

ANNUAL REPORTS
FOR
YELLOWSTONE NATIONAL PARK

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ANNUAL REPORT
FOR
YELLOWSTONE NATIONAL PARK
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YELLOWSTONE NATIONAL PARK.

Horace M. Albright, superintendent, Yellowstone Park, Wyo.

GENERAL STATEMENT.

Yellowstone National Park was established by act of Congress approved March 1, 1872. ^{1/} In the act of dedication the purpose of the park was set forth as "a pleasuring ground for the benefit and enjoyment of the people" and part of this expression was cut in the eternal stone forming the splendid northern entrance arch near Gardiner, the cornerstone of which was laid by President Theodore Roosevelt in April, 1903.

The park lies in the three States of Wyoming, Montana, and Idaho. It is rectangular in shape, the north and south boundaries being 54 miles long and the east and west boundaries 68 miles in length. On the north a strip more than two miles in width lies in the State of Montana, and on the west the Wyoming line lies about 2 miles within the boundary of the park. Thus territory on the west side of the park lies in both Montana and Idaho, the Idaho section lying south of the Continental Divide, which up to the Wyoming boundary forms the irregular dividing line between the States of Idaho and Montana.

The area of the park is 3,348 square miles or 2,142,720 acres, of which 3,114 square miles or 1,992,960 acres are in the State of Wyoming, 198 square miles or 126,720 acres in the State of Montana, and 36 square miles or 23,040 acres in the State of Idaho.

With one exception Yellowstone National Park is the largest park in the world, being exceeded in size only by Jasper National Park belonging to the Dominion of Canada and not yet extensively developed.

The altitude of the park varies from less than 6,000 to 11,155 feet, the summit of Electric Peak.

No changes have ever been made in the boundaries of the park since it was created in 1872. Legislation now pending in Congress, proposes to add the region including the headwaters of the Yellowstone, the Teton Mountains, and an intervening mountain area of great charm and beauty. There is also under consideration a modification of the east boundary line to include the headwaters of the Lamar River.

ADMINISTRATION OF THE PARK.

After the park was created in 1872 no appropriations were made for its administration, protection, or maintenance for a period of six years. During the greater part of this time the park was cared for by the first superintendent, Mr. E. P. Langford, who served without salary and paid all of his expenses from personal funds. Beginning with June 20, 1878, small appropriations were made for the park, the money to be expended under the direction of the Secretary of the Interior. However, dissatisfaction arose in Congress with the administration of the park, largely because of

repeated attempts to secure control of the geysers, Grand Canyon, and other remarkable phenomena, which control it was believed the park officials favored. The result was that there was included in the act of March 3, 1883, authority for the Secretary of the Interior to request the Secretary of War to detail troops to patrol the park. The Secretary of the Interior did not immediately ask for troops, and Congress finally refused to appropriate any funds whatsoever for his use in caring for the park. This made necessary the detail of troops to the park. They arrived on August 20, 1886, under the command of Capt. Moses Harris, who became the first military acting superintendent. With the exception of one brief period from that time until October 31, 1918, the military force, aided by a few scouts, guarded and administered the park.

In the meantime, the Engineer Corps of the Army was charged with the construction and maintenance of physical improvements, principally roads, bridges, and trails.

NATIONAL PARK SERVICE CONTROL.

Under the act of July 1, 1918, funds were appropriated for the establishment of a civil administration, including the necessary executive officers and a civilian ranger force. Under this act, also, all improvement work was transferred from the Corps of Engineers to the Interior Department. Thus all park activities were combined under one head. The park was given the same type of control that had theretofore been established in other parks.

Fort Yellowstone was abandoned and is now the headquarters of the superintendent and his civilian force.

The wisdom of this move has been demonstrated each season since the military control ceased. Not only has the civilian administration been more effective in protecting the park, but it has very much better correlated the different park activities, and has brought about an immense reduction in the cost of operating the park.

ORGANIZATION OF THE PARK.

The assistant superintendent and the purchasing agent, who is also the disbursing officer, handles matters in the general headquarters office, buying supplies and keeping the financial and other books of the park, disbursing funds, preparing official reports, handling appointments, and attending to the multitude of other matters naturally appertaining to a large Government office and required by the laws, rules, and policies governing the National Park Service.

The resident engineer supervises the road maintenance and construction and other physical improvements.

The chief ranger is in charge of the protection of the park, the operation of the buffalo and hay ranches, the care of wild animals, the fighting of forest fires, and similar activities.

The park naturalist is in charge of the information office and

all scientific work carried on in the park, either under the Park Service or by scientists working in the park under authority from the Department. He also is charged with the inspection of the forests for the detection of disease, and has charge of wood-cutting and timber operations, when dead and down timber is needed for wood, or live timber for the construction of buildings. He also edits and keeps up to date the park publications.

The master mechanic supervises and controls the shops, which include well-equipped blacksmith, machine, automobile repair, motorcycles repair, and carpenter shops.

The master of transportation has charge of all freighting operations, the warehouses, the checking of incoming and outgoing supplies, inventories of park property, and in general all matters relating to the transportation, distribution, and use of the property.

The chief electrician operates the power plant at headquarters, supervises all electrical installation in the Government buildings and the establishments of the public utilities, maintains all power lines and the street lighting system.

The chief lineman is charged with the maintenance and operation of the telephone system, including the upkeep of 247 miles of telephone lines and the operation of the switchboard at headquarters.

The master plumber has control of the water and sewer systems

at headquarters, the sanitary systems of the various hotels and camps throughout the park, the public automobile camps, and the construction of new camps, including the installation of water and garbage disposal systems, is under his supervision.

The master painter supervises all painting operations in the park, both by the Government and the hotel, camp, and transportation utilities. He personally does most of the painting of Government property. He also has charge of sign painting and the installation of signs throughout the park.

I have briefly mentioned only a few of the duties performed by these various departments. It is a pleasure to report that without the perfect functioning of this organization during the past season the tremendously successful results of the year never could have been accomplished.

HEADQUARTERS.

The headquarters of the park are located at Mammoth Hot Springs, the buildings of the abandoned Fort Yellowstone being used for general offices, shops, and homes for park employees. Here it is our desire and intention to establish, as soon as funds are available, a museum not only for the benefit of tourists, but also for the use of scientists who come here each year in great numbers for the purpose of studying botany, zoology, geology, and other subjects.

Connecting headquarters with the various ranger stations in the park are 847 miles of telephone lines.

JURISDICTION OVER OFFENSES.

When Yellowstone National Park was established this part of the West was embraced within territories under the complete control of the Government, and when later States were carved out of these territories exclusive jurisdiction over Yellowstone Park was retained by the Federal Government. On May 7, 1894, the President approved the act providing for the punishment of offenses in the park, such punishment to be administered under the Federal law by a United States Commissioner, who was given authority to punish misdemeanors and violations of the regulations by the imposition of fines up to \$500.00 or imprisonment of six months, or of both fine and imprisonment. In case of felony the commissioner has the power to bind over suspects upon the determination of probable cause to the Federal court at Cheyenne. Hon. J. W. Maldrum is United States Commissioner, and is the only man to ever hold this office.

WEATHER BUREAU.

One of the main branches of the United States Weather Bureau is located at headquarters and is in charge of Mr. Edgar Fletcher. He makes all of the observations and reports usually required from offices of this size and importance by the United States Weather Bureau. In the work of observing weather conditions the rangers

at the various stations in the park assist. A full report of weather conditions during the past year, compiled with the assistance of Observer Fletcher, is published in another part of this report.

POST OFFICE DEPARTMENT.

The postoffice of the park is Yellowstone Park, Wyoming, and is located at headquarters. Without doubt branches should be established before the opening of another season at Upper Geyser Basin, the outlet of Lake Yellowstone, and the Grand Canyon, with Post Office Department trucks carrying the mail from the main office to these branches. There is another postoffice located at West Yellowstone, Montana, which prior to January, 1930, was called Yellowstone, Montana. Confusion in the transmission and distribution of mails was responsible for the change in name to West Yellowstone. While conditions have been better this year, the change did not accomplish all the results that were expected. There is also a postoffice at Gardiner, Montana, near the northern gate, from which a star route delivery is made to several stations along the road through the northeast corner of the park to Cooke City, Montana, as well as to Cooke City itself. Frank Lind of Gardiner is the contractor for carrying mail on this route. The transportation of mails from Gardiner to headquarters is handled under contract by the Yellowstone Park Transportation Company.

BUREAU OF FISHERIES.

9.

The Bureau of Fisheries maintains a hatchery at Lake Yellowstone and stations for collecting eggs in other parts of the park. A further report of its activities on its own behalf and in cooperation with the National Park Service is published in those sections of this report which relate to fish and fishing.

BUREAU OF MINES.

At the request of the National Park Service the Director of the Bureau of Mines detailed his chief mining engineer, Mr. George S. Rice, to make a study of the coal mine in Mount Everts, with a view to ascertaining whether or not it would be advisable for the National Park Service to develop it, in order to meet the fuel needs of Mammoth Hot Springs. Mr. Rice arrived in the park on August 16 and left on the 19th. While he has only filed a preliminary report on his findings, his recommendations will be that no farther development work be done in the Mount Everts mine, because there is no evidence that it would be a producer of good coal at reasonable cost.

BUREAU OF ANIMAL INDUSTRY.

Each year the Bureau of Animal Industry details one of its scientists to assist in the vaccination of the tame buffalo herd. The cooperation of the B. A. I. in the care of the buffalo herd has been an exceedingly important thing, and the effective results that it has obtained are deserving of the utmost appreciation of the National Park Service.

UNITED STATES GEOLOGICAL SURVEY.

The Geological Survey maintains gaging stations for the measurement of stream flow and the recording of other data in regard to certain waters of the park, particularly the Yellowstone, Snake, and Madison Rivers. While these gaging stations have some educational value, in my opinion they are detrimental to the park, and certainly they are of no value in our operations. The stations affect the park adversely because they record data that may later be used in the development of schemes for commercializing the park in one way or another.

FOREST SERVICE.

Yellowstone Park is almost surrounded by several national forests, the Absaroka, Beartooth, Shoshone, Eaton, Targhee, Madison, and Gallatin. We cooperate with the supervisors of all of these forests in fire protection activities and in the care of game. The most cordial relations have always existed between the administration of the park and the forest officers with whom we have some in contact.

RAILROADS AND HIGHWAYS TO PARK ENTRANCES.

There are four main gateways to Yellowstone Park, all of which are approached by automobile roads, and three of which have both train and automobile service.

Northern gateway.—The northern or Gardiner gateway is reached via the Northern Pacific Railway. This is a branch line from Livingston, 53 miles distant. During the 1920 season two trains a day were operated over this branch, the morning train arriving at Gardiner at 11:25 and departing at 11:45, and the evening train arriving at 5:30 and departing at 7:30. On both the incoming morning train and outgoing evening train through Pullman cars were carried for the purpose of giving through connections with eastern and western trains on the main line. As will be noted in the tables of travel statistics, these trains carried 9,717 visitors to the park during the season, and 9,175 leaving the park availed themselves of this train service.

The automobile road from Livingston south to Gardiner during most of the season was in a poor state of repair. This observation does not apply to the ten miles of road immediately north of the park, as this strip was improved by Gardiner citizens, aided by the National Park Service and the park utilities, who, prior to the opening of the season, regraded this part of the road and surfaced large sections of it with cinders. However, the road north of Yankee Jim Canyon was badly rutted, rocky, and rough during most of the summer.

Eastern gateway.— The eastern or Cody gateway is 55 miles from the town of Cody, which is situated at the terminus of the Chicago, Burlington, and Quincy Railroad. The Burlington operated

two trains a day, carrying through Pullman cars from eastern and southern points, as well as one local train. The through trains arrived at 6:00 a.m. and 12:50 p.m. and departed at 9:00 a.m. and 8:00 p.m., and the local train reached Cody at 7:10 p.m. and left at 3:35 p.m. Visitors coming from northern and western points changed trains at Billings, Montana. The Burlington Service at Cody was used by 4,075 visitors to the park, and 4,563 visitors upon completing their tour left via the Burlington Route.

Automobile roads converging at Cody from Wyoming and Montana points were generally in excellent condition. The Yellowstone Highway, leading north from Cheyenne through Douglas, Casper, Shoshoni, and Thermopolis was in excellent condition, with the exception of one short stretch of road north of Shoshoni. These Wyoming roads were never in better condition than they were this year.

The plan favored by the Governor and the Highway Commission for the early construction of a road through the wonderful Wind River Canyon is attracting wide-spread interest among motorists. Work has progressed continually on the road across the Big Horn Mountains, which will be a part of the Black and Yellow trail, a scenic route from the East which is being actively promoted by several States, especially South Dakota and Wyoming. The approach road from Cody to the park was in unusually good condition this

year. The tremendous increase in traffic brought grave fears that dangerous accidents would occur in the box canyon of the Shoshone where the day is located. These fears prompted the placing of more signs at both ends of the Canyon and plans have now been made for the establishment of a block system for the control of traffic during the season of 1921.

Western gateway.— The western gateway is at the town of West Yellowstone, Montana. It is reached by the Yellowstone Park branch of the Oregon Short Line Railway. The Yellowstone Special, a solid Pullman train, was operated from Salt Lake City, leaving at 8:30 in the evening and arriving at 8:00 in the morning at West Yellowstone. Trains leaving the park departed at 7:00 in the evening. This gateway holds the record for train passengers 14,268 visitors entering the park via the Oregon Short Line trains, and 14,322 people utilizing this train service after finishing their tour of the park.

The automobile roads approaching the western gateway from Utah and Idaho points were in better condition than they were last year, but considerable improvement work remains to be done on the main road from Salt Lake City on the section north of Ashton. The Ruby Valley and Madison River Valley routes from Montana points were well maintained, but the road from Bozeman up the Gallatin Valley was closed part of the season on account of

construction work. As noted last year, the Gallatin Valley road is being entirely rebuilt, and when finished this highway will be one of the best and most scenic roads approaching the park.

Southern gateway.—The southern gateway is 23 miles south of the main loop road system of the park, and is located near the Snake River. Roads converging at Sheffield's Resort (Moran Postoffice), 25 miles south of the park, connect southern and central Wyoming points, as well as Idaho communities, with the park road system. The Park Service maintained a road in the Teton Forest over a distance of 30 miles south of the park. The road under construction through the valley of the Hoback River, south of the Jackson Hole, is not in condition for automobile travel this year, but it is being rapidly improved by the State in cooperation with the Federal Government. Interference with ferry service by the ravages of the Snake River made it necessary for motorists coming into the Jackson Hole from Idaho points by way of Teton Pass to move northward along the west side of the Snake and cross the dam at the foot of Jackson Lake. After the ferry service was reestablished many motorists chose to cross the Snake at Jackson and come north over the main Jackson Hole highway through the community of Kelly and thence to the Buffalo Fork of the Snake.

The roads in the lower Jackson Hole were not in as good

condition as usual, due to the long winter and late spring, which not only made the roads soft but prevented early maintenance work. The Wind River route, approaching the park from Lander, Riverton, and Dubois, by way of Tugotee Pass, was used this year by more motorists than ever. This highway is being rebuilt by the State and Federal Government, and when finished will be an unusual scenic route. It should be in a few years one of the most popular approaches to the park. It connects with the park road system at the Buffalo Fork approach, a few miles east of Moran.

Northwestern gateway.-- The northwestern gateway was used very little by tourists this year on account of the reconstruction of the Gallatin road. It will be open for travel next year, but the improvement work will not be finished until the season of 1922.

Northeastern gateway.-- The northeastern or Cooke City entrance is unimportant so far as tourist travel is concerned. More than the usual number of tourists visited the Cooke City region this year, but that section will never be as popular as it deserves to be until the road which is being constructed from Red Lodge and Bear Creek, Montana, to Cooke City is completed. Construction work is proceeding slowly and it will be several years before the road is available for automobile travel.

ROAD SYSTEM OF THE PARK.

There are 273.8 miles in the main park road system, and 24.75 miles of secondary highway. Under a special act of Congress we also maintain 28 miles of the approach road in the Shoshone National Forest, which is a part of the main highway between Cody and the park. Also, under similar special authority, 80 miles of the main approach road from the south, in the Teton National Forest, are maintained and repaired each year under Yellowstone Park appropriations.

TRAIL SYSTEM OF THE PARK.

There are 680 miles of trails in the parks, 87½ miles of which were constructed during the season of 1920.

TRAVEL OF THE 1920 SEASON.

By a considerable margin this has been the largest tourist season in the history of Yellowstone National Park. Last year 62,261 visitors were recorded at the various gateways of the park, and this year the total reached 29,779 an increase of 28 per cent. This great increase in numbers is more remarkable than mere numbers would indicate. In the first place, the very late spring in the western States was undoubtedly discouraging to people contemplating motor trips to the park. Again, the summer weather in all of the surrounding States, as well as on the plains, was not what one could call uncomfortable in any sense of the word.

Furthermore, due to the long winter and late spring, followed by many summer storms, road conditions in many western States were not as good as last year. Nevertheless, more motorists visited the park than ever before, and there were far more visitors from distant points than usual.

In the following tables there are some very interesting and striking figures regarding the distribution of the 1930 travel. It should be especially noted that the train travel greatly increased this year. This fact is particularly striking when it is pointed out that the railroads did practically no advertising, either before or during the season. Next year, should an active advertising campaign be undertaken, the train travel, despite increased rates, should go far beyond that of the present season, and this is to be expected because it is understood that all of the railroads approaching the park expect to advertise the Yellowstone extensively, beginning early in the new year.

It should be noted that the eastern entrance, which a few years ago enjoyed only a negligible patronage, this year forged ahead of the other entrances in the number of private motorists, thus becoming the most popular entrance in the eyes of the motoring public.

On the other hand, the western entrance at the close of the season stood far ahead of the others in the number of visitors arriving by train.

The largest travel for one day during the 1920 season was 1,498 tourists who entered the park on Aug. 8. This is to be compared with 1,256 tourists who entered on August 6, 1919. The greatest train travel occurred on Aug. 10, when 665 people were carried to the various gateways. The heaviest train travel for a single gateway was 391, arriving at West Yellowstone, Montana, on the Oregon Short Line, on Aug. 5. The greatest number of private automobiles entering the park on one day was 273 on Aug. 9. Compare this with 202 on August 4, 1919. The gateway having the largest number of automobiles in a single day was the Cody entrance, on August 4, when 123 entered the eastern gateway, carrying 450 people.

There was also a large increase in the number of people using the trails of the park. It is to be hoped that the "trailers", as they are coming to be called, will increase rapidly each year.

The following tables make various classifications of the 1920 travel, and likewise present comparisons with the travel of previous years that are exceedingly interesting.

Travel by different entrances.

From the north, via Gardiner, Mont. -----	26,113
From the west, via Yellowstone, Mont. -----	30,521
From the east, via Cody, Wyo. -----	19,871
From the south, via Moran, Wyo. -----	3,871
Total -----	<u>79,776</u>

Yellowstone Park Transportation Co.

Entering via the northern entrance -----	10,558	
Entering via the western entrance -----	15,393	
Entering via the eastern entrance -----	<u>4,833</u>	30,884

Making trips with private transportation.

With automobiles, paid and complimentary ----	45,728	
With automobiles, second trip -----	<u>2,901</u>	48,629
With motorcycles -----	116	
With miscellaneous facilities, including out-of- season visitors to the park -----	741	
		657
Grand Total -----		<u>79,776</u>

Private automobile travel.

	Automobiles.	Tourists.
Entering via the northern entrance	4,804	14,963
Entering via the Western entrance	4,085	14,899
Entering via the eastern entrance	4,365	15,530
Entering via the southern entrance	874	3,252
Total	15,498	48,633

Motor cycle travel.

	Motor cycles.	Tourists.
Entering via the northern entrance	55	36
Entering via the western entrance	31	44
Entering via the eastern entrance	28	35
Entering via the southern entrance	1	1
Total	80	116

Private automobile travel.

	Auto- mobiles	Tourists
Entering via the northern entrance	4,809	14,961
Entering via the western entrance	4,015	14,870
Entering via the eastern entrance	4,400	15,580
Entering via the southern entrance	578	2,272
Total	13,802	48,683

Motor cycle travel.

	Motor cycles	Tourists
Entering via the northern entrance	57	56
Entering via the western entrance	30	44
Entering via the eastern entrance	24	32
Entering via the southern entrance	3	4
Total	84	116

* Includes 1 complimentary motor cycle, carrying 2 passengers.

Entrance	Private trans- portation.			
<hr/>				
1920				b
North	4,236	13,434	10,658	28,118
West	4,045	13,109	15,595	30,503
East	4,424	15,635	4,233	19,868
South	881	3,894	.....	3,894
Total	<u>13,586</u>	<u>46,072</u>	<u>30,586</u>	<u>79,777</u> *
<hr/>				
1919				
North	3,498	13,433	9,353	26,788
West	3,792	14,641	8,997	23,589
East	2,860	10,430	3,025	13,453
South	623	3,462	.....	3,462
Total	<u>10,773</u>	<u>40,966</u>	<u>21,375</u>	<u>63,851</u> /

* Includes 84 motor cycles, carrying 116 passengers.

/ Includes 38 motor cycles, carrying 56 passengers.

The following tables are given for the purpose of comparing the travel of this season with the number of visitors entering the park in 1919:

Entrance,	Private transportation.		By Rail:	Total Visitors
	Cars.	Visitors		
1920				
North	4,250	15,455	10,909	26,115
West	4,056	15,126	12,256	23,581
East	4,417	15,638	4,235	19,871
South	875	3,371	.....	3,371
Total	13,598	49,600	30,296	79,776
1919.				
North	5,499	13,423	9,553	22,786
West	5,792	14,561	8,697	23,658
East	2,880	10,430	3,025	13,455
South	623	2,452	.....	2,452
Total	10,773	40,966	21,295	62,821

‡ Includes 30 motorcycles and 116 tourists.

* Includes 36 motorcycles and 56 tourists.

Name of State:	North		West		East		South		Total	
	Pass-									
	Carriers									
Alabama	2	5			2	4			4	9
Arkansas	3	11	4	20	12	44			20	75
Arizona	3	15	35	62	10	23	2	12	25	121
Kalifornia	43	147	94	279	323	1117	12	43	428	1606
Kalifornia	179	203	271	622	73	223	21	67	264	1028
Konnecticut	9	23	1	4	1	2			12	21
Kilwaukee	1	2	1	3	1	4			5	10
Kerida	6	21	3	12	14	42	1	2	20	21
Georgia	1	3	1	2	2	6			4	12
Illinois	111	251	20	94	177	522	4	12	222	1022
Illiana	42	124	14	22	74	222			122	422
lowa	123	422	40	141	227	222	6	20	422	1412
labe	22	22	1222	4422	20	122	222	1122	1412	2222
louisiana	22	122	22	222	224	772	12	22	222	1122
Kentucky	2	4	2	12	6	21	1	2	14	21
Kentiana	1	4	2	12	7	22			11	22
Kansas	1222	2172	222	2722	274	1222	14	20	2272	12222
Kryland	2	7			4	12			7	21
Konnecticut	14	22	2	2	12	24			22	112
Kilne	1	4			4	14			2	12
Kalifornia	72	222	12	22	122	422	2	7	222	722
Konnecticut					6	12	1	2	7	24
Kassouri	42	127	27	122	122	227	4	12	222	222
Konnecticut	202	724	12	22	22	221			217	1122
New York	42	124	12	41	27	222			121	222
New Mexico	2	2	2	20	14	20			22	22
New Jersey	7	20	2	10	12	22			22	72
New Hampshire	2	2			1	2			2	14
New York	1	2	22	72	4	12	2	10	22	122
New York	22	207	20	211	414	1442	12	27	272	2022
North Carolina	1	2	1	2					2	2
North Dakota	172	277	2	22	22	212	1	2	227	222
Ohio	20	122	42	122	120	727	2	24	277	1222
Ohio	24	147	22	22	127	222	2	2	227	274
Oregon	74	222	122	274	12	22	7	17	227	222
Pennsylvania	20	74	2	27	22	127			22	222
Rhode Island	1	2							1	2
South Carolina	1	2	1	2	2	7			4	12
South Dakota	121	472	2	22	22	222			222	212
Texas	12	20	24	124	170	222	12	22	242	222
Vermont	4	12	1	2	2	12	1	2	11	24

Name of State:	North		West		East		South		Total
	Pass- Carriage								
Delaware	15	48	667	688	11	28	130	220	622
Virginia	8	27	1	2	6	18	1	14	47
West Virginia	1	6	1	1	1	3	1	3	7
Washington	222	1007	100	808	55	211	3	17	600
Massachusetts	126	448	18	48	64	207	1	3	414
Wisconsin	83	317	22	105	214	200	50	240	1129
West Virginia	10	41	1	5	3	10	1	10	70
Dist. Columbia	4	9	1	3	6	14	0	0	26
Maine	64	183	6	23	6	21	1	4	215
Illinois	1	2	2	6	1	1	1	4	11
Ohio	1	7	1	7	1	1	1	7	17
Total	399	1507	878	1408	632	1200	242	541	4565

Complimentary cars, unclassified by States 35
 Motorists entering in complimentary cars, unclassified by States, 79
 Cars and motorists entering, second trip, unclassified by States, 500 : 2041

Grand total, all cars and motorists, classified and unclassified.....12002 : 42,423

ACCOMMODATIONS.

During the season of 1919, about two-thirds of the total travel to the Park was of the class traveling in their own automobiles. Of this number, it was estimated that about 60 per cent carried with them their own tents, bedding, etc., and camped out. During the season just passed, 49,633 of the total of 79,776 visiting the park, or 61 per cent, came in their own cars, and while we have no exact data on which to base an estimate, it is the best judgment of rangers and others who have had an opportunity to observe many of these cars that the number of those with their own outfits has increased to about 70 per cent.

The accommodations furnished by all concessioners in the Park were, as a rule, of the highest order. The transportation company, hotel company, and camp company, are to be congratulated upon the quality of the service rendered, especially with the extreme difficulty that these companies have had for the past three years, in securing and keeping experienced help.

The total number of meals and lodgings furnished at the hotels and camps during the season were as follows:

	Meals	Lodgings	Total
Hotels:			
Mammoth Hotel			
Old Faithful Inn			
Lake Hotel			
Canyon Hotel			
Totals			
Permanent camps:			
Mammoth Camp	80,168	18,775	98,943
Geysers Camp	65,705	19,380	85,085
Canyon Camp	66,804	21,054	87,858
Lake	34,589	16,070	50,659
Camp Roosevelt (Tower Falls)	<u>7,838</u>	<u>2,658</u>	<u>10,496</u>
Totals	255,004	77,977	332,981

YELLOWSTONE PARK CAMPS COMPANY
Livingston, Mont.

Report of Meals and Lodgings of 1920 Season.

YELLOWSTONE PARK CAMPS COMPANY.

M E A L S

	MAMMOTH	OLD FAITHFUL	LAKE	CANYON	ROOSEVELT
Guests	80,168	65,705	34,589	66,804	7,838
Employees	<u>25,395</u>	<u>22,726</u>	<u>20,261</u>	<u>22,718</u>	<u>8,115</u>
Totals	75,557	88,431	54,850	89,522	16,048

LODGINGS

Guests only	18,775	19,380	16,070	21,054	2,658
Total meals to guests - - - - -	225,293				

Total meals to guests - - - - -	225,295
Total meals to employees - - - - -	<u>105,215</u>
Total - - - - -	330,510
Total lodgings to guests - - - - -	77,877

YELLOWSTONE PARK
CAMPS COMPANY

Livingston, Mont.
Oct. 5, 1920

Mr. H. M. Albright,
Superintendent National Park Service,
Yellowstone Park, Wyo.

Dear Mr. Albright:

Herein find report of meals and lodgings
1920 Park season, as requested in your recent
circular letter. We suppose this is all the
information you desire in regard to meals and
lodgings. If not, do not hesitate to call upon
us.

Yours truly,

Sec'y-Treas.

KRM-B

SERVICE TO THE PUBLIC

Hotels.—Hotels were operated throughout the season at Mammoth, Old Faithful, Lake Outlet, and Canyon. The travel tables indicate that almost 57 per cent of the train travel to the park stopped at hotels. They were filled up with tourists beginning the very first day of the season, and the crowds continued almost constantly until within a few days of its close. The hotels also accommodated many of the travelers who went through in their own cars, but no exact data as to their number is available, for the reason that some of them stop a night or two in hotels, possibly part of the time at permanent camps, and part of the time in their own camps.

The service was excellent and many went out of their way to express their satisfaction with the excellent service received, commenting specially upon the reasonable rates. The few complaints received were directed mostly at the "graft" practiced by some of the porters, and by head waiters who sold preference in the dining rooms when crowds were so great as to require two or three sittings.

The Hotel Company constructed a new dormitory for female help at Canyon Hotel, built a new porte cochere on the front of the Lake Hotel, and made a temporary addition under canvas to the dining room at Old Faithful Inn, giving the dining room added capacity of 125 seats.

This Company employed two Chinamen to cultivate the garden on Gardiner River, which furnished an abundance of fresh vegetables for all hotels in the Park.

Permanent Camps.--The Yellowstone Park Camps Company, maintained permanent camps at Mammoth, Old Faithful, Lake Outlet, Grand Canyon, and camp Roosevelt near Tower Falls. The latter, however, was not one of the regular stopping points for rail-road tourists, but was maintained as a special camp for those who desired to stop over to rest or fish, as it is located in one of the best fishing regions of the Park and there are many intensely interesting side trips that can be taken from here. This camp was well patronized. Slightly above 43 per cent of the tourists coming to the Park by rail and going through with the transportation company patronized the camps, and they also received their share of the patronage of the private motorists. The service was excellent, and about the only complaints received were due to the conditions at Camp Roosevelt, which were the result of the unfinished and consequently unsettled conditions of the camp, which was still in process of construction.

