum.	Minimum.	Range.	Winds.	Precipitation.	Remarks.
1	79	40	39	SW.	.....	
2	80	38	42	S.	.....	
3	71	41	30	SW.	.....	
4	62	41	21	W.	.....	
5	60	41	19	W.	.....	
6	58	36	22	NW.	.....	
7	52	29	23	NW.	0.01	Rain.
8	65	26	39	W.	.....	
9	70	37	33	NW.	.....	
10	72	46	26	NW.	.....	
11	59	43	16	W.	.....	
12	65	38	27	NW.	.....	
13	74	46	28	W.	.....	
14	78	54	24	W.	.....	
15	71	37	34	W.	.....	
16	72	29	43	NW.	.20	Rain.
17	76	30	46	NW.	.....	
18	78	44	34	W.	.....	
19	78	47	31	W.	.....	
20	74	45	29	W.	.01	Snow.
21	52	29	23	N.	.20	Snow.
22	39	0	39	N.	.01	Snow.
23	39	12	27	N.	.....	
24	51	24	27	NW.	.....	
25	61	46	15	W.	.....	
26	62	42	20	W.	.....	
27	65	30	35	W.	.....	
28	69	42	27	S.	.....	
29	55	27	28	W.	.....	
30	70	27	43	S.	.....	
Total	1,957	1,067	890	.....	.43	
Mean	65.23	35.57	29.67	W.	.....	

Maximum, 80° on 2d instant; minimum, 0° on 22d instant; mean, 50.40; precipitation, 0.43; prevailing winds, west.

OCTOBER, 1895.

Date.	Maximum.	Minimum.	Range.	Winds.	Precipitation.	Remarks.
1	63	42	21	SW.	0.01	Rain.
2	56	34	22	SW.	.....	
3	44	35	9	SW.	.02	Rain.
4	50	23	27	W.	.....	
5	61	25	36	SW.	.....	
6	65	33	32	SW.	.....	
7	69	36	33	SW.	.....	
8	67	31	36	SW.	.....	
9	60	43	17	SW.	.....	
10	67	30	37	SW.	.....	
11	67	34	33	SW.	.....	
12	69	37	32	SW.	.....	
13	67	34	33	W.	.....	
14	60	31	29	SW.	.....	
15	67	28	39	SW.	.....	
16	69	29	40	S.	.....	
17	67	31	36	SW.	.....	
18	60	34	26	W.	.....	
19	56	22	34	SW.	.....	
20	68	22	46	SW.	.....	
21	58	21	37	S.	.....	
22	49	16	33	W.	.....	
23	56	20	36	S.	.....	
24	56	22	34	S.	.....	
25	53	28	25	N.	.....	
26	48	27	21	NW.	.41	Snow.
27	44	14	30	S.	.....	
28	54	24	30	S.	.....	
29	50	23	27	NW.	.....	
30	46	24	22	W.	.....	
31	50	23	27	S.	.....	
Total	1,816	876	940	.....	.44	
Mean	58.58	28.26	30.32	SW.	.....	

Maximum, 69° on 7th instant; minimum, 14° on 27th instant; mean, 43.42°; precipitation, 0.44; prevailing winds, southwest.

NOVEMBER, 1895.

Date.	Maximum.	Minimum.	Range.	Winds.	Precipitation.	Remarks.
1	51	36	15	S.	.....	
2	56	46	10	S.	.....	
3	38	24	14	NW.	0.31	Snow.
4	23	15	8	NW.	.41	Snow.
5	24	8	16	NW.	.22	Snow.
6	20	3	17	NW.	.....	
7	23	10	13	S.	.....	
8	27	15	12	SW.	.17	Snow.
9	35	20	15	S.	.....	
10	40	14	26	S.	.....	
11	38	19	19	N.	.....	
12	33	18	15	N.	.05	Snow.
13	32	19	13	N.	.....	
14	35	23	12	SW.	.....	
15	42	29	13	S.	.....	
16	46	34	12	S.	.....	
17	43	31	12	SW.	.....	
18	46	36	10	S.	.....	
19	39	22	17	S.	.....	
20	41	31	10	N.	.....	
21	40	10	30	NW.	.....	Snow traces.
22	10	—4	14	NW.	.....	
23	13	—10	23	NW.	.....	
24	16	0	16	N.	.....	Snow traces.
25	28	12	16	N.	.....	
26	28	19	9	N.	.....	
27	34	27	7	S.	.15	Snow.
28	35	20	15	S.	.....	
29	36	12	24	S.	.....	
30	30	22	28	S.	.....	
Total	1,002	561	441	.....	1.30	
Mean	33.41	18.70	14.70	S.	.....	

Maximum, 56° on 2d instant; minimum, —10° on 23d instant; mean, 26.05°; precipitation, 1.30; prevailing winds, south.

DECEMBER, 1895.

Date.	Maximum.	Minimum.	Range.	Winds.	Precipitation.	Remarks.
1	31	18	13	N.	.....	
2	21	4	17	N.	.....	
3	20	0	20	N.	.....	
4	27	—1	28	SW.	.....	
5	35	20	15	S.	.....	
6	34	27	7	S.	.....	
7	33	25	8	S.	.....	
8	29	17	12	N.	.....	
9	35	20	15	NE.	.....	
10	34	29	5	S.	.....	
11	37	25	12	S.	.....	
12	44	27	17	S.	.....	
13	42	25	17	SE.	0.10	Snow.
14	26	14	12	S.	.....	
15	32	27	5	NW.	.05	Snow.
16	27	8	19	N.	.....	
17	19	8	11	N.	.....	
18	16	0	16	N.	.....	
19	16	6	10	S.	.....	
20	35	15	20	S.	.37	Snow.
21	21	7	14	S.	.....	
22	11	3	8	N.	.....	
23	15	3	12	SW.	.....	Snow traces.
24	15	9	6	NW.	.....	Snow traces.
25	17	10	7	N.	.....	
26	26	15	11	S.	.....	
27	25	15	10	S.	.70	Snow.
28	24	6	18	N.	.....	
29	9	—6	15	N.	.07	Snow.
30	18	7	11	N.	.....	
31	17	5	12	S.	.....	Snow traces.
Total	791	368	403	.....	1.29	
Mean	25.52	12.52	13.00	S.	.....	

Maximum, 44° on 12th instant; minimum, —6° on 29th instant; mean, 19.02°; precipitation, 1.29; prevailing winds, south.

METEOROLOGICAL RECORD—Continued.

JANUARY, 1896.

Date.	Maximum.	Minimum.	Range.	Winds.	Precipitation.	Remarks.
1	28	16	12	S.	0.52	Snow.
2	18	−7	25	N.	.....	
3	16	2	14	N.	.....	
4	28	14	14	N.	.13	Snow.
5	36	22	14	S.	.....	
6	37	25	12	S.	.....	
7	36	18	18	S.	.....	
8	40	25	15	S.	.....	
9	37	24	13	S.	.....	
10	38	31	7	S.	.....	
11	35	13	22	N.	.....	Snow traces.
12	22	−6	28	N.	.....	
13	31	4	27	N.	.....	
14	28	14	14	NW.	.....	
15	14	−6	20	N.	.61	Snow.
16	35	−5	40	S.	.41	Snow.
17	38	32	6	S.	.17	Snow.
18	42	31	11	S.	.05	Rain.
19	38	25	13	N.	.....	
20	48	26	22	S.	.32	Snow, rain.
21	40	34	6	S.	.....	
22	36	22	14	N.	.....	
23	28	13	15	N.	.....	
24	26	19	7	N.	.....	Snow traces.
25	37	18	19	N.	.....	Snow traces.
26	39	29	10	S.	.....	
27	45	22	23	S.	.....	
28	43	29	14	S.	.....	
29	40	24	16	S.	.....	
30	35	22	14	S.	.....	Snow traces.
31	31	10	21	S.	.....	
Total	1,045	540	506	.....	2.21	
Mean	33.70	17.42	16.29	S.	.....	

Maximum, 48° on 20th instant; minimum, −7° on 3d instant; mean, 25.56°; precipitation, 2.21; prevailing winds, south.

FEBRUARY, 1896.

Date.	Maximum.	Minimum.	Range.	Winds.	Precipitation.	Remarks.
1	38	14	24	S.	.....	
2	36	25	11	S.	.....	
3	34	17	17	S.	.....	
4	24	1	23	N.	.....	
5	26	16	10	NW.	0.21	Snow.
6	19	13	6	N.	.40	Snow.
7	17	−5	22	N.	.....	
8	33	13	20	N.	.....	
9	27	18	9	N.	.32	Snow.
10	35	5	30	NW.	.....	
11	25	19	6	SW.	.....	
12	24	15	9	SW.	.....	
13	32	21	11	SW.	.....	
14	37	27	10	NW.	.21	Snow.
15	40	14	26	N.	.....	
16	40	25	15	S.	.....	
17	43	23	20	S.	.....	
18	39	14	25	S.	.....	
19	43	16	27	S.	.....	
20	46	14	32	S.	.....	
21	44	17	27	SW.	.....	
22	34	24	10	NW.	.....	
23	39	6	33	N.	.....	
24	42	20	22	S.	.....	
25	43	23	20	S.	.....	
26	42	31	11	N.	.31	Snow.
27	31	18	13	SE.	.05	Snow.
28	33	25	8	N.	.55	Snow.
29	26	5	21	S.	.02	Snow.
Total	982	474	518	.....	2.07	
Mean	34.21	16.34	17.86	S.	.....	

Maximum, 46° on 20th instant; minimum, −5° on 7th instant; mean, 25.27°; precipitation, 2.07; prevailing winds, south.

MARCH, 1896.

Date.	Maximum.	Minimum.	Range.	Winds.	Precipitation.	Remarks.
1	23	−8	31	N.	0.41	Snow.
2	−4	−20	16	N.	.02	Snow.
3	6	−21	27	N.	.....	
4	20	4	16	W.	.12	Snow.
5	30	8	22	S.	.....	
6	24	3	21	SE.	.....	
7	22	9	13	N.	.....	Snow traces.
8	36	21	15	SW.	.21	Snow.
9	35	19	16	S.	.....	
10	38	17	21	S.	.....	
11	36	25	11	W.	.....	
12	41	20	21	S.	.....	
13	30	17	13	N.	.41	Snow.
14	26	0	26	N.	.....	
15	36	1	35	NW.	.....	
16	32	20	12	NW.	.30	Snow.
17	35	2	33	S.	.....	
18	45	19	26	S.	.....	
19	46	17	29	SW.	.....	
20	41	33	8	SE.	.40	Snow, rain.
21	45	32	13	S.	.....	
22	49	31	18	S.	.....	
23	50	35	15	S.	.....	
24	45	39	6	S.	.07	Snow.
25	46	32	14	S.	.05	Snow.
26	45	34	11	S.	.02	Snow.
27	44	31	13	NW.	.31	Snow.
28	37	25	12	NW.	.05	Snow.
29	34	19	15	N.	.25	Snow.
30	38	17	21	NW.	.....	
31	25	6	19	NW.	.....	
Total	1,050	487	569	.....	2.62	
Mean	34.00	15.71	18.35	S.	.....	

Maximum, 50° on 23d instant; minimum, −21° on 3d instant; mean, 24.88°; precipitation, 2.62; prevailing winds, south.

APRIL, 1896.

Date.	Maximum.	Minimum.	Range.	Winds.	Precipitation.	Remarks.
1	32	0	32	S.	.....	
2	43	10	33	S.	.....	
3	48	20	28	S.	.....	
4	50	23	27	S.	.....	
4	53	29	24	S.	.....	
6	59	33	26	W.	.....	
7	49	31	18	W.	0.03	Snow.
8	40	29	11	S.	.06	Snow.
9	38	27	11	S.	.04	Snow, rain.
10	36	27	9	S.	.59	Snow.
11	34	22	12	NW.	.15	Snow.
12	43	17	26	S.	.....	
13	49	36	13	S.	.05	Rain.
14	44	30	14	S.	.27	Snow.
15	31	18	13	NW.	.....	Snow traces.
16	22	8	14	NW.	.....	Snow traces.
17	19	10	9	NW.	.....	
18	33	12	21	SW.	.....	Snow traces.
19	38	20	18	W.	.....	Snow traces.
20	40	18	22	NW.	.....	
21	48	27	21	SW.	.....	
22	51	30	21	S.	.10	Snow, rain.
23	48	32	16	SW.	.....	
24	55	31	24	S.	.....	
25	58	33	25	S.	.....	
26	60	32	28	S.	.....	
27	47	31	16	S.	.....	
28	47	29	18	SE.	.....	
29	57	28	29	S.	.....	
30	53	33	20	S.	.....	Snow traces.
Total	1,325	726	599	.....	1.29	
Mean	44.17	24.20	19.27	S.	.....	

Maximum, 60° on 26th instant; minimum, 0° on 1st instant; mean, 34.19°; precipitation, 1.29; prevailing winds, south.

MAY, 1896.

Date.	Maximum.	Minimum.	Range.	Winds.	Precipitation.	Remarks.
1	56	29	27	S.	.....	
2	47	29	18	W.	.....	Snow traces.
3	54	34	20	S.	.....	
4	51	37	14	SE.	0.71	
5	43	33	10	NW.	.34	Rain, snow.
6	42	30	12	NW.	.47	Snow.
7	48	32	16	W.	.12	Snow.
8	45	30	15	S.	.29	
9	48	34	14	S.	.16	
10	44	29	15	S.	.11	
11	45	32	13	S.	.05	
12	45	32	13	NW.	.....	Snow traces.
13	41	21	20	NW.	.03	Snow.
14	34	19	15	NW.	.07	Snow.
15	38	22	16	S.	.04	Snow.
16	41	24	17	S.	.....	Snow traces.
17	44	26	18	S.	.....	
18	45	23	22	SW.	.11	Snow.
19	44	32	12	S.	.15	Snow traces.
20	50	30	20	S.	.....	
21	61	30	31	S.	.....	
22	57	39	18	S.	.09	
23	61	36	25	S.	.08	
24	52	39	13	S.	.72	
25	56	33	23	NW.	.04	
26	62	40	22	S.	.....	Slight showers.
27	60	35	25	S.	.12	
28	71	34	37	S.	.....	
29	76	43	33	S.	.....	
30	49	44	5	NW.	.15	
31	65	37	28	NW.	.....	
Total	1,619	1,017	602	.....	3.85	
Mean	52.23	32.81	19.42	S.	.....	

Maximum, 76° on 20th instant; minimum, 19° on 14th instant; mean, 42.52°; precipitation, 3.85; prevailing winds, south.

JUNE, 1896.

Date.	Maximum.	Minimum.	Range.	Winds.	Precipitation.	Remarks.
1	69	40	29	NW.	0.02	
2	65	43	22	NW.	.13	
3	58	40	18	NW.	.16	
4	56	36	20	NW.	.01	
5	64	34	30	NW.	.04	
6	64	38	26	W.	.08	
7	56	36	20	W.	.....	
8	62	36	26	W.	.....	
9	74	43	31	SW.	.25	
10	76	43	33	SW.	.....	
11	57	46	11	SW.	.....	
12	65	32	33	W.	.....	
13	78	39	39	S.	.....	
14	78	45	33	S.	.....	
15	79	43	36	S.	.....	
16	78	46	32	S.	.....	
17	81	46	35	S.	.....	
18	72	52	20	S.	.....	
19	79	40	39	S.	.....	
20	77	42	35	S.	.....	
21	80	43	37	S.	.....	
22	78	49	29	NE.	.05	
23	68	49	19	SE.	.....	
24	73	39	34	NW.	.....	
25	58	39	41	SE.	.....	
26	73	32	19	S.	.....	
27	79	40	39	SE.	.....	
28	79	39	40	S.	.....	
29	79	44	35	S.	.....	
30	85	44	41	S.	.01	
Total	2,140	1,238	902	.....	.73	
Mean	71.33	41.26	30.06	S.	.....	