The Camps Company made excellent progress towards carrying out its plan for a most extensive remodeling and general improvement and enlargement of the camp service to meet the needs of the increased travel. A large central building was constructed of logs at Lake Camp for dining room and lobby. Another similar central

building was constructed of logs at Camp Roosevelt. A large, artistic stone fireplace is a feature in each of these buildings.

At Mammoth Camp the old tents were all taken down and new cottage tents with asbestos roofs were built instead. These tents are arranged in rectangles of eight single and three double tents around a court, and in the center of each court is located a water closet, provided with flush toilets. The sets of tents are arranged in streets, all presenting a very neat appearance. A concrete plunge was also built in connection with Mammoth Camp, 40 x 100 feet in size, 3 $\frac{1}{2}$ -5 feet deep, and connected with a natural hot spring by a large pipe. The water is of specially fine quality and this bath was enjoyed by a large number of tourists and employees during the summer. Dressing rooms were built around three sides of the plunge, but the plan for the further development of this camp contemplates a roof over the plunge and a large amusement hall in connection with it.

TRANSPORTATION SERVICE.

The Yellowstone Park Transportation Company furnished first-class automobile passenger service throughout the tourist season, meeting all incoming and outgoing passenger trains of the Park Branch of the Northern Pacific Railroad at Gardiner, Montana, at the northern gateway; of the Oregon

Short Line Railroad at the West Yellowstone, Montana, gateway; and of the Burlington Railway at Cody, Wyoming, 58 miles east of the eastern gateway, June 20th to September 20th, inclusive. This company had in operation 125 ten-passenger automobiles and 40 seven-passenger touring cars. Of these, 20 seven-passenger touring cars were hired from outside parties, the balance being White cars belonging to the Company. During 93 days, a total of 30,336 passengers were carried an average distance of 211.9 miles each. As an example of the heavy demands made upon this company, some days during the height of the season they were called upon to move as high as about 2,800 tourists from one station to the next, the stations varying from 5 to 100 miles apart.

The arrangement of selling tickets so that tourists may enter at one gateway and return by the same one, or either of the other two, gives a series of combinations which make up nine different trips, varying in length from 149.3 to 302.7 miles, averaging 211.9 miles. The standard rate for any of these trips is \$23.00, an average of 11.8 cents per mile. Carefully prepared schedules, which must be adhered to unless good reasons for variation can be given by the drivers, made it possible to tell the whereabouts of any car with reasonable accuracy at any time, and the machine-like adherence to these schedules, which characterized the wonderful organization of this company, brought from tourists many expressions of admiration as to the efficiency which was apparent.

The big cars are most comfortable. Additional charges are made to parties desiring the exclusive use of a seven-passenger car, and in such cases the car is placed entirely at their disposal, may be used for side trips, and more latitude is permitted as to schedule, etc.

The drivers were carefully selected before the season opened from many applicants. They are not only skilled, but are required to be always obliging, courteous and careful. Not only were they solicitous of the safety, comfort and pleasure of their passengers, but were also thoughtful and courteous to private automobile tourists encountered along the road, and many tourists of both classes took pains to express their commendation of certain drivers, or sometimes of the yellow cars in general. These conditions were in marked contrast to the service and attitude of this company's drivers during the season of 1919, when reckless driving, discourtesy, and disregard of park regulations characterized their service.

Marked improvement in service at the Transportation Company's garages, which are maintained at Mammoth, Upper Geyser Basin, Lake Outlet, and Grand Canyon, was also apparent; but this service is still far from satisfactory and does not compare favorably with the service given private motorists at the garages found in the small villages near the park entrances.

This condition is a result of the fact that the importance of keeping the Company's cars in running order overshadows the demands of the private motorist for quick repair service, and often there are not sufficient mechanics employed to keep both up to a maximum degree of efficiency.

Tourists in each car were furnished with copies of the Company's Time Tables and were invited to see to it that the driver followed the schedule. These time tables covered every trip made by the cars between stations. Number 1, Gardiner to Mammoth, is copied below as a sample.

YELLOWSTONE PARK TRANSPORTATION CO.
1920 Time Table 1920

Explanation:

Column 1-Gears drivers are to use between stations. The gear shown opposite one station is used to the next station.

Column 2-Speed of car in miles per hour. Speed one station is used to the next station.

Column 3-Speedometer readings at stations.

Column 4-Names of stations.

Column 5-Stops: When the word "slow" appears, cars are to go ahead at a speed not exceeding 5 miles per hour. On account of the narrowness of the roads and sharp curves, it is impracticable for cars to come to a full stop at many of the stations, on account of the consequent blocking of the roadway.

Column 6-Time table for car leaving initial point at time shown.

Column 7-Passengers are invited to look at their watches on leaving the starting point, and to fill out this column accordingly. For instance, a car leaving Mammoth at 8.10 am. on time table No. 2 would arrive at the different stations ten minutes later than shown in Column 6.

Column 8-Passengers are invited to enter in this column the actual arriving time of their cars at

the different stations. By checking this time against Column 6 you can tell whether you are running on schedule or not.

Note for drivers—On cars numbered over 125 use one gear higher than shown in schedule.

These schedules are subject to necessary changes as a result of experience in operation.

NATIONAL PARKS SERVICE
Yellowstone National Park

Horace M. Albright
Superintendent

Approved June 10, 1920. Yellowstone National Park

Time table No. 1
Gardiner to Mammoth

Gear	M.P.H.	Miles	STATIONS	Stops	Time	Your Car	Your Car
					1st	Arrives	Acres
							Did
							Arrive
		0:	Gardiner, Mont.....		11.35	am	.....
		3:15:	0.1 Entrance Arch.....		11.54	am	.....
		2:12:	1.6 Bridge & Eagle's Nest.....		11.42	am	.....
		3:15:	2.1		11.45	am	.....
		3:15:	2.7 Hotel Garden.....				.....
		2:12:	3.0 Mont-Wyo. State Line.....		11.49	am	.....
		2:12:	3.5 Boiling River.....		11.51	am	.....
		2:12:	4.5 Road to left, T.F. ....				.....
		3:10:	4.7 Change to 3rd Gear		11.54	am	.....
		10:	4.9 Mammoth Hotel.....		11.57	am	.....
		1	5.4 " Camp.....		12.00	p	.....

This system worked out splendidly and had much to do with the general satisfaction of the transportation service as expressed by thousands of tourists.

The company last fall remodelled one of the old stage company buildings at Mammoth into a first-class automobile repair and machine shop, and it is admirably equipped to do automobile repairing. Another of the old barns at Mammoth was remodelled into a bunk house for drivers, and at the present writing a steam heating plant is being installed to serve both the repair shops and bunk house in winter. The boiler for the heating plant is being reclaimed from the Fountain Hotel, which has been abandoned for several years.

A new gas-filling station has recently been built by this company at Mammoth Hot Springs, on a site between the post-office store and the Cottage Hotel, and was in operation towards the close of the season. The construction of another new filling station near Wittaker's general store at Canyon Junction has just been begun.

MISCELLANEOUS SERVICE.

Mr. J. E. Hayes, official photographer, maintained picture shops at his headquarters at Mammoth Hot Springs, Old Faithful, and Tower Falls. He also sold his photographic wares from stands in all hotels and camps, and through the general stores in the

Park. Mr. Haynes built a new picture shop at Mammoth Hot Springs, near his residence on Avenue A, on plans approved by the National Park Service. The new building, as well as the driveway, cement walk, and ornamental illuminated sign in front, are all very attractive and a decided credit to the Park.

Mr. George Whittaker maintained his general store in connection with the postoffice at Mammoth Hot Springs, and also maintained a complete general store at Canyon Junction. His new log building at Canyon, which was constructed late last fall and in early spring under most difficult circumstances, is very attractive, and is conveniently located for private automobile tourists.

Mr. G. A. Hamilton maintained his two general stores at Upper Geyser Basin and at Yellowstone Lake Outlet, and was also permitted to operate a small branch store at Thumb of Yellowstone Lake near Snake River Junction during most of the season to accommodate tourists entering from the south. At Thumb, his branch store was maintained in a building formerly used as a lunch station by the Hotel Company. Mr. Hamilton has for nearly a year had in process of construction a fine new store building at Lake Outlet, on an entirely new site, on the lake shore. He anticipates having it finished in time so it can be used by the opening of next season. He also

constructed a new filling station at Upper Geyser Basin, near his general store, but did not get the tank installed in time to operate it during the past season. A $5\frac{1}{2}$ ft. concrete sidewalk, about 250 feet in length, was constructed by Mr. Hamilton from his Upper Basin store to Old Faithful Inn.

Mr. Henry P. Brothers, of Salt Lake City, operated the Geyser Baths at Upper Geyser Basin during the season and gave satisfactory service. He reports that a total of 11,018 baths were furnished, of which 8,959 were furnished to tourists and 2,059 to park employees.

Messrs Pryor & Frischman operated their curio shop and ice cream parlor at Mammoth Hot Springs in a very satisfactory manner. They also conducted weekly picture shows and dances twice a week in the Post Exchange auditorium, which service was especially appreciated by park employees. They made some slight changes in the front of their store at the suggestion of the landscape architect, and gave the inside of the store a general renovating.

The Yellowstone Park Boat Company operated small gasoline and row boats at Lake Outlet when there was a demand for them for picnic and fishing excursions.

All of these public utilities rendered excellent service to the public and complaints against them were rare. All enjoyed excellent patronage.

INFORMATION BUREAU.

Previous to this year there has been no settled place to secure information, the clerks handling as best they could such inquiries as came in. This year, however, a small office, with photographs, a ground relief map, and a collection of wild flowers, on the walls, was established under the charge of the Park Naturalist. The office was further supplied with a few geological specimens for exhibition, and with maps, pamphlets, and circulars for free distribution and for sale. The result was an astonishing one. Ten thousand one hundred inquiries, or 12½ per cent of our total travel, visited the Information Bureau and appeared very much pleased with the service rendered. About 9,000 general information circulars of Yellowstone National Park were given out, and also 1,500 circulars of the other national parks. Two thousand Glances of Our National Parks were distributed free; 979 pamphlets and 248 maps were sold, and 540 additional calls received for sale pamphlets that were out of print, and more than 1,000 calls for a pamphlet on flowers. In addition, much research was done to secure information and some answers sent out by mail.

A further service was the preparation of monthly bulletins on birds, animals, flowers, and geology, and the posting thereof in all public places in the park. About 35 sets were posted each month, and this led to a call for extra copies, and accordingly 775 sets were given out free. The August bulletin is quoted below

August bulletin on birds, flowers, etc.,

inserted here.

A further most valuable feature of the Information Service and one which was highly appreciated by tourists was the giving of free half-hour talks or lectures by Park Ranger Isabel Bassett Hanson three times daily -- at 4:00 p.m. at Mammoth Camp; at 7:30 p.m. on the porch of Mammoth Hotel; and at 9:00 p.m. at the Public Automobile Camp at Mammoth Hot Springs at a camp fire gathering. The title of the lecture usually given was "How the Yellowstone Came to Be." This was a short discussion of the geological formation of the park expressed in non-technical language. The lecture was sometimes varied, however, by giving other talks on the history of the park, the care of its wild life, and other subjects of interest to the traveling public. Many favorable comments on the value of these talks were heard daily from tourists.

ROADS OF THE PARK --PAVEMENT A NECESSITY.

Last year I commented at length upon the need of adopting a program for permanently surfacing the roads of Yellowstone Park, or at least those that are hardest and costliest to maintain. This discussion appears on pages 164 and 165 of the 1919 annual report, and I call attention now to the fact that everything said in that report is more important than ever as a result of another year's operations.

ROAD MAINTENANCE AND IMPROVEMENT.

During the past season the roads have been in excellent condition, but were kept so only by the most painstaking efforts on the part of the officers of the park and the road foremen. Hundreds of favorable comments on the smooth condition of the highways, and the effective sprinkling, were made at the central office and at ranger stations by pleased tourists.

Much of the success of this season in road maintenance is to be credited to the employment of General Chittenden's section-crew idea, something that had been abandoned for many years. This plan involved the use of section crews every few miles apart on all main highways, these crews being charged with the filling of chuck holes and ruts, and the installation of culverts and other such repairs. Equipped only with a gravel wagon and a team, each crew sought simply to keep its own section smooth and thoroughly pleasant for driving. The plan worked so well this year that it will be utilized next season on a much larger scale.

The very late spring kept the roads closed until well into May, and grave fears were entertained that it would be impossible to open the park in time. The early snowfall in October had stopped much construction work in the upper park. This work had to be finished, the hotels, camps, and stores had to be rationed, and roads and bridges had to be repaired before June 30.

THE SNOWFLOW.

Faced with this discouraging accumulation of snow and a desperate necessity for overcoming it, a plan had to be developed for clearing the roads. The result was the construction by our master mechanic of an immense snowplow, which was made of sheets of boiler steel 1/4 inch thick, and fastened to a 75-horsepower Holt caterpillar. With this plow the roads from Golden Gate to Lake Outlet by way of Grand Canyon, a distance of over 40 miles, were cleared of snow, leaving a roadway for motor vehicles eleven feet wide.

The plow left headquarters May 12, and arrived at the Lake on May 23. Later, about the middle of June, this power plow opened Dunsen Pass.

All of the main loop roads were ready for traffic on June 20, the first day of the season, except the Dunsen Pass road. This, however, was opened on June 23, and on July 1 all cars were permitted to pass over the road. Only five days thereafter were the yellow cars of the Yellowstone Park Transportation Company routed by way of Norris.

The approach roads of the park were opened on time, with the exception of the south road, which was opened about June 23. Sylvan Pass was opened on June 17, the snow being shoveled out by crews of men working from both sides, the Cody Club paying for one crew, a notable cooperative effort that the Service tremendously appreciated.

Advancing now to a brief mention of work performed on the roads, the following is submitted as a mere sketch of our road maintenance activities:

The Main Salt Line:-- To care for this loop system and its crossroad from Morris Junction to Canyon Junction, sprinkling and maintenance (section) crews were stationed at Mammoth Hot Springs, Beaver Lake, Gibbon Meadows, Madison Junction, Expulsior Geyser Basin, Spring Creek, West Thumb, Lake Outlet, Trout Creek, Grand Canyon, and Virginia Meadows. These crews sprinkled the roads, except several miles on the Continental Divide and between Arvica Creek and the Natural Bridge on the Thumb-Lake road. The men stationed with each of these crews, and charged with filling up ruts, etc., worked with gravel wagons and did very effective work in keeping the highways smooth.

Between Canyon Junction and Tower Falls Junction the construction crew in Dunraven Pass did considerable maintenance work on the main road, as well as on the Mount Washburn road. Likewise, a large crew organized for heavy road repairs also did light maintenance work between Tower Falls Junction and the three-mile post east of Mammoth Hot Springs.

The construction crew in Dunraven Pass, with steam shovel and air compressor outfit, as well as graders and gravel wagons, continued the widening of the road and making of fills. Three large fills and one small one were completed, $1\frac{1}{2}$ miles of road

were widened, one 16-inch G. I. culvert and one 24-inch G. I. culvert were installed, and several old culverts were temporarily repaired. During the summer the grader crew made three trips over the Mount Washburn road.

A graveling crew was located part of the summer at Mud Volcano and the remainder of the season at Lake. This crew placed 300 cubic yards of gravel on the Lake-Canyon road, but mostly on that section south of Mud Volcano.

At Lake this crew widened the fill just west of the Lake Hotel, 250 cubic yards being added to the fill. It also completed the grading of the new road along the lake shore, past Hamilton's new store, and gravelled this new section. A steam roller is now completing this job.

This crew also did heavy grader and maintenance work on 5 miles of the road west of Lake Junction toward Thumb, and from Lake to Trout Creek, and lighter work was performed on the east approach road five miles beyond Lake Junction.

A large crew was on the Tower Junction-Mammoth road from about August 1 to September 12. This crew furnished the Geode Creek fill and placed a 6-foot rock cap on the fill, in addition to carefully ditching it as a protection against becoming soft.

The crew is now building a new road to Mammoth Camp from the main Mammoth-Norris road.

The crew also improved the approaches to Camp Roosevelt,

later returning to the six-mile post east of Mammoth Hot Springs. It made general repairs to the road for several miles west and east of that point. Near the beaver dam the road was raised and 400 linear feet of the highway was gravelled near Blacktail Deer Creek. Nine galvanized iron culverts were installed between the four and eight-mile posts on this road.

On the west side of the loop system during July the power grader outfit, with a gasoline roller, repaired the Mammoth-Harris road from the seven-mile bridge over the Gardiner River to the eighteen-mile post from Mammoth. It also improved the road to Madison Junction from Harris.

Later in the season this outfit was moved to the Canyon, where it repaired the main road around the Canyon Hotel and out as far as the garage.

The North Approach Road: -- Considerable gravelling was done on the north approach road from Gardiner, and protection was given to this important highway by placing log cribs in the Gardiner River to prevent washing by flood waters. Grader work on the road was also performed from time to time.

The West Approach Road: -- This road was maintained by the crew at Madison Junction. During August the power outfit, equipped with grader, scarifier and gas roller, tore up, reshaped, and rolled $5\frac{1}{2}$ miles of the oil macadam road east of the Riverside Ranger Station. Later in the summer the oil macadam road between

this station and the west entrance was patched wherever holes had been worn in the surface.

The East Approach Road: -- This road was maintained and repaired by a crew stationed at Cub Creek, twelve miles from Lake Junction, and a small cut of 400 cubic yards was made to eliminate a sharp curve. The material from the cut was used to raise the road. The crew also drained the road and repaired culverts between Sylvan Pass and Pabaska. Seven galvanized iron culverts were installed.

The South Approach Road: -- This road was repaired and maintained throughout the summer. First a small crew made emergency repairs, then a large crew did considerable heavy maintenance work, grading, draining, repairing culverts, removing fallen trees, etc. From time to time a second grader crew went over the road.

The East Approach Road (In the Shoshone Forest): -- In April, under a deficiency appropriation of \$5,000, a log crib was built to protect the big Elk Park Bridge. The crib was built of logs, with log floor and rock fill. It is 200 feet long, 3 feet high, and 7 feet wide. This construction crew also cleared the channel under the bridge of driftwood, and the abutments of the old bridge were floated away.

In May and June this crew graded and repaired the forest road up to the park boundary, then assisted in clearing Sylvan Pass of snow.

The South Approach Road (In the Teton Forest)†--This road was lightly graded and general repairs were made as far as Pacific Creek. Here it prepared to build log cribs for the protection of the road and bridges, but had to be recalled to repair the road near Arizona Creek, and on account of shortage of funds had to be ordered to headquarters before any crib work could be performed.

The Cooke City Road. -- One mile of this road between Tower Falls Junction and the Yellowstone River was rebuilt. The grades were reduced, three galvanized iron culverts were installed, and the road was widened. The road was graded as far as the Lemar River bridge. Part of the expense of this improvement was borne by Cooke City operators.

Bridges: -- The steel bridge over the Yellowstone, known as the Barnett Bridge, and the Lemar River bridge were repaired and strengthened during the season.

The Sylvan Pass under-pass bridge was completed and made ready for its fill on August 17th, 1920. This was built by contract under the 1919 appropriation.

TRAIL CONSTRUCTION AND REPAIRS.

Five small crews with pack trains were employed most of the summer building new trails, clearing out and repairing old ones, and building and repairing snowshoe cabins. Twenty-seven and one-half miles of new trails were opened up, namely, $3\frac{1}{2}$ miles

to connect Lone Star Geyser with Upper Geyser Basin via the west side of the Firehole River; 17 miles from the Cody road near Turbid Lake to the east boundary via Jones Pass; and 7 miles to connect the Upper Lesser trail at the mouth of Cold Creek with a new snowshoe cabin and lookout point near Frost Lake. The mileage of old trails cut out and repaired was 524½. The full list of trails in the park, showing mileage of new ones built and old trails repaired, is shown below:

TRAIL SYSTEM.

Twenty-seven and one-half miles of new trails were constructed during the season of 1920, and 524½ miles of old trails were cleared out and repaired. Of the 620 miles of trails in the park as listed below, 366 miles were used by tourists, and the number of tourists making use of them is estimated at 900 to 1,000.

List of Trails in Yellowstone Park.

<u>Name of Trail</u>	<u>Length in miles</u>	<u>Miles built 1920</u>	<u>Miles cleared out and repaired, 1920</u>
Sportsman Lake	20		20
*Sagehen Mountain	7		7
Fawn Pass	24		24
*Snow Pass	5		5
Riverwalk	23		23
*Crystal Spring	2		2

<u>Name of Trail</u>	<u>Length in miles</u>	<u>Miles built 1920</u>	<u>SO. Miles cleared out and repaired, 1920</u>
*Lake of the Woods	8		8
*Mass Trail	8		8
Madison Plateau	15		15
Fairy Falls	6		6
Little Firehole	11		11
Grizzly Lake	2		
Summit Lake	16		16
*Mallard Lake	8		8
*Mary Mountain	25		25
*Lone Star	5½	3½	
*Morris Pass	1½		1½
*Sheridan	14		14
*Shoshone	15		15
West boundary	60		60
Snake-Behler Trail	22		22
*South Boundary	33		33
*Upper Yellowstone	35		35
*Jones Pass	17	17	
*Canyon-Lake	14		14
*Lamar	43		43
*Grabe Lake	9		4
*Storm Peak	21		21
*Washburn	20		20
*W. Washburn	7		
Specimen Ridge	12		

<u>Name of Trail</u>	<u>Length in Miles</u>	<u>Miles built 1920</u>	<u>Miles cleared out and repaired, 1930</u>
Amethyst Mt.	7		
*Fossil Forest	1		
Crystal Creek	1		
*Burksyden	7		
*Knowles	9		
Hallroaring	15	10	15
Crevice	5		
Hallroaring-Lassar	12		12
*Slough Creek	12		
*Steamboat Point	7		7
*Frost Lake	7	7	
*Heart Lake	6		6
*Lake Shore	11		11
*Lower Falls	$\frac{1}{2}$		
*Uncle Tom	$\frac{1}{2}$		
*7-mile Fishery	3		3

* Used by tourists.

BUILDINGS.

The large wooden stable south of the stone garage was remodelled for the storage of vehicles and road equipment. Stalls were removed and a row of double sliding doors, fifteen in number, placed clear across the West side to provide ease of access. Sixty vehicles of average size can be stored here.

Part of a frame building formerly used as a hay shed was altered by tearing out the floor, making double the walls and partitions, and providing plenty of doors and ventilation, for use as a general ice house, and the old unsightly ice houses near Mammoth Camp torn down. One hundred and five linear feet of this building, which is 20 feet wide inside, was so altered and two partitions provided, making three compartments for use of the Government, the hotel company, and the camp company, respectively. The two companies paid the expenses of remodeling this building. The total capacity is 750 tons of ice. The balance of this building is still used for storing hay.

The cottage occupied by Chief Ranger McBride at headquarters was renovated and water from the mains, toilet, and bathroom installed.

A small wooden building near the stone garage was remodelled into an excellent paint shop. The changes were not many, requiring new floors in part and new double doors to permit the entrance of large vehicles to be painted.

New water system and electric lights were installed in the log cabin one mile south from headquarters used by the ranger in charge of the show herd of buffalo.

SNOWSHOE CABINS.

Several new one-room, rough log cabins, 12 x 16 feet in size, were built as stopping places for park rangers making patrols in winter on snowshoes, namely, one at Frost Lake near the east boundary, another at Farebell Creek on the south boundary, another to replace an old one at Cascade Creek on the south boundary, and another in the northeast corner of the park near the Cooke City entrance. Late last fall a new cabin was built at Aster Creek on the Snake River road to replace the old one which was badly located near Lewis Lake. This cabin was 14 x 16 feet in size, with shingled roof, and one-inch board floor. Another cabin was built late last fall at Park Point, to replace the old one there. This cabin also has a shingled roof. A new cabin was built recently on Thoroughfare Creek in the southeast corner, designed to house two rangers who will be stationed there all winter. This cabin is built near the old cabin, which can be utilized as a stable, and is 16 x 30 feet in size, with two rooms.

All of these cabins except the ones at Aster Creek and Park Point have roofs of rubberoid, laid over hewed poles

and covered about 6 inches deep with earth. The floors are of poles flattened on three sides, and the doors and window shutters are made of 2-inch plank to provide protection from bears. The walls are of peeled logs, well-chinked with mud.

The cabins at Sportsman Lake, and Buffalo Lake were repaired by putting on new rubberoid roof and furnishing floors of squared poles and heavy plank shutters and doors, and those at Grayling and West Line, south of Riverside, were repaired in the same manner, except that the roof board under the rubberoid, and the floors, are of one-inch boards which were reclaimed from old buildings near the west entrance. Nineteen snowshoe cabins were rationed or otherwise supplied for winter use.

AUTOMOBILE CAMPS.

The development of a system of much-needed camps for the use of the thousands of tourists driving their own automobiles through the park was begun during the past season, and excellent progress was made. The most essential things in developing these camps are a good supply of pure drinking water, and adequate sanitary toilet facilities. Realizing the importance of these camps, due to rapidly increasing travel, the work of developing them at some of the main points was begun early in June, just as soon as the roads were open.

On June 4 we began the work at Canyon, and by the end of the month the water system was nearly completed. It consisted of

a pipe line bringing water from the hotel company's water system at Canyon Hotel to the site of the new camp, which is on the knoll near Canyon Junction, formerly the site of the Wylie Permanent Camp. About 5,000 feet of 1½-inch galvanized iron pipe was laid a foot under ground, from the hotel to the camp site, and at Canyon Junction a branch line was taken off to supply the Canyon Ranger Station and the general store. The branch line, and the distribution of the water to eleven faucets which are placed at convenient intervals in the public camp, required the laying of 1,400 feet of one-inch and 700 feet of ¾-inch galvanized iron pipe. Sanitary earth closets to the number of six were provided in this camp. Signs necessary for the guidance of occupants of the camp were made and put in place. The old buildings left by the Wylie Company when the camp site was abandoned were torn down, and the logs, together with dead and fallen timber cleared from the camp site, saved for wood for the campers. This camp was filled with tourists as soon as opened, as it replaced a badly located and poorly equipped site opposite the ranger station.

Similar accommodations were provided at a new camp located at Upper Geyser Basin, in the thick timber on the opposite side of the road from Old Faithful. Here, however, the work of clearing the site was considerable, as there was much fallen timber to clear away, and green timber had to be cut to provide roadways to and through the camp. This camp is

ideally located, on level, sandy soil, close to but entirely screened by trees from the road; convenient to the objects of interest, stores, etc. Here also the water was a serious problem, as there is no adequate supply of pure water close by. As a temporary expedient, a pipe line was connected with the hotel company's system, and the much-needed camp was opened to tourists early in August, abandoning the old camp just below the camp company's site on Firehole River, which was badly located for the large numbers of people who desire to camp there.

The question of an adequate supply of pure running water for this most important camp was solved by building a low concrete dam about 15 feet long across a small stream of clear, pure water, located about a mile from Old Faithful Geyser in a northeasterly direction. This formed a small reservoir, from which the water was piped to a 700-gallon concrete settling basin through a 3-inch main. There is a fall of about 100 feet from the settling basin to the camp. From the settling basin the water is run for 3,000 feet through a 3½-inch galvanized iron pipe, when the main pipe branches into two 1½-inch mains, one 1,800 feet long leading to the public camp, and the other, 1,500 feet long, to the camp company's Old Faithful Camp. The camp company bore its proportionate share of the total expense of the work.

The public camp developed last year at Mammoth Hot Springs near the power house proved the most popular of the

two, and therefore the one at the old barns was abandoned. Improvements were made to the lower camp by increasing the size of the water pipe which supplied it, and adding laterals and more faucets to the system, distributing them over a larger area. The water system as now developed consists of 500 feet of one-inch main taken from the headquarters water system at the power plant, extended further by 800 feet of 3/4-inch main, with 910 feet of 3/4-inch laterals. Additional toilets were also provided at this site, and garbage cans, which were emptied daily, placed at convenient intervals.

No work has been accomplished for years that is of more importance to the public than the improvement of these camps. Providing plenty of pure running water is especially important. The number of tourists who make their own camps has become so great, that the main camps at Mammoth, Upper Basin, Lake Outlet, and Grand Canyon, are crowded throughout the season, and it requires the services of one to two men and a team constantly to keep them cleaned up and supplied with wood. The improvement and development of the camp at Lake Outlet, and of several of the minor camps which are used extensively, is important, and this work will be continued as rapidly as funds will permit.

TELEPHONE AND TELEGRAPH LINES.

On the date of my last annual report we were maintaining 269 miles of grounded telephone and telegraph lines in the park, which included 22 miles of line between Snake River and Beehler Stations which was seldom in use, as it was impracticable to keep it in a serviceable condition on account of the rough country which it traversed. This line was taken down recently, and therefore the total mileage of lines in the park is now 247.

Heretofore the headquarters-Morris line consisted of two grounded circuits on the same poles, splitting at Morris Junction so as to serve both sides of the park. The induction between these two lines has always been so great as to cause much inconvenience, and often it was so bad that conversation could be carried on over but one of them at a time. To avoid this, two additional wires were strung on crossarms on the same poles, providing two metallic circuits to take the place of the two grounded ones from Mammoth to Morris, improving the service wonderfully.

Another important improvement in the same line was made by running separate wires into Mammoth Camp from our switchboard, instead of having the Camps company's attachment made from the headquarters-Morris line.

During June and July heavy repair work was required on all park lines, to repair damage done during the long winter

and put the lines in shape for good summer service. The Desnaven Pass line, which runs from Canyon to Tower Falls Ranger Station, which has not been kept up since 1916, when it was built for the purpose of checking automobiles, was thoroughly repaired, requiring the resetting of nearly all the poles for the whole distance of about 20 miles. This gives us two lines to Canyon Station, one via Morris and the other via Tower Falls. Lake Junction to Sylvan Pass 16 poles had to be reset, and about a mile of this line at Jackson Grade was changed so as to prevent further trouble from poles washing out during high water. Thirteen miles of the line between headquarters and Tower Falls Station was practically rebuilt.

Innumerable small electric storms throughout the park during July and August caused many cases of slight damage to the lines by burning out of fuses, the burning out of two pairs of wires in the cable leading to the switchboard, etc., requiring constant attention of two linemen to keep the lines working satisfactorily. On the night of August 7 we had a heavy windstorm in the Gibbon Canyon which blew down considerable timber and broke the line eight times. Repairs to this line were not completed until about 8:30 p.m. on August 9, on account of the inaccessible country through which this line passes, it being necessary to cover the territory on foot.

CULTIVATION OF LAND.

The 45 $\frac{1}{2}$ -acre field at the northern entrance was re-seeded to timothy and clover last spring and was kept irrigated during the summer. Parts of it have a fair stand of grass, but the crops were not heavy enough to pay the expense of cutting it for hay and it was left on the stalk to be eaten later by the elk and other wild animals. The field is still foul from weeds in places.

No work in the line of cultivation of new meadows was done. The old meadows at Lesser River were kept irrigated, and the meadows on Slough Creek were irrigated and cleared of brush so that the hay could be harvested more easily. Both meadows yielded excellent crops of hay.

There are vast natural meadows on Slough Creek and they can be made to yield hay that can be utilized for feeding buffalo, elk, and other animals more economically than can be furnished by cultivating and seeding meadows on the Lesser River, provided the winter conditions as to snow and cold will permit us to hold the animals there in winter to be fed.

In my recommendations at the end of this report I advocate the expenditure of necessary funds in developing these hay lands.

ICE.

During December and January 232 tons of excellent ice were harvested, hauled about three-fourths of a mile to our new ice house, and securely packed for summer use. Most of the work was done by regular employees, and the cost, including their wages, was \$1.87 per ton.

SIGNS.

A very considerable amount of work was accomplished during the year in the erection of signs in different sections of the park. New milestone signs were placed between Lake Junction and Canyon Junction, between Canyon Junction and Tower Falls Junction, and between Tower Falls Junction and Mammoth Hot Springs. New signs designating the public automobile camps and ranger stations were manufactured in the park and proved to be very effective when installed. Large signs were also placed at each entrance, as well as at every road junction.

Several hundred small direction signs for the public automobile camps, the geyser basins, and miscellaneous unmarked points of interest were made in the park and installed by the master painter, who has been given full charge of all sign work throughout the park, not only of the Government but also of the various park utilities. An effort is being made to harmonize and unify all park signs.

The colors used in the manufacture of all signs are green and white, with red for danger warnings.

WATER SUPPLY AND POWER PLANT.

Park headquarters at Mammoth Hot Springs is provided with an adequate supply of pure mountain water from streams seven miles south, brought through a substantial system of pipe lines, reservoirs, and mains. This system furnishes water to all Government buildings at headquarters; to the public utilities whose headquarters are located here, including the hotel company, camps company, transportation company, and store, curio shop, and picture shop. A description of this system will be found on page 157 of the annual report for 1919.

During the past season a pipe was connected with the system to furnish pure water for use of travelers using the public automobile Camp near our power house, and half a dozen faucets were placed at convenient intervals throughout the grounds.

The hydroelectric power plant, which was also described in detail on page 157 of the 1919 annual report, is supplied with water for power from the same system.

Extensions of the lighting system were made during the season as follows: A pole line was constructed and a new street lighting circuit 1,200 feet long was established, providing street lights from the circuit at the south end of the headquarters grounds near Liberty Cap, up the hill past the employees' quarters, and on to Mammoth Camp. Another line was constructed from a point on the south side of Capitol Hill, south for 3,600

feet to the cabin used by the ranger who is in charge of the show herd of tame buffaloes.

The northern entrance checking station was also connected up with the Gardiner City electric lighting system, providing light for registering automobiles after night, at the entrance arch. This took a line 400 feet long.

Most of the outside wire required for all of the above-named extensions was secured by reclaiming old wire that was formerly used to connect up the Gardiner Canyon Slide with the power plant, where it was no longer needed.

The total production of the power plant for the fiscal year 1920 was 149,850 kilowatt hours, which was disposed of as follows:

Electric current sold.....	18,164 kilowatt hr.
Consumed by Govt. buildings, shops, street lighting, and lines	130,076 " "

The peak load for the year was 56 kilowatts.

The cost of the electric system for the fiscal year 1920, as shown by the cost report, was \$6,159.87. The actual cost to the Government to produce current was 4-7/40 cents per kilowatt hour. The electric current was sold at 5 cents a kilowatt hour, the total of 18,164 kilowatt hours sold bringing in a revenue of \$309.20.

IRRIGATION SCHEMES.

There are under discussion in the States of Montana and Idaho schemes more or less speculative in their nature which contemplate the utilization of several of the most beautiful sections of Yellowstone Lake for storage reservoirs.

The Montana project contemplates the erection of a dam at the outlet of Lake Yellowstone, this dam to be used for the storage of water to be used in irrigating lands in southern and eastern Montana. The promoters of this project first asserted that they wanted to construct a dam that would store water eight feet above low water mark, but now they assert they want to construct a six-foot dam.

There are several Idaho projects. One contemplates the use of Lake Yellowstone, this project being similar to the Montana scheme, except that the water is to be taken into the Snake River by means of tunnels through the Continental Divide. Another Idaho plan contemplates the erection of dams at the outlets of Lewis and Shoshone Lakes and the raising of these lakes to a height that would bring about the destruction of numerous areas of timber.

The most actively promoted Idaho project, however, is the one that involves the erection of dams in what is called the Falls River Basin. These structures would store the waters of Beahler River, Falls River, Mountain Ash Creek, and

other streams, and would flood between 8,000 and 10,000 acres of fine meadow and timber land lying at the base of scenic cliffs and plateaus, within which there are more waterfalls than there are in all of the remainder of the park combined. This is the project that has already been presented to Congress and received the approval of the Senate.

None of these projects should be favorably considered under any circumstances, because any one of them will result in the desecration of the park to a greater or less extent. More important than this, however, is the fact that should approval be given to the least harmful of the plans, namely, the one advocated by Montana promoters, a precedent would be established that would mean the ultimate ruination of the park.

TRIP TO UPPER YELLOWSTONE AND BECHLER RIVER REGION

For the purpose of determining the relation of several proposed irrigation schemes to the Upper Yellowstone region and the southwest corner of the park, known as the Falls River Basin, I left headquarters on September 29 and made an extensive trip throughout the southern part of the park. I first visited the Yellowstone River Valley beyond the southeast arm of Yellowstone Lake, a region inhabited by the park's largest moose herds, and went up the river as far as Bridger Lake, inspecting en route the new Upper Yellowstone Ranger Station,

which has just been created.

I then followed the south boundary west to Fox Creek Snowshoe Cabin, thence over Big Game Ridge and up to Heart Lake. The Heart River and Snake River valleys were traversed to the Snake River Station, and from that point the south line of the park was followed to the Beahler River Ranger Station in the southwest corner. I spent two days examining the basins of Falls River, Mountain Ash Creek, Beahler River, and Boundary Creek, as well as reservoir sites south of the park. After completing this work a trip was made up the Beahler River to its headwaters, and thence over to Shoshone Lake.

This trip took me through a wonderful mountain region, much of which is visited by only a few hundred people each year, and the rest of which is almost unknown to any but rangers. Practically all of this territory was covered by Mr. Wm. C. Gregg of Hackensack, New Jersey, whose explorations and reports are mentioned herein in other connections.

FISH PLANTING.

The total collection of eggs of the black-spotted or native trout by the United States Fish Hatchery at Yellowstone Lake Outlet was 6,312,000, of which 5,682,600 were collected from Yellowstone Lake and tributaries, and 629,400 from Fish

Lake, near Soda Butte Station.

Mr. W. T. Thompson, Superintendent of the United States Fish Hatchery, at Bozeman, Montana, who also operates the park hatchery, states that the quality of the eggs was very good.

Distribution.-- Of the eggs collected, 1,951,500 were hatched at the park hatchery and planted back in small streams around Yellowstone Lake and in other waters in the park. The balance were shipped out and used as follows:

Shipped to Leadville, Colo., hatchery & planted in Colorado and adjacent waters	1,000,000
(The Leadville Hatchery furnished part of the men engaged in making the collection in the park.)	
Given to Department of Naval Service, Canada, in exchange for salmon eggs	200,000
Sent to Glacier Park Hatchery	245,000
Sent to Bozeman Hatchery and distributed from there.	2,417,000
Planted in Yellowstone Park	1,951,500
Total	<u>5,811,500</u>

From these statistics, it is evident that of 6,612,000 fish eggs collected in the park, but 5,811,500 were distributed, a loss in hatching of 700,700, or nearly 11 per cent. Another considerable loss occurred in transportation from hatchery to stream, especially in the plants that necessarily had to be made with pack train, varying, according to distance and care taken, from 1 to 20 per cent.

Mr. Thompson also furnished Eastern Brook and Rainbow Trout for restocking streams in the park. The detailed list of fish planted in the park during the past season follows:

TABLES OF FISH PLANTED 1930 SEASON.

DATE	WATERS	NUMBER
<u>Eastern Brook Trout.</u>		
June 9	Glen Creek	10,000
.....	Obsidian Creek	10,000
July 17 ...	Gibbon River, at Virginia Meadows	5,000
Aug. 31 ...	See Paros Creek, in Lower Geyser Basin	5,000
	Upper Firehole River near Lone Star Geyser.	5,000
		35,000.
<u>Rainbow Trout.</u>		
Aug. 27 ...	Gibbon River, in Gibbon Meadows	40,000.
<u>Black Spotted Trout.</u>		
Aug.	# Bear Creek, in vicinity of East Road.....	4,000
	# Owl Creek, in vicinity of East Road.....	3,000
	Tributary to Sylvan Lake (East of Lake)..	5,000
	Lake Eleanor	4,000
	Middle Creek, three-mile post to ranger S.	30,000
	# Crow Creek, near park boundary	5,000
	Galaxy Creek, in vicinity of road.....	24,000
	# Moose Creek, about 3½ miles from outlet..	24,000
	/ In tributary stream, outlet of Shoshone	
	Lake (near Outlet)	20,000
	Aster Creek, in vicinity of 12-mile post,	
	West Thumb	20,000
	Tributary streams of Lewis River, near 2-	
	mile post, West Thumb	20,000
	*Grassfish Creek, west of road & above falls	12,000
	#Baula Lake	7,000
	#Falls River, near forks, vicinity Baula L.	14,000
	*Falls River, near Cascade Creek and vicinity	
	of Snowshoe cabin	14,000
	*Falls River, north of 3 and 4-mile posts &	
	east of Terrace Falls	50,000
	*Falls River, in vicinity of 2-mile post	
	west (Gallop Creek) ..	15,000

DATE	WATERS	NUMBER
August	*Cascade Creek, tributary to Falls R., near 2-mile post	30,000
	# Proposition Creek, north of Birch Hills..	10,000
	# Mountain Ash Creek, vicinity of Union Falls	80,000
	# Tributary to Falls R., near Bechler River	7,000
	# Boundary Creek, about $2\frac{1}{2}$ miles from outlet	14,000
	# Boundary Creek, north of Falls.....	14,000
	# Tributary to Robinson Creek, vicinity of 13-mile post, west boundary	7,000
	Slough Creek, above rapids	30,400
	Lamar River, above Buffalo Farm	30,000
	Soda Butte Creek, near northeast entrance	57,000
	# Cache Creek	63,000
	# Buffalo Creek, near park line	63,000
Sept. 2....	# Tower Creek	78,000
3....	# Hallroaring Creek	52,500
4....	Slough Creek	105,000
11....	Sedge Creek	52,000
	Bear Creek	48,000
13....	#*Extreme headwaters of Bechler River	84,700

Planted by U. S. Bureau of Fisheries.

August...	Pelican Creek	15,000
	Hatchery Creek	10,000
	Clear Creek	25,000
	Hatchery Creek	10,000
	Bridge Creek	20,000
	Hatchery Creek	3,000
	Pelican Creek	42,000
	Hatchery Creek	15,000
	One-Mile Creek	10,000
	Hatchery Creek	25,000
	Flat Mountain Arm	60,000
	Clear Creek	48,800
	Chipmunk-Crouse	72,000
Sept.	Columbine Creek	120,000
	Cub Creek	120,000
	Clear Creek	100,000
	Thamb	110,000
		<u>1,261,500</u>

*Waters previously barren.

#Fish had to be planted with peck train.

As will be noted, 234,700 of the blackspotted trout planted were placed in streams previously barren, and 19 of the plants made, with a total of 303,800 fish, were placed in streams so remote from the road that they had to be transported part of the way by pack train.

Transportation for the fish planted was furnished by truck and pack train by the National Park Service, except for a few loads taken with truck from Lake Outlet to Slough Creek and Lamar River by the Yellowstone Park Camps Company, the 275,200 planted by the U. S. Bureau of Fisheries in the small streams around the Lake, and one lot of 64,700 planted in the very headwaters of Bechler River on September 18. This lot was handled from Lone Star Geyser to destination with a pack train furnished by Mr. W. O. Gregg, of Hackensack, New Jersey, who explored the southwest corner and Bechler River country very thoroughly during the past summer, and who takes a very strong personal interest in its development. The handling of this large number of fish with pack train was done principally by our permanent ranger force, and the men who did the work are deserving of special credit, as they usually had to work very late at night to get the fish to their destination without delay and save excessive losses. Every plant made was apparently successful, and the loss was relatively small.

While the number of eggs of black-spotted trout taken was

slightly less than taken during the season of 1919, the season's work was much more of a success so far as the interests of Yellowstone Park are concerned, as the numbers used for restocking in the park itself were about 33-1/3 per cent of the number of eggs hatched, while but about 9 per cent were replanted in 1919.

On September 23, Mr. Ernest Shaw, Supervisor of the Absaroka National Forest, planted 5,000 black-spotted (native) trout fry in a small lake called "Hidden Lake" located about a mile north of the park line near where it is crossed by Buffalo Creek. This lake is sometimes connected with Buffalo Creek during periods of high water, but Mr. Shaw thought the black-spotted fry planted in Buffalo Creek near the park line might not find their way into it, and these waters were previously barren. Mr. Shaw transported the fry through the park by pack train from Lower Bridge.

FISHING BY TOURISTS.

The large majority of tourists who visit the park are either not at all interested in fishing or do not have sufficient time at their disposal to do any fishing. Of those who do fish, by far the greater majority come from that class of tourists who are making camping trips through the park, and the most of their fishing is done in the

streams close to the main road, or at the Fishing Bridge near Lake Junction, where the fishing is easy and most everyone is more or less successful. Towards the end of the season, however, the trout are not so plentiful at the bridge, and many are disappointed. There are so many fishing in the streams close to the road that the fish are either frightened away or too well educated to take bait or a fly, and not a very great many are regarded with big catches in the streams that are readily accessible from the automobile roads. To the comparatively small number of tourists who had the time and inclination to make trips some miles from the main roadways for the purpose of fishing, success in bagging the limit was the usual thing.

By a policy of increased planting in all the streams that are easily reached by everyone, it is hoped that the fishing may be improved so that all may enjoy success.

A twenty-pound Mackinaw trout was caught with hook and line in Snake River, not far from the south entrance, on September 21, 1920.

WILD ANIMALS.

At the time of closing my last year's report the outlook for the wild animals, and the elk especially, was very bad. There was no forage on the winter range at all, and almost without warning came the unprecedented storm of October

222-23rd when from fifteen to twenty-eight inches of snow fall in all parts of the Park and effectually sealed up what little forage there was left on the summer and fall ranges. The animals were driven down in large numbers, and many crossed the Park boundaries only to fall a prey to the merciless hunters waiting just across the line. Large numbers of elk, many bear, and some deer were destroyed. The antelope tried to leave the Park and even the buffalo left their ranges again and again to seek out forage still left uncovered. Other storms followed during the last few days of the month and served to emphasize the already severe conditions. With the game animals leaving the Park on all sides to certain destruction by rifle or starvation, it became necessary to begin feeding hay at once, never to cease entirely until May 5th, 1920. November proved another record breaking month and so did December January and February were comparatively mild and led to hopes of an early spring. But March, April, and May proved particularly cold and stormy and were the bitter end to a long, hard winter. Six long months of continued work and hardship to save the lives of the remaining animals was the record of our Service. The sections of our wonderful herds of wild game that remain are a monument to the hardships of bitter cold and raging storms cheerfully endured by rangers and other members of the National Park Service. And the thanks of

all America is due to the friends that so unselfishly provided the funds for the work. Early in May, the grass began to grow and things took a turn for the better for our greatly weakened animals. Recovery proceeded rapidly, there has been a satisfactory increase in young animals, forage has grown well, and there is ample hay cured on the stalk for an average season. In addition to the forage distributed over the ranger, there has been 850 tons of excellent hay secured and stacked at various points for winter use.

The worst feature of the work ahead of us to preserve the game animals through the winter of 1920-21 is the Montana game law permitting elk to be killed from Oct. 15 to Dec. 31, and a second elk to be killed on payment of \$25.00. It is the same law that permitted the slaughter of 1919-20, and it is a disgrace to the great state of Montana.

Owing to the losses of last winter, not so many elk have been seen as usual by the tourists. Probably an additional reason is the steady stream of cars along the roads that has a tendency to keep these timid animals at a distance. On the other hand, antelope, deer, mountain sheep, and beaver were seen much more frequently than usual. Our wild animals are a great source of interest to all our visitors, and even a woodchuck or a porcupine creates some excitement.

Buffalo--Wild birds— 61 wild buffalo, of which nine

were last year's calves, were seen in January by rangers in Pelican Valley. A bull was seen at Turbid Lake on April 14th by rangers; also two bulls at Mary's Bay on April 20th and twenty-six buffalo of both sexes in Pelican Valley on April 27th. No dead animals have been found. The herd is evidently splitting up and it is thought that the reason is on account of the need for new pastures. I saw eight near Turbid Lake along the east road early in June and next day Engineer L. L. Hill saw fifteen in the same locality. It is evident that the wild buffalo have increased, at least to the extent of the calves noted above. Cold weather did not seem to affect these animals at all and the effect of heavy snow was only to make them restless; with their great strength and ponderous weight buffalo can break their way to fresh food, so it is not surprising that all buffalo seen have been in good condition. These buffalo will undoubtedly find fresh pasturage within the Park as the herd increases; the wild herd probably contains well over a hundred animals at the present time.

Buffalo—Large herd.—One calf was born in October after the date of my last report. This herd became uneasy even before the first big storm and many succeeded in breaking away from the herd and came in to Mammoth repeatedly. As the hay at the Buffalo Farm for winter use was none too plentiful for the large herd during a long winter, it was desirable to keep them grazing as late as possible. Finally on Nov. 15th, the

bulk of the herd was taken to Slough Creek, where hay had been put up during the summer, and fed there until the end of the month. The calves were separated from their mothers and corralled at the farm where they were fed hay.

During December, January, and February, 235 buffalo were cared for at the Buffalo Farm. On February 23rd, the bulk of the herd was driven from the farm to Slough Creek to utilize the hay still there until March 25th, when 127 bulls and steers were brought to Mammoth to be fed baled hay, leaving 235 cows and calves at the Buffalo Farm. Hay was exhausted at the farm and by great exertions eight tons were hauled out from Mammoth.

All buffalo were taken back to the Buffalo Farm about May 1st and turned out to grass. The animals were thin in flesh owing to short rations, but soon began to improve. During the winter about three hundred tons of hay was fed at Buffalo Farm, about seventy-five tons at Slough Creek, and thirty-nine tons at Mammoth. During the summer just finished the herd has ranged on the slopes of Specimen Ridge and Mt. Morris, and 450 tons of hay were put up for the coming winter at the Buffalo Farm and 225 tons at the field on Slough Creek.

On December 6th an old bull was found dead near Junction Butte; a cow and a calf died near the mouth of Bear Creek during January, and two bulls near Knowles Cabin; in March a yearling bull died near the mouth of Blacktail Deer Creek; an eight-year-

old bull was found dead August 17th; one bull killed another at Mammoth on April 19th. Fortunately the only valuable one of these eight buffalo was the cow that died in January and she had been badly crippled for some time.

A three-year-old bull was shipped to the City of St. Louis on November 19, 1919; a six-year-old bull to Aurora, Illinois, on January 30, 1920; a five-year-old bull to Hibbing, Minn., on June 30, 1920; a three-year-old bull to Thermopolis, Wyo., on June 30, 1920; and a bull to the President of Park Zoological Society, Milwaukee, Wisconsin, on June 30, 1920. On April 1st the new calves began to appear, but unfortunately the first two were frozen to death or died from the exposure; since then 48 more calves have appeared and the tame herd now totals 448 animals.

On June 18th, fifteen bulls were brought to Mammoth and held in the smaller corral for the tourists to see. They created a great deal of interest and it was estimated that they were seen by over 30,000 visitors.

The entire herd is in excellent condition; and barring another heavy fall of snow early in the season, the natural range should keep them in good condition for some time. While the 450 tons of hay in stack at the Buffalo Farm should prove sufficient for the winter, it is possible that we may have to use some of the

hay stacked on Slough Creek. The ever increasing number of animals in this herd means that more and more hay must be provided each year and the only safe way is to seed more and more irrigated ground. It is hoped provision for such improved land will be made each year as the increase in the herd warrants.

Mountain Sheep.—The usual herd of mountain sheep came down to Gardiner Canyon during the October storm and remained in the vicinity all winter; at one time eighteen animals were seen. There was also a small band on the walls of Golden Gate. On October 20th a male lamb came to the tent of two laborers near the Buffalo Park and entered without any apparent fear. He was thin but still seemed a healthy specimen. The buffalo keeper took him to the Park and fed him milk, bread, etc., but the sheep finally died.

Seven sheep were seen near Tower Falls in December; and in January fifty-three sheep were seen north of the Yellowstone River and fifty-four more to the south thereof. Only a few dead bodies were found during the winter and it is evident that our estimated number of two hundred in the Park is too low if anything.

The majority of the mountain sheep spent the winter at low altitudes where they were able to pick up a fair living. On March 15th they began to move back on the high mountains, and in June the lambs began to appear. A small band remained on Mt. Washburn

and at least two bands on the rim-rock along the Lamar Valley. These three bands were frequently seen by tourists during the season. On July 1st, I saw four female sheep in the main automobile road between headquarters and Gardiner.

Antelope.—The storm of last October brought the antelope down with a rush to the neighborhood of the Lowlands about Gardiner and below. Most of the antelope tried repeatedly all through October, November, and December, to leave the Park, and a good many did leave. The latter wintered near Electric, Montana, and it is hoped that most of them returned safely to the Park. The antelope remaining inside were fed hay in a special enclosure so constructed that the small antelope could feed therein undisturbed by the larger elk. Even under these conditions the herd was greatly weakened by the time spring came and nineteen were reported as dead. In April and May, the antelope began to recover and move back on their summer range.

Horns were shed by the antelope bucks in late October and November. As the old sheaths came off, it was found that the new horns had already begun growing on the tip of the bone core so that at no time were the animals without a serviceable horn. This was in marked contrast with elk and deer, whose growing horns of April, May, June, July, and August were too soft and sensitive for use in battle or defense.

The antelope situation is a serious one. We have only three hundred head left and the number seems doomed to decrease.

Antelope will not breed in captivity and zoological gardens can-

not even maintain the ones they get. There are not many antelope left in the United States and the total number is steadily getting smaller and smaller. Therefore, it behooves us to wisely care for pronghorn if we would prevent the extermination of this wonderful animal.

Moose.--During the winter the moose of the upper Yellowstone, Snake River, and Bechler River Basins had a hard time and short rations, but seem to have come through with only a slight loss of mostly old and decrepit members of the species. During the summer they have recovered and are now vigorous and strong with a satisfactory number of calves. I believe that there are about eight hundred moose in the Park.

In addition to the above localities, little colonies have established themselves near the Riverside, Gallatin, and Sylvan Pass stations; on the headwaters of Hellroaring, Slough, and Soda Butte Creeks; and on Eagle Creek to the east of the Park. They have been seen occasionally by tourists and always caused the wildest enthusiasm. One of our important moose ranges is the meadows and forests of the Bechler and Falls River Basins, in the far southwestern corner of the Park. There is an irrigation scheme being developed which, if approved, will destroy this range and drive out these moose to certain destruction, and there is a fine band of elk also whose range will be destroyed there.

Elk.—The estimates of park superintendents as to the number of elk in the Park up to 1911 varied from 25,000 to 40,000, but were usually mentioned as being "thousands" and no figures stated.

In April, 1912, a census was taken of the northern herd by Park employees, and the count of 30,101 was then considered as approximately accurate.

If the Park furnished ample winter range for the elk, as well as summer range, there would be no problem, but most of the grass in the park is covered with snow in winter so deeply that it is not available, and the only real winter range is the lowest land, two to twelve miles in width, along the northern border. In ordinary winters, this would furnish a good range for fifteen to twenty-five thousand elk, but over a large portion of the Absaroka National Forest, which joins the park on the north, the conditions are the same as they are in the Park. Until grazing permits for cattle and sheep were granted on this range, 20,000 to 30,000 elk normally included in the northern herd, had ample summer range in the park and reasonable winter range included on both sides of the park line on the north.

Realizing the situation which confronted the northern elk herds on account of the curtailing of its natural late fall and winter range by encroachment of settlers and granting of grazing permits on the adjacent forest reserves in summer, a meeting was held in the office of the Park Superintendent in

the Park on September 9, 1912, in which representatives of the Park, the United States Biological Survey, and the United States Forest Service, participated. Previous to this date the question had not been entirely overlooked, for, acting upon suggestions of the Park Superintendent, the Department of Agriculture had, in the interests of the elk, limited the grazing districts for sheep in the Absaroka National Forest adjoining the Park, and the States of Montana and Wyoming had set aside game preserves shutting the Park where elk were protected absolutely from hunters.

At this meeting, while it was the intention to consider the situation from every angle, it has since become evident that the importance of keeping the winter range in the National Forest entirely free from grazing was not realized. The following points were unanimously agreed upon and recommended, namely:

1. That the whole elk problem should be handled as a unit.

2. That for the present the elk herd of about 50,000, which includes the park herd, the Jackson Hole herd, and those that range in the forest reserves just outside the park, should be maintained at its present size, of which the northern herd should not exceed 35,000.

3. That under present conditions the annual drop from the herd (killed under game laws of the adjoining States, shipped, etc.) should not exceed 7,500 to 8,000.

4. That some equitable arrangement be made whereby the people of the State of Montana may derive their due proportion of the benefits of the herd.

5. That for the present the existing sheep grazing lines on the Gallatin National Forest be maintained.

6. That so far as elk are concerned, the present lines on the Absaroka National Forest (Jardine-Slough Creek trail) are reasonable and should be maintained.

About the only result of this meeting was to excite enough interest to keep the subject alive and cause an occasional census to be taken of the northern herd of elk, and these figures are now useful for comparison. The figures given below are sufficient to show just how serious the situation has finally become, and how easily possible the extermination of the elk herds may be if better protection and more winter range is not given them.

Results of Census.--The first census taken, in April, 1912, mentioned above, showed 30,101 in the northern herd. The next census was taken April 9 to May 1, 1913, and showed an increase to 36,967 in the northern herd. The next spring, April 11 to May 2, 1914, the count showed 35,308 in the northern herd.

Following the most excellent conditions of the winter of 1914-1915, no census was taken of the herd, but a conservative estimate of increase was 10 per cent, which would place the number in the northern herd around 37,198. Beginning April 5, 1916, a careful count showed 39,544 animals in the herd, and 1,938 were known to have been killed during the hunting season and shipped out alive to new ranges and city parks, thus accounting for 31,602. The discrepancy was accounted for by reliable reports to the effect that there was an unaccounted for increase

in the southern herd, indicating that a heavy migration from the northern to the southern herd had taken place, which is not surprising, as their summer ranges sometimes might overlap.

The worst set-back to the northern elk herds of record, except that of the past winter, occurred during the very severe winter of 1916-17. This was said by many old timers to have been the longest and hardest winter in their memory - in fact, it was much worse than was last winter, though the elk did not suffer so much as forage conditions were better and the open season for hunting in Montana was shorter. We had but 12 tons of hay for feeding the wild animals including antelope, deer, and mountain sheep, and up to this time it had not been the practice to feed the elk at all; but efforts were always made to keep them away from the feeding so as not to interfere with the smaller animals which are scarcer and not so hardy. The winter was so severe, however, that it was impossible to hold the elk back and they came in and ate much more than their share of the hay that was fed. There were very heavy losses of all kinds of wild animals, as well as of domestic stock in the surrounding country, and the official count made from May 23 to June 9, 1917 placed the number of elk in the northern herd at 19,345, but accounted for 23,745, the difference having been killed during the hunting season, and shipped away alive.

The apparent loss from severe weather was something like 25 to 30 per cent of the herd.

The winter of 1917-18 was mild, the game had plenty of winter forage, and the losses were slight. No census was made of the elk. About 350 tons of hay were fed from January 5 to March 19, and about 3,500 elk came in to share it with the deer, antelope, and mountain sheep.