Maximum, 85° on 30th instant; minimum, 32° on 12th and 26th instant; mean, 56.29°; precipitation, 0.73; winds, south.

Time of eruptions of geysers at Upper Basin, Yellowstone National Park.

JULY, 1895.

Date.		Artemisia.	Beehive.	Castle.	Grand.	Giant.	Giantess.	Splendid.
1	a. m.				7.30			8.30
	p. m.	7.30		3.45			5.10	1.30
2	a. m.		11.00		1.45			
	p. m.	7.15	5.30	3.45		5.00		2.30
3	a. m.		11.30	8.45	7.00			6.30, 11.45
	p. m.	6.30	7.00					5.00
4	a. m.	7.30	11.45		5.30			
	p. m.							4.30
5	a. m.							
	p. m.	5.00			7.15			
6	a. m.			9.15				1.30
	p. m.	7.30			8.30	1.30		
7	a. m.				5.30			5.30
	p. m.	7.30		6.45				
8	a. m.	8.30			7.00			7.45
	p. m.							4.00
9	a. m.			2.00				
	p. m.							
10	a. m.				7.00			
	p. m.			5.30				
11	a. m.	7.30						
	p. m.	8.30			5.30	4.30		
12	a. m.			3.15				3.00
	p. m.				7.00			11.00
13	a. m.	7.30					3.00	3.00, 5.00
	p. m.							6.30
14	a. m.	8.00		4.00				
	p. m.		6.00, 11.45	5.30	6.30			
15	a. m.	5.15						6.30
	p. m.	8.30	5.30	11.45	8.00			
16	a. m.					3.00		
	p. m.				7.00			9.00
17	a. m.	7.15		3.00				1.30, 6.00
	p. m.		3.00		5.30			
18	a. m.	6.30						
	p. m.			9.00	4.30		8.00	
19	a. m.	8.30	7.10					1.30
	p. m.		11.00		5.00			9.00, 11.00
20	a. m.	7.00		12.15				2.30, 6.00
	p. m.				6.00	4.30		
21	a. m.	5.15						
	p. m.			6.00	7.00			
22	a. m.							
	p. m.				5.30			
23	a. m.	7.00		12.30				
	p. m.							6.00, 9.00
24	a. m.	4.30			8.30			3.30
	p. m.	8.00		4.30	6.30	9.30		
25	a. m.			9.00				5.30
	p. m.			11.45	8.00			9.00, 11.00
26	a. m.	2.30	2.00					2.00, 5.00.
	p. m.							7.00
27	a. m.				7.30			7.30
	p. m.	5.00		12.30				
28	a. m.						4.30	
	p. m.	2.30	2.30	1.00		4.00		
29	a. m.		11.45		7.00			
	p. m.	3.30						
30	a. m.		10.30	9.00				2.30, 4.30,
	p. m.	4.30	2.00		6.30			6.30
31	a. m.				7.00			
	p. m.	6.15		3.00				

Time of eruptions of geysers at Upper Basin, Yellowstone National Park—Continued.

AUGUST, 1895.

Date.		Artemisia.	Beehive.	Castle.	Grand.	Giant.	Giantess.	Splendid.
1	a. m.	8.30			8.00			
	p. m.							
2	a. m.			8.30				
	p. m.	5.00				9.00		
3	a. m.	9.00		9.30				
	p. m.				4.30			
4	a. m.		8.00	4.00	7.30		2.30	
	p. m.	2.30	4.00					
5	a. m.				6.30			
	p. m.	5.15	6.40	12.30				7.30
6	a. m.			9.00	5.30			
	p. m.	2.30	12.30			11.45		
7	a. m.			5.30	10.00			6.30
	p. m.	8.30	4.30	9.00				4.00
8	a. m.							6.30
	p. m.	4.30	4.15					
9	a. m.			11.45	7.00			
	p. m.	5.10						4.30
10	a. m.	9.30		8.00		5.10		
	p. m.		1.00		8.00			
11	a. m.							
	p. m.	3.30		1.30			4.30	
12	a. m.	8.00	3.00					
	p. m.			4.30		3.00		
13	a. m.		9.00	11.30	7.30			9.00
	p. m.	4.00						12.15, 3.00, 6.00
14	a. m.		11.30	11.45				6.30
	p. m.	3.00	2.15					
15	a. m.				6.30			
	p. m.	7.20	2.30	4.30				
16	a. m.		11.30		5.30			9.00
	p. m.	4.30						12.30, 3.00, 6.00
17	a. m.			5.00				
	p. m.	2.30				11.30		
18	a. m.				7.00			
	p. m.			3.30				
19	a. m.	8.00			6.30			
	p. m.							2.30, 4.00, 7.30
20	a. m.			5.30	7.00			
	p. m.	5.30						6.30
21	a. m.		2.30, 7.00	4.00			1.30	
	p. m.		5.10	9.00	7.00	9.30		
22	a. m.		6.00					
	p. m.	2.30	6.15	4.00	9.00			
23	a. m.			11.30				
	p. m.							7.30
24	a. m.	9.30			7.30			
	p. m.							4.30, 7.00
25	a. m.			3.30				10.00, 12.00
	p. m.	7.00	4.00					4.00, 6.30
26	a. m.				6.30			
	p. m.							
27	a. m.				6.45	5.30	4.30	
	p. m.	3.30	2.00	2.30				
28	a. m.							11.30
	p. m.	6.30		10.30				2.15, 7.00
29	a. m.				7.00			7.30
	p. m.	4.30		6.30				
30	a. m.				5.30			
	p. m.	3.30		1.30				
31	a. m.							
	p. m.							

Time of eruptions of geysers at Upper Basin, Yellowstone National Park—Continued.

SEPTEMBER, 1895.

Date.		Artesia.	Beehive.	Castle.	Grand.	Giant.	Giantess.	Splendid.
				4.30	6.30			7.30
1	a. m.	7.30				4.30		
	p. m.		11.30	3.30				10.30
2	a. m.				9.30			
	p. m.	10.00		11.30				
3	a. m.				4.30			5.00
	p. m.	4.30					1.30	
4	a. m.		8.00	7.30				
	p. m.	7.30	6.30		7.30			10.00
5	a. m.	9.30	5.30		6.30	9.00		2.30, 5.30
	p. m.							8.30
6	a. m.		4.00	5.00	7.00			
	p. m.	4.30		1.00				
7	a. m.		3.30	8.30	2.30			
	p. m.	8.30						10.00
8	a. m.	7.30						1.30, 3.00,
	p. m.		3.25	1.00	5.30			6.00
9	a. m.							8.00
	p. m.							5.30
10	a. m.	3.30			2.30	4.30		
	p. m.			4.30			6.30	
11	a. m.	2.30			7.00			
	p. m.	8.00		9.30	4.30			8.00
12	a. m.							11.00
	p. m.			5.30	6.30			2.30, 5.30
13	a. m.	5.30						
	p. m.	9.30						
14	a. m.		6.30	7.00	7.00			7.30
	p. m.		6.00					4.00
15	a. m.	4.30	5.30		9.30	6.30		
	p. m.	6.30	5.00	10.30	7.30			
16	a. m.							8.30, 11.30
	p. m.							
17	a. m.	7.00	3.15	9.30	9.30			
	p. m.							
18	a. m.	3.15		1.10		6.30		
	p. m.			9.00	7.30			
19	a. m.	6.30			7.00			7.00
	p. m.			3.15				
20	a. m.				8.50			
	p. m.			9.30				
21	a. m.	2.30			7.30	10.30	3.00	
	p. m.	8.30			8.30			8.30
22	a. m.			12.30				
	p. m.			7.30				
23	a. m.	5.30	11.30		7.30	11.45		
	p. m.							7.30, 10.00
24	a. m.	7.30	2.00	10.30				2.00
	p. m.	9.00	2.00		7.30			
25	a. m.		1.45					5.30
	p. m.	8.30	3.30		5.30			
26	a. m.			12.30				
	p. m.					7.30		8.30
27	a. m.	2.30			1.30			
	p. m.		3.00	5.30				7.30
28	a. m.							3.30, 5.00
	p. m.	8.30			7.30			
29	a. m.			5.00				
	p. m.	10.30						
30	a. m.		2.30, 10.00	9.30	8.30	4.30	8.00	11.45
	p. m.							2.00, 4.00,
								6.00
					4.30			7.30
		2.30						

Time of eruptions of geysers at Upper Basin, Yellowstone National Park—Continued.

JUNE, 1896.

Date.		Artemisia.	Beehive.	Castle.	Grand.	Giant.	Giantess.	Splendid.
1	a. m.							
	p. m.							
2	a. m.							
	p. m.							
3	a. m.							
	p. m.							
4	a. m.							
	p. m.							
5	a. m.							
	p. m.							
6	a. m.							
	p. m.							
7	a. m.							
	p. m.							
8	a. m.						5.00	
	p. m.			4.30				2.15, 4.05
9	a. m.							
	p. m.	6.30			5.30			5.10, 7.15
10	a. m.							
	p. m.	5.30						3.35, 5.40, 8.10
11	a. m.	10.30						9.25, 11.10
	p. m.			10.30		9.30		
12	a. m.				8.30			
	p. m.	4.30						8.05
13	a. m.	9.30						7.30
	p. m.			5.30				
14	a. m.							8.00
	p. m.	6.15		2.00	7.30			3.00
15	a. m.			8.30		6.30		10.15
	p. m.							
16	a. m.				6.30			7.30
	p. m.	7.30		5.30				
17	a. m.							
	p. m.	8.30			9.30			4.30, 6.00
18	a. m.							
	p. m.	7.00			8.00			5.30
19	a. m.			9.30				8.30
	p. m.					8.30		
20	a. m.						9.30	
	p. m.	2.30						5.30
21	a. m.			4.30				7.30
	p. m.							4.00
22	a. m.				8.00			8.30
	p. m.	7.30		4.30				3.10
23	a. m.		10.25					
	p. m.			11.30		9.00		3.40
24	a. m.			11.00	5.30			8.30
	p. m.	7.30	11.30					5.00
25	a. m.	6.30		9.30	6.00			
	p. m.							5.20
26	a. m.					7.30		
	p. m.	7.00						
27	a. m.			11.00	7.30			8.00
	p. m.	6.30						
28	a. m.			6.00				10.00
	p. m.							7.30
29	a. m.			5.30	6.30	6.30		10.30
	p. m.	8.30						3.00
30	a. m.			6.00			4.30	
	p. m.	7.30	10.30					5.45

Time of eruptions of geysers at Upper Basin, Yellowstone National Park—Continued.

JULY, 1896.

Date.		Artemisia.	Beehive.	Castle.	Grand.	Giant.	Giantess.	Splendid.
1	a. m.	9.30	11.45	6.00	7.30			10.30
	p. m.	7.30		7.00	6.00			2.30
2	a. m.			6.00				7.30
	p. m.			5.30				6.00
3	a. m.	6.30						1.30
	p. m.			8.30	8.30			3.30, 6.00
4	a. m.	5.10				11.30		10.30
	p. m.			6.00				6.00
5	a. m.	6.30						
	p. m.							7.30
6	a. m.	7.00			8.30			9.00, 11.30
	p. m.			9.30				
7	a. m.	7.30					4.30	7.30
	p. m.			5.30	5.30			5.00
8	a. m.	5.30						7.00, 10.00
	p. m.				7.30			1.00, 5.00
9	a. m.	7.00						
	p. m.							4.30
10	a. m.	2.45		3.15		10.30		10.00
	p. m.			5.30			5.00	3.15, 6.30
11	a. m.	7.30			8.00			
	p. m.	10.50						2.30
12	a. m.		12.30	8.30				
	p. m.	7.30		10.30	5.30			2.15
13	a. m.		1.30					9.30
	p. m.	9.00						2.00, 4.30
14	a. m.							8.15, 10.30
	p. m.	8.30			7.00			
15	a. m.			1.00		1.30		
	p. m.							7.30
16	a. m.	5.30		1.30				
	p. m.	8.30		9.00	6.30			
17	a. m.							
	p. m.							4.30
18	a. m.	5.30		3.00			4.30	10.00
	p. m.							5.30
19	a. m.		3.30	9.30				
	p. m.				6.00	6.30		8.00
20	a. m.	7.30		6.30				
	p. m.	10.30						
21	a. m.		12.15		7.30			9.30
	p. m.			11.00	8.30			2.30, 5.00
22	a. m.	5.30					9.30	
	p. m.	11.30			7.00			7.30
23	a. m.							11.30
	p. m.	9.30		4.30	6.30			4.00
24	a. m.		12.30					7.30, 9.30
	p. m.			9.30				12.30, 5.00
25	a. m.		1.30		8.30	9.30		
	p. m.							
26	a. m.			4.30				
	p. m.	7.30		11.00	7.00			
27	a. m.	8.30						
	p. m.							2.30, 5.30
28	a. m.				5.30			11.30
	p. m.	3.30						
29	a. m.							
	p. m.	4.00						2.30, 7.30
30	a. m.					10.30		
	p. m.	7.00		4.30				
31	a. m.			11.30				
	p. m.	2.30			9.30			

REPORT

OF THE

ACTING SUPERINTENDENT

OF THE

YELLOWSTONE NATIONAL PARK

TO THE

SECRETARY OF THE INTERIOR.

1897.

WASHINGTON:
GOVERNMENT PRINTING OFFICE.
1897.

REPORT

OF THE

ACTING SUPERINTENDENT OF THE YELLOWSTONE NATIONAL PARK.

YELLOWSTONE NATIONAL PARK,
OFFICE OF THE SUPERINTENDENT,
Mammoth Hot Springs, Wyo., August 31, 1897.

SIR: I have the honor to submit the following report of the condition of affairs and of the management of the Yellowstone National Park for the period from June 23 to August 30, 1897.

The letter of instructions from the Department, dated June 17, 1897, authorizing me to assume charge of the Yellowstone National Park as its acting superintendent, was received by me on June 22, and my administration of affairs commenced on June 23.

The two troops of the Fourth Cavalry that marched from Fort Walla Walla, Wash., on May 20, en route to relieve the two troops of the Sixth Cavalry in the park, did not arrive within the park boundary until June 26. On the 27th they arrived at the lower or Fountain Geyser Basin. Accompanied by my predecessor, Capt. George S. Anderson, Sixth Cavalry, I met the squadron, Fourth Cavalry, on June 27 in the lower Geyser Basin, caused copies of the rules, regulations, and orders to be read and distributed to the officers and men, and gave orders for the proper instructions and posting of detachments to relieve without delay the outpost detachments of the Sixth Cavalry. On July 6 the last outpost detachment of the Sixth Cavalry arrived at Fort Yellowstone from Snake River, and July 8 Captain Anderson, with his squadron, Sixth Cavalry, marched from Fort Yellowstone, en route to Fort Robinson, Nebr.

After my arrival in the park and while awaiting my letter of instructions from the Department my time was occupied in inspecting the outstations, routes of travel, roads, and bridges in the park, and gathering information of the winter and summer habitats of game, numbers of the different species, etc. In the meantime the work of opening the roads for travel progressed under the direction of Captain Anderson, and on June 1 the main route of travel from the north boundary, commencing at Gardiner, going via Mammoth Hot Springs through Golden Gate to Norris Geyser Basin, thence via the Fountain, Upper Geyser Basin, the Thumb, Lake, and Canyon back to Norris Geyser Basin, was open for tourists; also the road from west boundary. The road from the south boundary up Snake River was not open until the latter part of June for wagon transportation.

After commencement of the fiscal year three crews were organized, and the work of repairing roads already opened was prosecuted vigorously. Assistant Engineer Fowble with a small crew continued the work of determining the altitudes at each milepost. All of this was continued to completion under my general direction, and the crews were put to work on the new roads. Seven new bridges have been built, as follows: Over Trout Creek; over Firehole River, at Riverside Geyser; over ravine near west thumb of lake; over Gibbon River, in Virginia Meadows; over Green Creek; footbridge over Firehole River, near Biscuit Basin, and over East Gardiner above the Undine Falls for new road leading from Mammoth Hot Springs to Cooke City; a new bridge is in process of construction over Middle Gardiner on same road. Nine bridges have been repaired, 55 new culverts have been built—some to replace old ones—and 10 have been repaired. Detailed reports are made of this work from time to time to the Quartermaster-General of the Army, and detailed estimates of cost for next year's work are now being prepared and will be forwarded to the Quartermaster-General when completed.

These estimates will embrace the cost of completing, in a substantial manner, the road down the canyons of Lewis and Snake rivers from Thumb Station to the southern boundary of the timber reserve near Jackson's Lake; the road from Mammoth Hot Springs to Cooke City, including combination bridges over Yellowstone and Lamar rivers; projected road from commencement of Grand Canyon, near Canyon Hotel, to Yancey's; Riverside Station to west boundary; for substantial stone or wooden guards on all completed roads at dangerous places (brinks of precipices, etc.); saddle trails to various points of interest; employment of four expert mountaineers, hunters and trappers, as scouts and gamekeepers; annual repairs to roads and bridges, etc.; in all about $250,000.

During the month of July the main roads were in excellent condition, but the unprecedented travel and absence of rain caused those portions of the road made over geyserite to pulverize and break into ugly chuck holes that could not be seen for the dust, causing frequent discomfort to travelers. The remedy for this will be a heavy top dressing of gravel, which will be applied after the close of travel, provided there remains a sufficient balance of the appropriation that may be applied to this purpose.

TRAVEL.

The aggregate number of tourists visiting the park from opening of season (June 1) to August 20 was 8,720. The aggregate number carried through the park over the regular route, by the Yellowstone National Park Transportation Company, was 3,842; those carried by C. J. Bassett, via Beaver Canyon, 59; and by David A. Curry, over the same route, 43; aggregate number carried through by licensed transportation of personally conducted camping parties, 1,255; the aggregate number carried through in private transportation, 3,327; bicyclers, foot travelers, etc., 194. The number of persons taking the trip on Yellowstone Lake who came into the park by the regular transportation company was 1,667; the number of persons taking this trip who went through the park with camping parties was 922.

During the very heavy travel it became necessary to station guards at frequent intervals on the roads to prevent accident and imposition and preserve good order. It was impossible, with such great fields of camps, always to fix the responsibility of unclean camps and unextin-

guished fires on the proper parties. In order to prevent undue monopoly of the choicest camping places, parties were not permitted to camp longer than two days in one place. The campers became so numerous between Gardiner and Mammoth Hot Springs that I was obliged to prohibit camping or grazing of stock in that section after August 1, in order to preserve the grass for the antelope and mountain sheep which winter there. Thoughtless or intentional violations of the rules and regulations and instructions to tourists were very few in comparison to the number of visitors. The foolish desire to write names in conspicuous places, so far as may be judged by manifestations during the season, seems to be limited to the class of campers whose opportunity for education has been very limited or neglected; no cases of violation or trespass by passengers of the regular transportation company have been reported, the result, no doubt, of careful drivers and guides from the hotels. The presence of a United States commissioner in the park and the speedy trial of a trespasser has a wholesome and deterrent effect. A statement of the cases brought before the commissioner is appended (Appendix A).

LEASES.

No violation of stipulations in any lease has come to my knowledge On July 30 Mrs. Jennie H. Ash forwarded through this office $30, in payment of rent for year ending August 7, 1898, on lease dated August 7, 1895; no other rentals have been paid through this office. Upon inquiry it is learned that all other rentals due on leases have been paid direct to the Department in Washington.

During the present season Mr. F. Jay Haynes has erected a log cabin studio in the Upper Geyser Basin, on ground leased April 18, 1896. This cabin is the most beautiful and most appropriate in the park. The logs for side walls were sawed from native live pine on three sides; the fourth or outer side of each log was peeled and shaped with drawknife. After being placed they are held in contact and shape with hardwood maple pins. The inside is finished with Wise basswood, and floored with Oregon pine, oiled. The roof is made of Washington cedar shingles, 4½ inches to the weather. Size of building, 24 by 50 feet, with addition 16 by 16 feet—one story, with 10-foot walls; a shingled porch 10 feet wide along entire east front. The cabin is rustic in appearance throughout.

A two-story frame building, 20 by 30 feet, has been erected by Mr. H. E. Klamer on a site surveyed and platted in Upper Geyser Basin, under a lease to be issued by the Department, but which has not as yet been received. These buildings were commenced under the administration of my predecessor.

The old structures used for dairy purposes, a mile distant in the hills above the Mammoth Hotel and in close proximity to the source of water supply for the hotel, were torn down and the débris burned as a sanitary measure. Dairy conveniences were constructed in Swan Lake Flat, 4 miles distant and out of sight from road, where grass is plentiful, drainage safe, and where snow lies too deep for game to feed in winter.

A statement of the leases now held in the park is hereto appended (Appendix B).

HOTELS.

A thorough inspection of all the hotels and lunch stations was made in June. The conditions as to cleanliness, neatness, and good order were excellent. Mr. J. H. Dean, the president, general manager, and

superintendent of all hotels and lunch stations, seems in every way thoroughly equipped for his duties and, to my observation, is unexceptionally polite, gentlemanly, and obliging to all patrons. He has good and capable managers at all hotels and makes frequent and thorough inspections during the period of travel. The food is of excellent quality, well cooked and well served, the table linen unexceptionable, and the tables decorated with beautiful wild flowers in their season. The heavy outlay required by this association in order to be prepared for any and all contingencies may be inferred from the subjoined record. (Appendix C.)

REGULAR PARK TRANSPORTATION.

A thorough inspection of the coaches, surries, stables, harness rooms, repair and paint shops, was made at the beginning of the season and everything was found to be in excellent condition, employees well organized, work systematized, and to all appearances a thorough discipline maintained. At the date of this first inspection I found present, ready for business, 1 superintendent of stages, 1 foreman of stables, 1 railroad trainman, 1 agent for each hotel in the park, 3 blacksmiths, 1 wagon maker (for repairing), 1 painter, 1 washer, 8 stable men, 2 day herders, 1 night herder, 2 six-horse Concord coaches, 31 four-horse Concord coaches, 4 two-horse surries, 37 drivers, and 144 well-groomed horses. During the month of July another inspection was made, and I found in service 83 regular drivers, 155 temporarily employed drivers, 2 six horse coaches, 83 four-horse coaches and spring wagons, 53 two-horse surries and spring wagons, 22 four-horse and 78 two-horse vehicles in temporary employ, 282 regular team horses, and 412 employed team horses. This does not include extra teams at park stations, nor teams for baggage, for driving to the formations, freighting, etc.

I have always found Mr. S. S. Huntley and his assistants efficient, polite, and obliging. Mr. Huntley is the best manager and handler of coach transportation it has ever been my pleasure to observe. The passenger plant of this company comprises:

	Number.	Seating capacity. Each.	Seating capacity. Total.
	2	20	40
Coaches	30	11	330
Do	22	8	176
Do	17	3	51
Surries	10	5	50
Mountain wagons	5	5	25
Spring wagons	3	10	30
Wagonettes	1	10	10
Buckboard surreys	1	9	9
Do	1	5	5
Do	1	3	3
Do			
Total seating capacity			729
Total number of horses			557

The Lake Boat Company transacted business, so far as my observation extended, in a satisfactory manner. I made several trips on the boat during the season—one in a severe windstorm—and the boat showed herself to be a staunch craft; every portion appeared neat and clean, the employees respectful, and the master, Mr. E. C. Waters, polite, courteous, and obliging. The boat carried of all classes 2,589 passengers on the regular trips, besides many excursion parties of which I have no record.

PROTECTION.

The troops placed under my command for protecting the park were strangers to the geographical and topographical features of the country, and, as already stated, arrived within the park boundary on June 27. The important duties of registering travelers, sealing guns, making out permits, with statements as to intended camps, taking accurate descriptions of arms, inspecting wagons for durability and safety, giving necessary information to visitors, etc., are entirely different from the ordinary routine duties of camp and garrison and require time to become familiar with.

In addition to all these, as the travel rapidly increased, a constant patrol on the roads was necessary to see that camp fires were extinguished, camping grounds left clean, and objects of interest and great natural wonders uninjured. These latter being so numerous and the crowds of visitors and campers becoming so great, in July it required my entire force to protect them and enforce the regulations on the main traveled road. Fully impressed with the necessity for an additional force to enable me to guard the park properly, application was made to the Adjutant-General of the Army on July 14 for an additional force of one troop of cavalry or one company of infantry. This application was not favorably considered, and two important summer outposts had to be abandoned. Knowing the futility of attempting to give adequate protection to the greatest game park in the world, in which are located the greatest wonders of the world, an area (including annexed timber reserve) of 5,000 square miles, I did not hesitate to employ the services of expert hunters, trailers and trappers, for this purpose, and also for the purpose of instructing the soldiers in this duty. It requires the knowledge of an expert hunter, acquainted with the habits and habitats of game, to catch a poacher of large game, and it requires an old trapper to catch a trapper.

On the 14th of August six of the Yellowstone Park Transportation Company's coaches and one United States Dougherty spring wagon were held up by two masked and well armed highwaymen and the occupants robbed of over $500. The robbery occurred between 9 and 10 a. m., on the road leading from the Canyon to Norris Geyser Basin, at a point about 3 miles from the Canyon Hotel, on the Solfatara Plateau. Report of the occurrence reached me at Mammoth Hot Springs about noon. All the means at my disposal—in addition to assurance of a money reward which was not at my disposal—were placed in active operation and continued until the robbers were duly arrested and placed in safe confinement, on the night of August 29. The preliminary examination is set for September 10 before United States Commissioner Meldrum in the park. The history of this case, including result of preliminary hearing, will be the subject of a special report.

There has been but one fire so far this season. A smoke was discovered by a scout from the top of Lake Hotel on August 24 and information by wire reached me at Lower Geyser Basin in the evening. Orders were dispatched by courier to the camp below Fountain Hotel and by wire to Fort Yellowstone. Following is the report of senior officer sent to find and extinguish it:

FORT YELLOWSTONE, WYO., *August 31, 1897.*

SIR: I have the honor to report that, pursuant to verbal orders from Captain Erwin, commanding this post, I left the post at 10 o'clock p. m. on August 24, with Scout Burgess, 11 privates of Troop H, Fourth Cavalry, 4 pack mules, and 110 rations, to find and put out a fire on Astringent Creek. We reached the Canyon Station at 4.10 a. m. the 25th instant, made coffee for the men, and fed the stock. We left the

Canyon at 6 a. m. Burgess accompanied us as far as the Mud Geyser and returned from there. At the ford I found Sergeant Simons, Fourth Cavalry (Troop D), who said that the fire appeared to be on the Sulphur Hills. We crossed the Yellowstone at the Diamond Ford and went up Pelican Creek to the Sulphur Hills, which we reached at 10 a. m. There was no sign of fire; I spent two hours looking for it, and went into camp at 12 m. on a creek 2 miles west of Astringent Creek. Lieutenant Hawkins reported to me at 2 p. m. with the first sergeant and 8 privates of Troop D, Fourth Cavalry. Lieutenant Hawkins had left the camp at Lower Basin with his detachment at 7 p. m. the previous evening. He had no rations and his detachment was fed from the supplies I had brought. Lieutenant Hawkins and I rode and walked to the north of Sulphur Hills and walked to within 100 yards of the edge of the fire, but without discovering it.

On the 26th I sent the sergeant up the creek on which we were camped, with orders to climb the highest hill he could find and look for signs of the fire. He returned at noon and reported that he got lost and returned to camp accidentally. I also sent two men up Astringent Creek, while Lieutenant Hawkins and I climbed the butte between Astringent and Pelican creeks on foot. Scout Morrison came in about noon, and thought the fire must have been up Pelican Creek. That afternoon, from the divide between Astringent and Pelican creeks, we discovered signs of fire on a hill to the west, and started for the place, riding by the sun. Owing to the almost impassable nature of the country, we had to make a detour, and missed the place by a mile. The next morning, the 27th, we found the fire at 9.30 a. m. It began near the head of the creek that empties into Pelican at the Vermilion Springs and ran northeast over the hill to the head of a branch that comes into Pelican 2 miles below the mouth of Astringent Creek. The fire was three-quarters of a mile long and not over 100 yards wide in any place. Over about an acre it had been in the tree tops; the rest of the area it had only burned the fallen timber and done no damage. It was only smoldering, and at 3 p. m. it was practically extinguished. I had camp moved to within a half mile of the fire, and sent Lieutenant Hawkins home with all but seven men. At dark that night it appeared to be completely extinguished.

On the 28th I kept two men on the ground burying every bit of fire that appeared, and on the morning of the 29th I went carefully over the whole ground and found fire in fourteen different places, none bigger than a man's hand. I left two men to watch the fire and brought the rest of the detachment to the Canyon, and returned to the post on the 30th. On this date two men from the Lake Station returned to the scene of the fire, and to-day, the 31st, two men have gone there to extinguish any fire that may be left.

I circled the fire carefully on foot, searching for the trail of any party that might have left it. There was no trail near it. It was in a country very difficult to traverse, and there was no water within a half mile of the fire. There was no sign of lightning having started it, and it must have started from spontaneous combustion in a decaying log, or from friction of two dry trees rubbed together by the wind.

The detachment marched about 130 miles, the first 50 of which was made in twelve hours and with a pack train. The horses returned in good condition.

Respectfully submitted.

ELMER LINDSLEY,
Second Lieutenant, Fourth Cavalry.

The ACTING SUPERINTENDENT YELLOWSTONE NATIONAL PARK.

GAME.

The prevailing impression is that game, buffalo excepted, is increasing in numbers. The black bear have increased rapidly, and have become very annoying. Complaints have come in from Norris Lunch Station, Fountain Hotel, Thumb Lunch Station, Lake Hotel, and from the station of a detachment of soldiers at the Canyon that bears have broken into their storehouses and destroyed meat and other provisions in large quantities. It is a common occurrence to see from 6 to 12 bears any afternoon feeding on the garbage dumps within a few hundred yards of the Fountain Hotel. Among the number is 1 large grizzly. At Norris, Fountain, Thumb, Lake, and Canyon lunch stations and hotels the bears feed daily on the garbage from the kitchens. At least 12 bears might be disposed of to responsible zoological gardens, where desired, for the expense of capturing, which would be small.

The number of buffalo is estimated at 24. An expert hunter, equipped

with a good knowledge of the park, as well as of the habits and habitats of the game therein, is engaged in making thorough observations with a view of estimating closely the number of each species within the park boundaries, including annexed timber reserve. The result of these observations will be included in my supplemental report for this season.

I have consulted with Dr. Frank Baker, superintendent of the National Zoological Park, at Washington, as to the advisability and practicability of corraling the remaining buffalo in the park with a view to their preservation and increase, and our concurrent conclusion is that it has been the experience of most persons engaged in the capture and domestication of wild animals that while the young of two classes to which the buffalo belong may be caught and confined with usually successful results, it is otherwise with adult animals, a large proportion of which fail to adapt themselves to even slight restraint, and die in consequence. As to the practicability, the buffalo remaining in the park are now scattered in very small herds at a number of points far remote from each other. They are mostly in rough, rugged regions, where they could not safely be captured alive, and their ranges are separated by mountains, streams, and canyons of such impassable character that their transportation could not be accomplished without great injury and loss. Even were the advisability of the project free from doubt, the difficulties in the way of its successful accomplishment appear to be insuperable.