The winter of 1918-19 was also warm - the mildest on record with warm temperatures and but little snow. The wild animals remained scattered all winter and did not come in at all for forage, as they had plenty on the range. Several thousand elk went outside of the Park into the National Forest on the north, apparently from force of habit, as they did not need to go for forage, but this happened after the close of the open season for hunting and they were not molested to any extent. The increase in the herds was apparently normal and the losses from all causes slight. No count was made, nor would it have been practicable to have made one, as the elk were too much scattered all winter, the snow being so shallow that many of them remained on the summer range all winter.

The history given above is only reviewed for comparison and to better emphasize the fearful tragedy that occurred during the long, cold winter of 1919-20.

From the figures given, 19,345 elk in the northern herd in

June, 1917, and the fact that the two winters following were quite mild in character with no apparent losses in the herd, it would not seem improbable that there were 25,000 in the herd a year ago. Last June, after the most disastrous winter which our wild animals have ever had to face, our rangers estimated the survivors in the northern herd of elk at 11,000, and I am reliably informed that the southern herd fared but little if any better. This loss of nearly 60 per cent in one winter is alarming and indicates most forcibly the possible danger of complete extermination of this most noble race of animals. The story of the long winter of hunger and suffering is heart-breaking. The conditions which caused it were anticipated and preparations on a scale thought to be beyond any possible necessity were made.

The very mild winter and early spring were followed by an unusually dry summer. The winter snows melted early, rains were scarce, and lack of moisture prevented the usual growth of grass on the ranges. As it was plain before the end of summer that there would be but little natural winter food for the wild animals, preparations were made for acquiring sufficient hay to cover the necessities of an ordinary winter. There were already on hand 235 tons of hay available for feeding them, in addition to that provided for buffalo and the domestic stock. On October 23d came a very severe snow storm, which covered the whole country with from one to three feet of snow and stopped all motor traffic throughout the park. Even the road from

Headquarters to Gardiner, which seldom is filled with snow until late in winter, had to be plowed out with a power grader before it was possible. At first it was taken as a joke, as it was hardly thought possible that this could be the beginning of winter, but no relief came, and we finally had to bring in our trucks that were snowed in out in the park with the caterpillar tractor, which could travel over the snow by packing it down.

The elk immediately began going down and leaving the park by thousands, and in an effort to hold them inside where they could not be slaughtered, we immediately began feeding hay. It at once became evident that we would need all the hay we could get, and during November every cent available from our appropriation was used in purchasing hay in stack from farmers down the Yellowstone Valley, just below the northern entrance. During the month 670 tons of alfalfa hay were purchased, at \$35. a ton in stack, at distances varying from one to nine miles from the feeding grounds, and preparations were made for hauling it on trucks, or sleighs if snow came too thick to use the trucks. The whole situation was carefully reviewed and plans were made to provide what was thought to be enough hay to bring the animals through in fair shape. A deficiency appropriation was asked of Congress and was passed, including \$30,038.59, which was necessary to pay for sufficient hay to

last through to nearly April 1st, when we could reasonably expect good weather. But to provide for further contingency, an additional sum of \$8,000 was carried in the bill to be used only in case it was actually needed.

From the time of the big storm the latter part of October, until May 1st, was a period of constant anxiety and hope that the weather would moderate and give relief to the starving elk. The \$8,000 had to be used to continue the feeding beyond April 1st; on April 9th no change was in sight and it became apparent that the hay on hand would not be enough unless moderate weather were to come suddenly, and we had been disappointed too often to count upon this. It was quite evident that we would be out of hay before April 20th, and with continued cold, backward weather, the elk, which had been on a short ration all winter and were already thin in flesh, would all die for the want of a few tons of hay to continue the feeding until grass grew.

An appeal was made by telegram to the American Red Star Animal Relief and a few prominent men who had become interested in the unusually serious situation which was confronting the elk herds and who had offered to assist if such a desperate contingency arose. These gentlemen responded generously and quickly, donating a total sum of \$4,708, with which 103 tons of additional hay were purchased, which served to save the several thousand elk which we had been keeping up on a daily ration of

hay all winter. The names of the parties who so generously contributed to this fund are as follows:

American Red Star Animal Relief Association	\$1500.00
National Parks Association	853.00
Mr. William C. Gregg, Hackensack, New Jersey	2000.00
Mr. H. M. Blackmer, Midwest Refining Co., Denver, Colo.	500.00
Hon. Stephen T. Mather, Director, National Park Services	<u>350.00</u>
	\$ 4703.00

We were very fortunate in having the last purchase of hay located and being able to get it on short notice, for it grew scarcer and raised in price almost daily during the spring months. The price paid for hay for these animals varied from \$35. per ton in stack, near Gardiner, in November, to as high as \$52.60 per ton for baled alfalfa hay delivered at Gardiner in April. A total of 1,851 tons of hay was fed out last winter to buffalo and other animals, of which 422 tons were fed to the tame buffalo herd and the balance to our antelope, deer, mountain sheep and about 8,000 elk. This hay cost a total of \$61,808.23 of which \$4,703 was donated as above, and the balance of \$56,806.23 was expended from park appropriation also referred to above. As stated before, 812 tons of hay were used for feeding wild animals during the severe winter of 1916-17, and 350 tons were fed during the mild winter of 1918-19, compared with 1489 tons used for the same purpose during the past winter. Had

we not been prepared, the loss must have been something fearful, amounting almost to total extermination of the herd.

The following table contains data showing some of the extremes, and is designed for comparison of conditions from year to year affecting the life of the buffalo and other animals, and particularly emphasizes the kindness of the winter of 1918-19, the dryness of the summer of 1919, and the severity of the following winter:

Comparative Weather Data To Illustrate Contrast In Winter Seasons of 1918-1919, and 1919-1920.

	<u>Oct.</u>	<u>Nov.</u>	<u>Dec.</u>	<u>Jan.</u>	<u>Feb.</u>	<u>Mar.</u>	<u>Apr.</u>	<u>May.</u>	<u>Winter</u>	<u>Average for</u>
Lowest Temperature										
1918-1919 (Mild)	17	-5	-20	-5	-8	-6	15	17		
1919-1920 (Cold)	-6	-19	* -31	-11	-8	* -25	* -3	24		
Average Temperature										
1918-1919 (Mild)	44	37	21	22	19	29	30	47	51	
1919-1920 (Cold)	*30	23	15	23	21	24	31	45	25.25	
Normal Temperature (35 years)	42	29	22	15	20	25	27	47	30	
Total Precipitation										
1918-1919	2.87	0.65	0.39	0.88	1.64	1.00	1.41	1.89	1.19	
1919-1920	2.69	0.80	2.12	0.28	1.02	1.95	1.35	2.64	1.63	
Normal Precipitation (35 years)	1.14	1.44	1.22	2.24	1.24	2.18	1.38	1.91	1.75	
Total Snowfall										
1918-1919	5.0	5.9	3.7	10.0	18.2	9.9	7.6	5.7	8.25	
1919-1920	*25.6	6.4	27.7	* 2.9	12.3	20.0	4.8	3.2	12.93	

Record breaker for month.

The dryness of the summer of 1919 is shown by the following figures on temperature and precipitation as compared with normal:

	(1919)	<u>June</u>	<u>July</u>	<u>Aug.</u>	<u>Average</u>
Average Temperature (Warm)		59	65	61	61.67
Normal Temperature (35 yrs.)		56	62	61	59.67
Total Precipitation (Dry)		0.14	0.80	0.40	.4467
Normal Precipitation		1.64	1.18	1.02	1.28

The severe winter conditions suggested by the above table were unparalleled in the records of the Weather Bureau.

What became of 14,000 elk which were missing in our northern herd on June 1st last? Our records indicate that 449 were shipped out alive to city parks and for stocking other ranges, of which 298 went to Canada. It has been estimated that about 6,000 were killed during the hunting season in Montana - October 15 to December 24 - or if not killed were wounded so that they crawled away and died. Reports have it that about 400 were killed in the West Gallatin country from the small part of the northern herd known as the Gallatin Herd before the heavy snow came which kept the hunters out of that section the balance of the season. It is hard to believe that the balance of those missing died of sheer starvation and exposure, yet such was probably the case if the number in the herd last fall was not greatly overestimated.

Hunting Season.--The Laws of the State of Montana permit the killing of elk in Park County from October 15 to December 24th. These Laws are unworthy of a civilized state. They are indefensible. The results of such a law, as were in evidence last fall, would seem little short of criminal. This slaughter is only rivaled by the tremendous slaughter of buffalo on the plains in the early days, which it is well known finally practically resulted in the extermination of the species.

Hunters came in droves, from all directions and every method of transportation - on foot, with saddle and pack trains, automobiles, trucks, but by far the greater number came on the daily trains to Gardiner. For several weeks the outgoing trains were loaded with carcasses of elk, often requiring an extra express car to handle them, and the depot platforms at Gardiner and the next station below at Cerulea Springs looked like slaughter pens.

The residents of the Yellowstone Valley for twenty miles down enjoyed good business, for in addition to getting their own meat, they had in use all kinds of transportation, pack outfits, farm wagons, automobiles and trucks, hauling dead elk from where they were killed to the depot at high rates. They also charged rates that brought them a good profit for board for the numerous hunters who came in by train. The hunters were of all types and professions - farmers, doctors, lawyers, merchants, etc., and also included many women and children - mostly, however, from Montana points. Many of them had never hunted before, knew but little of the use of a gun, and nothing whatever of butchering and curing for the meat after the animal had been killed; and as for the park line, most of them trusted to good luck or the kind mercies of residents of whom they might inquire as to its location, for but few engaged and paid for the services of a guide. Thanks to a kind Providence, but

few of them did stray across the line. Those who did trespass, however, though usually they did so through ignorance or carelessness, were arrested and tried before the Park Commissioner and paid their fines.

Due to the large number of inexperienced hunters in the field, hunting was a hazardous proceeding, and it was extremely fortunate that no one was killed by stray bullets, which were much more numerous than were those which were well directed. The most popular method of hunting was for a number of hunters to lie in wait until a herd of elk, consisting of bulls, cows, and calves, came across the park line, when they were immediately surrounded by several hunters, all of whom would begin shooting into the herd, and all would continue shooting until their ammunition was exhausted, or until the elk all dropped or got away, usually wounded. Then each member of the party who had participated in the fusillade would come forward and claim his or her elk, until all that had dropped were claimed.

Most of the hunters who came had no trouble in getting their elk, some of them by going but a mile or two from town. A story is told of one man who came to Corwin Springs and put up at a hunting camp maintained there near the railroad, and next morning killed his elk on the east end of the bridge, across Yellowstone River just as it was making its way toward the Gallatin Gorge. Escorted at the other end of the bridge.

By the middle of December the number of hunters had dwindled, probably because all who cared to had secured their elk, though some were killed daily right up to the close of the open season, December 31st. An effort was made to tabulate the total number actually killed in Montana during the hunting season, but no accurate figures were procured. It is certain, however, that the number ran up to several thousand and that many more died of wounds and were never discovered.

Protection of Elk.—Adequate patrols were maintained along the park borders throughout the hunting season, and several hunters who were found across the line with unsealed firearms, or in possession of trophies, were arrested and tried. During the hunting season, the State Game Wardens also had deputies on the job to see that the laws were complied with by hunters, and a few were arrested and fined for hunting without license, trespassing upon the game preserve, etc., but transgressions usually happened through ignorance, as the laws of Montana were sufficiently broad so that no one was obliged to violate them to get their meat. The Forest Service also had several rangers stationed in the Yellowstone Valley during the winter engaged in patrolling for game protection after the hunting season was over, and our ranger force assisted by making numerous patrols in the Gallatin Game Preserve west of Yellowstone River along the park lines.

There was no occasion for criticism as to the manner in which the elk were protected, as everything possible was done with the means at hand to protect them and prevent them from starving to death. The main drawback was the fact that the State Law permitted unreasonable slaughter by leaving so long an open season, and lack of sufficient hay and open range to provide them with winter forage to keep them from starvation.

Feeding hay and special care of elk.—As previously stated, 1,489 tons of hay were fed to our wild animals last winter, most of which was eaten by the large elk herds. The maximum number of elk taking this hay at any one time was estimated at 8,000. Feeding was begun before the end of October and continued daily until May 3rd. Most of the work was done by park rangers, and at times it was most strenuous, especially in days when the mercury hung away below zero, during blizzards, etc., when the necessity for feeding was even greater than in pleasant weather. Trucks were used when the roads were free enough from snow so they could get over them, but for long periods it was necessary to resort to the use of teams and sleighs, changing to wagons when the snow disappeared on a part of the road and remained on the balance. More than 1,000 tons of the hay fed was taken from the stack and hauled in racks, the distance hauled varying from one to twelve miles. It took several rangers' entire time to handle this work, and overtime; frozen fingers and ears, and going without lunch were common occurrences. On occasional days when the

weather warmed up so less food was required, or when hauling from nearby points, the spare time was taken up repairing equipment, changing hay racks from sleighs to wagons or trucks, or vice versa, and hauling away and disposing of the dead bodies of elk that expired on the feeding grounds, and these were not few. During all of this period, the elk as well as other animals, even including our tame buffalo herd, showed a continual strong tendency to go down to lower levels, and every effort was made throughout the winter to keep them back in the park. The strain of overwork, anxiety, and constant responsibility and fear of disaster to the elk herds was continuous, and much credit is due our ranger force for the uncomplaining and patient manner in which they handled the situation.

Elk shipped from the Park.—Elk were captured in the Park near Gardiner Montana, and shipped to city parks and for stocking ranges, as follows:

1919

December 3	- To City Park of St. Louis, by express, crated..	12
" 5	- To Hunt National Park, Sulphur, Okla., express..	5
" 15	- To Palisades Inter-state Park, New York	65

1920

January 20	- To Rocky Mountain Park of Canada, Banff, Canada	200
" 21	- To City of Minneapolis, Minnesota	2
" 21	- To Agricultural and Mechanical College of Texas	3
" 23	- To City of Aurora, Illinois	4
Feb. 8	- To Sonora Experiment Station of Texas	5
Feb. 14	- To City of Allentown, Pa.	5
March 2	- To Jasper Park, Canada	26
" 26	- To Sonora Experiment Station, Texas	2
" 5	- To San Antonio, Texas.....	1
April 10	- To New Mexico	50

The total number of elk captured in the park for shipment since this practice was begun in 1911-1912 is as follows:

Winter	1911-1912	177
"	1912-1913	533
"	1913-1914	99
"	1914-1915	373
"	1915-1916	413
"	1916-1917	426
"	1917-1918	145
"	1918-1919	101
"	1919-1920	<u>442</u>
		2,908

Depredations by elk.—The complaints from farmers outside of the park of damages from the presence of elk on their ranches were not as numerous as usual, but this is probably accounted for by the fact that we bought all of their hay at a good figure, so they had nothing left except fences to be damaged.

Present conditions.—The past summer has been one of the best on record so far as conditions for growth of vegetation was concerned, and the prospects for an easy winter for the wild animals are first-class. All reports received during the latter part of the summer from rangers who have been in contact with the elk herds indicate a good crop of calves. The deaths from starvation last winter included nearly every calf in the herd. In many cases the mothers were shot during the hunting season, leaving the young to shift for themselves, and they soon died of cold and lack of a mother's care. We are not prepared to feed the wild animals this winter, as no hay except what was cut and stacked on Slough Creek and the Buffalo Farm is available,

and no funds are available for the purpose. With the heavy growth of excellent forage on the ranges, it is to be hoped that the elk and other animals will winter well without being fed hay, as there is but little doubt that the annual feeding of hay tends to domesticate them and make them dependent upon being fed every year. Even last winter when the weather was so severe and conditions so serious, reports indicated that the few hundred elk that remained on the usual ranges along the north line of the park and in the National Forest just outside fared better and the percentage of loss was less among those that hung around constantly waiting for their short rations of hay.

Should the emergency arise, however, it will be necessary to meet it by calling for a deficiency appropriation for purchasing hay.

Fortunately, hay will be cheaper than it was last year, as it is much more plentiful due to a good season. It is to be hoped that the fall may be long and open, so the elk will not leave the park in great numbers before the close of the Mexican hunting season, as another slaughter like last year will mean almost their extermination, and there has been no change in the law since last fall.

Gallatin herd.—While usually considered as a part of the northern herd of elk, the herd of somewhere around a thousand elk that summers in the park and always winters in the Gallatin National Forest just outside of the northeast corner is quite separated from the main northern herd, and conditions are often quite different for them. Their winter range is usually amply sufficient for their needs, and even last winter the loss was not excessive. About 400 were killed by hunters after the season opened and before the early snow stopped the use of automobiles into that section - for automobiles have come to play a large part in the hunting and fishing sports and many who make trips for this purpose would not do so had they to go any other way. The same Montana Game Laws, which permitted the heavy slaughter near Gardiner up to Christmas last fall, apply, however, and the danger of complete extermination of this little herd cannot be overlooked.

Southern elk herd.—The conditions in Jackson Hole where the southern herd always winters were similar to those that governed on the north except that the State Law protected the elk by a shorter open season. The best reports received indicated that about a thousand were killed by hunters during the open season of Wyoming. Such reports as were received from time to time by hearsay during the long winter indicated about the same difficulty

in securing sufficient hay as we encountered, and I understand that the price of hay went even higher. Cotton cake was purchased also and fed successfully. It is a well known fact that many cattle owners who use the summer ranges in Jackson Hole for pasturing their stock had to take them out to winter last year. There are supposed to be about the same number of elk left in this herd as in the northern herd. In June, Assistant Chief Ranger Brooks accompanied representatives of the United States Biological Survey and the United States Forest Service on a trip up Buffalo Fork to examine the condition of the elk range in that section.

A few hundred elk spend their summers in the Beahler and Falls River country in the southwestern corner of the park, and in certain mild winters they sometimes winter there also. Last winter 400 of these left the park into Idaho and never returned, which reduces this small herd by more than half.

Deer.—The winter storms and accompanying cold weather did not have such a quiet effect on the deer, for they browsed a great deal and were not dependent on grass to such an extent. Still, even in their case, large numbers left the Park in October, November, and December, and many were killed by hunters. In spite of this and of the fact that forty-nine mule deer and two white-tails were found dead, I do not believe that they suffered any serious diminution in numbers. Most of those that did leave

the Park returned when the proper season arrived. It was interesting to note that with the deer more than any other animal small bands were cut off by the early storms in remote sections of the Park and managed to survive the winter. In all, about two hundred deer were fed at Gardiner and fifty near headquarters.

As early as January 6th, the deer began to shed their horns. As it was noticeable that these early shedders were sick or weak, I believe it was a consequence of their condition that led to early shedding. One buck was seen with horns as late as March 25th. About March 17th most of the horn butts began to swell and new horns to grow, to complete their growth during late July; and the skin on the new horns began to wither and fall in late August. About the 25th of May the color of the mule deer changed from the gray of winter to the red coat of summer, and changed back again to the gray coat about September 1st.

About the normal number of fawns have appeared since May 1st, until now we have about twelve hundred mule deer and a hundred white-tail deer in the Park.

Woodchucks.--Woodchucks first appeared on February 5th, were out a few days, then disappeared to make their final emergence from hibernation on March 17th. The last one seen in the fall was on September 5th. Although this is considered a rather insignificant animal here, the tourists have been much interested in them all summer. Three tame woodchucks at the Canyon Ranger Station have attracted unusual attention.

Beaver.--Beaver are so numerous in the Park that there is practically no way of estimating the number. Almost every stream has its colonies. Beaver signs in the shape of dams, houses, canals, runways, stumps, and pieces of trees cut for food are abundant and excite much interest among the tourists. There are extensive workings in a small gulch along the road to Cooke City leading down from the west to the Yellowstone River. This gulch was formerly filled with quaking asp, but is fast being stripped of its trees by the beaver. Many tourists from Camp Roosevelt saw the beaver at work there in the evenings. Another beaver dam and pond is at the junction of Lava and Lupine Creeks beside the main road from Tower Falls, five miles from Mammoth. At this point, it was a common occurrence for tourists to see beaver and observe their interesting ways in the late afternoons and evenings.

Porcupines.--Porcupines were numerous all over the Park plateau. As a rule they lived on grass and small vegetation, but in winter and early spring they ate the bark from pine and spruce trees. The damage was not great, however, as the trees were too thick in most places and they are not often completely girdled and killed. Porcupines were often seen, especially in the evening, and are very amusing to the tourists.

Jack Rabbits.—Jack rabbits changed completely from the white pelage of winter to the summer coat by May 10th. They were quite common about Mammoth and Tower Falls and the other open, low-lying parts of the Park. The little sottontail rabbits did not change their color in winter and were common below Mammoth and along the Gardiner River to the north boundary. The snowshoe rabbit was an abundant inhabitant of the forested areas of all parts of the Park and changed to a pure white coat in winter. They were often seen at night along the loop roads.

Among the other animals that were often seen and proved interesting to the tourists were nine squirrels, three different chipmunks, two species of ground squirrels, muskrat, conies or rock rabbits, badgers in the open country, and five species of bats. Canada lynx, bobcat, fox, weasels, and fishes occur here, but were so rare as to be seldom seen even by our rangers. Otter, pine marten, mink, skunk, two species of weasels, flying squirrels, woodrats, pocket gophers, beaver, muskrat, nine other species of mice, and three different shrews, were common everywhere, but still not apt to be seen by tourists because most of them were active only at night.

Coyotes, wolves, and mountain lions.—These are by far the most destructive of our carnivorous animals, and efforts are constantly made to keep them down to a reasonable number. It is hardly practicable, even if it were desirable, to entirely

exterminate these animals, but a certain amount of hunting and trapping by our rangers each year has a most salutary effect.

They usually kill annually quite a large number of young elk, deer, antelope, and mountain sheep. This year, however, their depredations have not been heavy. Apparently the mountain lions left the Park altogether during the severe weather, and the coyotes and wolves found so many dead and dying animals that they gave over their hunting to a large extent. Two rangers gave all their attention from Jan. 1st to May 31st to hunting and trapping the carnivores, and other rangers aided whenever possible. In all, 107 coyotes and 28 wolves were destroyed.

Black bears.--Black, brown, and cinnamon bears are all included in the term "black bear", as scientists have agreed that each is but a different color phase of the same species. Black bears were numerous and abundant right up to the snow storm and cold weather of October 22-23rd, and then all disappeared at once. There had been little evidence of hibernation--den digging before the storm and the snow fell too deep for all of them to find suitable places, yet they disappeared so suddenly that it was thought probable that most of them left the Park. When they reappeared in the spring, it was late and not so many bears as usual came back. It is quite likely that many were trapped and shot outside the Park.

Early in the season there was considerable disappointment among the tourists at the scarcity of bears, but by the first of August black bears were being seen by practically everyone that wished to in the neighborhood of Old Faithful, West Thumb, Lake, Canyon, and Tower Falls. Depredations by bears were of minor importance and none were killed except one at Lake, early in the season, for destruction of automobiles and store houses.

The garbage dumps at Lake and Canyon were used as heretofore and a new dump established near Old Faithful. It was a regular practice for people from the hotels and camps to go to see the bears congregated at these three points. Wires were firmly stretched between trees and posts to keep people from going beyond the danger line, and the rangers were placed on duty with rifles to protect them. This is one of the most interesting features of the Park to the majority of tourists, but requires careful regulation.

But even more interesting than the bear dumps was a clever yearling bear that frequented the highways about the West Thumb and daily "held up" passing automobiles. As a rule the tourists were willing victims of the "hold-up bear"; and most of them would risk being tried before the United States Commissioner for violation of Park regulations, which prohibit "approaching, molesting, or feeding the bears", rather than turn a deaf ear to the demands for candy, sugar, etc. This rule is the most difficult to enforce of all the Park Rules and Regulations.

Probably we still have a hundred black bears left, and I see no reason to doubt but that they will soon become as abundant as ever. Certainly they are as fat and sleek at this time as it is possible to be.

Grizzly bears.--The Grizzlies do not seem to have had so much trouble with the weather last winter; at any rate a larger proportion returned to the Park. After the bears caused by the operations of the bow and arrow hunters, employed by the California Academy of Sciences, under Department permit, had time to wear off, Grizzlies began to appear again near the Canyon, where from five to fifteen were seen every night after sunset. A few appeared at the Lake also, and some at other remote points.

I believe there are at least forty grizzlies in the Park now. These bears have been very well-behaved this year. They have made no depredations, and none have had to be shot. They are now in the best of condition to enter hibernation.

On December 1, 1910, the museum of California Academy of Sciences applied for permission to collect four Grizzly bears, representing that the Yellowstone National Park was the only place where they could be secured, and that the mounted group would be of great scientific value. This permission was granted by the Department, and about June 1st representatives of the Academy arrived to secure the specimens. The party proceeded

to the Grand Canyon, where they established headquarters. Soon three grizzlies were killed and the party was notified that only one more bear could be killed.

As there were difficulties in finding another suitable specimen, permission was requested to kill a large grizzly seen near the Canyon garbage dump. This permission I refused on the ground that I felt that this would spoil the excitement the tourists were then taking in seeing these bears.

Nevertheless, the party stationed themselves on the trail used by the grizzlies in going to the garbage, and there killed four more bears.

After this killing, no bears, either black or grizzly, appeared for nearly ten days, thus causing disappointment to thousands of tourists. Not only were seven bears killed, but four young cubs were left motherless and one other was believed to have been wounded.

A full report on the details of these killings has been made to the Service, with recommendation regarding permits of this character.

BIRDS.

While we have an even two hundred different species of birds on our lists, only sixty-five are common and likely to be noted by tourists in the park. The most remarkable and

interesting are the California gulls, white pelicans, mallards, Canada geese, blue herons, Sandhill cranes, Richardson grouse, ruffed grouse, osprey, kingfishers, williamson napsuckers, red-shafted flickers, Rocky Mountain jays, ravens, Clark nut-crackers, meadow-larks, Brewer blackbirds, Cassin purple finches, vesper, white-crowned, and song sparrows, pink-sided juncos, green-tailed towhees, western tanager, tree and cliff swallows, yellow and Audubon warblers, dippers or water ouzels, mountain chickadees, thousand solitaires, western robins, and mountain bluebirds. Hawks, owls, osprey, mallards, geese, and pelicans create a great deal of interest because our absolute protection makes them so tame and easily studied.

The spring migration of birds began early in March and was not completed until after June 1. As a result of a backward season, migration was later than usual, and, owing to our ponds and lakes still being frozen, very few shore-birds, ducks and geese stopped here at all. The fall migration began with the willet in July and is still going on, normally, at this time.

California gulls and white pelicans nested as usual on Molly Island; there were about two hundred young gulls and a hundred pelicans raised to maturity. The beaver ponds and sloughs of the upper Yellowstone valley had a great many nests of mallard and blue-winged teal, while Barrow golden-eye and mergansers nested in other localities nearby.

Canada geese had their homes in the south end of Yellowstone Lake and on Grebe Lake. In many places they showed a preference for the tops of beaver houses as nesting sites. During the winter there were about fifty whistling swan in the park, mostly about the Lake outlet.

During the summer there were at least one pair of trumpeter swan here, but the nest was not located, although it was probably here somewhere.

The osprey nested in the usual numbers in Gardiner and Yellowstone Canyons and about Yellowstone Lake; unfortunately a series of heavy hailstorms in late July destroyed most of the eggs at the Canyon, but the nests about the Lake and in the Gardiner Canyon, and near the road to Cody, escaped. As usual, the nesting osprey created a great deal of interest at the Canyon.

A pair of bald eagles again had their nest on a pine on the Yellowstone River shore, one mile north of the Fishing Bridge.

Last October and November, the Rocky Mountain jays, or, as colloquially called, "the Camp robbers", became very bold and frequented all the camp sites, and even became so audacious as to watch all the park roads for possible campers that might have food for them. As usual the Clark nutcrackers congregated about Mammoth during the winter in search of scraps from the kitchens; later, we found them destroying ticks on the elk-bedding grounds. They were later than usual in starting

their nests although even this year they began nesting early in March, and long before the snow had gone.

Usually all our magpies go down on the plains below 5,000 feet elevation to nest, but this year was memorable for the finding of an occupied nest in the Lamar Valley where four young magpies were reared.

Water ouzels began to sing about Christmastime and kept it up all through the winter, often giving a concert in the most rigorous part of a very hard winter. The pine siskins appeared with the first dandelion seeds in June and were extremely busy for several days destroying great quantities of this undesirable plant.

Cliff swallows, bluebirds, wrens, and robins nested about the buildings at Mammoth; bluebirds, flickers, and robins about Old Faithful Inn; cliff swallows near the Lake outlet; and cliff swallows, bluebirds, and osprey about the Canyon.

On the whole, the year has been a favorable one for the birds. Not one of the many species has been lacking to any great extent, and a few have been more numerous than usual. Birds formed no inconsiderable part of the attractive feature of the park. Whether it was the songsters of June and July, the nesting osprey at the Canyon, the wonderfully tame hawks and geese and ducks of the roadside, or the gulls and great white pelicans at the Lake -- somewhere along the trip birds were sure to make themselves noticeable even to the novice in bird-love.

ANTILERS

For several years permits have been given to take shed elk horns out of the park for souvenirs. As the bull elk shed their horns every year, and in certain years many more die, these horns are quite plentiful, and while they are very common in this part of the West, to an easterner, especially to the boys, they are very highly prized as souvenirs of the park and their memorable trip. Travel was so heavy and horns so plentiful during the past season, that it seemed as if at least half of the private cars leaving the park, had a pair of elk horns, and many who had not them on the road seemed as eager to procure them as they were to view the wonders of the park. There was such a demand for them that parties were found searching for them several miles away from the road, and the danger of their becoming lost or of setting forest fires was so great that it was decided to be a matter of good policy to discontinue the practice, which was done on September 1st.

Several parties who had met people going out with horns on August 31st, were very much disappointed that they were not allowed to acquire a pair.

FLOWERS.