The coyotes are numerous and bold. It is estimated that of a herd of 500 antelope that wintered in the valley of the Gardiner and on the slopes of Mount Everts 75 (15 per cent of the herd) were killed by coyotes during the past winter, and many antelope fawns, elk calves, and broods of grouse have been destroyed by them this season. The opinion has been advanced by a few of the friends of the park that if the coyote is exterminated the gopher in time would eradicate the grass from the winter valley ranges. I do not concur in this opinion, and request authority to reduce the number so that they will not hunt in packs.

FISH.

This subject will be discussed in my supplemental report.

CARRYING FIREARMS.

The custom of carrying firearms through the park has been almost universal among those who live in the neighboring States and travel in their own conveyances or on saddle animals accompanied by pack animals. During the first half of the season it was found that many firearms, fastened with red tape and sealing wax at the point of entry, had broken seals at the point of exit. In many cases it was evident that the seals were broken by accident; others showed signs of having been broken and resealed. To remedy this a new system of sealing has been adopted similar to that used by express companies, and the practice of using red tape and sealing wax has been discontinued.

The regulation prohibiting firearms in the park, except on written permission from the superintendent, has been strictly enforced. It is essential to the best interests of the park.

A certain sentiment of hostility toward the park and of antagonism toward the efforts of the authorities to protect the wild animals from destruction has existed and continues to exist among the ranchers and the people of the settlements near the park boundaries. This feeling

of hostility seems to be due to an idea, which prevails widely, that a reservation of any part of the public domain for the perpetual benefit of the whole people is an invasion and an abridgment of the private rights of the people of the adjoining region. This idea naturally arises from an ignorance of the benefits that result from such reservations to the people of the whole country and an equal ignorance of the advantages which accrue to the inhabitants of the immediate vicinity. In consequence of the benefits which have already resulted to this region from the existence of this park as a breeding place from which the surplus game may wander down into the adjoining country where it may be freely taken, and from the opportunities afforded by the park for remunerative employment during the summer season, there is already a marked diminution of this hostile feeling. As these benefits come to be better understood I believe that this hostility will further diminish, and my best efforts shall be devoted to the encouragement of a friendly sentiment toward the park among the citizens of the surrounding country.

I forward herewith latest map of the park, including the annexed timber reserve, showing roads completed, roads projected, roads under construction, roads available but not yet used by the Park Transportation Company, saddle trails, and old wagon trails that may be used as saddle trails.

Several important matters not referred to in this report will be the subjects of special reports, to be submitted at the close of the season. I submit herewith the meteorological record as kept at Fort Yellowstone by the post surgeon, together with a copy of the latest rules and regulations of the park, existing orders, and forms of licenses and permits.

Very respectfully,

S. B. M. YOUNG,
Colonel Third Cavalry, Acting Superintendent.

The SECRETARY OF THE INTERIOR.

METEOROLOGICAL REGISTER, FORT YELLOWSTONE, WYO.

JULY, 1896.

Date.	Maximum.	Minimum.	Range.	Winds.	Precipitation.	Remarks.
1	78	47	31	S.	.....	
2	70	48	22	S.	.....	
3	76	43	33	S.	.....	
4	84	44	40	S.	.....	
5	88	49	39	S.	.....	
6	88	52	36	S.	.....	
7	84	58	26	S.	.....	
8	86	49	37	S.	.....	
9	87	52	35	S.	.....	
10	86	51	35	S.	.....	
11	85	54	31	S.	0.06	Rain.
12	77	52	25	NW.	.67	Rain.
13	77	52	25	E.	.....	
14	81	57	24	S.	.29	Rain.
15	82	50	32	SE.	.25	Rain.
16	79	51	28	SE.	.....	
17	79	49	30	S.	.....	
18	83	46	37	S.	.....	
19	73	46	27	SE.	.....	
20	81	45	36	SE.	.....	
21	64	46	18	N.	.....	
22	67	44	23	N.	.37	Rain.
23	60	43	17	E.	.....	
24	70	37	33	S.	.....	
25	76	47	29	SE.	.01	Rain.
26	72	45	27	E.	.....	
27	74	42	32	S.	.02	Rain.
28	64	52	12	SE.	.07	Rain.
29	76	41	35	S.	.35	Rain.
30	70	41	29	S.	.....	
31	77	43	34	S.	.....	
Total	2,394	1,476	918	.....	2.09	
Mean	77.22	47.61	29.61	S.	.....	

Maximum 88°, on 5th and 6th instant; minimum 37°, on 24th instant; mean, 62.41°; precipitation, 2.09; winds, south.

AUGUST, 1896.

Date.	Maximum.	Minimum.	Range.	Winds.	Precipitation.	Remarks.
1	82	43	39	SE.	.....	
2	78	52	26	S.	.....	
3	79	44	35	S.	.....	
4	65	45	20	SW.	.....	
5	74	38	36	S.	0.03	Rain.
6	77	43	34	SE.	.....	
7	67	49	18	S.	.06	Rain.
8	72	37	35	SE.	.....	
9	72	40	32	S.	.....	
10	77	43	34	S.	.....	
11	77	35	42	NW.	.....	
12	77	36	41	S.	.....	
13	77	38	39	N.	.....	
14	84	40	44	S.	.....	
15	81	46	35	S.	.....	
16	71	50	21	S.	.....	
17	84	48	36	NW.	.06	Rain.
18	82	48	34	SW.	.....	
19	85	53	32	S.	.....	
20	72	50	22	S.	.....	
21	65	53	12	NW.	.....	
22	65	30	35	NW.	.....	
23	76	34	42	S.	.....	
24	80	40	40	S.	.....	
25	73	46	27	W.	.....	
26	81	40	41	S.	.....	
27	84	42	42	S.	.....	
28	86	48	38	W.	.....	
29	84	51	33	S.	.....	
30	84	50	34	S.	.22	Rain.
31	75	47	28	N.	.....	
Total	2,386	1,359	1,027	.....	.37	
Mean	76.96	43.83	33.13	S.	.....	

Maximum 86°, on 28th instant; minimum 30°, on 22d instant; mean, 60.39°; precipitation, 0.37; winds, south.

SEPTEMBER, 1896.

Date.	Maximum.	Minimum.	Range.	Winds.	Precipitation.	Remarks.
1	61	45	16	SW.	.....	
2	64	44	20	S.	0.05	Rain.
3	69	39	30	W.	.....	
4	72	45	27	S.	.....	
5	81	41	40	S.	.....	
6	81	44	37	S.	.....	
7	78	48	30	S.	.....	
8	72	37	35	NW.	.....	
9	40	30	10	NW.	.....	
10	42	21	21	NW.	.....	
11	48	33	15	S.	.23	Rain, snow.
12	49	34	15	S.	.....	
13	57	31	26	SW.	.....	
14	72	35	37	S.	.....	
15	73	38	35	S.	.....	
16	65	35	30	SE.	.....	
17	51	31	20	S.	.....	
18	50	34	16	N.	.....	
19	68	30	38	S.	.....	
20	72	34	38	SW.	.37	Rain.
21	67	45	22	SE.	.....	
22	76	38	38	S.	.....	
23	64	42	22	SW.	.22	Rain.
24	53	41	12	NW.	.23	Rain.
25	43	36	7	NW.	.....	
26	44	26	18	E.	.....	
27	60	25	35	NW.	.....	
28	70	27	43	S.	.....	
29	69	32	37	SE.	.....	
30	70	32	38	S.	.....	
Total	1,881	1,073	808	.....	1.10	
Mean	62.70	35.76	26.94	S.	.....	

Maximum 81°, on 5th and 6th instant; minimum 21°, on 10th instant; mean, 49.23°; precipitation, 1.10; winds, south.

METEOROLOGICAL REGISTER, FORT YELLOWSTONE, WYO.—Continued.

OCTOBER, 1896.

Date.	Maximum.	Minimum.	Range.	Winds.	Precipitation.	Remarks.
1	71	35	38	S.	.....	
2	72	37	35	SE.	.....	
3	61	38	23	S.	0.06	Rain.
4	55	24	31	E.	.....	
5	52	26	26	S.	.....	
6	50	20	30	S.	.....	
7	64	22	42	S.	.....	
8	56	31	25	SW.	.....	
9	45	30	15	NW.	.....	Snow traces.
10	60	24	36	S.	.....	
11	58	25	33	S.	.....	
12	59	27	32	SW.	.....	
13	60	28	32	S.	.....	
14	63	27	36	NE.	.....	
15	61	31	30	S.	.....	
16	62	28	34	SE.	.....	
17	66	33	33	SE.	.....	
18	64	31	33	S.	.....	
19	56	29	27	SE.	.....	
20	59	27	32	S.	.....	
21	53	30	23	S.	.....	
22	53	31	22	SE.	.....	
23	55	22	33	S.	.....	
24	58	23	35	S.	.....	
25	56	30	26	S.	.....	
26	46	27	19	SE.	.....	
27	39	27	12	S.	.....	
28	39	26	13	S.	.....	
29	40	21	19	SW.	.....	
30	40	19	21	S.	.....	Snow traces.
31	38	20	18	SW.	.....	
Total	1,724	749	975	.....	.06	
Mean	55.61	24.16	31.45	S.	.....	

Maximum, 73° on 1st instant; minimum, 19° on 30th instant; mean, 39.88°; precipitation, 0.06; winds, south.

NOVEMBER, 1896.

Date.	Maximum.	Minimum.	Range.	Winds.	Precipitation.	Remarks.
1	30	25	5	NE.	0.60	Snow.
2	32	24	8	SE.	.05	Snow.
3	34	20	14	SE.	.07	Snow.
4	28	21	7	S.	.02	Snow.
5	21	15	6	SE.	.....	
6	24	2	22	NE.	.....	
7	20	1	19	NE.	.....	
8	33	3	30	SE.	.10	Snow.
9	31	21	10	SE.	.25	Snow.
10	32	10	22	NE.	.10	Snow.
11	29	11	18	NE.	.....	
12	36	15	21	S.	.....	
13	42	18	24	SE.	.....	
14	47	34	13	S.	.....	
15	50	38	12	S.	.....	
16	47	40	7	SW.	.....	
17	43	37	6	SW.	.03	Rain.
18	25	19	6	S.	.35	Snow, rain.
19	20	14	6	SE.	.60	Snow.
20	25	7	18	SE.	.20	Snow.
21	38	1	37	S.	.05	Rain.
22	38	20	18	SW.	.40	Snow.
23	27	19	8	S.	.....	
24	22	17	5	N.	.80	Snow.
25	−2	−5	3	NE.	.30	Snow.
26	−10	−15	5	NE.	.....	
27	−11	−26	15	NE.	.....	
28	−4	−27	23	SE.	.....	
29	11	−17	28	SE.	.....	
30	18	−15	33	SE.	.....	
Total	776	327	449	.....	3.92	
Mean	25.86	10.90	14.96	SE.	.....	

Maximum, 50° on 15th instant; minimum, −27° on 28th instant; mean, 18.38°; precipitation, 3.92; winds, southeast.

DECEMBER, 1896.

Date.	Maximum.	Minimum.	Range.	Winds.	Precipitation.	Remarks.
1	30	10	20	SE.	.....	
2	34	22	12	SE.	.....	
3	36	27	9	SE.	.....	
4	39	30	9	E.	.....	
5	33	25	8	SE.	.....	
6	30	15	15	SE.	0.15	Snow.
7	27	16	11	SW.	.....	
8	32	18	15	SW.	.....	
9	39	26	13	SE.	.....	
10	43	24	19	S.	.....	
11	40	22	18	S.	.....	
12	39	22	17	SW.	.....	
13	38	30	8	S.	.10	Snow.
14	33	16	17	SE.	.02	Snow.
15	40	25	15	S.	.10	Snow.
16	31	15	16	S.	.....	
17	34	17	17	SE.	.....	
18	31	16	15	SE.	.....	
19	32	18	14	S.	.02	Snow.
20	36	21	15	S.	.....	
21	33	26	7	SW.	.....	
22	32	14	18	SE.	.....	
23	28	10	18	S.	.....	
24	41	20	21	S.	.....	
25	39	21	18	SE.	.....	
26	35	13	22	S.	.....	
27	36	25	11	S.	.....	
28	40	26	14	SW.	.....	Snow traces.
29	35	22	13	W.	.....	
30	34	15	19	SE.	.....	
31	31	23	8	SE.	.07	Snow.
Total	1,081	630	451	.....	.46	
Mean	34.87	20.32	14.55	SE.	.....	

Maximum, 43° on 10th instant; minimum, 10° on 1st and 23d instant; mean, 27.59°; precipitation, 0.46; winds, southeast.

METEOROLOGICAL REGISTER, FORT YELLOWSTONE, WYO.—Continued.

JANUARY, 1897.

Date.	Maximum.	Minimum.	Range.	Winds.	Precipitation.	Remarks.
1	19	9	10	S.	.....	
2	11	0	11	SE.	.....	
3	12	-1	13	S.	0.02	Snow.
4	17	-6	23	S.	.....	
5	26	12	14	SE.	.....	
6	30	19	11	SW.	.....	
7	35	23	12	SE.	.....	
8	40	19	21	S.	.....	
9	35	13	22	SE.	.....	
10	32	10	22	S.	.....	
11	25	7	18	S.	.....	
12	32	12	20	SE.	.....	
13	28	15	13	SW.	.....	
14	29	2	27	SE.	.....	
15	30	11	19	SW.	.....	
16	22	8	14	NW.	.10	Snow.
17	25	4	21	NW.	.....	
18	35	10	15	SE.	.....	
19	32	12	20	S.	.....	
20	31	18	13	S.	.....	Snow traces.
21	36	25	11	S.	.....	Snow traces.
22	40	32	8	SW.	.....	
23	38	0	38	NW.	.....	
24	2	18	20	N.	1.00	Snow.
25	-12	-25	13	N.	.....	
26	-9	-29	20	SW.	.....	
27	5	-21	26	S.	.....	
28	21	-10	31	S.	.....	
29	30	18	13	S.	.....	
30	37	23	14	S.	.....	
31	35	20	15	SW.	.....	
Total	765	212	553	.....	1.12	
Mean	24.67	6.83	17.84	S.	.....	

Maximum, 40° on 8th and 22d instant; minimum, —29° on 26th instant; mean, 15.75°; precipitation, 1.12; winds, south.

FEBRUARY, 1897.

Date.	Maximum.	Minimum.	Range.	Winds.	Precipitation.	Remarks.
1	40	25	15	S.	.....	
2	35	29	6	NW.	0.07	Snow.
3	34	15	19	SW.	.....	
4	28	19	9	S.	.....	
5	36	26	10	E.	.07	Snow.
6	36	26	10	S.	.12	Snow.
7	33	20	13	S.	.....	
8	34	19	15	S.	.....	
9	30	16	14	S	.....	
10	20	—5	25	SW.	.....	
11	29	12	17	W.	.....	Snow traces.
12	31	16	15	N.	.15	Snow.
13	19	1	18	S.	.....	
14	24	5	19	S.	.....	
15	32	16	16	S.	.....	
16	30	17	13	NW.	.....	Snow traces.
17	20	—2	22	SW.	.....	
18	22	—10	32	SW.	.....	
19	33	9	24	N.	.30	Snow.
20	26	8	18	S.	.....	Snow traces.
21	21	—2	23	NW.	.07	Snow.
22	22	5	17	SW.	.....	
23	19	5	14	SW.	.....	
24	28	9	19	W.	.....	
25	30	10	20	NW.	.02	Snow.
26	30	2	28	W.	.....	
27	36	16	20	W.	.....	
28	40	23	17	S.	.....	
Total	818	330	488	.....	.80	
Mean	29.21	11.79	17.42	S.	.....	

Maximum, 40° on 1st and 28th instant; minimum, —10° on 18th instant; mean, 20.50°; precipitation, 0.80; winds, south.

MARCH, 1897.

Date.	Maximum.	Minimum.	Range.	Winds.	Precipitation.	Remarks.
1	33	12	21	NE.	.....	
2	27	6	21	S.	.22	Snow.
3	37	8	29	S.	.....	
4	31	9	22	W.	.....	
5	25	5	20	NW.	.07	
6	9	4	13	NE.	.....	
7	26	—2	28	SW.	.....	Snow traces.
8	25	9	16	S.	.....	
9	29	14	15	S.	.....	
10	27	18	9	N.	.....	
11	22	-2	24	NE.	.10	Snow.
12	4	—16	20	NE.	.....	
13	7	—17	24	SW.	.....	Snow traces.
14	24	0	24	S.	.....	
15	31	10	21	S.	.....	
16	39	5	34	S.	.....	
17	33	19	14	S.	.....	
18	34	25	9	S.	.....	Snow traces.
19	29	5	24	E.	.07	Snow.
20	30	13	17	N.	.....	
21	23	10	13	N.	.....	
22	22	—11	33	S.	.....	
23	27	15	12	S.	.....	Snow traces.
24	38	21	17	S.	.....	
25	40	33	7	S.	.....	Rain traces.
26	42	34	8	NE.	.....	
27	34	24	10	S.	.....	
28	40	27	13	S.	.....	Snow traces.
29	33	22	11	NW.	.....	
30	25	17	8	NW.	.....	Snow traces.
31	34	19	15	NW.	.....	
Total	880	328	552	.....	1.06	
Mean	28.387	10.580	17.806	S.	.....	

Maximum, 42° on 26th instant; minimum, —17° on 13th instant; mean, 19.48°; precipitation, 1.06; winds, south.

METEOROLOGICAL REGISTER, FORT YELLOWSTONE, WYO.—Continued.

APRIL, 1897.

Date.	Maximum.	Minimum.	Range.	Winds.	Precipitation.	Remarks.
1	34	15	19	NE.	.....	
2	31	23	8	N.	.....	
3	35	19	16	N.	.....	
4	42	20	22	W.	.....	
5	37	25	12	N.	0.47	Snow.
6	38	11	27	NW.	.....	
7	35	26	9	NW.	.....	
8	35	27	8	S.	.....	
9	42	25	17	S.	.....	
10	45	31	14	S.	.02	Snow.
11	39	22	17	NW.	.30	Snow.
12	39	23	16	S.	.....	
13	47	20	27	NW.	.....	
14	50	29	21	S.	.....	Rain traces.
15	51	29	22	S.	.....	
16	61	31	30	S.	.....	
17	60	33	27	SW.	.....	
18	59	33	26	S.	.....	
19	61	31	30	SE.	.....	
20	52	32	20	NW.	.37	Rain.
21	44	32	12	SW.	.....	
22	37	28	9	NW.	.....	Snow traces.
23	50	26	24	S.	.....	
24	54	28	30	W.	.....	
25	61	34	33	S.	.....	
26	63	35	28	S.	.....	
27	60	43	17	SW.	.....	
28	55	25	30	SE.	.05	Rain.
29	54	34	20		.....	
30	63	33	30		.....	
Total	1,415	827	618	.....	1.21	
Mean	48.16	27.57	22.60	S.	.....	

Maximum, 63° on 25th instant; minimum, 11° on 6th instant; mean, 20.6°; precipitation, 1.21; winds, south.

MAY, 1897.

Date.	Maximum.	Minimum.	Range.	Winds.	Precipitation.	Remarks.
1	68	38	34	S.	.....	
2	67	33	34	NW.	.....	
3	72	36	36	S.	.....	
4	75	38	37	SE.	.....	
5	73	39	34	S.	.....	
6	69	41	28	SE.	.....	Rain traces.
7	62	39	23	SE.	.....	
8	47	23	24	S.	0.05	Snow.
9	51	33	18	SE.	.....	Rain traces.
10	56	32	24	S.	.....	
11	60	34	26	NW.	.....	
12	66	40	26	NW.	.....	
13	70	36	34	N.	.....	
14	75	37	38	NW.	.....	
15	76	42	34	S.	.....	
16	73	43	30	SW.	.....	Rain traces.
17	74	41	32	SE.	.....	
18	73	40	33	E.	.....	
19	76	37	39	E.	.....	
20	77	44	33	SE.	.....	Rain traces.
21	66	51	15	NW.	.....	
22	70	40	30	SE.	.....	
23	76	37	39	SW.	.....	
24	71	45	26	SW.	.....	Rain traces.
25	70	45	25	S.	.40	Rain.
26	54	39	15	NW.	.....	Rain traces.
27	70	39	31	S.	.....	
28	75	41	34	SW.	.....	
29	77	44	33	S.	.....	
30	77	44	33	SW.	.10	Rain.
31	70	46	24	NW.	1.00	Rain.
Total	2,137	1,213	924	.....	1.55	
Mean	68.94	39.13	29.80	S.	.....	

Maximum, 77° on 29th, 29th, and 30th instant; minimum, 23° on 8th instant; mean, 29.80; precipitation, 1.55; winds, south.

JUNE, 1897.

Date.	Maximum.	Minimum.	Range.	Winds.	Precipitation.	Remarks.
1	50	36	14	S.	0.5	Rain.
2	47	35	12	NW.	.005	Rain.
3	46	35	11	NW.	.....	
4	54	37	17	N.	.....	
5	59	38	21	NW.	.....	
6	69	36	33	S.	.....	
7	71	45	26	SW.	.....	
8	67	49	18	SE.	.05	Rain.
9	64	39	25	SW.	.04	Rain.
10	68	36	32	SW.	.....	
11	75	40	35	SW.	.....	
12	79	47	32	S.	.....	
13	83	47	36	SW.	.....	
14	82	54	28	SW.	.....	
15	80	52	28	NW.	.40	Rain.
16	59	37	22	S.	.10	Rain, snow.
17	46	33	13	SW.	.....	
18	61	37	24	SW.	.10	Snow.
19	65	40	25	S.	.....	
20	71	40	31	S.	.....	
21	81	41	40	S.	.....	
22	78	46	32	S.	.....	
23	71	43	28	SW.	.1	Rain.
24	53	41	12	NW.	.....	
25	69	41	28	NW.	.....	
26	71	43	28	W.	.....	
27	64	44	20	SE.	.6	Rain.
28	63	42	21	SE.	.3	Rain.
29	66	41	25	S.	.15	Rain.
30	75	47	28	S.		
Total	1,987	1,242	745	.....	2.345	
Mean	66.23	41.40	24.83	S.	.....	

Maximum, 83° on 13th instant; minimum, 37° on 17th instant; mean, 53.81; precipitation, 2.345; winds, south.

METEOROLOGICAL REGISTER, FORT YELLOWSTONE, WYO.—Continued.

JULY, 1897.

Date.	Maximum.	Minimum.	Range.	Winds.	Precipitation.	Remarks.
1	77	52	25	S.	.....	Rain.
2	61	47	14	S.	0.38	Rain.
3	51	39	12	NW.	.15	Rain.
4	55	43	12	S.	.09	
5	68	39	29	NW.	.....	
6	69	48	21	S.	.....	
7	74	44	30	NW.	.....	
8	65	45	20	SW.	.....	
9	73	36	37	W.	.....	
10	78	38	40	S.	.....	
11	85	43	42	S.	.....	
12	89	47	42	S.	.....	
13	84	59	25	SW.	.14	Rain.
14	80	50	30	S.	.....	
15	81	50	31	S.	.....	
16	82	50	32	SW.	.....	
17	68	50	18	NW.	.....	
18	56	36	20	N.	.....	
19	62	32	30	NW.	.....	
20	74	51	23	SW.	.....	
21	79	45	34	S.	.....	
22	78	46	32	SW.	.....	
23	74	45	29	SW.	.....	
24	77	51	26	SW.	.....	
25	78	45	33	SW.	.....	
26	82	42	40	NW.	.....	
27	87	48	39	SW.	.....	
28	89	42	47	SW.	.....	
29	84	49	35	SW.	.....	
30	82	57	25	SE.	.35	Rain.
31	80	47	33	SW.	.....	
Total	2,340	1,416	901	.....	1.11	
Mean	74.806	45.677	29.129	SW.	.....	

Maximum 89°, on 12th and 28th instant; minimum 32°, on 19th instant; mean, 60.24°; precipitation 1.21; winds, southwest.

AUGUST, 1897.

Date.	Maximum.	Minimum.	Range.	Winds.	Precipitation.	Remarks.
1	74	43	31	S.	.....	
2	70	41	29	NW.	.....	
3	74	42	31	NW.	.....	
4	80	48	32	SW.	.....	
5	82	51	31	S.	.....	
6	84	50	34	S.	.....	
7	82	50	32	SW.	.....	
8	76	51	35	SW.	0.15	Rain.
9	73	53	20	S.	.26	Rain.
10	81	49	32	S.	.16	Rain.
11	85	51	34	S.	.....	
12	76	49	27	SW.	.....	
13	71	52	19	SW.	.....	
14	74	40	34	NW.	.....	
15	77	42	35	S.	.....	
16	80	43	37	NW.	.....	
17	79	48	31	NW.	.....	
18	77	42	35	NW.	.....	
19	80	42	38	NW.	.....	
20	81	42	39	NW.	.....	
21	81	41	29	SE.	.....	
22	77	48	29	NW.	.....	
23	83	46	37	W.	.....	
24	88	51	37	NW.	.....	
25	81	50	31	NW.	.....	
26	79	37	42	W.	.....	
27	80	46	34	SW.	.....	
28	81	47	34	W.	.....	
29	83	40	43	SW.	.....	
30	81	50	31	S.	.....	
31	61	50	14	SW.	.....	
Total	2,435	1,438	997	.....	.57	
Mean	78.54	46.38	32.16	NW.	.....	

Maximum 88°, on 24th instant; minimum 37°, on 26 instant; mean, 62.46°; precipitation, 0.57; winds, northwest.

RULES AND REGULATIONS OF THE YELLOWSTONE NATIONAL PARK.

DEPARTMENT OF THE INTERIOR,
Washington, D. C., June 1, 1897.

The following rules and regulations for the government of the Yellowstone National Park are hereby established and made public pursuant to authority conferred by section 2475, Revised Statutes, United States, and the act of Congress approved May 7, 1894:

1. It is forbidden to remove or injure the sediment or incrustations around the geysers, hot springs, or steam vents; or to deface the same by written inscription or otherwise; or to throw any substance into the springs or geyser vents; or to injure or disturb, in any manner, or to carry off any of the mineral deposits, specimens, 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 shall 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, and anyone failing to comply therewith shall be peremptorily removed from the park.

5. Hunting or killing, wounding or capturing of any bird or wild animal, except dangerous animals, when necessary to prevent them from destroying life or inflicting an injury, is prohibited. The outfits, including guns, traps, teams, horses, or means of transportation used by persons engaged in hunting, killing, trapping, ensnaring, or capturing such birds or wild animals, or in possession of game killed in the park under other circumstances than prescribed above, will be forfeited to the United States, except in cases where it is shown by satisfactory evidence that the outfit is not the property of the person or persons violating this regulation, and the actual owner thereof was not a party to such violation. Firearms will only be permitted in the park on written permission from the superintendent thereof. On arrival at the first station of the park guard, parties having firearms will turn them over to the sergeant in charge of the station, taking his receipt for them. They will be returned to the owners on leaving the park.

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. Fishing may be prohibited by order of the superintendent of the park in any of the waters of the park, or limited therein to any specified season of the year, until otherwise ordered by the Secretary of the Interior.

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 in his discretion, and no pack trains shall be allowed in the park unless in charge of a duly registered guide.

8. The herding or grazing of loose stock or cattle of any kind within the park, as well as the driving of such stock or cattle over the roads of the park, is strictly forbidden, except in such cases where authority therefor is granted by the Secretary of the Interior.

9. No drinking saloon or barroom will be permitted within the limits of the park.

10. Private notices or advertisements shall not be posted or displayed within the park, except such as may be necessary for the convenience and guidance of the public, upon buildings on leased ground.

11. 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, and will not be allowed to return without permission, in writing, from the Secretary of the Interior or the superintendent of the park.

Any person who violates any of the foregoing regulations will be deemed guilty of a misdemeanor, and be subjected to a fine as provided by the act of Congress approved May 7, 1894, "to protect the birds and animals in Yellowstone National Park and to punish crimes in said park, and for other purposes," of not more than one thousand dollars, or imprisonment not exceeding two years, or both, and may be adjudged to pay all costs of the proceedings.

CORNELIUS N. BLISS,
Secretary of the Interior.

INSTRUCTIONS TO PERSONS TRAVELING THROUGH YELLOWSTONE NATIONAL PARK.

DEPARTMENT OF THE INTERIOR,
OFFICE OF SUPERINTENDENT YELLOWSTONE NATIONAL PARK,
Mammoth Hot Springs, Wyo., June 20, 1897.

The following instructions for the information and guidance of parties traveling through the Yellowstone Park, having received the approval of the Secretary of the Interior, are published for the benefit of all concerned:

(1) *Fires.*—The greatest care must be exercised to insure the complete extinction of all camp fires before they are abandoned. All ashes and unburned bits of wood must, when practicable, be thoroughly soaked with water. Where fires are built in the neighborhood of decayed logs, particular attention must be directed to the extinguishment of fires in the decaying mold. Such material frequently smolders for days and then breaks out into dangerous conflagration. Fire may also be extinguished where water is not available by a complete covering of earth well packed down.

(2) *Camps.*—No camp will be made at a less distance than 100 feet from any traveled road. Blankets, clothing, hammocks, or any other article liable to frighten teams must not be hung at a nearer distance than this to the road. The same rule applies to temporary stops, such as for feeding horses or for taking luncheon.

Camp grounds must be thoroughly cleaned before they are abandoned, and such articles as tin cans, bottles, cast-off clothing, and other débris must be either buried or taken to some place where they will not offend the sight.

(3) *Bicycles.*—Many of the horses driven in the park are unused to bicycles and liable to be frightened by them. The greatest care must therefore be exercised by their riders. In meeting teams riders will always dismount and stand at the side of the road—the lower side, if the meeting be on a grade. In passing teams from the rear, riders will ring their bell as a warning and inquire of the driver if they may pass. If it appear from the answer that the team is liable to be frightened, they may ask the driver to halt his team and allow them to dismount and walk past.

Riders of bicycles are responsible for all damages caused by failure to properly observe these instructions.

(4) *Fishing.*—All fish less than 6 inches in length should at once be returned to the water, with the least damage possible to the fish. No fish should be caught in excess of the number needed for food.

(5) *Dogs.*—When dogs are taken through the park, they must be prevented from chasing the animals and birds or annoying passers-by. To this end they must be carried in the wagons or led behind them while traveling, and kept within the limits of the camps when halted. Any dog found at large in disregard of this section will be killed.

(6) *Grazing animals.*—Only animals actually in use for purposes of transportation through the park can be grazed in the vicinity of the camps. They will not be allowed to run over any of the formations, nor near to any of the geysers or hot springs; neither will they be allowed to run loose in the roads.

(7) *Miscellaneous.*—The carving or writing of names or other things on any of the mileposts or signboards, or any of the seats, railings, or other structures, or on the trees, will not be permitted.

Persons are not allowed to bathe near any of the regularly traveled roads in the park without suitable bathing clothes.

(8) Willful disregard of the instructions will result in the ejection of the offending person or persons from the park.

S. B. M. YOUNG,
Colonel, United States Army,
Acting Superintendent Yellowstone National Park.

ADDITIONAL RULES ENFORCED BY SUPERINTENDENT.

OFFICE SUPERINTENDENT YELLOWSTONE NATIONAL PARK,
Mammoth Hot Springs, Wyo., July 10, 1897.

Warning is given that on and after July 17 instant any loose cattle or stock found wandering within the limits of the park in violation of paragraph 8 of the Rules and Regulations of the Yellowstone National Park, 1897, will be driven out of the park via Riverside Station, on the west side, and permission will not be given for their return through the park.