More than two thousand tourists made definite inquiries of our Park Naturalist, and many times that number showed interest in our wonderful wealth of flowers. We have over six hundred species listed, besides a hundred or more grasses. Of the flowers about 175 are so common as to attract general attention. Conditions vary from the warm, lower valleys where the bitterroot, wild rose, prickly pear cactus, mentzelias, and the wild iris grow, up through the lodgepole forests and the Engelmann spruce areas to the arctic-alpine zone where there are no trees and only the hardiest alpine species, such as the alpine forget-me-not, the dwarf lungwort, and the mountain yarrow and lupine grow. The climate is dry everywhere in the park, and consequently there are sudden and great changes of temperature with frequent summer frosts.

The large, blue, woolly pasque flower was quite common at low altitudes during early June. The dark, purple larkspur began to bloom a little later and gradually worked up, step by step, to timberline. Still later, the monkshood began blooming in shady, damp nooks where the long spiked heads were very conspicuous. At times the hills between Mammoth and Gardiner, and about Tower Falls, were literally covered by the rose-colored blossoms of the bitterroot.

Lupines were our commonest flowers in July and August, covering the country from the lowest valleys to the mountain

tops with large masses of light blue at low elevations to purple at high altitudes.

Wild strawberries were abundant and large and sweet. Wild roses were numerous about Mammoth and Tower Falls. In June, the service-berry bushes were a mass of sweet-scented white bloom about Mammoth, only to extend rapidly up the slopes as high as the Mud Falls by July 6. Firweed began to bloom about July 20, and soon the park was filled with its flaming, bright-lined spikes; probably it was the most conspicuous and showy of the August flowers. August was also the blossoming month for goldenrod along the loop roads. At the end of the season the purple asters were abundant from the lowest elevations to the very top of Mount Washburn.

Frigid gentians differed from all other flowers in not being as common as usual. Ordinarily this is the most distinctive flower, and certainly it is the most sought-for and most frequently inquired about of all.

The Mount Washburn road became much talked about because of the wonderful border of a mile or more of deep purple phacelia, or waterleaf, that was as true and even as if set out by human hands. This border lasted throughout the season and was one of our floral wonders. Forget-me-nots of three species were particularly abundant along the mountain roads. Beardtongue bloomed in masses of long, showy, purple spikes in a number of localities besides the roads. Among the masses

of blossoms, the brilliant Indian paint brush was not as conspicuous as usual. Orchids were abundant, but never many in any one place. The iris lily bloomed abundantly in a few wet meadows below 7,000 feet. The cactus was very abundant on a large meadow two miles west of the Lake Hotel, but there were only a few blossoms elsewhere.

As a rule, our flowers were wonderfully fine and abundant. At times the whole countryside flamed with a rich melody of many blossoms. This was due, no doubt, to a late spring, well-distributed rains, and plenty of warm sunshine.

GEYSERS, HOT SPRINGS, AND SIMILAR PHENOMENA.

At Mammoth, the big spring above Jupiter Terrace discharged less water than usual, and seemed much less active; but Hymen Terrace became more active, and a number of new, or recently abandoned terraces began building up and the discharges were more active than ever. The slowly drying Angel Terrace disclosed a beautiful pink tinting; there has been a wonderful growth of algaean matter in the Hymen Terrace.

At Norris, the Constant has practically discontinued operations, and its activity has been transferred to the Whirligig Geyser directly across the footpath. The Monarch and the Bathtub have not played at all. The Black Geyser shows evidence of regaining its power of twenty years ago.

At Fountain, both the Fountain Geyser and the Great Fountain Geyser continued to play at quite regular intervals of about four hours for the former and from eight to twelve hours for the latter. The Fountain Geyser played from its oldest crater.

There were no marked changes at the Upper Geyser Basin except that the Old Faithful Geyser decreased its interval of eruption. It played at an average of 77 minutes in October of 1919, 64 minutes in June, 1920, less than 65 minutes in July, and a little less than 64 minutes in August. The Daisy Geyser played at an average interval of 78 minutes in October, 1919, when its close similarity to Old Faithful was notable, 90 minutes in June, 82 minutes in July, and 90 minutes in August. The Grotto Geyser played frequently but did not develop any regularity. The Giant played on an average of about every eight days.

The Giantess played irregularly at an interval of seven days or more; on Aug. 24 this geyser started a very fine eruption and played intermittently for 37½ hours, the longest eruption which I have any record of. The eruption was, at the same time, a very beautiful and powerful one. Usually the Beehive Geyser played two or three times after the Giantess, but in the case of this powerful eruption the Beehive did not follow at all, thus tending to confirm suspicions of well-posted observers of the park force that when the Giantess gives a fine

eruption there is not enough water left for a display of the Beehive.

The Grand Geyser has become our most notable geyser; it has no known indicator, but it has played once or twice a day, and lately has shown some evidence of playing quite regularly every eleven hours. There is evidently a close connection between the Grand and Small Geysers. The Castle Geyser has been very irregular and disappointing. After a quietest period extending over several years, the Lioness and the two Cabs gave a very fine eruption, lasting several minutes, on Aug. 7.

FOREST FIRES

No forest fires of any consequence occurred during the past season. This condition was due partially to the fact that the season was unusually wet and partially to the careful motorcycle patrols and the efficiency of the ranger force in general. This was in marked contrast to the season of 1919 when eight serious forest fires occurred during August alone, burning over an aggregate of 6,368 acres, and the total cost of fighting fires was \$29,968.05.

WUEL.

The strike of coal miners late last fall was felt keenly by the cities and villages of Montana, but fortunately we had purchased our coal before it occurred and were not affected.

To relieve the shortage in the village of Gardiner, at the Northern entrance, permission was given by your office to allow the townspeople to open up a coal mine in the park. A vein located at the lower end of Gardiner Canyon, which was in plain view of the road but which had never been prospected, was opened up, and a tunnel run for more than eighty feet. The vein was of good size, but the quality of the coal did not warrant further work, and it was abandoned. The entrance was soon covered entirely by a rock slide.

Nearly everyone who travels through the park marvels at the great amount of wood that is going to waste, and remarks upon its value, if only near a market. While this is true, it is a remarkable fact that the cost of cutting and hauling it is so great, that at our headquarters at Mammoth we find it cheaper to buy coal in the outside market, ship it in by rail, and haul it five miles from Gardiner, than to cut and haul the wood, therefore, practically everyone living at Mammoth uses coal and buys just enough wood for kindling. Of course, further up in the park, wood is used entirely, as it is more conveniently located to hotels and camps, and distance for hauling coal would be prohibitive.

The total amount of timber cut or gathered in the park for various purposes during the past fiscal year was as follows:

Firewood: -

For government use, cut from dead timber	80 cords.
" " " " " green "	80 "
Cut by Yellowstone Park Camps Company, standing and down dead timber	875 "
Cut by Camps Company, green timber	85 "
Cut by Hotel Company, green timber	1550 "
Total for firewood	<u>1990</u> "

For building purposes: -

By Camps Company, 48,100 linear feet of standing green logs varying in diameter from 5 inches to 14 inches were taken.

The following list of cases tried before the United States Commissioner, Hon. John W. Malrus, during the period from October 15, 1918, to September 30, 1920, totaling 51, speaks well for the activity and general efficiency of our park ranger force.

CASES TRIED BEFORE THE UNITED STATES COMMISSIONER

DATE of Trial	United States vs.	Charged with	Action Taken
1919			
Oct. 29	Bert Gust	Hunting wild animals	Fined \$25 *
	Robt. Gust	" " "	Discharged
	H. J. Bush	" " "	Fined \$25 *
Oct. 31	P. G. Oikarson	Shooting a gun	Fined \$50 *
Nov. 10	H. C. Redlich	Hunting wild animals	Fined \$25 *
Nov. 26	Louis Larsen**	Killing an elk	Fined \$50 *
	Harvey Halverson**	" " "	Fined \$50 *
Nov. 13	Gilbert Egli	Hunting wild animals	Fined \$25 *
Dec. 1	John J. Jackson	" " "	Fined \$25 *
Dec. 2	Bert Herod**	Killing an elk	Fined \$100 *

Date of Trial	United States vs.	Charged with	Action Taken
1929			
June 30	A. C. Green D. K. Malendon W. C. Terry	Defacing formation " " " "	(Fined \$10 ((
June 30	A. B. Strode	Violating fishing regulations	Fined \$ 5 *
July 2	H. R. Lafferty	Speeding	Fined \$25 *
July 2	G. L. Myers	Defacing formation	Fined \$20 *
July 7	G. F. Schultz	Speeding	Fined \$10 *
July 16	Chas. Miller	Defacing formation	Fined \$25 *
July 16	G. S. Warren	Violating fishing regulations	Fined \$ 5 *
July 19	Leo Draher	Defacing formation	Fined \$25 *
July 21	G. A. Garrett	Violation traffic rules	Fined \$25 *
	J. R. Meek	" " "	Fined *
July 24	J. C. Lamer	Defacing formation	Fined \$10 *
	L. Douglas	" "	Fined \$10 *
July 27	G. H. Smith	Defacing formation	Fined \$10 *
July 28	E. R. Eldridge	Violating fishing regulations	Fined \$10 *
July 29	R. F. Haller	Defacing formation	Fined \$25 *
July 30	L. L. Paisley	Speeding	Fined \$25 *
July 31	J. H. Smart	Leaving camp fire burning	Fined \$15 *
July 30	T. G. Sullivan	Defacing formation	Fined \$25.

*Costs were assessed in addition to fine.

**Rifles forfeited to the United States.

Date of Trial	United States vs.	Charged with	Action Taken
Aug. 2	G. H. Houghton	Leaving camp fire burning	Fined \$610 *
Aug. 3	Arthur Manden	Defacing formation	Fined \$10 *
Aug. 5	Harold Whitaker	Disorderly conduct	Fined \$10 *
	Sam Moore	" "	Fined \$10 *
	George Hanger	" "	Fined \$10 *
	Frank Zotti	" "	Fined \$10 *
	Lillian Touchatobe	" "	Fined \$10 *
	Tom Schlichde	" "	Fined \$10 *
Aug. 6	George Herringfield	Speeding	Fined \$25 *
Aug. 7	H. Keith	Defacing formation	Fined \$30 *
Aug. 7	M. E. Howell	" "	Fined \$ 5 *
Aug. 9	J. Martin	Speeding	Fined \$25 *
	C. Hynch	"	Fined \$25 *
Aug. 9	H. H. Kasel	Defacing formation	Reprimanded
Aug. 9	Oliver Mitchell	Defacing formation	(Fined \$40.00
	Margaret McKinney	" "	(and costs.
	Ida Powell	" "	(\$15 rescinded
Aug. 10	Henry Otting	" "	Fined \$10 *
Aug. 10	L. Dolsted	Speeding	(Fined \$40 *
	Mable Fletcher	"	(
Aug. 12	F. L. Davis	"	Fined \$30 *
Aug. 11	E. H. Lambert	"	Fined \$30 *
Aug. 12	H. T. Smith	Defacing formation	Fined \$10 *
Aug. 12	C. W. Dutton	" "	Fined \$30 *
Aug. 13	F. G. Smith	Leaving camp fire burning	Fined \$10 *
Aug. 16	George Brown	Defacing formation	Fined \$10 *
Aug. 16	H. F. Cleary	" "	(Fined \$65 *
	J. C. Gilley	" "	(Fined
	M. O'Neill	" "	(

Date of Trial	United States vs.	Charged with	Action Taken
Aug. 17	H. Linquist	Defacing formation	Fined \$ 1 *
Aug. 20	H. Taylor	" "	Fined \$10 *
Aug. 16	H. H. Byrd	Speeding	Fined \$20 *
Aug. 18	M. L. Beveridge	"	Fined \$20 *
Aug. 21	G. T. Foss	Leaving camp fire burning	Fined \$10 *
Aug. 23	O. F. Benton	Speeding	Fined \$25 *
Aug. 31	H. Slater	"	Reprimanded
Aug. 24	H. S. Erickson	Defacing formation	Fined \$10 *
Aug. 25	J. A. Smith	" "	Fined \$20 *
Aug. 27	A. LaBalle	" "	Fined \$ 1 *
Aug. 28	R. H. Mateon E. Hinton L. Wallis	Obnoxious conduct " " " "	(Fined \$75 { {
Sept. 9	G. A. Hamilton Ernest Matherson Joe Kious Adolph Peters	Cutting green timber " " " " " " " " "	(Acquitted (and case (dismissed.
Sept. 3	W. L. Clove G. O. Clove	Speeding "	Fined \$10 * Fined \$10 *
Sept. 9	William Asplin	Petty Larceny	Fined \$100 *
Sept. 9	Fred Anholt Mark Barabert	Cutting knotted trees " " "	Fined \$5 * Fined \$5 *
Sept. 15	J. I. Miller	Speeding	Fined \$25 *
Sept. 14	Elias Ahaja	"	Fined \$25 *
Sept. 20	G. A. Hamilton	"	Fined \$25 *

*Cents were assessed in addition to fine.

**Rifles forfeited to the United States.

In addition to the foregoing arrests, there were four arrests for defacing monuments, two for destroying government property, two for speeding, four for leaving camp fires, and three for cutting green timber in the Park. In these cases the defendants were taken to the superintendent's office and dismissed with a reprimand, it being known that the evidence was insufficient to secure conviction before the United States Commissioner.

EXPIRES DATE
of Contract: Expiration:

Nature of Business:

Contractor	Nature of Business	Contract Dates	Expiration
Yellowstone Park Hotel Co.	Hotels, news-stands, laundries, etc.	3-21-17	3-21-27
Yellowstone Park Camps Co.	Permanent camps, news-stands, laundries, etc.	3-20-17	1-1-27
Yellowstone Park Transportation Co.	Automobile transportation line, sale of gasoline, oil and other automobile supplies and garage service.	3-21-17	3-21-27
Yellowstone Park Boat Co.	Power boats, rowboats, and other transportation on Lake Yellowstone	2-7-25 (2-19-24)	2-7-25 2-7-25
J. E. Haynes	Photographs, photographic supplies, guide books, etc.	1-1-17	12-31-27
G. A. Hamilton	General store, gasoline, oil, etc., at Upper Geyser Basin.	1-1-19	12-31-29
	and		
	General store, gasoline, oil, etc., at Outlet of Lake Yellowstone	1-1-20	12-31-29
George Wittaker	General store, gasoline, oil, etc., at Mammoth Hot Springs.	2-13-13	2-13-23
	General store, gasoline, oil, etc., at Grand Canyon.	4-20-18	3-13-23
Mrs. Emma Fryer and Trishammann	Confection shop, ice cream, and soft drinks	1-1-17	1-1-27
Henry P. Brothers	Swimming pool baths at Upper Geyser Basin	7-1-14	7-1-24
Robert I. Maloy	Construction of metal surfaced road connecting Gardiner and Cook City.	1-29-20	1-29-26
Howard Eaton, Wolf, Wyo.	Conducting sampling parties through the park, using saddle and pack outfits.	1-1-20	12-31-20

[Handwritten signature]

<p>W. D. Marlow, Livingston, Mont.</p>	<p>Hauling freight (ore and supplies) between Cardiner and Cooke, using eight Spack trucks operated on special schedule.</p>	<p>1-1-20</p>	<p>12-31-20</p>
<p>Yellowstone-Western State Col, St. Paul, Minn. - Yellowstone, Mont.</p>	<p>Use of a portion of tract of land formerly leased (near western entrance) together with seven buildings located thereon, for housing or storing personal property, including privilege of disposing of such property, and the use of a track to remove it from the park.</p>	<p>1-1-20</p>	<p>12-31-20</p>
<p>Dr. W. E. Graback, Yellowstone Park, Wyoming.</p>	<p>Practice medicine and surgery, and to sell drugs and druggists' sundries in Yellowstone National Park.</p>	<p>7-31-20</p>	<p>7-31-21</p>

Moving Picture Companies.—The following named individuals or companies operated moving picture cameras in the Park under special permits from the Service:

- January, 1930 - F. L. Hiseock, of Cody, Wyo., for the Fox Film Corporation, of New York City.
- Jan. and Sept.- A. G. Lester, of Fossil, Wyo., for the International Film Service, New York City.
- Jan., Feb., & July - Jesse G. Bill, of Portland, Oregon, for the Adventure Seenic Corporation, of Portland, Ore.
- March, April and May - J. A. Ramsey, representing C. L. Chester, of 120 West 41st Street, New York City.
- July - William L. Finley, of Portland, Oregon.
- Aug. & Sept. - Leland J. Burrod, of Sunset-Burrod Pictorial Company, of California.
- August - L. M. Lewis, of Minneapolis, Minn.
- Aug. & Sept. - Norman McClintock, of Pittsburgh, Pa.
- August - Harval McGregor, of Burbank, Calif., representing Sacred Film Company.
- July & August - Capt. F. E. Kleinschmidt, of New York City.
- September - A. C. Allen, of Medford, Oregon.

SPECIAL PARTIES.

Visit of Secretary of the Interior and Secretary of the Navy.--

Secretary of the Interior, Hon. John Barton Payne, accompanied by the Secretary of the Navy, Hon. Josephus Daniels, arrived in the park on the morning of July 25 by way of the northern entrance, having motored from Helena, Montana, with U. S. Senator F. J. Walsh, by way of Boulder, Three Forks, and Bozeman, Montana. At Bozeman they were joined by Governor S. V. Stewart of Montana, and several carloads of citizens from Livingston, Big Timber, and Billings joined the party and accompanied them to the park. They made an official inspection of the park, going to Upper Geyser Basin and making a side trip to Lower Star Geyser on the 27th. On the 28th the party visited Jackson Lake, returning to the Canyon Hotel that evening. On July 29 they went to the top of Mount Washburn, lunched at Roosevelt Camp, returned through Dunraven Pass, and left on the 30th via the Cody entrance.

Visits by Officials of National Park Service.-- Hon. Stephen T. Mather, Director of the National Park Service, made an official inspection of the park extending from noon, August 19, to noon August 20, entering and leaving via Cody.

Assistant Director Arno B. Cammerer visited the park officially from June 14 to 15th.

Governors. -- Governor Robert D. Carey of Wyoming came in at the eastern entrance on August 23, went out via the south entrance

into Jackson Hole on August 25, and returned to Cody through the park, spending the night of August 28 at the Lake Hotel.

Governor S. V. Stewart of Montana visited the park July 28 to 29th with Secretaries Payne and Daniels.

Governor John J. Cannell of West Virginia was here from July 28 to 30th, inclusive, accompanied by Ex-Governor Henry D. Hatfield on the same State.

Governor L. D. Frazier of North Dakota entered the park at Gardiner on July 27 and spent a few days camping with his family.

Appropriations Committee Tour. — The Appropriations Committee of the United States House of Representatives made an official tour of the park from July 19 to July 23. The following members of the Committee were in the party:

Hon. James W. Good, Iowa, Chairman;
 Hon. William R. Wood, Indiana;
 Hon. Louis C. Cresson, Michigan;
 Hon. Barton L. French, Idaho;
 Hon. Joseph W. Byrns, Tennessee;
 Hon. Joseph M. Evans, Montana;
 Hon. John J. Egan, New Jersey;
 Hon. James F. Byrnes, South Carolina.

Accompanying the party were Hon. H. J. Sinnott, Chairman of the Public Lands Committee, Mr. J. B. Beards of the Reclamation Service; and Mr. A. E. Barta, Clerk of the Appropriations Committee.

The wives and friends of several members also met the party and accompanied them for at least a part of the park trip.

This Committee arrived at West Yellowstone on the morning train of July 19 and proceeded that day to the Canyon Hotel by way of

Morris Basin, where they remained over night. On July 30 they went to the top of Mount Washburn, arrived at Camp Roosevelt for a one o'clock luncheon, and proceeded in the afternoon to Mammoth Hot Springs.

The morning of July 31 was spent viewing Mammoth Hot Springs and inspecting the plants and buildings of the National Park Service and the concessioners whose headquarters are located at Mammoth. The party proceeded in the afternoon to Old Faithful Inn.

The next day part of the party visited Jackson Lake, the balance going on to the Lake Hotel, where the two groups rejoined each other late that night. Here they were met by Hon. Frank W. Mondell, Member of Congress from Wyoming and Floor Leader of the House of Representatives, and also by Director A. P. Davis of the Reclamation Service and his construction engineer. The party left the park the next morning via the east entrance.

Visits by Other Members of Congress.— Other Members of

Congress visiting the park were as follows:

U. S. Senator, C. B. Henderson of Nevada;
 U. S. Senator, Miles Poindexter of Washington;
 Hon. C. F. Hicks of New York;
 Hon. Burton Summers of Texas;
 Hon. Carl W. Huddick of Montana;
 Hon. Addison T. Smith of Idaho.

Railroad Officials. -- The following prominent officials of the railroads which are interested in bringing tourists to the park were counted among its official visitors during the past season:

Vice President, H. M. Adams, and General Passenger Agent, A. L. Craig, and Passenger Traffic Manager, W. S. Basinger of the Union Pacific System; General Passenger Agent, D. E. Spencer of the Oregon Short Line.

President J. M. Mansford, and Passenger Traffic Manager, A. M. Cleveland, of the Northern Pacific Railway Company.

Vice President C. G. Burnham of the Chicago, Burlington and Quincy Railroad Co.; General Passenger Agent, T. C. Peck of the Salt Lake Route.

the

Pathfinding Tour. -- The Official Pathfinding Tour, under the auspices of the National Park to Park Highway Association and the American Automobile Association, with the approval of the National Park Service, left Denver, Colorado, on August 23 and reached the east entrance to Yellowstone Park on September 3. The leaders of the party were A. L. Westgard, of Washington, D. C.; Gus Holm's, of Cody, Wyoming; Scott Lovitt, of Great Falls, Montana; and H. H. Burham, of Denver, Colorado.

Massachusetts Forestry Association. -- Twenty-seven members of the Massachusetts Forestry Association making their annual tour of parks and monuments, under the leadership of Mr. Harris A. Reynolds, Secretary of the Association, came into Gardiner on July 2 and left via Cody on July 5.

Other distinguished visitors, who are mentioned on account of

their special interest in the welfare of the park, were as follows:

Brigadier General John A. Johnston, U. S. Army, who arrived on July 17 and remained until August 25.

Mr. George Horace Lorimer, Editor of the Saturday Evening post, arrived with his family via Cody on July 7 and left on July 13.

Mr. Emerson Hough of Chicago, was here from July 6 to August 23.

Lieut. General Hunter Liggett, U. S. Army, was here from August 2 to August 5, inclusive.

Lieut. General S. B. M. Young, U. S. Army, Retired, and Mrs. Young returned from Washington, D. C., arriving at the east entrance on July 1. General Young was twice superintendent of the park.

Admiral C. McR. Winslow and Admiral Fletcher, U. S. Navy, spent a large part of July in the park with their families.

Mr. Hal G. Swarts, writer for the Saturday Evening Post, spent several weeks of July and August in the park.

Col. Franklin D'Olier, Commander of the American Legion, toured the park from August 16 to 19th inclusive.

Col. E. Lester Jones, Director of the Coast and Geodetic Survey, camped in the park with his family for ten days, beginning August 19, and after making the park trip left by way of Cody on September 6.

Mr. William C. Gregg of Hackensack, New Jersey, came to the park by way of Gardiner on August 8 and spent several weeks with a pack outfit exploring the southwest corner of the park. He has submitted a detailed report of this country, with a number of excellent photographs of the beautiful scenery in the Bechler and Falls River country. Mr. Gregg left the park on September 26.

Mr. Harbert Corey, writer for numerous magazines and newspapers, entered the park on August 29 and left on September 7.

Conventions. — While no conventions were held in the park, several that were held in western States during the tourist season brought large parties of tourists to the park that otherwise might not have come. Delegates and others attending arranged their trips so that they could visit Yellowstone and other national parks, either en route to, or returning from these conventions. The four most important conventions were as follows:

The National Democratic Convention held in San Francisco, California, the latter part of June.

The National Convention of the Ancient Order of the Mystic Shrines, held in Portland, Oregon, July 4 to 7th.

The National Convention of the Kiwanis Club, held in Portland, Oregon, in June.

The National Convention of the National Educational Association, held in Salt Lake City, Utah, in July.

Boy Scouts in the Yellowstone. -- The unusual opportunities for recreation and study offered by Yellowstone National Park were utilized by the Boy Scouts of America in increasing numbers during the 1920 season. Realizing that the natural wonders of this region appeal to few classes of citizens more than to Scouts, and are understood better by none, the park administration offered the lads every facility for seeing Yellowstone thoroughly, especially those sections of it in which wild life abounds. To encourage the use of the park more and more by Boy Scouts,

the Park Service will be ready at all times to assist in planning trips, to furnish experts who can speak to the boys on the natural history of the park, and to allow the Scouts wider latitude than usually is given tourists, because such boys have been trained to use without abusing.

Scouts from New York, Iowa, Utah, and Idaho visited the park during the year, the largest party being from Ogden, Utah. Some of the groups chose to hike the entire distance around the park; others rode between the principal points of interest, which they used as bases for expeditions into territory seldom visited by tourists, where they studied bears, porcupines, deer, wild ducks, and other animals in their native environment.

Not an accident or case of illness marred any of the trips. Many lads left the park ten pounds heavier than when they entered, and every one learned much of out door life and how to meet unusual

conditions. Scout Executive George A. Goates of Ogden declared the boys in his party of 85 learned more in the two weeks they spent in the Yellowstone than they would have learned in a year of scouting otherwise.

APPROPRIATIONS.

The appropriations made available since the date of the last report are as follows:

1920 fiscal year.		
Act	Purpose	Amount
Nov. 4, 1919	Reimbursement of funds expended fighting fires.	\$25,000.00
Mar. 6, 1920	Reimbursement of funds expended fighting fires.	4,968.05
Mar. 6, 1920	Reimbursement of funds expended in emergency purchase of hay for wild animals.	38,058.59
Mar. 6, 1920	Log crib in Elk Park.	3,000.00
		\$ 71,026.64
1921 fiscal year.		
June 5, 1920	Administration, protection, maintenance, and improvement.	\$278,000.00

The deficiency appropriations brought up the total funds made available for the 1920 fiscal year to \$326,526.64, \$255,500 having been appropriated by the act of July 19, 1919, as stated in the last annual report.

Neither the appropriations for last year nor those for the

current fiscal year are adequate for the care and upkeep of this park, and until the necessary improvements have been made I believe that the Yellowstone should receive in the neighborhood of half a million dollars annually.

REVENUES.

The revenues of Yellowstone Park are steadily increasing, and during the current fiscal year the total amount collected will approach, if not exceed, \$150,000.

The revenues for the 1920 fiscal year follow:

Sale of automobile and motorcycle permits	
Collected from corporations and individuals operating hotels, permanent Camps, the transportation line, stores, and picture shops	
Sale of electric current	
Sale of water	
Miscellaneous collections	
Total	\$

All of these funds were deposited to the credit of miscellaneous receipts of the United States Treasury.

VITAL STATISTICS.

Births:— A baby boy, Roscoe Harold Bonnell, was born to Mr. and Mrs. Fred Lorne Bonnell, one of our mechanics, at Mammoth Hot Springs, on September 9, 1920.

Weddings:— Mr. C. A. Hamilton, who has a store concession in the park, and Miss May Spence, of St. Paul, Minnesota, were married at the Yellowstone Park Chapel, at Mammoth Hot Springs, at 10:30 a.m., September 23, 1920. Residents of the park attended the wedding.

Deaths:— On April 21 Forest Ranger W. R. Johns, while returning from one of his patrols through the park and about $1\frac{1}{2}$ miles inside of the park, on Hellroaring Creek, found the body of a man, the snow which covered him having melted so that a little of his clothing showed. Due to the severe weather, it was impracticable to move the body, and it was carefully wrapped in strong canvas and buried near the spot where it was found. The grave is located about $1\frac{1}{2}$ miles inside of the park from the north boundary, on the right bank of Hellroaring Creek, and is marked with stakes at the head and foot, and the tree nearby is blazed. The man apparently was a foreigner, but there was positively no means of identification.

Mr. Jake Miller, Sr., of Phoenix, Arizona, died of heart failure near the top of Sylvan Pass on June 30, 1920. He and

his son, Jake Miller, Jr., were making the trip through the park in a Ford car, and as the car was not pulling very well in going up the grade in Sylvan Pass, Mr. Miller, Sr., decided to walk, his son going ahead with the car. When the son had gone about two hundred yards he looked back and saw his father lying in the road. The old man was dead when the son reached him. Doctor Howe, of Cody, Wyoming, examined the body and reported that death was due to fatty degeneration of the heart. Mr. Miller was 70 years of age and very fleshy, weighing about 215 pounds.

On July 31 Miss Mary Smith, a girl of about fourteen, traveling with her mother and stepfather, Mr. M. Goodwin, died in the public automobile camp at Old Faithful of heart failure. An undertaker met the party at Gardiner, and the body was shipped back to Fort Collins.

ACCIDENTS.

On July 11 Mr. J. R. Alderson and his wife, son, and a daughter, of Strawberry Point, Iowa, in a Buick light six car, were enroute from the Canyon to Tower Falls. When they were about five miles from the Canyon, going up hill, the engine died. The son, R. T. Alderson, who was driving, got out to crank it, as the starter would not work. He unwittingly left it in reverse instead of neutral, and when the engine started the car ran backwards and went over the bank, and was badly wrecked. All climbed out except the mother, who sustained a badly wrenched

right shoulder and some minor bruises and contusions. There were no broken bones, and at the last report the mother was recovering.

The Yellowstone Park Transportation Company's ten-passenger car No. 69, loaded with tourists, left the road on a curve a little south of the nine-mile post, Mammoth towards Norris, about 2:45 the afternoon of July 18. The only person injured was J. G. Carter, 715 Adams Street, Toledo, Ohio, who sustained a fractured arm. The arm was set by Dr. T. W. Meyers, of Wichita, Kansas, who was traveling in another one of the transportation company's cars. The other ten passengers in the car were interviewed, and with one exception they all spoke well of the driver. Doctor Redden was called from Mammoth and took the injured man in, and another car was sent to take the passengers to West Yellowstone. Several passengers said that Mr. Carter jumped from the car and landed against a stump.