S. B. M. YOUNG,
Colonel, United States Army,
Acting Superintendent Yellowstone National Park.

DEPARTMENT OF THE INTERIOR,
OFFICE SUPERINTENDENT YELLOWSTONE NATIONAL PARK,
Mammoth Hot Springs, Wyo., July 17, 1897.

To avoid accidents in future and for the safe conduct of tourists traveling through the park, driving over the roads of the park at night is prohibited, except in special cases of emergency, for which permission must be obtained in writing from this office.

S. B. M. YOUNG,
Colonel, United States Army, Acting Superintendent.

DEPARTMENT OF THE INTERIOR,
OFFICE SUPERINTENDENT YELLOWSTONE NATIONAL PARK,
Mammoth Hot Springs, Wyo., August 11, 1897.

From this date until further orders fishing is prohibited in the following-named streams: Gardiner River, from its mouth up to the junction of the east and middle forks; Glen Creek, Indian Creek, Willow Creek, Obsidian Creek, and Beaver Lake.

S. B. M. YOUNG,
Colonel, United States Army, Acting Superintendent.

FORM OF LICENSE FOR GUIDES.

Registered No. ——.]

UNITED STATES OF AMERICA.

DEPARTMENT OF THE INTERIOR.

OFFICE OF SUPERINTENDENT YELLOWSTONE NATIONAL PARK.

Be it known that —— ——, of ——, is hereby authorized under paragraph 7, Rules and Regulations, and upon the conditions hereinafter set forth, to act as guide and to personally conduct back trains in and through the Yellowstone National Park from ——, 189—, to ——, 189—, using for such purpose —— saddle and pack animals.

The names and addresses of the guide and each tourist, as well as those of all employees, with schedule of route and camping places of all parties taken into the park, must be registered by the guide in a book kept for that purpose by the acting superintendent of the park.

On the wagon roads of the park vehicles have the right of way over pack trains or saddle animals, and the guide must see that no vehicle is delayed nor the horses thereof frightened by his outfit.

Special attention must be given to the complete extinguishment of fires. (Par. No. 1, "Instructions to persons traveling through the Yellowstone National Park.")

All camping places must be carefully policed before being abandoned.

The guide will be held responsible for all violations of the park regulations by his employees or by parties conducted through the park by him, and must report to the acting superintendent of the park all violations of such regulations which come to his knowledge in any way.

For willful violation of the conditions hereof on the part of the guide, or of the park regulations by his employees or persons carried by him, this authority will be revoked by the acting superintendent of the park.

Signed at Mammoth Hot Springs, Wyo., this —— day of ——, 189—.

—— ——,
Colonel, United States Army, Acting Superintendent.

—— ——. (Signature of guide.)

List of registered guides.

No.	Guide.	Residence.	Number animals.	Duration.
1	J. G. Fiske	Jackson's Hole, Wyo		
2	David Rhodes	Gardiner, Mont	25	Aug. 10 to Nov. 15, 1897.
3	W. A. Hagne	Fridley, Mont	25	Aug. 11 to Dec. 1, 1897.
4	Elwood Hofer	Gardiner, Mont	35	Do.
5	Taswell Woody	Yancey's	30	Aug. 12 to Dec. 1, 1897.
6	Wm. J. Proctor	Bearguleh, Mont	12	Aug. 16 to Dec. 1, 1897.
7	B. D. Sheffield	Livingston, Mont	20	Aug. 18 to Nov. 1, 1897.
8	Richard Randall	Gardiner, Mont	30	Aug. 19 to Dec. 1, 1897.
9	Thos. Smith	Jackson's Hole, Wyo	*10	Aug. 21 to Dec. 1, 1897.
10	Wm. Van Buskirk	Gardiner, Mont	35	Aug. 26 to Dec. 1, 1897.
11	Fountain Black	Chico, Mont	10	Aug. 27 to Nov. 1, 1897.
12	Frank Gruard	Sheridan, Wyo	30	Aug. 29 to Dec. 1, 1897.

* And one 2-horse spring wagon.

Observations made on geysers, hot springs, etc., in the park by members of the geological department will be reported through that department.

FORM OF PERMIT TO CARRY ARMS, SEALED.

No. ——.] DEPARTMENT OF THE INTERIOR,
OFFICE OF SUPERINTENDENT YELLOWSTONE NATIONAL PARK,
——— ——, 189—.

Mr. ——— ——— has permission to carry through the park, sealed, the following arms, viz, ——— (to travel by the wagon road only), from ——— to ———, via ———.

By order of the acting superintendent:

———,
———.

[Reverse side of form.]

Examined at—	Date.	By—
Norris		
L. Basin		
U. Basin		
Canyon		
Thumb		
Snake River		
Riverside		
Soda Butte		
Fort Yellowstone		
Upper Yellowstone		
Pelican Creek		

FORM OF RECEIPT FOR FIREARMS.

No. ——.] DEPARTMENT OF THE INTERIOR,
OFFICE OF SUPERINTENDENT YELLOWSTONE NATIONAL PARK,
——— ——, *189—*.

Received from Mr.——— ——— the following firearms, to be returned to him on his exit from the park at this post: ———.

———,
———.

APPENDIX A.

Statement of cases brought before Hon. John W. McIlvain, United States commissioner, since the 1st day of July, A. D. 1897.

July 5.—United States *v.* Thomas McKeever, Patrick McGeehan, and Samuel Davis. Charge: Violation of rules and regulations promulgated by Secretary of the Interior with reference to management and care of Yellowstone National Park. Fined $10 each.

July 8.—United States *v.* John Sweeney. Charge: Assault. Trial had July 20. Defendant discharged.

July 14.—United States *v.* J. D. Lorden and J. G. Seiveright. Charge: Violation of rules and regulations. Defendants fined $5 each.

July 19.—United States *v.* John Lindsay and Hugh McDermont. Charge: Violation of rules and regulations, etc. Fined $10 each.

July 19.—United States *v.* J. M. Lloyd. Charge: Violation of rules and regulations. Trial had August 10. Defendant discharged.

July 27.—United States *v.* Frank L. Patrick. Charge: Assault. Defendant not yet arrested.

July 29.—United States *v.* A. H. Conlisk and E. S. Crocker. Charge: Violation of rules and regulations. Defendants discharged.

August 12.—United States *v.* John Townsend. Charge: Assault. Fined $25 and costs.

August 25.—United States *v.* H. K. Bateman, James Elston, and Otto Boetticher. Charge: Violation of rules and regulations. Defendants adjudged to pay costs.

August 25.—United States *v.* F. M. Joslyn and M. T. Gandy. Charge: Violation of rules and regulations. Defendants fined $5 each and costs.

August 26.—United States *v.* Gus Smitzer and George Reeb. Charge: Robbery. Case pending.

August 27.—United States *v.* Isaac Wampler and W. D. Coates. Charge: Violation of rules and regulations. Defendants adjudged to pay costs.

August 28.—United States *v.* John Austin and S. N. Van Blaricon. Charge: Violation of rules and regulations. Defendants fined $5 each and costs.

August 30.—United States *v.* C. B. Lyle. Charge: Violation of rules and regulations. Defendant adjudged to pay costs—$9.50.

Many other cases, such as leaving camp not properly policed and fires not thoroughly extinguished, where the parties were arrested and marched back many miles and made to comply with the rules, having been considered sufficiently punished, were not sent before the commissioner.

APPENDIX B.

LEASES IN YELLOWSTONE NATIONAL PARK.

Yellowstone Park Transportation Company: Mammoth Hot Springs, 2 acres; Norris, 2 acres; Fountain, 1 acre; Upper Geyser Basin, 2 acres; Lake, 2 acres; Canyon, 1 acre; building, etc., for the accommodation of employees and stock.

Yellowstone Park Association: Mammoth Hot Springs, Mammoth Hotel and commissary; Mammoth Hot Springs, Cottage Hotel and Mammoth barn; Fountain (Lower Basin), cottages; Fountain, Fountain Hotel and barn; Lake, Lake Hotel and barn; Canyon, Canyon Hotel, pump house, and barn.

Yellowstone Lake Boat Company: Near Lake Hotel, 2 acres; Frank Island, 2 acres; Stevenson's Island, 2 acres; Dot Island, 1 acre; West Thumb, 1 acre; Ways, 2 acres; Southeast Arm, 2 acres; Dot Island Game Corral, 2 acres; to be located by superintendent, 6 acres.

Jennie H. Ash: Mammoth Hot Springs, dwelling, post-office, and store.

Ole A. Anderson: Mammoth Hot Springs, dwelling and store.

John F. Yancey: Pleasant Valley, hotel.

F. J. Haynes: Mammoth Hot Springs, studio.

F. J. Haynes: Upper Geyser Basin, studio.

APPENDIX C.

Greatest number of arrivals in one day (July 19)	434
Least number of arrivals in one day (July 18)	2
Greatest number of arrivals in one week (week ending July 26)	1,416
Least number of arrivals in one week (week ending June 8)	40
Greatest number of arrivals in one month (month ending July 31)	2,430
Least number of arrivals in one month (month ending June 30)	377

Greatest number of tourists fed in one day.

	Date.	Number.
Mammoth Hot Springs Hotel	July 25	1,341
Fountain Geyser Hotel	July 27	737
Lake Hotel	July 25	629
Canyon Hotel	July 25	855
Norris Lunch Station	July 27	561
Upper Basin Lunch Station	July 30	232
Thumb Lunch Station	July 26	257

Greatest number of tourists accommodated over night at each hotel.

	Date.	Number.
Mammoth Hotel	July 24	397
Fountain Hotel	July 23	418
Lake Hotel	July 26	212
Canyon Hotel	July 21	355

Extra bedroom equipment bought, season of 1897, account of Christian Endeavor business.

Woven wire double bed springs	267
Hair mattresses	169
Pillows	475
Pillow slips	325
Sheets	340
Spreads	123
Room towels	570
Napkins	468

SUPPLEMENTAL REPORT.

DEPARTMENT OF THE INTERIOR,
SUPERINTENDENT YELLOWSTONE NATIONAL PARK,
Mammoth Hot Springs, Wyo., November 10, 1897.

SIR: I have the honor to submit the following supplemental report of the condition of affairs and of the management of the Yellowstone National Park from August 21 to present date.

TRAVEL.

The total number of visitors carried over the regular route by the Yellowstone National Park Transportation Company was 781; total number carried by C. J. Bassett via Beaver Canyon, 22; total number carried through by licensed transportation of personally conducted camping parties, 129; total number carried through in private transportation, 1,127; total number of bicyclers, foot travelers, etc., 41. The total number of persons taking trip on the Yellowstone Lake, traveling by the regular transportation company, 628; total number taking this trip who went through with camping parties, 345. Total number of visitors to the park since August 21, 2,100.

The aggregate number of tourists carried over the regular route by the Yellowstone National Park Transportation Company during the entire season, 4,626; aggregate number carried by C. J. Bassett via Beaver Canyon, 124; aggregate number carried by licensed transportation of personally conducted camping parties, 1,354; aggregate number carried by private transportation, 4,454; aggregate number of bicyclers, foot travelers, etc., 235.

The aggregate number taking the trip on Yellowstone Lake traveling by regular transportation company was 2,295; number of persons taking this trip who went through with camping parties, 1,267; aggregate number taking trip on the Yellowstone Lake during the season, 3,562.

Grand aggregate of visitors to the park for the season of 1897, 10,825.

Violations of the rules and regulations were extremely rare during the latter part of the season. Exceptions, however, were found in neglect and carelessness displayed in failing to thoroughly extinguish their camp fires and police their temporary camp grounds, by tourists traveling in private transportation. These exceptions do not apply to the personally conducted camping parties traveling with licensed transportation.

FIRES.

But one fire occurred in the park after August 21. This was between Wildcat Peak and Bobcat Ridge, in the forest reserve south of the park. It was extinguished by a detachment of men under Lieutenant

Hawkins, from the Lower Geyser Basin, assisted by men from the outpost at Snake River Station. It was a series of small fires set at different places between Wildcat Peak and Bobcat Ridge, supposed to have been kindled by hunters for the purpose of preventing large game from passing north between these points.

Substantial sidings have been erected at the various points of interest along the regularly traveled route, for the comfort and convenience of tourists in getting out of and into coaches and other conveyances.

The mania for carving and writing names on guard rails, benches, etc., placed for the safety and convenience of visitors, seems to have increased during the latter part of the season. It is contemplated to erect a large bulletin board for the convenience of visitors next season affected with this insane passion, with columns for name and address, and a heading, "All fools and idiots required to register here only."

The Park Association should construct a hotel at Upper Geyser Basin where now there is but a temporary lunch station. I have been informed by Hon. D. S. Lamont, vice-president Northern Pacific Railway, that the subject of building a hotel at that point, and also a new one at Mammoth Hot Springs, will be taken under advisement at the meeting of the directors of the association in December next. The old, barn-like structure called the "Mammoth Springs Hotel" should be torn down and the plateau at its front set apart as a military reservation for parade and drill purposes, and for ground on which the post of Fort Yellowstone could be enlarged; it is now cramped for room for its present small garrison. The new hotel should be built on the site of the old post, from which the ramshackle structures in which the troops were formerly housed should be removed.

On my recommendation a proposition to establish permanent camps, suitable in neatness, comfort, and convenience for a large number of visitors who desire to experience that mode of an outing in the park, is now being considered by the Park Association and the Park Transportation Company. There is a demand for this kind of accommodations, and, in my judgment, it is for the interest of the public, and the proper management of the park could be best subserved by the accomplishment of this proposition. The maximum charges for this service should be fixed by the Department, and the acting superintendent should see that the service charged for, both by the Park Association and the Park Transportation Company, are duly, properly, and courteously rendered. There is another class of travel which can be accommodated as heretofore by the annual licenses for five conveyances each, granted on the approval of the acting superintendent to applicants of reliable character who live at and near the railroad terminus.

The increase of travel entering the park on the west from the Union Pacific Railroad demands a better class of wagon transportation. Application for a license to supply this demand is now under consideration, and will be forwarded in due time for consideration by the Department.

ROADS.

A generous appropriation by Congress for the proper repairs of the present roads and the building of new ones, as noted in my estimates to the Quartermaster-General, would be a measure of economy. Many portions of the present traveled roads should be macadamized, and protected by strong revetments. Permanent stone guards, connected by guard rails, should be constructed at all dangerous points. A massive stone or steel bridge—the former preferable—should take the place

of the wooden structure in the Golden Gate Pass. The timbers in this structure have lost their elasticity, and a new bridge should certainly be constructed next season.

The road down Madison Canyon to the west boundary over the new site has been opened, but not thoroughly completed; the road down Lewis and Snake river valleys, from the Thumb to the southern border of the forest reserve at head of Jacksons Lake, is open, but requires much work to thoroughly complete it; the road from Mammoth to the northeastern corner near Cooke City requires large expenditure for completion. Baronett's bridge, on this road, is unsafe and must be renewed. The proposed road from Canyon Hotel down the Yellowstone to Yancey's, to intersect the Cooke City road, should certainly be constructed. Professor Walcott, Director of the Geological Survey, at my request passed over the proposed location of this road and fully concurs in my recommendation that it be built.

It is due to the public that a commission, composed of a member of the Geological Survey, an officer of the Engineer Corps, United States Army, and a gentleman from civil life, be appointed to advise with the acting superintendent on the location of new roads and saddle trails, in order that all the beauties, wonders, and grand scenery may be made accessible to visitors.

PROTECTION.

The area of the park proper and of about two-thirds of the timber reserve to the south, is, and can be, well protected against poachers during the winter season by the present garrison of Fort Yellowstone, aided by the expert guides and scouts now employed. Two or three soldiers accompany each civilian scout.

These details are changed from time to time, in order that all may become acquainted with the country and habits and habitats of the game, and the tricks and cunning ways of the poachers.

During the summer season an additional force of mounted and foot troops is necessary to protect the park, and enforce the rules and regulations.

The forest reserve adjoining the east boundary of the park comprises an area of over 1,000 square miles. There are about 125 people living and mining in this section, during the summer. Of this number, about 100 are miners and prospectors, and about 25 are ranchers. These people obtain their fresh meat from the big game in this section. By a glance at the map it will be seen that a high, rugged, impassable (in winter) range of mountains (altitude averaging 10,000 feet) extends from the northwest corner of this reserve, longitude 110° to 110° 55′ on south boundary.

One troop of cavalry should have station east of this dividing line, with headquarters in Stinking Water mining region, with outposts on Shoshone River and in Sunlight Basin, near the eastern boundary of the forest reserve, and on Thoroughfare Plateau and the headwaters of the Yellowstone. Foot troops are necessary in Upper Geyser Basin and at Mammoth Hot Springs during the summer season, in order to afford adequate protection to the wonderful formations, incrustations, etc., at these points, while the cavalry would be occupied in keeping the main traveled routes thoroughly patrolled, to require all campers, travelers, and other persons found in the park to comply with the rules and regulations governing the same.

It is impossible to accomplish this with the present small force at Fort Yellowstone.

FISH AND GAME.

Attention is invited to the following report on fish and game by Lieut. Elmer Lindsley, Fourth Cavalry:

FORT YELLOWSTONE, WYO., *November 4, 1897.*

SIR: In obedience to your verbal instructions, I have the honor to submit the following report regarding the fishes, birds, and animals in the park.

FISHES.

The waters of the park have been stocked as follows (report of superintendent, 1892):

In 1889: East Fork of Gardiner above falls, 1,000 black-spotted trout; Gibbon River above Virginia Cascade, 990 rainbow trout; Madison River above Keppler's Cascade, 995 Loch-Leven trout; Gardiner River above falls, 4,975 brook trout; Yellowstone River above falls, 2,000 whitefish; Twin Lakes, 1,000 whitefish.

In 1890: Shoshone Lake, 24,012 lake trout; Shoshone Lake, 3,350 Loch-Leven trout; Lewis Lake, 12,013 lake trout; Lewis Lake, 3,350 Loch-Leven trout; West Fork of Gardiner above falls, 7,850 brook trout; Nez Perce Creek, 9,850 Von Behr trout; Yellowstone River above falls, 10,000 whitefish.

All of these plants, except that of the whitefish in the Yellowstone, were made in previously barren waters. No trace has ever been found of the whitefish in either the Yellowstone River or the Twin Lakes.

The rainbow trout planted in Gibbon River seem to have come down over the cascades; but very few are found above the cascades, while below the stream is well stocked to its junction with the Firehole.

No Loch-Leven trout have ever been found in the Madison (Firehole) above Keppler's Cascade, but the brook trout are very numerous there. Evidently, through some error, the fontinalis were planted there instead of the Loch Leven.

The brook trout in Gardiner River and in the West Fork (Glen Creek) have thriven and bred abundantly, especially in Willow Creek. These streams, however, being easily accessible from the wagon roads, and the brook trout taking the fly so eagerly, have been fished out to such an extent that in August last it was deemed advisable to prohibit fishing in them for a time. This was done, and the order has not yet been revoked; it probably may be revoked next season—for a part of the season at least.

The Von Behr trout in Nez Perce Creek have multiplied abundantly, and not only this stream, but the Firehole River, from the lower falls to Keppler's Cascade and Iron Creek, are abundantly stocked, as is also the Little Firehole below Mystic Falls. In the Firehole Basin is also found an occasional brook trout, evidently come down Keppler's Cascade, and a considerable number of the native mykiss. Several good specimens of rainbow trout have also been taken from the Little Firehole, near its mouth. I can not account for the presence of the rainbow in this locality, as it seems to me plainly impossible for any fish to ascend the lower falls of the Firehole.

I have never heard of any fish being taken from Shoshone or Lewis lakes. I have seen fishes of apparently 3 or 4 pounds' weight in Shoshone Lake, and a skeleton has been found on the shore of Shoshone Lake of a fish that probably weighed 10 pounds. Two soldiers of Troop D, Fourth Cavalry, reported having seen schools of trout 2 feet long near the mouth of De Lacey Creek in Shoshone Lake.

In 1893 brook trout were planted in Shoshone Creek, and these have thriven amazingly: the stream is now literally alive with trout from 1½ pounds down.

In 1895, 500 black bass were planted in some small land-locked lakes in the Firehole Basin; nothing has been seen of them since, and I fear that all have perished.

In the Yellowstone and both forks of Snake River, with most of their tributaries, the native mykiss is indigenous and remarkably abundant. In the Madison River and its north fork, the mykiss, whitefish, and grayling are indigenous, and in the Firehole River, between its junction with the Gibbon and the lower falls, the mykiss, rainbow, Von Behr, fontinalis, grayling, and whitefish may be taken from the same pool.

I believe that bass would thrive in the small lake near the Gardiner River where ice is cut for the post; also in Moose and Loon lakes in the Falls River Meadows, and recommend that these lakes be stocked with bass. The former can be stocked at any time of year; the latter only in summer.

I hope that a hatchery will be established here, and some employee of the Government instructed in the artificial propagation of trout. A folding canvas boat is much needed for ascertaining the condition of plants made in several lakes remote from a wagon road.

BIRDS.

Pelicans, geese, ducks, gulls, and sandhill cranes are numerous. There are some swan. All of these birds nest here. Ospreys, hawks, and eagles are fairly numerous. There are a few sharp-tailed grouse, but in the main the altitude is too great for them. The big mountain grouse is fairly abundant all over the park, and broods of the ruffed grouse are found in many places. Sage grouse have been seen in the park, but are very uncommon. The jay family is represented by the magpie in some parts of the park, and by the Clarks crow, moose bird, and crested jay in all parts. The little water ousel, a very curious and interesting bird, is fairly common, especially on the Gardiner and Gibbon rivers. Robins, kingfishers, and other small birds abound.

ANIMALS.

Buffalo.—But very few buffalo have been reported this season. The scouts, however, seldom see much sign in the summer, and now the few remaining buffalo are scattered and range in the most remote and inaccessible parts of the park in summer. I am confident of finding 25 this winter, when the snowshoe season sets in, and hope there are nearly double this number in the park. Since Idaho has forbidden the killing of buffalo—as has Montana and Wyoming—I have strong hopes of being able to protect them from further slaughter by poachers. Whether they will still decrease on account of natural causes only time can tell. A strong effort is being made to protect them and to save the remnant, if possible.

Moose.—Moose are becoming quite numerous in the south part of the park, and particularly in the southern forest reserve, where I believe there are more moose than in all the rest of the park. There are rumors of a band between Mammoth Hot Springs and Grand Canyon, but this rumor will not be verified before snow falls. I most earnestly recommend that Congress be urged to include the forest reserve in the park. This reserve is now under charge of the park management, with orders to protect the game therein. The only practical change which would take place in the status of this strip, were it included in the park proper, is that the law of May 7, 1894, would then apply to it, and poachers could be prosecuted and punished by *law*, whereas now it is only under executive orders.

Elk.—Notwithstanding the hard winter of 1896–97, which killed many elk and drove many more out of the park, there is no perceptible diminution in their number. I believe that more than 5,000 winter in the park, and that at least 15,000 leave the park in the autumn to winter in the lower country.

I happened to be at the south boundary of the forest reserve this year, just after the first snowstorm, on October 13 and 14. The country about Jackson Lake was literally alive with elk, and from the best estimates I believe that 10,000 crossed the south boundary this fall. Many go down the Madison to winter; some down the Gallatin, and some down the Yellowstone. All that survive the winter return to the park to raise their young, as soon as the snow will permit of their return. Of those that winter in the park, the largest herd ranges north of the Yellowstone River, in the country that it has been so often proposed to cut off from the park. I doubt if any more would ever winter in the park under any circumstances, if this should happen. The park furnishes an ideal summer range for 40,000 elk, but there is not enough winter range for one-fourth that number.

Sheep.—There are several bands of sheep that range along the higher mountains of the park. A very fine bunch winters close to the post, on the slopes of Mount Everts. This bunch numbered about thirty last winter. There are smaller bunches in the northeast corner of the park, some along the range between Swan Lake Flat and the Madison Basin, and a considerable number in that portion of the forest reserve east of the park. It is difficult to make an estimate of the total number in the park, because of the inaccessibility of their range, but I am confident of more than 100, and believe there are 200 in the park.

Deer.—Deer are numerous, and in the summer are distributed over the whole park. Their protection has as yet offered no difficulties and probably will not for many years to come. Probably 200 winter in the immediate vicinity of the post and are very tame. A few white-tail deer inhabit the lower and more open portions of the park.

Antelope.—Last winter drove many of the antelope out of the park, and of the number which left but few ever returned. A year ago there were probably 1,000 antelope in the park; now I doubt if there are half that number. Their winter range is at the base of Mount Everts, between the Yellowstone and Gardiner rivers. This range has become infested with coyotes, which kill many antelope and worry the rest of them, until I am satisfied that unless the coyotes can be driven away or killed the antelope will be driven from their winter range and will not return.

Bear.—The bear have increased and are quite numerous; the small black bears are very fearless. They frequent the garbage dumps at all the hotels and are objects of

much interest to tourists. If let alone they are quite harmless, and the enjoyment they afford tourists more than offsets the mischief they do.

Wolverine.—Wolverine, while not plentiful, are distributed over a large part of the park, though they are seldom seen by tourists.

Coyotes.—Coyotes are very numerous in certain sections. They do some damage to the waterfowl and kill some of the young elk, but the antelope is the greatest sufferer from their depredations. If a large number of coyotes could be gotten rid of, it would doubtless be a great benefit to the other game in the park.

There are some mountain lions, but these are rarely seen and do no material harm.

Fur-bearing animals.—The beaver are quite numerous in the park, and inhabit the following localities: Gardiner River, near the post, Lupine and Blacktail creeks, Elk Creek, the Lamar River, Slough Creek, Cache Creek, Soda Butte Creek, a few in Pelican Creek, the Upper Yellowstone, Thoroughfare Creek, a few in Barlow's Fork of Snake River, some in Falls River Meadows, a few about Shoshone Lake. There is a flourishing colony in Nez Perce Creek, a large one near the mouth of Magpie Creek, and a goodly number in the Gibbon River near Norris. There are some in Cascade Creek and in the lake, and all the creeks that drain into the Gardiner River above the falls. The lower beaver dam, opposite Obsidian Cliff, has been rebuilt. I think there are more beaver in the park now than at any time within the last six years, and if unmolested they will rapidly increase. Their protection, however, is one of the most difficult duties intrusted to the park management. They are now quite valuable and very easy to trap, and their skins are easily disposed of. The professional beaver trapper leaves almost no sign of his work, and it is very hard to catch him at his work.

Otter are fairly abundant and have increased since the barren streams have been stocked with fish.

Marten are plentiful and are widely distributed, as are the Canadian lynx and wild-cat.

Mink are quite plenty; foxes are plenty, and there are a goodly number of black and cross foxes. There are some badgers and many muskrats, ground hogs, squirrels, skunks, porcupines, and rabbits. Of the last we have the cottontails, a few jack rabbits, many snowshoe rabbits, besides the paca—tiny rock rabbits.

On the whole the park is a grand success as a game preserve. The variety of species is great and the condition of most of the species is satisfactory. The exceptions to this are, first, the buffalo, which are undoubtedly away from their natural range, the open plains; and next the antelope, which are suffering for lack of suitable winter range, and from the depredations of coyotes. The elk problem is not a serious one as yet, but it undoubtedly will be in a few years, unless more suitable territory is provided for winter range. This territory can now be acquired with little difficulty and at insignificant expense, and if it is acquired promptly there will always be elk hunting about the edges of the park. The longer the acquisition of this winter range is deferred the more difficult it will be, until perhaps a few generations hence the elk problem will become as difficult as is that of the buffalo now.

Respectfully submitted.

ELMER LINDSLEY,
Second Lieutenant, Fourth Cavalry.

The ACTING SUPERINTENDENT YELLOWSTONE NATIONAL PARK,
Fort Yellowstone, Wyo.

Mr. Lindsley has been charged, under my direction, with the duties of instructing the outposts and detachments in the work of protection, with regulating the movements of scouts, and making frequent inspections of all detached outposts, the manner in which patrol and scouting duty is performed—in brief, he is charged with the main duty of protecting the fish, game, and fur-bearing animals against poachers.

From my own personal observation and reports of scouts, I believe this report to be as accurate as can be made at this time. Later, when the conditions are favorable for traveling on skis, the number of buffalo and moose in the park may be closely verified, and, if materially different from the numbers in this report, it will be revised and amended accordingly.

On the morning of November 4 a large band of antelope from the slopes of Mount Everts drifted across the north boundary line of the park, between Gardiner and Electric Peak. They were fired into by lawless persons and 10 were killed. The band recrossed the line into the park. Later in the day Lieutenant Lindsley, with a detach-

ment of 20 men and 2 scouts, formed a long skirmish line and herded this band back to their winter range. The band numbered about 250.

Having obtained the names of the lawless persons who slaughtered the antelope, I have given instructions if found inside the boundary lines of the park they shall be arrested and ejected therefrom—not necessarily at the nearest point. One of the miscreants, John Dewing by name, was of the party which slaughtered so many antelope under similar conditions last winter.

The coyotes and the winter storms cause the antelope to drift down the valley of the Yellowstone and out of the park. Steps have been taken to diminish the number of coyotes.

An earthquake shock several seconds in duration was experienced at Mammoth Hot Springs at 2.30 o'clock a. m. on the 4th instant. It aroused the majority of the inhabitants from their slumbers, but caused no perceptible damage. It was not noticed at Yellowstone Lake, Firehole Basin, Grand Canyon, or Norris Basin.

RECOMMENDATIONS.

It is recommended that one additional troop of cavalry and one company of infantry be stationed at Fort Yellowstone for temporary duty during the tourist season, or in lieu thereof two companies of infantry.

That the forest reserve adjoining the park boundaries, set apart, reserved, and established as a public reservation by proclamation of the President, made on the 10th day of September, 1891; also, all that tract of land situate in the State of Wyoming, embraced within the following boundaries: Beginning at the intersection of parallel 44° north latitude with 110° west meridian, thence due south on said meridian to parallel 43° 30′ north latitude, thence due west to the meridian of 110° 50′, thence due north to its point of intersection with parallel 44° north latitude, thence due east on said parallel to the place of beginning; also, all that tract of land situate in the State of Wyoming, embraced within the following boundaries: Beginning at the southwest corner of the present Yellowstone National Park boundary, thence due south to parallel 44° north latitude, thence due east on said parallel to its point of intersection with the west boundary line of the State of Wyoming, be made part of the Yellowstone National Park, and that the boundaries of the Yellowstone National Park, as now fixed by law, be extended to include the same, and that the National Park protective act, approved May 7, 1894, section 1, be amended accordingly.

The altitude is too great for agriculture, and of the thousand elk estimated as slaughtered there annually, 75 per cent are taken by nonresidents, for the heads and teeth.

Very respectfully,

S. B. M. YOUNG,
Colonel Third Cavalry, Acting Superintendent.

The SECRETARY OF THE INTERIOR.

Inclosed herewith are copies of general and special instructions pertaining to outposts, and report pertaining to disbursements.

EXHIBIT 1.

OFFICE OF SUPERINTENDENT YELLOWSTONE NATIONAL PARK.
Fort Yellowstone, Wyo., November 1, 1897.

Lieutenant Lindsley, Fourth Cavalry, under the special directions of the acting superintendent, is charged with the important work of protecting the game, fur-bearing, and feathered animals of the park.