On July 4, Dr. J. W. Stryker, of Livingston, Montana, jumped from a running board of a car and landed in front of another car which was running close behind. The lady driving the rear car was unable to stop when the car ahead slowed down and she ran out to the side. Doctor Stryker was quite seriously injured, several ribs being broken and his arm badly torn and lacerated.

On July 28, the Yellowstone Park Transportation Company's car No. 54, en route to West Yellowstone, went off the road be-

tween the Frying Pan and Norris, tipping over on its side. This was occasioned by the car's meeting the transportation company's car No. 186 going in the opposite direction towards Mammoth. Nobody was seriously hurt.

On July 18, the Yellowstone Park Transportation Company's hired car No. 169, driven by the owner, Mr. Palpin, left the road at a point at the eleven-mile post from Old Faithful towards Thumb, striking a tree. The occupants of the car were employees of the Yellowstone Park Hotel Company engaged in cutting wood. All of them were more or less bruised, but no bones were broken. The driver claimed that he struck a soft spot in the road where the grader had been over it, throwing him off.

A Chandler car going towards Upper Basin left the road at a sharp turn at Excelsior Geyser about 3:30 a.m., on August 6, 1920, turned over twice and landed right side up. There were six people in the car and nobody was injured beyond a few scratches. The driver was tried for speeding.

On August 18, the Yellowstone Park Transportation Company's car No. 111, nearing Madison Junction on the road from Norris, met the company's car No. 214, going towards Norris. No. 111 misjudged the speed of No. 214 and thought he had room to pass, and in attempting to avoid a rut he caused a collision. Rev. S. A. Gavin, on the left hand rear seat of Car No. 111, either

had his head out of the car or was swung out to one side and received a severe blow on the head. He was cared for at the hotel company's hospital at Mammoth, until taken home by the very Rev. E. A. Martin, O. P., of Holy Natary Church, Minneapolis, Minn., who came for him September 3 and left September 7.

A baby Overland Four Cylinder car owned by C. L. Huffman, of Wichita, Kansas, driven by his son, left the road about a mile west of the Buffalo Farm and turned over. Mr. Huffman's shoulder was fractured.

On August 21, Henry Bayer was injured in an accident to the extent that he sustained a punctured lung and numerous abrasions about the body. Mr. Bayer was in company with Mr. and Mrs. Ed Schulte in a Cadillac Car, 1920 Wyoming issue, No. 93, all of them residents of Casper, Wyoming. The party was on the road to the Cody entrance, $1\frac{1}{2}$ miles east of the Lake Ranger Station. Mrs. Schulte was driving the car at a moderate rate of speed when the accident occurred. It was claimed by witnesses to the accident that Mrs. Schulte turned to the side of the road to allow another car to pass, which was going in the same direction, and in so doing ran off the bank, turning the car completely over. An investigation was instigated at once, and Ranger Winess reported that in his opinion the passing party was in no way responsible for the accident. The driver of the car was reprimanded. The injured man was attended, at the request of Ranger Winess, by a private doctor visiting the Lake Public Auto Camp.

On September 21, a Buick car driven by Mr. J. B. Ogden, and carrying two passengers, ran into a tree while making a turn near the twenty-mile post on the road from Lake to Sylvan Pass. The car was being driven at a high rate of speed. Mr. Ogden had four ribs broken, and Miss Edith Wheeler, one of the passengers, sustained several bruises and a broken jaw, caused by the breaking of the windshield. A passing machine took the occupants of the wrecked car to Holm Lodge. The broken car was later towed into Cody.

MEDICAL SERVICE

The contemplated permanent arrangement for furnishing medical and hospital service in the park the year around, has not yet been accomplished. The Yellowstone Park Hotel Company employed its own doctor during the tourist season, with the usual complement of nurses stationed at each hotel. The Camps Company also had a nurse stationed at each camp.

A temporary arrangement was made with Doctor W. E. Crawback, which went into effect the middle of August, whereby he furnishes medical service to government employees, and to cover the expense each employee is assessed at the rate of \$1 a month, or \$2 if he desires to have the free service extended to his family.

CHURCH SERVICES

The beautiful native stone Government chapel, which was built by the War Department by special appropriation in 1912, and which has since been open for use of all denominations alike, was used regularly all winter for services by Rev. J. F. Pritchard, of Belgrant, Montana, a missionary representative of the Protestant-Episcopal Church, under the direction of the Rt. Rev. A. W. Faber, Bishop of Montana. During the tourist season both morning and evening services were held every Sunday and were well attended by both travelers and park employees.

Bishop Faber made his annual visit to this mission on July 11th and conducted services both morning and evening, and on this occasion confirmed a class of eight members.

Catholic services were held occasionally under direction of Father Klaere, of Livingston, Montana.

Christian Scientists also held services frequently.

SCHOOL AT HEADQUARTERS

In the absence of any provision by the Government for furnishing school facilities for children whose parents reside in the park as employees of the government or concessioners, a private school was maintained at the expense of the families benefitted.

MOTION PICTURES

Motion picture entertainments were held in the amusement hall once a week throughout the year. During the winter these were financed by a cooperative arrangement between the park employees and the residents of Gardiner, Montana. During the summer season they were taken over and run by the Park Curio Shop.

RECOMMENDATIONS.

Most of the recommendations made in my 1919 report I want to here renew. These and the new recommendations not made last year will not by any means cover the needs of this park, but should the Service be placed in a position to carry out the greater part of them the park itself would not only be tremendously benefitted, but the hundreds of thousands of people or more who will visit this great playground next year and thereafter will derive a much larger measure of recreation and pleasure than the thousands who have already visited the Yellowstone. The recommendations follow:

1. More attention should be given to the private motorists. Additional public camp grounds should be developed at once. These should be equipped with water systems, comfort stations, fire places, and an adequate means of garbage disposal. Camps built

this year at Mammoth Hot Springs, Upper Geyser Basin, and the Grand Canyon should be further extended and improved, and new camps built at the outlet of Lake Yellowstone, the West Thumb of the Lake, Tower Falls, Norris Geyser Basin, and the eastern entrance, and at other points where campers congregate in large numbers. Then smaller camps with fewer facilities should be built from time to time as needed.

2. Closely related to the development of large public camp grounds is the need of new ranger stations, particularly at Upper Geyser Basin, Lake outlet, and the Grand Canyon, where existing stations are in a state of dilapidation and unfitted to serve present needs. These should be replaced immediately by large new stations with a central room which can be used as a community center for campers, this room to contain an information office, a branch postoffice if possible, and such other facilities as will better serve those visitors to the park who, for one reason or another, do not care to live in the hotels and camps.

3. Increased appropriations should be provided for the road system of the park. The transcendously heavy traffic to which it is now subjected is rapidly wearing out large sections of the road, and particularly those having a gravelled surface. More important still, the sprinkling system must be largely rebuilt,

due to the fact that it is practically worn out from long usage with a minimum of repairs.

4. A program for the gradual paving of most of the highways composing the main loop system should be adopted and progressively carried out. Under such a program those sections of the road which are hard to maintain should be bettered first, and as funds are available this work should be continued until all sections of the road not having a natural surface that is enduring and satisfactory are in the proper condition to withstand as heavy travel as the system will be likely to be subjected to.

5. The road known as the Firehole Cutoff, between Madison Junction and the Cascades of the Firehole, should be finished. It will cost about \$30,000 to finish this road. The fact that a very large sum of money has already been expended by the Army Engineers is another reason why this road should be completed and opened for use.

6. A new road should be built through Lower Geyser Basin, making accessible the great Fountain Geyser, Firehole Lake, the Black Warrior, and many other interesting features. Ever since automobiles were admitted to the park the Lower Geyser Basin has been practically off the map so far as the opportunity to see its wonderful springs and geysers is concerned.

7. The road between the West Thumb of Lake Yellowstone and Bridge Bay, not far from the Lake Hotel, has excessive grades, no water with which sprinkling can be done, and is otherwise hard to maintain. This road should be abandoned as soon as possible and a new highway constructed along the shore of the lake following the general route of the original road which was abandoned about nineteen years ago.

8. The Inspiration Point road at the Grand Canyon should be widened and protected by adequate parapets. Walks should also be constructed along this road, in order that pedestrians may not be subjected to the dangers attending the use of the road.

9. There are several sections of the Cody or eastern approach road in the park, as well as two miles of the southern approach road below Lewis Lake, which should be reconstructed, sharp curves eliminated, and grades bettered. Many bridges and culverts on both these approach roads should be rebuilt. Likewise, several bridges on the east approach road in the Shoshone Forest should be rebuilt.

10. By contrast with the northern entrance with its splendid arch, the eastern and western entrances appear very undignified and exceedingly ordinary. Attractive gateways structures should be built at these points.

11. At several places along the rim of Grand Canyon, and also along the rim of the second canyon of the Yellowstone near Tower Falls on the Mount Washburn road, and other equally dangerous places, the roads should be protected by well-built parapets, preferably of rock set in cement. It is particularly necessary that a parapet along the Grand Canyon and on Mount Washburn be erected next year.

12. The telephone system should be very greatly extended and as soon as possible metallic circuits should be constructed to the outlet of Lake Yellowstone and to Upper Geyser Basin. If funds could be made available the advisable thing would be to acquire the independent line of the Yellowstone Park Hotel Company, and upon a consolidation of this line with the Government line establish a first-class system that would care for all business.

13. The utmost attention must be given to the care of the elk, buffalo, and other wild animals. It is very evident that additional hay ranches must be developed at once, and the great areas of native grass now accessible in the Slough Creek Valley should be utilized. This will require the construction of ranch house, barn, and fences, as well as the purchase of machinery for cutting and handling hay. More land at the buffalo ranch should be also put under cultivation, and additions made to

buildings at the ranch.

14. There should be a further adjustment of grazing privileges on the national forests north of the park, to the end that more of the natural winter range of the elk may be preserved for use of these animals when driven outside the park boundaries by storms.

15. There should be very radical changes in the Montana game laws, and I recommend that the National Park Service do everything possible to urge the delimitation of the season to a very short period, preferably two weeks, until some of the losses of last year are made up by the natural increase. The 75-day season now authorized by the laws is indefensible from any standpoint.

16. More funds must be provided for the buildings and grounds at headquarters. Within two years it will be necessary to paint most of the buildings of the old Fort Yellowstone, a valuable plant that should not under any circumstances be allowed to deteriorate.

17. Few trails should be built, particularly for the purpose of affording better fire protection. Wherever possible existing trails should be marked and improved. It is particularly desirable that the trail system paralleling the roads be completed, and also that a trail be built from Heart Lake across the arms of Lake Yellowstone to the Yellowstone River.

18. All irrigation projects, worthy as well as unworthy ones, should be given no consideration, under any circumstances. No irrigation projects involving the waters of Yellowstone Park that have been discussed need be constructed within the park boundaries, because there are adequate sites for the storage of these waters outside of the park.

19. After a careful consideration of all the problems of the park, I am convinced that, with the exception of the Firehole Cutoff road, the proposed highway through Lower Geyser Basin, the rehabilitation of the old road along the shore of Lake Yellowstone between West Thumb and the outlet of the lake, and the improvement of the road in the park connecting with the West Gallatin Road, no other highways should be built in Yellowstone Park, now or hereafter.

20. It would be most advantageous to the park if the legislation providing for the extension of the park to include the headwaters of the Yellowstone and the Teton Mountain region should be enacted into law. My recommendation regarding the construction of no more new roads would also extend to the area involved in the proposed enlargement. However, the main highway across this area, now under the jurisdiction of the Park Service, should be further improved and always kept in first-class condition.

In my opinion, also, the territory at the headwaters of the Lamar River, east of the park, including the valleys of Cache, Calfee, and Miller Creeks, as well as the Lamar River itself, should be added to the park, in order that the eastern boundary may better conform to the topography of the country.

21. The hotels, camps, and transportation line should all be required to expand their facilities as fast as possible, in order that they may accommodate the ever-increasing throngs of visitors. It is particularly necessary that some of the hotels be enlarged by the addition of more sleeping rooms and extensions of the dining rooms. More cars for side trips must be kept hereafter at the main points of interest.

22. A careful study must be made of sanitary problems at Mammoth Hot Springs, Upper Geyser Basin, Lake outlet, and the Grand Canyon. This survey should be made by the United States Public Health Service and should be comprehensive, extending, if possible, over the entire season, in order that conditions early and late, and at the height of the season, may be observed by the engineer. It is probable that sewer systems will have to be established in the early future at each of the main points of interest, and as the public utilities of the park will have so many extensions of their own to finance, these systems are likely to become a charge upon the Federal Government.

23. Finally, it is recommended that if possible authority be secured from Congress for the use of Yellowstone Park appropriations immediately upon the enactment of the sundry civil bill. Under such a plan a tremendous saving in the purchase of supplies and the initiation of improvement work could be effected, and in many other directions the operation of the park could be conducted more economically and efficiently, and with greater benefit to the people of the Nation who use the park. Likewise, it would be a most desirable thing if the revenues of the park could be expended in the maintenance and improvement of its roads and trails.

ANNUAL REPORT
FOR
YELLOWSTONE NATIONAL PARK
1921-- 1922

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YELLOWSTONE NATIONAL PARK

Horace M. Albright, Superintendent, Yellowstone Park,
Wyoming

General Statement

Yellowstone National Park was established March 1, 1872 (Secs. 2474 and 2475, R. S. or 17 Stat., 32). It was the first national park to be established in the world and is our largest park. Its area is 3348 square miles, or 2,142,720 acres, of which 3,114 square miles, or 1,992,960 acres are in Wyoming; 198 square miles, or 126,720 acres, are in Montana; and 36 square miles, or 23,040 acres are in Idaho. The original boundaries of the park are still intact, but it is proposed to add approximately 500,000 acres of adjoining Government lands to the park, most of these lands lying at the headwaters of the Lamar River, at the headwaters of the Yellowstone, and in the Teton Mountain region. There are no private holdings in Yellowstone Park. The United States Government has retained and always exercises exclusive jurisdiction over the park area.

The Park Organization

The park is in charge of the superintendent who controls all activities of the Government in the park, except the U. S. Commissioner's court, and the Post Office; he also supervises the public utilities and individual operators who have franchises

from the Department of the Interior authorizing them to construct hotels, camps, transportation lines, stores, etc., for the accommodation of the traveling public. The organization which assists the superintendent in operating the park, and conducting its many and varied activities under the policies of the National Park Service consists of nine departments: Administrative, engineering, protection, information, mechanical, electrical, property and transportation, sanitation and painting.

Summary of Results Attained by the
Park Organization -

All of these departments of the park organization rendered excellent service during the past year, and most satisfactory results were obtained in all activities in which they were engaged.

The roads have been in splendid condition throughout the tourist season and promoted numerous expressions of praise from visitors who declared that our roads now rank with the best of western highways. The park has been protected with great efficiency since the appointment of Chief Ranger Woodring, and the assumption by him of complete control of the ranger service. More trail work was performed during the past year than during any other year of the park's existence, and with amazingly small cost. Fish planting was accomplished on a grand scale far surpassing in results the planting of previous years. There have been most gratifying results attained in

in the construction of automobile camps and in the improvement of water systems. Sanitation work has brought exceedingly fine results. Never before has park property been handled so economically and efficiently, and transportation facilities have been kept at a higher standard than at any time in the past. The buildings and grounds at headquarters, worth over one million dollars, have been maintained in better condition and with less cost than we have been able to do this work before the present year. The painting and sign-posting achievements of the year have been highly gratifying, and are worthy of more commendation than space permits here. Machinery and equipment have been maintained in first-class condition considering the fact that most of it is very old and badly worn by long use, and all shop work has been generally satisfactory. An immense amount of work has been performed by the office force and it is proper to mention the fact that this force has had to undertake much work for other parks because the superintendent of the Yellowstone is also the Field Assistant to the Director.

Nearly 100,000 tourists were in the park during the summer, and enjoyed its scenery and wonderful natural phenomena, as well as its opportunities for healthful recreation. Less than a score of accidents occurred, and there was only one fatal accident, this resulting from the breaking of an axle of a private automobile. Service by the utilities was never

better. Very few complaints were filed either with the rangers or at the headquarters office. This summary of the year's achievements indicates that both the Government organization and the utilities of the park are reaching a high state of efficiency, and can be depended upon in the future to produce even better and more pleasing results than were accomplished this year.

Weather

Unusually pleasant weather prevailed until the middle of November, but by the end of the month temperatures well below zero were recorded and, with but two exceptions, the greatest amount of snow that has fallen in November during the past 35 years. December continued cold with an excess of snowfall, there being 16 inches of snow on the ground at Mammoth Hot Springs at the end of the month, which with the exception of 1919, is the greatest of record for the date. At Snake River there were 43 inches on the ground at the end of the year. Extremely cold weather prevailed during January and February, the lowest temperature for the winter at Mammoth, 25° below zero. The January snowfall was light but the February fall was the greatest that had occurred during the past 34 years. At Mammoth the depth of snow on the ground at the close of February, 29 inches, is the greatest of record for the date, while there were 56 inches on the ground at the Canyon and 64

inches at Snake River. March and April were months of light snowfall and decreased steadily until at the end of April it had practically all disappeared at lower elevations, while in the passes and at higher elevations material depths remained. May was generally cold but June was warm with the greatest amount of sunshine of record. The midsummer months were characterized by frequent thunderstorms, though generally light. The highest temperature for the summer, 88°, occurred at Riverside on July 4th and also on August 18th. Killing frost occurred at Hazzard September 8th, with a temperature of 25°.

Railroads and Highways to Park Gateways

No new gateways to the park were opened during the past year but the Hoback Canyon road leading into the Jackson Hole from Rock Springs and other points on the Lincoln Highway was opened for travel and dedicated with appropriate ceremonies on July 15, 1922. Congressman F. W. Mondell and Governor Robert D. Carey, of Wyoming, participated.

Four railroads carried passengers to park gateways during the season. The Northern Pacific, with terminal at Gardiner, Montana, the Northern Gateway, operated two trains daily over its branch line from Livingston, carrying sleepers from Chicago, St. Paul, St. Louis and Omaha, and Portland and Seattle. The

Union Pacific System operated its Yellowstone Special between Salt Lake City and West Yellowstone, the Western gateway, each day of the season. During the larger part of the summer, daylight trains between Pocatello and West Yellowstone were operated by the Union Pacific connecting at Pocatello with trains from St. Louis, Denver, and Portland, Oregon.

The C. B. & Q. Railroad operated three trains daily into Cody, the Eastern Gateway town. These trains carried sleepers.

The Chicago Northwestern Railroad operated one train to and from Lander, Wyoming, the Southern Gateway town, each day, which train arrived in the evening and departed in the morning. This is the first season that the Chicago and Northwestern has carried passengers to Lander for the Yellowstone Park tour. A new transportation line, known as the Lander-Yellowstone Transportation Company, operated standard National Park busses each day between Lander and Moran, taking a day and a half for the trip with night stop-over at Brooks Lake. At Moran, tourists transferred to the cars of the Yellowstone Park Transportation Company for the trip to the Lake Hotel and Lake Camp, which were reached in the late afternoon of the second day from Lander.

While only 99 passengers were carried during the season from Lander to the park this is regarded as a good showing for the first year's operation and there is every reason to believe that the popularity of the Lander, or Southern Gateway, will

rapidly increase as its wonders become known. When the park is extended southward more tourists will doubtless use the new route because the handicap of distance from the park line will be greatly reduced.

Railroad and other Publicity

Yellowstone has been the object of a tremendous amount of advertising and favorable newspaper and magazine publicity prior to, and during, this season. The campaign of advertising conducted by the railroads was very extensive and effective. Beautiful booklets on the park were issued in large quantities and distributed in all sections of the Nation. Many editors and special writers were in the park in the course of the summer, among them being some of the best known writers of our time. Over 100 members of the National Editorial Association, all of whom are editors of newspapers, spent four days in the park, July 13-16, inclusive, while enroute to Missoula, where their annual convention was held. Through the cooperation of the public utilities of the park a publicity agent was placed in the park during the season. This writer succeeded in disseminating to newspapers of the country a large number of interesting articles bearing on the use of the park and likewise used pictures of tourist life in the park to good advantage in publicity work.

An especially fine collection of pictures was secured during the summer by the official photographer, J. E. Haynes, and by photographers on the ranger force.

As usual, the National Park Service itself and many highway associations conducted campaigns of publicity with excellent results in the stimulation of travel.

Travel in 1922

Advertising of the park and other favorable publicity just described, combined with low rates offered by the railroads, and active work by highway associations and the National Park Service itself, succeeded in bringing to Yellowstone National Park more visitors than it has ever had before in a single season. This year 99,223 visitors entered the park as against 81,651 last year.

There was an increase in rail travel this year of 8889 over last year. The western entrance shows an increase of 4,386 by rail; the northern entrance 3,266; and the eastern entrance 1,138. 99 came via the Lander or southern gateway. All entrances showed an increase in automobile travel; 855 at the east; 594 at the north 532 at the west; and 553 at the south.

The western entrance continues to lead in rail travel, while the Cody, or eastern entrance, again maintained its supremacy as the motorists' favorite gateway.

The largest number of park entrants registered in a single day in the history of the park was 1,903 on July 23rd. Compare this with the high figures of last year, 1,659 on August 6, 1921, and 1,498 on August 2, 1920. The heaviest train travel occurred on June 20th when 1,223 people were delivered at the rail gateways. Previous record 665 on August 10, 1920. The heaviest rail travel arriving at a single gateway was 757 at West Yellowstone by the Union Pacific System, July 23, 1922. On June 20, 1922, the Northern Pacific delivered 734 at Gardiner. Previous years' record was 381 at West Yellowstone August 3, 1920.

There was an increase of 2,824 in motor travel over last year.

The heaviest motor travel at park gateways on one day was 357 automobiles carrying 1,181 tourists on August 7, 1922, compared with 306 automobile carrying 1,247 passengers on August 6, 1921. The eastern, or Cody entrance, enjoyed the largest motor travel for a single day when on August 7, 1922, 126 cars carrying 437 people entered the park. 115 cars with 404 people entered the Cody entrance on August 5, 1921.

It is estimated that each day between July 20 and August 15, there was an average of 5,000 people in the park. About 50,000 of the total of 61,507 motorists here in their own cars camped out with their own equipment. Visitors represented

every state in the Union, Alaska, Philippine Islands, Hawaii and the Panama Canal zone; England and nine other countries belonging to the British Empire; and thirteen other foreign countries, Austria, Belgium, China, Cuba, Denmark, France, Germany, Holland, Japan, Mexico, Norway, Sweden and Switzerland.

There were 121 makes of automobiles in the park during the season and 7 makes of motorcycles.

- Total Season Travel by Entrances -
1922 and 1921

DIRECTION	RAIL VISITORS	BY AUTOMOBILE CARS VISITORS	BY MOTORCYCLE MOTORCYCLES VISITORS	BY TAXI-			TOTAL VISITORS
				NO. TOURS-	BACK, ETC. VISITORS	PRE-SEASON VISITORS	
1922							
NORTH	10,861	5,448	18,154	47	76	669	29,760
WEST	12,003	4,983	17,794	41	62	801	35,751
EAST	5,304	5,864	20,039	35	55	337	25,735
SOUTH	99	1,548	5,520	3	4	100	5,724
PRE-SEASON VISITORS							
(NORTH AND WEST)				710			
TOTAL -	33,268	18,253	61,507	126	198	1,907	1,253
1921							
NORTH	7,595	4,854	16,590	23	76	1,316	25,537
WEST	12,703	4,751	16,202	23	76	847	29,783
EAST	4,165	5,105	17,495	29	49	211	21,923
SOUTH	1,015	1,015	3,532	1	2	61	7,615
PRE-SEASON VISITORS							
(NORTH AND WEST)				784			
TOTAL -	24,469	15,129	53,040	76	123	2,435	784
							81,651

Trail Trips

Each year more and more people use the trails of the park and during the season of 1922 there were many large parties seeing the park via the saddle horse routes. Among them were two large parties, one composed of Eastern girls and another of Eastern boys, both conducted by the Valley Ranch Company, with headquarters on the South Fork of the Shoshone. The girls' party is the first of its kind ever to be conducted through the park.

National Park Service Activities

Work of the National Park Service relates to administration, protection and maintenance of the park and its improvements, construction of new improvements, supervision of the public utilities and individual operators and a wide range of miscellaneous matters. There are 356 miles of roads in the park. 78 $\frac{1}{2}$ miles of trails, besides several hundred miles of game trails used by rangers on patrol; 259 miles of telephone wires; approximately 100 buildings, including Fort Yellowstone, a plant worth in excess of \$1,000,000; a large amount of machinery and equipment; power plant; water systems; 8 highly developed automobile camps and 36 automobile camps of which development has started; the buffalo ranch and three hay ranches, also several isolated hayfields.

Administrative Department

Headquarters Office: During the year from five to seven clerks were employed in the headquarters office on general correspondence, files, personnel, purchasing, disbursing, time-keeping, miscellaneous financial matters, information and a wide range of other duties relating to this and to other parks. Approximately 13,000 pieces of mail were received and 13,300 dispatched.

Appropriations: Appropriations made available since the date of the last report are as follows:

<u>Act</u>	<u>Purpose</u>	<u>Amount</u>
May 24	1923 fiscal year. Administration, protection, maintenance	\$ 281,000
May 24	1923 fiscal year. Construction of physical improvements (immediately available)	80,800
		<u>\$ 361,800</u>

Revenues for 1922

Revenues collected during the 1922 fiscal year were as follows:

Sale of automobile and motorcycle permits.....	109,457.72
Collected from corporations and individual operating hotels, permanent camps, the transportation line, stores, and picture shops.....	52,302.35
Sale of electric current, water, and miscellaneous collections.....	<u>3,254.46</u>

Total165,014.53

All of these funds were deposited to the credit of miscellaneous receipts in the United States Treasury.

Revenues for the 1923 fiscal year will amount to \$195,000.

Personnel: During the year the maximum number of employees on the payrolls was 112 appointees and 360 temporary mechanics, skilled laborers, laborers, etc., a total of 472 on August 15th. The minimum number of employees on the payroll occurred during the month of February when there were 62 appointees and 6 others on the rolls.

On May 22, 1922, Assistant Superintendent Chester A. Lindley was appointed Postmaster of Yellowstone Park but was also officially designated as Assistant Superintendent under which he continues to perform some of his former Park Service duties in addition to his Post Office duties.

On May 22, 1922, Mr. Leroy Hill, Purchasing Clerk and Disbursing Officer, was appointed Assistant Superintendent.

On January 16, 1922, Park Ranger Sam T. Woodring was appointed Chief Ranger vice Jas. McBride.

Engineering Department

Park Engineer in charge with two assistant engineers during the working season. The principal work of the engineering department was the maintenance and upkeep of the roads. On

account of the late Fall the roads of the park were open to automobile traffic until late in November but the heavy snows of the winter blocked them until the latter part of May. The first car went through from headquarters to Old Faithful on May 26th, and to Yellowstone Lake on June 3rd. The Continental Divide road was opened June 11th; Dunraven Pass on June 12th; Sylvan Pass, June 14th; the Southern Entrance road, June 25th and the Mt. Washburn road June 28th. The loop road system and the East, Northern and West approach roads were all in fine condition for traffic when the park opened on June 18th.

Road Maintenance: During the park season 345 miles of roads were maintained, including 26 miles in the Shoshone National Forest, East of the park, and 30 miles in the Teton National Forest, south of the park. Twenty-three small crews, requiring the service of 106 employees and 42 teams were stationed from 10 to 15 miles apart. Each crew maintained a section averaging 15 miles of road.

Sprinkling System: From June 20th to September 8th, 107 miles of main park roads were sprinkled twice daily. The equipment used was 2 auto truck sprinklers, 16 four-horse sprinklers and 2 two-horse sprinklers. One repair crew of seven men and two teams made repairs and maintained the system during the season. Five new non-shrinkable redwood tanks were installed,

4 of 1600-gallon capacity and 1 of 300-gallon capacity. The system was also extended to include that section between Norris Junction and Virginia Cascades, about 3 miles. For the operation and maintenance of the sprinkling system the following crew was required: 1 foreman, 2 carpenters, 16 four-horse teamsters, 2 two-horse teamsters, 2 truck drivers, 7 laborers and 36 two-horse teams.

Road Improvement, Dunraven Pass: The improvement of the Road through Dunraven Pass which was begun in 1919 and continued during the following seasons, was completed in August. The work this year consisted principally of excavating side ditches through the rock cuts and general cleaning up. Two and one-half miles of ditch was blasted out. Three quarters of a mile of road leading from the Pass towards the Canyon was surfaced with gravel.

Gravel Surfacing: Roads leading south from the loop system and West Thumb toward Moran on Jackson Lake were improved by surfacing as follows: The Dine Creek Grade, about 3/4 of a mile in length, was widened and graveled. By the end of the season about 3 1/2 miles of the South Forest road will have been surfaced. Similar work was done between the 1 and 6 mile posts south of West Thumb; 2 miles of graveling has been completed to date and other stretches aggregating 2 miles will be graveled this Fall.

Repair and Construction of Bridges: Five bridges of

reinforced concrete were constructed in the Shoshone Forest Reserve this year, as follows:

Hornon Creek: 30 foot span, steel I beam bridge with reinforced concrete wing walls and railings. Contains 5 32-foot steel I beams, 70 cubic yards of concrete, 4,520 pounds of steel. Cost complete \$2,757.56.

Goff Creek: 20 foot span concrete I beam bridge. Contains 5,963 pounds of steel and 64 cubic yards of concrete. Cost complete \$2,272.10.

Horton Creek: 12 foot reinforced concrete slab bridge. Contains 40 cubic yards of concrete and 3,075 pounds of steel. Cost complete \$7,053.00.

Jacob Creek: 12 foot reinforced concrete slab bridge. Contains 40 cubic yards of concrete and 3,075 pounds of steel. Cost complete \$1,257.93.

Hess Creek: 6 x 8 foot culvert. Contains 3,368 pounds of steel and 26 cubic yards of concrete. Cost complete \$1,033.26.

The following bridges were repaired with new stringers and redecked with 3" planks; Lost Creek, 18' span; Rabbit Creek, 21 foot span; Clocktower 27' span, and another bridge over a stream on Sylvan Hill 20' span.

On the East Gallatin Road 4 32-foot and 1 24-foot bridges were re-decked with poles. Fourteen small log culverts, 3 6-foot log culverts and 1 8-foot log bridge were rebuilt.

Road Protection, Shoshone Forest: As a means of great protection to the roadway from the encroachment of the Shoshone River, the following work was done this year: Six hundred feet of embankment ripraped with large rocks near Grinnell Creek; 300 feet of embankment ripraped near Middle Creek; one log diversion crib 8 ft. wide and 9 ft. high and 24 ft. long added to the present crib at Elk Fork; log diversion crib 8 ft. wide, 5½ ft. high and 90 ft. long, built opposite the mouth of Canfield Creek; log diversion crib 9 ft. wide, 9 ft. high and 50 ft. long built at the Palisades.

Bechler River Road Survey: As this report is written a preliminary survey is being made for a road up the Firehole River from Lone Star Geyser to the headwaters of the Firehole, thence down Little Fork of the Bechler to Three River Junction, thence down the Bechler and Falls River to Cave Falls, near the south park line. With the Park Engineer and the Chief Ranger I rode over the route of this proposed road on August 22nd and 23rd.

Parapets and Guard Rails: The program started last year of building log guard rails and masonry parapets for protection along dangerous sections of the roads was continued this season. The greater part of the work done this year was at the Needles near Tower Falls, where the following work was completed: 54 masonry piers 20" x 20" were constructed, 238 20" log posts planted 36" in the ground, 4576 linear feet of 9" guard rail placed on the piers and posts and 90 cubic yards of material moved to eliminate

sharp curves. Between the 4 and 5 mile posts from Mammoth on the Tower Falls road 1136 lineal feet of guard rail were built, requiring 81 20" log posts to be placed, 30 of which were set in concrete. 275 lineal feet of guard rail was also built around the sharp curve above the Gardiner River Bridge.

New Buildings

The Lake Ranger Station and Community Center: The third of a chain which it is hoped to have throughout the park, is practically completed and will be ready for the 1923 season. The plans for this building, developed by the Landscape Engineering Division of the Park Service, have given us a structure unique in type and at the same time well suited for its requirements. The large community room forms an octagon in plan which is slightly less than forty feet across. In the center is a great stone fire place, open on four sides, which will present a camp-fire effect. A wing 26' x 38' provides quarters for the rangers stationed at this junction, the space being divided into a combined kitchen and dining room office, dormitory and bath with ample hall and closets. Logs have been utilized in the construction of the station with roof of sawed shakes and with a broad terrace of flat stones. The Lake Station has become one of the talked-of structures of the park.

Auto Camp Comfort Stations: A standard type comfort station has been prepared for auto camps in the park and this season will see the completion of at least three of those buildings, one at

Yellowstone Lake and two at Old Faithful auto camp. The Sanitary Engineer of the Public Health Service, and our Master Plumber, worked in conjunction with our Landscape Division in an effort to secure a layout not only presentable from the landscape point of view but one which would be thoroughly efficient as well. The building at Lake measures 12' 6" x 22', and those at Old Faithful 17' x 25'. Both consist of separate compartments for men and women separated by a three foot space which is utilized for plumbing installation. The plumbing fixtures are of the latest approved type and these stations forming a part of the new sanitary layout for the public auto camp, will be a much needed addition. The buildings are constructed with a frame of heavy logs which are exposed to weather. The walls are of rough boards and battens and the roof of shingles, this combination appearing well in the woods where they are located.

Maintenance Crew Stations: A small building 16' x 22' for use as a dining room and kitchen for the maintenance crew stationed at Dunraven Pass is under construction at the present time. This is a frame building with sawed shake roof. A similar building for the Cub Creek maintenance crew on the East Approach road is being constructed on the banks of Cub Creek. This building is built of logs and is being coiled inside in order that it may be used in winter as a snowshoe cabin by rangers patrolling between Lake Banger Station and Sylvan Pass Ranger Station.

Lake Engineer Station Alterations: The engineer station at Lake was improved by installation of more windows and by the

erection of screens for doors and windows. Preparations have been made to finish the building. Another room will be added next year in order that this station may be used in winter as the Lake Ranger Station.

Repairs to Penstock: The steel penstock 2300 feet long which conveys water from the reservoir to the power house at Hermoth was painted and placed on concrete piers to prevent deterioration by rust. The piers are 14 inches wide and are spaced 15 feet apart. Painting was done under the supervision of the Master Painter.

Landscape Engineering Activities: Work by the Landscape Engineering Division included the preparation of plans for buildings mentioned above, examination of plans and advice regarding location and erection of buildings by public utilities and individual operators, advice on painting, etc. Arrangements were also made, in the interest of the improvement of the landscape, for the removal of telephone lines and poles from certain sections of road where these lines and poles are too conspicuous. This work will be resumed before the opening of next season. Considerable work was done in the clearing of dead timber from roadsides. Several ugly intanglements of timber along the roads, thrown down by storm, were removed.

Protection Department

Under the direction of the Chief Ranger a vast amount of tremendously important work was done in the protection department during the year. The ranger force was reorganized, many changes

in personnel being made. Until June 15th the ranger force consisted of 1 Chief Park Ranger, 3 Assistant Chief Ranger, 1 Fish and Game Warden and 23 park rangers. During the summer this force consisted of 27 park rangers, including the Chief Ranger and his assistants, and 44 temporary rangers. 21 ranger stations and 15 snowshoe cabins were in use during the year. A manual giving in detail the instructions for the ranger force was issued in June.

Winter Activities: The winter activities of the ranger force were confined to the protection of the wild life of the park. During the spring months the rangers patrolled the roads to prevent wash-outs, and made frequent reports on the melting of the snow. The condition of the wild life during the winter is reported elsewhere.

Summer Activities: During the summer the work of the ranger force was greatly expanded, comprehending the protection of forests from fire, care of the wild life, checking of traffic at the gateways, protection of geyser and hot spring formations, guiding tourists, operation of information office, lecturing, motorcycle patrol of the roads, etc.

Forest Fires: There were few forest fires and none of these caused serious damage. During the latter part of June a fire burned into the park from the Madison National Forest, destroying approximately 80 acres of timber along the Madison River where this

stream leaves the park. On August 14th a forest fire was caused by lightning on the Cody Road. The fire burned over $1\frac{1}{2}$ acres. Several small fires occurred but no great damage was done because of the prompt action taken by rangers and others.

New Soda Butte Station: A log structure of simple design prepared by the landscape division is under construction by the rangers at the Cooke City entrance to the park, replacing the old station located near the mouth of Soda Butte Creek. This building, combining a checking and ranger station, is situated on a beautiful wooded spot near the park boundary in such a way that a good view of approaching traffic may be had. The rough log type is used here with an effort to keep away from modern commercial materials. The building measures 22 x 34 feet, divided into large living room, kitchen and dormitory and in addition a porch extends across the entire end of the building.

Fish Hatchery on Fish Lake: The design of this building conforms with that of the new Soda Butte Station and was erected by rangers during the month of May. The building is 18 x 24 feet with a 7-ft. extension in front for a porch. The interior plans for the hatchery were prepared by Supt. W. T. Thompson of the U. S. Bureau of Fisheries. All materials were furnished by the Bureau of Fisheries.

Trail Maintenance and Improvement: There are at the present time $781\frac{1}{2}$ miles of trails in Yellowstone National Park. Of these, 88 miles were constructed during the present year and $654\frac{1}{2}$ miles

were cleared of fallen timber, repaired and maintained. New Trails constructed included several sections of the Howard Eaton Trail, the name given to the trail system paralleling the loop road system. The trail was named in honor of Howard Eaton, pioneer guide of Yellowstone and famous game conservationist, who died April 5, 1922.

Fish Planting: One of the notable achievements of the year was the completion of the greatest fish planting project ever undertaken in Yellowstone Park. The following is a summary of this work:

	1920	1921	1922
Total collection of black spotted trout eggs from park waters	6,512,600	5,996,000	16,751,920
Number of eggs collected in park, hatched and returned to park waters or planted as eyed eggs	1,951,300	2,871,000	7,373,800
<u>Total number fish planted in Park</u>			
Black spotted trout collected in park	1,951,300	2,871,000	7,373,800
Black spotted trout received from Montana State Hatchery		18,000	1,000,000
	1,951,300	2,889,000	8,373,800
Eastern Brook Trout from outside hatcheries	38,000	82,000	116,000
Rainbow Trout, received from Montana State Hatchery	40,000	80,000	120,000
Grayling received from Montana State Hatchery		1,000,000	
Total Fish Plants for year	2,029,300	4,051,000	8,609,800

We are tremendously indebted to the Fish and Game Commission of The State of Montana for cooperation in these fish planting activities. 1,000,000 black spotted trout fingerlings, 116,000

Eastern Brook fingerlings and 120,000 Rainbow Trout fingerlings having been given to the park by the State in return for black spotted eggs collected here.

Buffalo Ranch Operations

The Buffalo Ranch is maintained for the care of the so-called tame buffalo herd. This herd at the present time numbers 578 animals. When last year's report was written there were 506 buffalo reported in the herd. Later 22 more calves of the 1921 crop were counted. Deaths and shipments during the year totalled 58 and there were 108 calves born in 1922. The 1921 calves were vaccinated November 25th and December 3rd of last year. Of these, 62 calves, 43 were male and 39 female. 27 of the males were castrated. Two of the female calves broke their legs during vaccination and were killed. 52 buffalo died of hemorrhagic septicemia between March 13th and April 5th. Of these, 23 were yearling bulls, 9 yearling heifers, 2 two-year old bulls, 7 two-year old heifers, 1 three-year old bull, 6 three-year old heifers, 2 four-year old cows, 1 five-year old cow and 1 ten-year old cow. Shipments of buffalo totalled 4. One bull and 3 cows 3½ years old were shipped to the New York Zoological Park, New York, in charge of the Chief Buffalo Keeper.

During the winter the herd was fed a total of 517 tons of hay, feeding starting on December 28th, 1921, and ending April 24, 1922. Improvements at the Buffalo Ranch during the year include the cutting and hauling of 300 posts and fence rails to

repair fences broken down by elk, clearing and ploughing of 200 acres of land on Anethyst Creek and the installation of new headgates in the lower hay meadows. Thirty headgates are to be installed, 15 being completed at this time.

Hay Ranch Operations

The following table shows the hay fed at the various park ranches during the past winter and the approximate amount put up this season. As the greater part of this year's hay has not been in the stack long enough to measure it it is not possible to give accurate tonnage at present.

Location	On hand Fall 1921	Fed Winter 1921-22	Left Spring 1922	Put up Avail. 1922	Fall 1922
Buffalo Ranch	662	517	145	375	520
Slough Creek	510	495	15	400	415
Gardiner	148	60	88	150	238
Yanceys	250	170	20	50	70
Totals	1470	1202	268	975	1243

Predatory Animals

During the year 154 predatory animals were killed, 24 wolves and 130 coyotes.

Natural features of the Park

The Park Naturalist and the rangers made observations of the wild life conditions, geysers, forests, flowers, etc., and the following information regarding the natural features of the park is based on those observations:

Game Conditions: Game conditions the past year have been excellent with the exception of those affecting the antelope. In spite of the severe winter our loss in game animals was only slightly above normal and natural loss. The severe winter was disastrous to the antelope, about one-third of the herd being lost. Our forage is in fairly good condition this fall and all game should winter well, unless the winter is unusually severe.

Tame Buffalo: The condition of the herd of 578 so-called tame buffalo is covered in the paragraph relative to the Buffalo Ranch. 18 fine bulls of this herd were kept at Esplanade Hot Springs during the summer season.

Wild Buffalo: Unavoidable conditions made it practically impossible to make extensive observations of our wild buffalo herd. Thirteen were found in the Pelican Creek district and 56 along the Lamar River. One large bull was found dead at the mouth of Willow Creek. In addition to the 59 actually seen, signs were observed of a herd of about 50 on Cache Creek. I would place the number of animals in the wild herd at 125 to 150.

Mountain Sheep: Sheep scab, the disease that threatened for a time to exterminate our mountain sheep, has practically disappeared and we have a large, thriving herd of about 250 animals. They were seen in many different parts of the park last season, including the Bechler River district.

Antelope: The most serious game problem in the park concerns the antelope. Unfavorable winter range conditions inside the

park boundaries, is the main cause of the rapid decline in numbers of this animal. Timid, nervous and not naturally adapted to the area in which the settlement of the outside country has forced them, they are easy prey for coyotes and wolves and not physically able to withstand the severe winter elements. The herd consists of about 350 animals at present of which 125 are this year's kids.

Mooses: A severe blow was dealt to our moose herds last fall when the State of Wyoming authorized the killing of 50 bulls in the Upper Yellowstone country. This nearly exterminated the male moose on this area and has a much greater effect in that it will affect the calf crop during the next few years, as the bulls were killed before the rut. With the issuance of 50 additional permits for the coming season the days of the Upper Yellowstone moose may be considered numbered.

Moose are rapidly taking up range in other sections of the park and are thriving in regions where they are left undisturbed.

Deer: Only five white-tail deer were observed around headquarters during the past season. There are but few of this species in the park. Blacktail deer are very numerous in all sections of the park. One herd of 56 was observed at Gardiner last May and others of 15 to 40 seen frequently in various sections. There are over 1,000 of these animals in the park.

Elk: The northern herd of elk wintered well and there is a splendid calf crop this year. Bad snow conditions in the Jackson Hole were responsible for a heavy loss of calves in the

southern herd. A show herd of 12 was enclosed during the summer near the Buffalo Corral for tourist enjoyment.

Black Bears: Black and brown bears have been numerous in all parts of the park and around the garbage dumps at hotels and camps. Aside from a few stolen hams and other edible articles they have caused very little trouble during the past season. "Hold-up" bears have been active along the roads.

Grisly Bears: The grizzlies are seldom seen except at hotel garbage dumps. There is no doubt but that they are present in sufficient numbers to maintain their species in the park. As many as 16 were observed at the Canyon in one evening, and several at the Lake and Old Faithful.

Beavers: Beaver are thriving in all sections of the park. Many new colonies have been established during the past year and their signs have been observed in many sections where they have never been known before.

Rabbits and Other Small Animals: Rabbits are very numerous and often seen by persons driving at night. Woodchucks are getting more numerous every year. Several at the Canyon Camp have been petted, fed and photographed by thousands of tourists the past summer. Ground squirrels are thriving and get to be a nuisance around the various buildings and road camps throughout the park. Pine squirrels, chipmunks, weasels and other small animals are thriving under park protection.

Birds: With the discovery and identification by Park

Naturalist Skinner of the Bob-o-link, Ruddy Turnstone, and White-faced Glossy Ibis, our list of park birds has increased to 205 species. Only about 70 are conspicuous enough to be noticed by our tourists.

Trees: 1922 was notable for the addition to our list of two new junipers, and a new broad-leaved cottonwood identified by our Park Naturalist.

Flowers: Again we note that our visitors are becoming more and more keen on flowers, never fail to admire them, and are eager seekers of botanical lore. More than fifty varieties were added to our list, bringing it very close to a total of 700 species.

Grasses were badly injured by lack of rain in June, but recovered later at the higher elevations. This June drought cut down the early flowers perceptibly; but the more generous showers later caused an unusual rebirth, and later than usual, a wonderful display of Fringed Gentians. The scarcity of early rain combined with warm weather led most of our flowers to blossom very early.

Geysers: During the winter of 1921-22 no very great changes occurred in either the Hot Springs or the Geyser Basins.

At Mammoth Hot Springs: The Orange Spring developed a small opening on top of the mound from which a pencil-size stream of water constantly shot up ten inches or more; activity and color increased at Minerva Terrace; Pulpit Terrace showed some wonderful growth and improvement and the same is true of

Jupiter Terrace; a fine spring and terrace started on the northern part of the old Marble Terrace in July and still continues to improve and increase in size; the spring near the old Cupid's Cave has opened again and is more active and more beautiful perhaps than ever before.

On August 14th, one of the Roadside Springs had a violent eruption, threw out quantities of rock and mud, and deluged the road. More activity has since been shown, and has created a great deal of interest. It has been suggested that, if this geyser action continues, it be called "The Semi-Centennial". This is the geyser that attracted so much interest as to be discussed in newspapers in all sections of the country.

At Norris Geyser Basin: Whirligig Geyser has been more active; the Constant Geyser has returned to its old regularity of one eruption every minute; Mud Boiler and the Valentine Geyser grew less and less frequent; the Bathub was simply a boiling spring without geyseritic action. The Monarch Geyser did not play at all.

At Lower Geyser Basin; all features remained normal. The Fountain Geyser played only once from the newer opening.

At Upper Geyser Basin: Old Faithful played every 64.6 minutes until June 21st when the average period suddenly dropped to 60.5 minutes until July 5th when it rose again to 63 minutes and so continued until the end of the season, extreme periods were 36 and 72 minutes long; the Daisy played on an average every 75

minutes; the Grand every 11 hours; the Giantess played twice during the season and the Beehive only once; the Castle played well three or four times a week; the Giant was seen more than usual, about three times a month; the Lion, Grotto, Oblong, and Sawmill played frequently but irregularly; the Riverside was not quite so regular this year, varying from $6\frac{1}{2}$ to 8 hours with an average interval of $7\frac{1}{2}$ hours; the Fan and the Mortar did not play at all and both seem to be quite "dead"; the Lone Star continued to play every $2\frac{1}{2}$ -3 hours.

At West Thumb: The Lakeshore and one or two other small geysers played at times.

To sum up the season, I should say geyser activity, except the Giantess and Beehive, has been very vigorous indeed.

Information Department

The museum, guide service and lecture service are all parts of the educational work being conducted in Yellowstone National Park in accordance with the policy of the National Park Service to make the parks mean more to the tourists from an educational standpoint. All of these services have been very popular with the tourists. The work of the information department is necessarily closely related to the work of the rangers and has been included above in connection with the discussion of what was accomplished in the protection department during the year.

Information Office: 30,289 people visited the information office at headquarters during the summer; 3,415 in June; 11,362 in July; 10,916 in August and 1,495 in September. Compare the total of 30,289 with 24,445 visitors to the information office in 1921 and 9,918 in 1920.

A total of 3954 Government publications relating to the park, including 944 National Parks Portfolios; and 632 other publications about the park were sold in the information office. A total of 31,945 free Government publications were distributed by this office and 62,000 free publications were given to visitors at ranger stations.

Museum: The room in the rear of the Information Office was fitted up as a Museum, specimens of igneous rocks, geyserite, and petrified wood were installed, and the Museum thrown open to the public on June 20th, the opening day of the season. Although the men were kept busy on other work necessitated by the heavy rush of tourists, specimens of various kinds were collected, labeled, and installed throughout the season until now (September 20th) there are 47 exhibits in the Igneous Rock case, 43 exhibits in the Geyserite case, 41 exhibits in the Petrified Wood case, 2 mounted animal heads, 1 mounted eagle, a case illustrating beaver work and containing 4 exhibits, a contorted tree, 2 specimens of minerals and 80 exhibits of pressed and dried flowers. To make the exhibits as interesting as possible, far more than the usual case was taken in the preparation of the descriptive labels.

Lecture Service: At Mammoth Hot Springs, Temporary Park

Ranger Dr. F. Z. A. Thone delivered a total of 232 lectures on the park, its geology, flora, fauna, history, etc. It is estimated that in his lectures Dr. Thone spoke to 60,000 tourists. Lectures were given at Mammoth permanent camp at 7:20; at Mammoth Hotel at 7:55 and before a bonfire in the public automobile camp at 8:30 each evening. From time to time lectures were also given in different parts of the park by the Park Naturalist.

Guide Service: 27,103 people (577 guide parties) were guided by rangers over the formations at Upper Geyser Basin. At Mammoth Hot Springs, 10,396 people were guided over the hot springs terraces.

Sanitation Department

Under the direction of the Master Plumber the extensive water and sewer system at headquarters was maintained during the year. A new heating plant with 1000 feet of radiation was installed in the assistant superintendent's home. Boilers and radiation were also installed in the shops. Plumbing in the new ranger stations and community centers at Old Faithful and Grand Canyon were completed. Also, the plumbing was nearly completed in the new Lake ranger station and community center and in the Lake comfort station. Water systems for new automobile camps were constructed at follows: At West Thumb, a Reservoir with 8000 gallon capacity and 3000 feet of pipe

lines; at Madison Junction, a reservoir with 8000 gallon capacity and 3000 feet of pipe lines to camp grounds; Mammoth automobile camp grounds, extension of pipe lines 2000 feet; Tower Falls automobile camp, a powerful hydraulic ram installed, cement reservoir under construction and pipe lines being laid as report is written. Also heating plant in post-office buildings and museum building being rebuilt.

Notable achievements in other sanitation work, through cooperation with Public Health Service officials, includes construction of a sewerage system and disposal plants at Upper Geyser Basin to protect the Firehole River from pollution by raw sewage from Old Faithful Inn, the permanent camp, the auto camp and the ranger station, the sewerage system requiring the laying of 3650 feet of 6 inch, 1250 feet of 8 inch, and 2175 feet of 10 inch vitrified tile, and the disposal plants requiring 2 sedimentation tanks with apparatuses for sterilization of effluent; the construction of a sedimentation tank and sewer system for Canyon Permanent Camp; the construction of a sewer line for Lake Camp; field work completed for comprehensive sewerage system and disposal plants at the Lake to care for hotel, camp, auto camp, ranger station and store. Similar work was done for the Canyon Hotel plant; also the beginning of drainage and other work for mosquito control at Old Faithful and Lake; study and location of water supplies for auto camps at Madison Junction, East Thumb, Canyon and

Roser Falls; bacteriological analyses of water and milk, 17 samples of milk and 84 water samples being analyzed during the season and several sources of drinking water being condemned as a result thereof.

Dr. Harrison G. Dyer of the Smithsonian Institution, expert in mosquito control, and Mrs. Dyer, also an authority on mosquitoes and their control, spent nearly a month in the park making collections of all species of mosquitoes and examining their breeding places, places and the dominant varieties of mosquitoes. The report was couched in such directory language as to enable us to begin mosquito control work in the form of drainage, filling low spots, or oiling.

Electrical Department

Electric System: The following table shows the total production of the power plant, disposition of current, revenues, etc., as compared with similar data for the fiscal year 1922:

The peak load for the year was 70 kilowatts.

	1921	1922
Total Production in kilowatt hours	161,180	221,340
Sold to park utilities	38,000	41,023.4
Consumed by Government buildings for power, lighting streets and buildings, loss on lines, etc.	123,100	183,622.2
Total revenues from sale of electric current during year, at 5¢ per kWh	\$1,904.00	\$2,051.17

Telephone System: The telephone lines of the park were maintained throughout the season. A new grounded wire line was built between the Lamar River Bridge and the Lower hay ranch on Slough Creek, 7 miles. Also, a line 3 miles in length was built from Dunraven Pass to the fire lookout station on Mt. Washburn. 9 miles of wire on Dunraven Pass and on the northern slope of Mt. Washburn down as far as Haynes Tower Falls Picture Shop was removed and the wire salvaged. An extra wire was strung between Morris Junction and Canyon Junction, 11 miles in length. The total mileage of telephone wire is now 261 miles.

Mechanical Department

The mechanical department maintained 17 trucks, 8 automobiles, a steam engine, a caterpillar engine, 3 steam rollers, compressors, pumps, etc., repaired road machinery including dump wagons, graders, 3 gravel loaders, drags, road tools, fire tools, etc. It also shod several hundred horses. It made the heavy hinges and locks for the doors of the new ranger stations.

The carpenter did miscellaneous work in the quarters at Mammoth, completed one new set of quarters in the old guardhouse at the south end of the old "Officers Row", remodeled quarters assigned to the Post Office, shingled the plumbing shop and the Assistant Superintendent's quarters, laid new floors in two rooms of the Superintendent's quarters, built toilet structures for

auto camps, made sign boards, etc.

A maximum of 12 men and a minimum of 6 were employed in the shops.

Property and Transportation

Under the direction of the steward and master of transportation 711 tons of material, equipment, and supplies, were moved from railroad terminals to headquarters. From headquarters 8 trucks were operated through the park, supplying road camps, construction camps, etc. The total mileage of the trucks was approximately 40,000. A maximum of 11 men were engaged in the warehouses and in transportation work.

Painting Department

The Master Painter and his assistants completed the painting of most of the roofs of the wooden buildings of Fort Yellowstone. The exterior walls of several more buildings of the Fort were painted. The residences of the U. S. Commissioner and the Assistant Superintendent were painted. In the park the Tower Falls ranger station and the new ranger stations at Grand Canyon and Old Faithful were either painted or stained with creosote stain. Many trucks and wagons, including the sprinkler wagons, were painted and varnished.

500 wooden signs were made and painted, including 300 trail signs. 300 steel signs were repaired and approximately 400 new steel signs were created. 2500 new boundary signs are being erected.

Improvements by Public Utilities and Individual Operators

Yellowstone Park Hotel Company: An addition to the Lake Hotel was begun June 1st. This annex will have 113 rooms and 59 bathrooms. A girls' dormitory of 58 rooms is under construction at Old Faithful, thus releasing for tourist use about 50 rooms in Old Faithful Inn. These rooms will be remodeled for tourists as soon as possible. Many other improvements were made by the Hotel Company, including painting of the exterior of the Mammoth Hotel, and the completion of the new dining room at Old Faithful Inn.

The Hotel Company had 810 cords of wood cut for Old Faithful Inn, and 535 cords for the Lake Hotel, and approximately 1000 cords are being cut for the Canyon Hotel. All wood cut was dead or fallen timber.

Yellowstone Park Camps Company: At Mammoth, 24 new cottages were constructed and furnished, together with additional wash rooms and comfort stations to accommodate increased capacity. At Old Faithful, 50 new cabins are in process of construction which will increase the capacity of that camp more than 20%. The new recreation pavilion was operated during the season and proved a successful addition to the entertainment features at the Camp. A delicatessen tent, 20 x 40 feet, was constructed in the public automobile camp adjacent to Old Faithful Camp. This delicatessen served prepared cooked foods such as soups, roasts, steaks, hot biscuits, muffins, pies and cakes; also fresh milk.

At Lake, modern flush toilets were installed in the wash rooms and the water supply system for the camp was improved and enlarged. A women's dormitory with a capacity for 24 persons was constructed. At Canyon Camp, a modern sewerage system for the scientific treatment of sewerage was installed and connected with flush toilets throughout the camp. Tub baths were also installed. Two dormitories, each with a capacity for 24 employees, were built. 20 new cabins and 40 new tents are in process of construction.

At Camp Roosevelt, six log cabins of two rooms each and five frame cabins of two rooms each were constructed. The travel at the camp showed an increase of about 30% over 1921.

Yellowstone Park Transportation Company: This company purchased 23 11-passenger busses and a new five-ton truck with 1200 gallon capacity, bought for hauling gasoline to various points in the park. Several used touring cars were also purchased for special service. All motor equipment purchased was standard White Company equipment.

In its construction department this company built two new drivers' bunk houses and two new mess houses at Yellowstone Lake. It also remodeled the stage barn at the Canyon for a drivers' bunk house. New chauffeurs' and mechanics' bunk houses are being built at Old Faithful. Work is also in progress at West Yellowstone on the remodeling of the Old Yellowstone-Western Stage Company's buildings which will be hereafter used as Western Es-

trance headquarters. Other improvements made by this company include a new washroom at Old Faithful, a new air pump installed at the Mammoth garage, a new grinding machine and miscellaneous machine shop equipment.

Yellowstone Park Boat Company: This company purchased a new speed boat which was placed on Lake Yellowstone. The boat has a capacity of 11 passengers. It is equipped with 18 $\frac{1}{2}$ H.P. Sterling engine and has a speed of from 35 to 40 miles per hour.

J. E. Haynes, Official Photographer: This operator conducted 11 sales establishments, 9 of these being the same as those in operation last year. The 2 new units are a shop in the Canyon public automobile camp opened for business June 25th and a sales stand in Old Faithful Inn opened June 26th. During the summer the Tower Falls Shop and store was rebuilt and doubled in size.

The photographic finishing department at Mammoth Hot Springs was enlarged by a 24 ft. addition and the installation of more equipment units provided double capacity. A 42 ft. addition to the Mammoth Picture Shop is under construction at this writing. The 1922 addition to the merchandise line of the official photographer include the publishing of the late General Hiram M. Chittenden's book and a contract to publish Dr. Frank H. A. Thomas book on the trees and flowers of the Yellowstone, which will be in print in 1923, making a collection of six Yellowstone books published by this operator. Nearly 100 negatives were added to his collection and all series were increased.

George Whittaker, Merchant: A new warehouse is under construction at Mr. Whittaker's Canyon store and an addition 16 feet in length is being built at the rear of the Mammoth store. The Mammoth store annex, formerly occupied by the Post Office is being improved by a 30 foot addition and a cellar and furnace room.