The following instructions will govern at the respective stations designated. Lieutenant Lindsley will give any additional instructions, from time to time, as may be found necessary.

GENERAL INSTRUCTIONS.

The operations of detachments will be confined to park limits, except in emergencies, which will be reported in detail, with reasons for leaving the park.

The principal duty of the stations in winter is to protect the birds and animals in the park. To this end each noncommissioned officer in charge of a station should, as rapidly as possible, familiarize himself thoroughly with the country included in his district, and should learn by observation the haunts and habits of fishes, birds, and animals in his district, and for whose preservation he is held responsible.

A record of each day's happenings, with number of miles traveled, destination, object of the trip, number of men, and kind of transportation (whether on foot, on horseback, or on skis), will be kept. The number and kind of game seen, its condition, the game signs seen, and the temperature and condition of weather will also be recorded. A copy of this record will be made out at the close of each month and forwarded to headquarters by first opportunity. This monthly report will also include a summary of the different kinds of game in the district, their range, condition, and an estimate of their number. The soldier in charge of a scouting party or patrol will carry a blank book, furnished for that purpose, in which he will record minutely the details of each day's trip, camping places, length of march and time consumed in marching, weather, game and game signs observed, and all circumstances of the trip. Upon returning to the station this record will be copied in the station record book and also copied on the monthly report.

No trip will be made on snowshoes by one man alone.

An abundant supply of park regulations will be furnished from headquarters, and the noncommissioned officer will see that a sufficient number of them is posted within the limits of his district. All violations of these regulations will be prevented.

It is of great importance that tourists shall be treated with fairness.

The special instructions from this office regarding the carrying, sealing, and inspection of firearms will be complied with. No one will be allowed to remain about stations, except members of this command. To prevent suffering, however, shelter may be granted in cases of necessity. As soon as the necessity is over the parties must be required to leave.

When the weather permits a trip of some kind should be made daily.

As neither the game nor the poachers travel by the wagon roads, these roads should be avoided as much as possible by patrols and scouting parties.

Visits to any particular locality should be made at irregular intervals and always by a different route, if possible. In this way all of the country will be learned in time.

Especial attention will be given to the prevention and extinction of forest fires.

All persons traveling through the park from October 1 to June 1 should be regarded with suspicion. They will be closely questioned and carefully inspected, and, if necessary, will be watched from station to station

People arrested will be sent immediately to the Mammoth Hot Springs, with the necessary witnesses in their case. They will be compelled to make such marches as the guard thinks proper, but will not be compelled to go more than a reasonable distance, their transportation being considered.

Great care must be taken that fire does not destroy any of the station buildings; candles, except in lanterns, will not be taken into the stable, nor will matches be lighted there.

Grain and hay will be frequently inspected to prevent waste or injury. Cleanliness of building and person will be required at all times; should vermin be found, every possible effort must be made to exterminate them.

All persons are enjoined to use the rations in the snowshoe cabins only in cases of necessity; never under any circumstances to waste any of them, and to always leave the cabins and their contents secure and in good condition. The ax and shovel must be left inside, the comfortables hanged up, the cooking utensils left clean and dry and the food in its box secure from mice, etc. Enough dry wood for one night should always be left in the cabin.

The noncommissioned officer will be held strictly responsible for everything pertaining to the station, and when relieved will turn over to his successor all the records, instructions, and public property in his possession, taking receipt therefor in duplicate. This receipt will show the number or quantity and condition of articles, and one copy will be at once transmitted to the post quartermaster.

SPECIAL INSTRUCTIONS.

Soda Butte Station.—The region to be covered by men from this station will be bounded on the west by the Yellowstone River and on the south by Broad Creek and the divide between Lamar River and Pelican Creek.

Particular attention will be paid to the prevention of poaching near the park boundaries, especially on upper Slough Creek.

In times of high water the bridge over Lamar River near the station will be frequently visited, and destruction of it prevented if possible.

A register of all parties passing the station will be kept, and a transcript of it will accompany each monthly report.

Nearly all the streams in this district contain beaver, which must be carefully watched and specially mentioned in each report. Buffalo may be found in almost any portion of the district, and the buffalo signs observed will also be noted in each report. The buffalo must not be pursued nor frightened. Attention will also be given to the preventing of the killing of elk on the north and east boundaries of the park and the forest reserve.

Riverside.—The district to be covered by men from this station extends from the head of Beehler River to Mount Holmes, over the Madison Plateau and up the Madison River as far as the mouth of Gibbon River, but not over in the valley of the Firehole, and including all the country north of the station which drains into the Madison.

Particular attention will be given to the prevention of poaching, special attention being given to the foothills around the basin in the fall and spring and to the prevention of the capture of live animals in the winter and early spring. Fur poachers must be closely watched for in the whole district, especially along all streams. The whole district must be frequently patrolled in winter to detect the trail of parties who may have entered on skis to poach in other districts.

The printed instructions in regard to the bridge near the station will be carefully obeyed.

Patrols may be sent to the Fountain or to Norris once in ten days for mail.

A register of all parties passing the station will be kept, and a transcript of it will accompany each monthly report.

Snake River.—The district to be covered by men from this station will include all of the country south of a line drawn from Madison Lake to Shoshone Geyser Basin along the south shore of the lake to the outlet, thence to the Thumb, thence along the lake shore to the mouth of Beaverdam Creek, thence east to the east boundary of the park, and south as far as the southern boundary of the forest reserve.

Particular attention will be given to the prevention of poaching near the forest reserve boundary in the valley of the Upper Yellowstone and the Falls River Basin.

Special attention will be given to the preservation of the buffalo on the west side, and to the moose, elk, and fur on the southwest corner of the forest reserve. The buffalo must not be pursued and care must be taken not to approach near enough to frighten them from their winter range.

Printed instructions in regard to the bridge over Snake River will be carefully obeyed.

As this district is far removed from stations of any considerable bodies of troops, especial attention will be given to the prevention of forest fires.

A register of all parties passing the station will be kept, and a transcript of it will accompany each monthly report.

In each monthly report special mention will be made of buffalo, moose, and beaver in the district.

Norris.—The district to be covered by men from this station will be bounded by a line from Apollinaris Spring to Mount Holmes, thence south along the divide to the Madison Canyon, along the Gibbon River to the falls, thence northeast to the Canyon Hotel, thence northwest to Apollinaris Spring, including all that country that drains into the Gibbon.

During the summer patrols will be made each day to connect with similar patrols from the Canyon and the Lower Basin, for the prevention of forest fires and violation of park regulations.

The Norris Geyser Basin will be watched, and all irregularities in the vicinity of the station prevented.

If mail is not otherwise received, a patrol may be sent to the post for it each ten days.

When arrests are made the facts will be reported to headquarters at once by wire.

The beaver in Winter, Straight, Obsidian, Solfatara, and Cascade creeks and in the Gibbon River must be carefully guarded. Report any moose or sheep sign at once by telephone. Patrol carefully for bear trappers in the whole district.

Mud Geyser Station.—The district to be covered by men from this station will include that country on the east of the Yellowstone River between Broad Creek and Beaverdam Creek, and limited by the mountains east of the Park and the Divide, between Pelican Creek and the Lamar River. It also includes the Hayden Valley and the country south as far as the Thumb.

Particular attention will be given to the prevention of poaching.

In summer this station will be moved to the regular camping place near the Lake

Hotel, when its duties will consist mostly in the regulation of camping parties and the prevention of forest fires. For this purpose daily patrols will be made over the roads toward the Canyon and toward the Thumb.

During the winter, if mail is not otherwise received, patrols may be sent every ten days to Norris.

Except in urgent cases members of this station will not be permitted to incur bills at either the Lake or Canyon hotels; such cases will be immediately reported, and cause therefor, by wire.

A special report will be made in regard to buffalo or buffalo signs seen in the district, and great care will be exercised not to pursue or frighten the buffalo on their winter range.

The number and location of fur-bearing animals—especially beaver—will be mentioned in each report.

Lower Basin.—The Lower Basin Station will be established when the troops from that camp return to the post.

The ground to be covered by it will be the valley of the Firehole River from its source to the Gibbon, and the valley of the Nez Perce Creek and its tributaries; also the valley of the Gibbon below the falls, and the country drained by Shoshone and Heron (De Lacey) creeks and northeast to the Thumb.

The bear parks and valley of the Little Firehole will also be included in this district. The beaver and all other fur-bearing animals will be carefully protected, and any buffalo sign reported at once by wire.

Particular attention will be given to prevent any access to the buffalo herd by poachers coming over from the west.

Frequent reports will be made by telephone of the condition of affairs about the station.

If mail is not otherwise received, a patrol may be sent to Norris for it each ten days.

After the hotels close especial watch will be kept of all parties entering the district with teams or pack trains, and any parties who interfere with supplies of hay and grain belonging to either hotel or transportation companies will be promptly arrested and returned to headquarters for trial.

S. B. M. YOUNG,
Colonel Third Cavalry, Acting Superintendent.

EXHIBIT 2.

OFFICE OF DISBURSING QUARTERMASTER,
IMPROVEMENT OF YELLOWSTONE NATIONAL PARK,
Mammoth Hot Springs, Wyo., October 25, 1897.

SIR: I have the honor to submit herewith a statement of the cost of work in the Yellowstone National Park under the appropriation for the "Improvement and protection" of the same during the season of 1897:

UNDER CONTRACT FOR GRUBBING AND CLEARING FOR ROADS.

Riverside to west boundary	$787.50	
Elk Park to Gibbon Meadows	180.50	
Soda Butte toward east boundary	1,066.00	
		$2,034.00

SURVEYING.

Determining exact location of portions of south boundary:		
Labor	1,440.49	
Saddle horses and pack train	570.24	
Rations, material, tools, etc	366.54	
Office and transportation	201.07	
		2,578.34
Locating new road from Riverside to west boundary:		
Labor	60.00	
Team hire	18.40	
Rations, tools, etc	14.32	
Office and transportation	7.84	
		100.56

Locating new road from Elk Park to Gibbon Meadows:		
Labor	$15.00	
Team hire	4.60	
Rations, tools, etc	2.60	
Office and transportation	1.96	
		$24.16
Relocating portion of road to east boundary near Soda Butte:		
Labor	121.66	
Team hire	32.20	
Rations, tools, etc	28.00	
Office and transportation	15.38	
		197.24
Preliminary survey for proposed road to Golden Gate:		
Labor	28.71	
Horse hire	2.88	
Rations, tools, etc	4.08	
Office and transportation	3.15	
		38.82
Viewing location for proposed road over Mount Washburn:		
Traveling expenses	38.39	
Office and transportation	3.84	
		42.23
Determining altitudes and marking same on mile-posts, Norris to West Thumb, via Fountain and Upper Basin:		
Labor	91.31	
Team hire	26.04	
Rations, tools, etc	16.50	
Office and transportation	9.43	
		116.28
Locating portion of north boundary and setting posts on same:		
Labor	515.03	
Team hire	108.52	
Rations, tools, etc	118.64	
Office and transportation	75.35	
		877.54
CONSTRUCTION.		
Three miles road, Riverside to west boundary:		
Labor	500.62	
Team hire	434.34	
Rations, tools, etc	186.60	
Office and transportation	102.64	
		1,224.20
Ornamental space at Mammoth Hot Springs, one-fifth mile of roadway, and water trough for carrying water to same:		
Labor	187.70	
Team hire	86.05	
Rations, tools, etc	52.50	
Surveying, and office and transportation	23.37	
		319.62
New approach to Grand Canyon Hotel and railings at dangerous points along Grand Canyon:		
Labor	216.09	
Team hire	50.71	
Rations, tools, etc	44.00	
Office and transportation	19.68	
		330.48
New road to east boundary (Cook City road), from new bridge toward head of canyon, 2¾ miles:		
Labor	1,556.64	
Team hire	1,075.75	
Rations, tools, etc	642.24	
Office and transportation	243.23	
		3,517.86
Rockwork at head of canyon, 1¼ miles:		
Labor	3,533.01	
Team hire	306.51	
Rations, tools, etc	886.40	
Office and transportation	361.01	
		5,087.56

One-half mile of road from White Pyramid to Black Sand Basin at Upper Basin:		
Labor	$30.40	
Team hire	13.80	
Rations, tools, etc	7.48	
Office and transportation	4.52	
		$56.20
Grading on 1-mile road, Canyon to Lake:		
Labor	62.00	
Team hire	30.00	
Rations, tools, etc	15.00	
Office and transportation	6.00	
		113.00

SAWMILL.

Labor		1,177.25	
Team hire		346.76	
Rations, tools, etc		354.90	
Office and transportation		142.40	
			2,021.31
Sawed:	Feet.		
Lumber	210,084		
Squared logs	25,200		
Cedar posts	12,000		
	247,284		
At $8.18 per M			2,020.50
Hauling lumber for storage at Mammoth Hot Springs from mill:			
Team hire		290.00	
Rations, tools, etc		58.00	
Office and transportation		29.00	
			377.00

BRIDGES.

Building bridge over Gibbon River in Virginia Meadows:		
Labor	19.50	
Team hire	7.95	
Rations, tools, etc	7.00	
Office and transportation	2.74	
		37.19
Bridge over Trout Creek between Grand Canyon and Lake:		
Labor	55.00	
Team hire	21.24	
Rations, tools, etc	15.68	
Office and transportation	8.62	
		100.54
Bridge over Firehole River near Riverside Geyser:		
Labor	148.00	
Team hire	72.00	
Rations, tools, etc	48.20	
Office and transportation	21.00	
		289.20
Bridge over Gardiner River on road to East Boundary:		
Labor	236.50	
Team Hire	21.92	
Hauling lumber	103.00	
Rations, tools, etc	175.72	
Office and transportation	36.11	
		573.28
Footbridge over Firehole River at Biscuit Basin:		
Labor	9.00	
Team hire	3.95	
Rations, tools, etc	1.36	
Office and transportation	1.29	
		18.60

REPAIRS.

Opening roads at commencement of season:		
Labor	$190.50	
Team hire	72.33	
Rations, tools, etc	52.56	
Office and transportation	26.28	$341.67
Repairs, Gardiner to Golden Gate:		
Labor	902.00	
Team hire	384.33	
Rations, tools, etc	281.50	
Office and transportation	154.83	1,722.66
Golden Gate to Yellowstone Lake, via Grand Canyon:		
Labor	2,195.50	
Team hire	951.17	
Rations, tools, etc	629.12	
Office and transportation	314.66	4,090.45
Norris to Upper Basin, via Fountain:		
Labor	1,600.62	
Team hire	876.75	
Rations, tools, etc	495.40	
Office and transportation	247.69	3,220.46
Upper Basin to Yellowstone Lake, via West Thumb, including new small bridge near West Thumb:		
Labor	233.25	
Team hire	124.12	
Rations, tools, etc	75.12	
Office and transportation	35.73	468.22
Repairing bridge over Firehole River near camp of Troop D:		
Labor	70.00	
Team hire	40.00	
Rations, tools, etc	38.00	
Office and transportation	11.00	159.00
Repairing trestle at Golden Gate:		
Labor	13.50	
Team hire	7.90	
Rations, tools, etc	12.00	
Office and transportation	2.15	35.55
Repairing all bridges and culverts, between Mammoth Hot Springs and Norris, including new bridge over Green Creek and redecking Indian Creek bridge:		
Labor	105.00	
Team hire	48.72	
Rations, tools, etc	38.00	
Office and transportation	15.37	207.09
Steamboat:		
Labor	367.50	
Team hire	47.40	
Rations, tool, etc	102.44	
Office and transportation	41.49	558.83
Grand total		30,939.1[illegible]

Respectfully submitted.

J. W. POPE,
Major and Quartermaster, U. S. A., Disbursing Officer.

ACTING SUPT. YELLOWSTONE NATIONAL PARK,
Mammoth Hot Springs, Wyo.

ATTACHED MAP / DRAWING

SEE ORIGINAL