C. A. Hamilton, Merchant: Mr. Hamilton completed his store and residence at Yellowstone Lake, also his filling station at that point. All of these buildings were painted. A comfort station for the use of tourists at his Old Faithful store is under construction.

Henry P. Brothers: No improvements were made by Mr. Brothers at his Old Faithful pool and bath establishment but he contemplates constructing an addition to his present building, this to be used as living quarters for his family. Mr. Brothers reports that a total of 11,754 baths were furnished during the season of which 10,020 were furnished to tourists and 1,734 to park employees.

The garages of the Yellowstone Park Transportation Company, the park stores and the Yellowstone Park Camps Company at its Canyon Camp and Camp Roosevelt sold gasoline at the authorized price of 40¢ per gallon at Mammoth Hot Springs and 45¢ per gallon at other points in the park. No complaints against the gasoline price were received.

Franchises and Permits

The following is a list of corporations and individuals to whom long term franchises covering the operation of public utilities in the park have been granted:

	Nature of Business	Effective date of contract	Date of Expiration
one	Park Hotel Co. Hotels, news stands, laundries, etc.	Mar. 21, 1917	Mar. 20, 1937
one	Park Camps Co. Permanent camps, news stands, laundries, etc.	Jan. 1, 1917	Dec. 31, 1936
one	Park Transportation company Automobile transportation lines, sale of gasoline, oil, and other automobile supplies and garage service	Mar. 21, 1917	Mar. 20, 1937
one	Park Boat Co. Power boats, rowboats, and other transportation on Lake Yellowstone	Feb. 7, 1913 Feb. 7, 1914	Feb. 6, 1923 Feb. 7, 1923
Wines	Photographs, photographic supplies, guide books, etc., also general store at Tower Falls	Jan. 1, 1921	Dec. 31, 1936
Milton	General store, gasoline oil, etc., at Upper Geyser Basin	Jan. 1, 1919	Dec. 31, 1928
	General store, gasoline oil, etc., at Yellowstone Lake.	Jan. 1, 1920	Dec. 31, 1928
Hittaker	General store, gasoline oil, etc., at Mammoth Hot Springs	Mar. 13, 1913	Mar. 12, 1923
	General store, gasoline oil, etc., at Grand Canyon	Apr. 30, 1918	Mar. 12, 1923
Fryer Schwan	Curie shop, ice cream and soft drinks	Jan. 1, 1917	Dec. 31, 1936
Brothers	Swimming-pool baths at Upper Geyser Basin	July 1, 1914	June 30, 1924

Short term permits: In addition to the above long term

permits the following short term permits were granted:

- 13 permits to conduct camping parties through the park using saddle and pack outfits.
- 5 permits to operate freight, express and mail service between Gardiner and Cooke City.
- 2 permits to practise medicine, one to Dr. W. E. Crambuck, and one to Dr. J. H. Wolfe, who succeeded Dr. Crambuck as park physician on September 8, 1922.
- 9 permits to operate moving picture cameras in the park.

Department of Justice - The U. S. Commissioner's Court

Hon. John W. Haldron, commissioner since 1894, held court whenever there were cases to be tried. During the year, 32 cases were tried by the Commissioner. There were 28 convictions and 4 acquittals. A total of \$500 in fines was imposed on defendants found guilty. This amount is exclusive of costs. There were 23 cases of violation of the regulations against speeding, 1 case of reckless driving, 2 cases of disorderly conduct, 2 cases of defacement of geyser formations, 1 case of petit larceny and 1 case of violation of the regulations governing camp fires.

Post Office

Yellowstone Park, Wyoming, is the only post office in the park. On May 22, 1922, Assistant Superintendent Chester A. Lindsley was appointed postmaster by transfer from the National Park Service, succeeding George Whittaker, postmaster here for

8 years. When he took over the office, it was moved to new quarters on the ground floor of the large stone building adjoining the superintendent's office, under the same roof and next door to the public information office.

The business transacted in this post office was proportionately greater than increase in park travel. Approximately 850,000 pieces of first-class mail were dispatched, an increase of about 20 per cent, and in almost exact proportion to increase in travel. Cash receipts which were about 40 per cent heavier than last year. Parcels Post business was much heavier. Insured packages sent out increased by about 25 per cent, and those coming by over 100 per cent. More than 3,000 Insured packages were dispatched, and about 2,000 received during the tourist season, besides many received and sent as ordinary mail of which no record was kept. The registry, money order, and C.O.D. business showed about a normal increase. This added business was handled without any appreciable increase in the expense of running the office.

Department of the Interior

Geological Survey: Officials of the Water Resources Branch of the U.S. Geological Survey visited the park during the year for the purpose of inspecting and repairing the water gauging stations established here for the purpose of measuring the volume of several important rivers. New gauges were installed on September 2nd and 3rd by Engineer Berkeley Johnson on the Lamar River, on Tower Creek and on the Gardiner River. The gauges at the outlet of Lake Yellowstone and on the dock near the Lake Hotel were adjusted by En-

(linear Johnson on September 5th.

The topographic branch of the Survey finished its partial revision of the topographic map of the park, and the new map was published during the summer. The important part of the revision is the correction of the topography of the Snake River and Falls River regions to show that these areas are not swamps.

Department of Agriculture

Weather Bureau The work of this bureau in the park is very important both to itself and to the National Park Service. Its able observer, Mr. Edgar Fletcher has continued in charge of the station at Headquarters during the past year. His summary of weather conditions in the park during the year will be found in another part of this report. During the year Mr. Fletcher prepared some very interesting and valuable charts on weather in the park during the past 33 years. Under Mr. Fletcher's constant guidance, many tourists were given an opportunity to observe the interesting weather recording instruments in the Weather Bureau station here.

Bureau of Animal Industry During the past year, this bureau not only sent Dr. Neil Plank to conduct the regular autumn vaccination of young buffalo calves, but it also aided in the work of stamping out an attack of hemorrhagic septicemia which broke out in the herd in March, 1922. Dr. Plank came into the park in the midst of deep snow and braved the hardship of traveling to the Buffalo Ranch on skis in order to conduct the fight against the

ravages of the disease. Serum was rushed by the B.A.I. from Washington. Had it not been for the efficient work of this bureau, doubtless we would have lost most of our fine buffalo herd. At this point, it is fitting that I express Yellowstone Park's appreciation of what the B.A.I. did for it in the grave emergency at the Buffalo Ranch.

Dr. J. C. Joss visited the park in August, 1922, from Portland, Oregon, and gave us many pertinent suggestions on the handling of meat and milk, and on some of our sanitation problems.

Department of Commerce

Bureau of Fisheries: Under the direction of Commissioner Henry O'Malley, the largest collection of eggs made in Yellowstone Park in recent years was made during the present season. Supt. Charles B. Grater, of the Leadville Hatchery was again in immediate charge of the Bureau of Fisheries interests in the park. A total of 16,751,920 eggs were collected during the season, compared to 5,996,000 in 1921, and 6,512,000 in 1920. 6,785,000 eggs were shipped out, and the remainder either hatched and planted as fry, or planted as eyed eggs.

Dr. Henry B. Ward, of the University of Illinois, assisted by Jas. L. Hyatt, spent more than two months in a careful and comprehensive study of the pelican depredations on the fish supply in Yellowstone Lake. Dr. Ward found that the pelicans destroy a vast quantity of fish each day, and expects to recommend that

these birds be classed as predatory and that their numbers be reduced. Dr. Ward also gave serious attention to the worm that infests some of the trout in Lake Yellowstone, and gathered considerable data about this infestation.

Treasury Department

Public Health Service: The work of this bureau is described elsewhere in this report. It covered inspection of buildings and grounds to detect insanitary conditions, analyses of water and milk, planning and preparing drawings and specifications relating to the Upper Geyser Basin sewer system, supervision of installation of sewer system at Canyon and Lake Camp, and similar work of great importance to health and happiness of park visitors. Sanitary Engineer H. E. Houston was here from June 11, 1922, to June 24; Assistant Sanitary Engineer A. P. Miller was assigned to the park all summer; also Acting Assistant Surgeon W. E. Crowbuck, the park physician, had instructions to aid in improving the sanitation of the park. All of these men are officials of the U.S. Public Health Service.

Prohibition Enforcement Service: This service cooperated during the past season in efforts to stamp out illegal traffic in intoxicating liquors. Several agents were detailed to Gardiner, West Yellowstone and the park to work on this problem. Gardiner was raided on the 20th of June, and four violators of the Volstead Law were caught, with a large quantity of liquor. The presence of prohibition agents made bootleggers wary, and it was difficult

for men to obtain liquor unless well known to the violators of the law. Hence there was less drunkenness in and about the park than has been the case in the past.

The Semi-Centennial Celebration

On July 14, 1922 at the Junction of the Gibbon and Firehole Rivers, under the auspices of the National Editorial Association, appropriate ceremonies were held commemorating the Fiftieth Anniversary of the establishment of the park. The ceremonies were held a few feet from the campfire of the night of September 19, 1870, where Cornelius Hedges first announced the idea of making a National Park of the Yellowstone region. Mr. Hedges' sons, Cornelius, Jr., and W. A. Hedges, were present and participated in the ceremonies, also Mr. C. F. Cook, who was a member of the Folsom-Cook Expedition of 1869, and one of the first white men to behold the Grand Canyon. This was Mr. Cook's first trip to the park since 1869. He is now 84 years of age.

Among other participating in the ceremonies were Hon. J. C. Brambleton, of Newton, Mass., President of the National Editorial Association, who made the commemorative address, Hon. J. H. Sinclair, Congressman from North Dakota, Hon. O. C. Moore, Lt. Gov. of Idaho, Hon. J. W. Meldrum, U.S. Commissioner of the Park, and the Park Superintendent who presided. Telegrams were received from the President, the Secretary of the Interior, the acting Director of the Service, the governors of the adjacent states, many senators and congressmen, and from numerous

conservationists. Most of the addresses and telegrams carried a strong note of conservation and advocated strict adherence to the principle of complete preservation of the park as embodied in the original idea of Cornelius Hedges which is the foundation of our national park system.

Gifts to the Park

The National Arts Club of New York gave \$1000 and the National Association of Audubon Societies gave \$500 to be used in the Falls and Bechler River regions and to improve access to this very scenic region. Mr. Thos. Cookran of New York gave the park a fine dog team fully equipped with sleigh, harness, etc., for use in the winter protection of the wild life. This is equipment that has been badly needed for years and will greatly facilitate our winter work. Director Mather and Mr. E. W. Child gave \$1000 for improving dangerous stretches of the Gody road.

Vital Statistics

There were 2 births and 5 deaths in the park during the year.

Medical Service

Dr. W. E. Crawbuck conducted the medical service until September 1st, and on September 16th was succeeded by Dr. J. M. Wolfe. On September 8th, Dr. Crawbuck's contract was cancelled at his own request and a new contract was issued to Dr. Wolfe. Dr. Crawbuck reports that he cared for 276 cases during the year, and made 618 calls.

School

For the first time in several years a school was conducted in the park. It was opened October 10, 1921, and closed May 26, 1922. There was an average enrollment of 13 pupils. Average attendance was 12 plus, perfect attendance 1, number of promotions 14, number of classes 4, per cent of punctuality 95%. Teacher, Mrs. Laurie K. Harriott. The school was maintained by contributions of parents and park employees.

Religious Services

Religious services were conducted quite often during the year in the Government Chapel. Ministers of the Episcopal and English Lutheran Churches of Park County, Montana, arranged to fill the pulpit. Catholic services were also held frequently during the tourist season.

Recommendations

The most important recommendations I have to make are as follows:

1. That the park be enlarged to include the Teton, and headwaters of the Lamar and Yellowstone Rivers, and that building of roads in these areas be prohibited except by special act of Congress.
2. That all irrigation and other projects that may result in commercialization of the park be condemned and vigorously fought.

3. That, if the general road budget is approved by Congress, the Firehole Cutoff, the Great Fountain Geyser Road, and the Beechler River Road be constructed, and that no more new roads be built in this park.
4. That sanitation work be continued by constructing next year a complete sewerage system and sewage disposal plant at Yellowstone Lake, and the following year at Canyon; also that auto camp construction be continued; and that mosquito control be vigorously continued at the main points of interest.
5. That more money be provided for the care of the wild life of the park, especially the antelope and buffalo.
6. That a law be passed authorizing the sale or other disposition of surplus buffalo.
7. That funds be provided for purchase of much needed equipment to replace old equipment worn out in use.
8. That more funds be provided for the maintenance of roads, trails and telephone lines; and for the extension of telephone lines; also for continuation of graveling of roads and construction of guard rails along same.

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The outstanding events of the season in Yellowstone National Park all occurred during the first two weeks subsequent to the opening of the park on June 20. Dr. John Wesley Hill, Chancellor of the Lincoln Memorial University, representing the President and you, delivered the formal address at the opening ceremonies in the north entrance arch at Gardiner. This address by Dr. Hill was a wonderful plea for the preservation of the national parks from commercial exploitation and its importance in national park history and policy I have elsewhere described.

THE PRESIDENT'S VISIT TO YELLOWSTONE

The greatest event of the year in this park of course was the visit of the late president, Warren G. Harding, and his distinguished official party of which you were a member. The party was enroute to Alaska and spent two days, June 30 and July 1st, motoring over the principal roads connecting the main centers of interest. The afternoon and evening of June 30 were spent in Upper Geyser Basin, while on July 1st Lake Yellowstone, the Grand Canyon and the Tower Falls district were visited. The President and his party saw many species of wild life, including elk, buffalo, deer, bear and antelope. The weather was perfect and the organization of the Park for the President's tour was so complete and functioned so smoothly and splendidly

that not even the puncture of a tire occurred to delay or inconvenience any member of the party. The park officers and employees, and those in charge of the public utilities cooperating in entertaining this distinguished group of visitors, are deserving of great credit for the comprehensive planning and efficient execution of the program for the President's tour.

Probably never before have so many men and women distinguished in official, professional and business life toured a National Park during a single season as were numbered this year among Yellowstone's visitors, including the President's party. Seven United States Senators, twenty-five Congressmen, and two Governors were among the official visitors, in addition to many ex-members of Congress and former Governors. During my official visit to the Yellowstone, which covered a period of three weeks, I had numerous opportunities to talk with guests of the park coming from all walks of life, and from all sections of the United States. Many were poor, others rich; some traveled to the park by train, others in their own cars; a few walked. However, rarely did I find any individual who was not enjoying himself or herself in the utmost degree.

GOOD SERVICE BY PUBLIC UTILITIES

With the exception of the transportation line, the public utilities rendered excellent service, considerably better than

ever before. The new Lake Hotel annex was completed and put in commission during the season. At Mammoth Hot Springs, the Yellowstone Park Camps Company erected a huge central camp structure which is one of the most interesting buildings of the park, and this company also greatly increased its capacity to accommodate visitors at all points in the park. The stores and picture shops were expanded somewhat and excellent service was rendered in these enterprises. The delicatessens established in several automobile camp grounds were very popular and greatly appreciated.

As to the transportation line, its own cars as operated under its highly efficient organization pleased the visiting public but there were insufficient cars to meet the demand and nearly one hundred cars had to be hired outside the park. Service by these outside hired cars was bad at times and always unsatisfactory. The company will be required to buy a very large number of new ten-passenger cars before the season of 1924. It must also revise its system of handling baggage in order to more expeditiously direct and effect the transfer of passengers from one station to the other, without injury to or loss of baggage.

COURTESY AND KINDNESS GREAT FACTORS IN SUCCESSFUL SEASON

I was particularly pleased with the success attained this year by the Superintendent of Yellowstone Park and his force of

rangers and other employees in operating the park upon a basis of courtesy, kindness and good will toward all who came to enjoy themselves amid the beauties and wonders of this great playground. The uniformly hospitable and kindly treatment accorded all who came in contact with the government officers and employees in the park was widely commented upon by visitors. Some parks having comparatively small travel have also attained an enviable reputation for cordial and helpful treatment of their guests but Yellowstone was the first large park to practice such a policy on a grand scale, reaching more than 100,000 people and causing them to feel that we were glad they came to the park, and that we wanted them to enjoy themselves while there to the fullest extent possible within the limits of their stay.

TRAVEL REACHES UNPRECEDENTED FIGURES

Travel to Yellowstone Park reached a grand total of 138,000 an increase of practically 40,000 over last year. The percentage of increase was 41. By rail 44,806 of these visitors reached the park as compared with 33,358 in 1922, or an increase of 11,448. By automobile or other means of conveyance the records show that 93,546 visitors entered the park gates as against 64,865 last year, an increase of 28,681. Of the motorists arriving in their own cars it is estimated that fully 75,000 camped out in the public camp grounds using their own equipment. About August 1st a rough census of people in the

park showed that approximately 14,000 people were there at one time.

NEEDS FOR VISITOR VEHICLES

While it is pleasant to contemplate this tremendous use and enjoyment of the park by our people there is another side to consider that arouses dire misgivings. Funds with which to maintain Yellowstone and the other parks are insufficient to keep the improvements from rapidly deteriorating or breaking down under excessive use. In Yellowstone Park this year under the tremendous pounding of heavy traffic the roads were severely damaged, particularly the gravelled surfaces of the highways, and this was done in spite of the efficient work of the engineering department of the park which maintained 25 maintenance crews covering every mile of the road system. There are not enough funds available to repair this damage before next season and unless increased appropriations for the park are made available permanent injury to this highway system will result and its destruction will be in full swing.

Likewise the telephone system through lack of adequate upkeep funds proved incapable of handling the business of the unprecedented season, and the same can be said of other government improvements and facilities. Public auto camps were filled to capacity for many weeks and before next year must be greatly improved and extended.

INCREASE IN APPROPRIATIONS SMALL; IN REVENUES LARGE

Appropriations for the 1924 fiscal year for this park were only \$6200 in excess of those for 1923, while revenues for the current year will exceed those for the last fiscal year by more than \$20,000. The revenues for the 1925 fiscal year will nearly equal appropriations for that year unless the Yellowstone estimates for 1925 are increased as they should be. As this report is written an increase of \$20,000 has been authorized in the estimates but this is likely to be the maximum increase that will be considered. It will not be sufficient to prevent deterioration of improvements and impairment of service.

PROTECTION FORCE TOO SMALL

The protection force, that is the ranger service, should be increased by at least thirty rangers; only twelve have been allowed in the new estimates. By my own observations, based on careful study of traffic conditions, care of camp grounds, fire patrols, etc., I know that next year's force augmented by the twelve additional rangers, if they are finally authorized in the next Appropriation Act, will be woefully insufficient to transact business within the scope of the duties of the protection department. We must never lose sight of the fact that Yellowstone is our largest park, that it is twice as large as any other except Mt. McKinley,

that it has over 350 miles of roads, over 300 miles of trails, nearly 300 miles of telephone lines, 21 ranger stations, an extremely valuable headquarters plant, and buffalo and other ranches to maintain and develop to meet ever increasing demands for public service. It is our most important game preserve, yet in proportion to its great size, its varied activities, its enormous patronage and its rapidly mounting revenues, its appropriations are far too low and in fact lower in proportion than many other parks.

YELLOWSTONE ROAD CONSTRUCTION REQUIREMENTS SMALL

While most of the other parks require extension of their highway systems on a considerable scale Yellowstone needs comparatively little new road building to complete her system. Revision of some small parts of the main loop system, touching important points of interest to make them safer and easier to negotiate, completion of the road up the Firehole River from Madison Junction which was begun before the war, and rebuilding of the north approach road through Yankee Jim Canyon are the most urgent road construction projects of this park. Its need for greatly increased funds for gravel surfacing, improvement of drainage, protection by parapets, etc., is most urgent, and will require considerable money.

I am opposed to new roads in the areas proposed to be added to the park, such as the upper Yellowstone country and the Teton region, and I am likewise opposed to building new roads through a virgin wild life section like the Gallatin Mountain region where it is proposed to construct a new highway in order to give patrons of a certain railroad system quick access to the main loop highway of the park. It is proposed to build this road across Bighorn Pass, going up the Gallatin River through the pass thence down Panther Creek to the road leading from Mammoth Hot Springs to Norris Geyser Basin. We must keep a large area of the Yellowstone in a state of untouched wildness if we are to be faithful to our trust as protectors of the wild life with which the park abounds.

VASTLY INCREASED USE OF YELLOWSTONE TRAILS

I am delighted with the great increase shown this year in the use of Yellowstone's trails. There were many saddle-horse parties on the trails and several hundred visitors enjoyed the wilderness charm of the distant sections of the park where the wild life is so abundant and so easy to approach and photograph. The most picturesque trail parties were the boys' and girls' parties from the Valley Ranch which is located on the south fork of the Shoshone, and G. C. Moore's party of boys. Each of these parties spent more than a month on the park trails. A group of

members of the Prairie Club of Chicago spent several weeks in the Yellowstone hiking over all the trails radiating from each permanent camp, and parties of college students of botany and geology used the trails for trips afield in connection with their research work.

HOWARD EATON TRAIL DEDICATED

The trails were all kept in good condition and some new trails were built, among the latter being a particularly fine trail from Mammoth Hot Springs to the summit of Sepulchre Mountain. The Howard Eaton trail was finished and dedicated on July 19, 1923, to that famous old guide and game conservationist, the late Howard Eaton. Members of the Eaton family were present at the dedication which was held at Sheepeater Cliff where Howard Eaton made his first camp in the park each year. The principal addresses were made by Congressman Charles E. Winter of Wyoming and Colonel Henry Hall of Pittsburgh, intimate friend of Howard Eaton for many years.

WILD LIFE OF YELLOWSTONE HAVE GOOD YEAR

The animals of the park are in exceptionally fine condition. Last winter was favorable to the game and all species came through with few losses. Such of these as did occur were natural deaths due to old age or attack by predatory animals. There was a very gratifying increase in all species, especially elk,

antelope and deer. The moose have not shown proportionate increase because of the killing of too many bull moose outside the south boundary of the park in the upper Yellowstone region. In two years one hundred bulls were shot in this section under authority of the State of Wyoming. I am sorry to record that more moose will be killed this year in Wyoming and this means in the area just south of the park in the watershed of the Yellowstone.

The buffalo herd continues to increase rapidly but it is hoped that under authority granted by Congress last winter the surplus males can be disposed of in a satisfactory manner. Pre-animals, particularly coyotes and wolves, were greatly reduced, nearly 300 being killed during the past year.

RECORD BREAKING YEAR IN FISH CULTURE WORK

Fishing was excellent in the park all season and should improve rapidly from year to year as a result of fish culture work now being conducted on a big scale. All park records for this work were broken this year when 31,570,000 eggs of the native outthroat trout were taken and a total of 6,748,000 eyed eggs and 6,247,000 fry were planted in streams of the Yellowstone region. Also 100,000 brook and 50,000 rainbow trout fingerlings were secured from the Montana Fish & Game Commission. The Park

also supplied 10,305,000 eggs to Glacier and the western States through the U. S. Bureau of Fisheries and the various state game commissions. Commissioner Henry O'Malley, head of the Bureau of Fisheries, directed this record breaking fish culture work through his western supervisor, Mr. C. F. Culler.

EDUCATION WORK VASTELY EXTENDED

The educational and information work in Yellowstone Park showed a satisfactory advance over previous seasons. Between 33,822 persons visited the museum and information office; 111,000 free pamphlets were distributed and 6,792 pieces of park literature were sold. The lectures at Mammoth were delivered by a Park Ranger before audiences totaling approximately 75,000. During the season a lecture series on the history of the Park was initiated at Old Faithful; about 40,000 persons attended these lectures. A useful addition to the literature of the Park was made this year in the book "Trees and Flowers of Yellowstone National Park," written by Dr. Frank E. A. Thone, the park naturalist, and published by J. E. Haynes, Official Photographer. Special attention was paid to visiting scientists and students. Several pieces of scientific work of major importance are projected for the Park for next season. Two classes of students, one in botany from the University of Chicago and one in geology and botany from Earlham College, Indiana, spent several weeks in the Park during August. A promising project, which may materialize

as early as the season of 1924, is for a summer school in science, to be supported by various universities and by private donations. It is hoped that the old barracks may be used for this school, and also to house the Museum, which is outgrowing its present quarters.

BEAUTIFUL CHAPEL IN USE

Yellowstone is most fortunate in being the owner of a beautiful little chapel built of native stone, and attractively located under the sheltering pines at headquarters. During the past season the chapel was used each Sunday and occasionally on week days; often it was filled to capacity. Effective advertising of services throughout the park brought these gratifying results. All religious denominations had equal opportunity to worship in the chap, thus harmonizing its use with all other park features which are perpetually reserved "for the benefit and enjoyment of the people."

TETON MOUNTAINS STILL LACK PARK STATUS

No action was taken this year on the proposal to extend the park lines to include the Teton Mountains, the headwaters of the Yellowstone and other areas, but sentiment is becoming more and more favorable to the plan and it will be carried out in a

very few years. President Harding after leaving the Yellowstone announced through the press that he favored the proposed extension very strongly, and felt that it should be made soon. I feel that this proposal is of the utmost importance and should be consummated this next year if possible, as several beautiful lakes are in danger of desecration by being used as reservoirs after damming them, and the moose are still being slaughtered in the Upper Yellowstone.

WIDE PUBLICITY THROUGH RAILROADS AND PRESS

Yellowstone National Park received a greater volume of publicity this year than in any previous year in its history. Several great railway systems distributed a large volume of high-class publicity material before the season opened.

The visit of the President to the park early in the season attracted national attention and the thirty correspondents and photographer who accompanied the official party released a veritable flood of park material, all of which was of a favorable character.

Throughout the season news and feature stories and news photographs were circulated from park headquarters. Statements of direct news interest and informational value were broadcasted regularly to mailing lists of hundreds of newspapers and were widely used. Special feature articles, dealing chiefly with

n and historical aspects of the park, received national circulation through the news association bureaus in New York, as did also news photographs. Every describing the buffalo herds of the park was used by over four hundred papers.

Clippings from every section of the country revealed national pride in Yellowstone Park and a genuine interest in the park. Pictures of changes in natural phenomena were widely used. The tremendous development of independent automobile travel gave particular value to articles containing travel statistics and general information about roads and camps.

Editorial articles from every section of the country reflected a general opinion that the Yellowstone Park should be preserved against any commercial encroachment. There was wide solicitude for the welfare of park animals, particularly the antelope. The editorial attitude toward the park was in every case friendly.

The Livingston Enterprise, a well edited daily published at the north western city, Livingston, Montana, issued a Yellowstone Daily Tourist Edition which carried the park news as well as full associated Press despatches. This paper performed a real public service and was much appreciated.

General Statement

Yellowstone National Park was established March 1, 1872 (Secs. 2474 and 2475, R. S. or 17 Stat., 32). It was the first national park to be established in the world and is our largest park. Its area is 89,669 square miles, or 5,142,720 acres, of which 3,114 square miles, or 1,992,000 acres are in Wyoming; 198 square miles, or 125,720 acres, are in Montana; and

56 square miles, or 21,000 acres are in Idaho. The original boundaries of the park are still intact, but it is proposed to add approximately 500,000 acres of adjoining Government lands to the park, most of these lands lying at the headwaters of the Lamar River, at the headwaters of the Yellowstone, and in the Eaton Mountain region. There are no private holdings in Yellowstone Park. The United States Government has retained and always exercised exclusive jurisdiction over the park area.

The park organization and its various functions remained the same during 1923 as last year.

Important Facts of 1923 Operations

1. The late President Warren G. Harding, with a party of over seventy distinguished men and women, enroute to Alaska, visited the park June 30 and July 1.

2. A Congressional party on inspection of Government activities in the West, headed by United States Senator Francis E. Warren, visited the park June 23-24, inclusive. Later, three United States Senators and sixteen Congressmen of the Sixty-seventh and Sixty-eighth Congress, toured the Yellowstone.

3. Travel to the park reached unprecedented figures. 139,305 visitors as compared with 98,223 last year, and increase of 42,182 or 41 percent.

4. For the current fiscal year park revenues will reach a total of \$265,000, or about \$33,000 over the receipts of the 1922 fiscal year, while appropriations for this year exceeded those of last by only \$5,000.

5. Under excellent care of the ranger service and in a winter generally favorable to wild life, the animals of the park suffered very little and losses were negligible. A census of the animals this spring showed gratifying increases in all species.

6. Congress granted authority to dispose of surplus buffalo. (See the appropriation Act of January 24, 1923 herein).

7. Service to the public was better than ever before except in the case of the Transportation line. Compliments on service were numerous and especially with regard to courtesy, kindness and spirit of helpfulness that marked activities of the National Park Service.

8. Excellent progress was made in developing public automobile camp grounds; also considerable extension of hotel and permanent camp facilities, including erection of great central building at Mammoth Camp costing nearly \$100,000. Transportation facilities proved inadequate and many hired cars were brought in, thus greatly lowering the usual high standard of service.

9. Excellent work on road maintenance preserved roads from destruction under heavy traffic. All trails in splendid repair. Some new trails built.

10. On July 28 cloudbursts damaged the roads, particularly the Cody road to the extent of \$27,700.

11. All records for trout egg harvest and fish hatching and planting were broken.

Weather

October was warm and sunny, with practically no precipitation.

Snow held off remarkably late in the fall, the first measurable amount occurring October 29, there being but one year of record with a later occurrence of the first measurable amount of snowfall. November was a normal month, but the forepart of December was unusually severe and stormy, while the latter part was comparatively mild, which condition continued until the closing days of January, when the coldest period of the winter began, culminating on February 14 with a severe cold wave, the lowest temperature at Mammoth Hot Springs being 25° below zero. At Riverside 45° below zero was recorded February 9. March, April and May did not depart greatly from the average of past years, but June was consistently cool with almost unprecedented frequency of showers and thunderstorms. July was the warmest month of the past four years. On July 20 a maximum temperature of 89° was recorded at Mammoth. This, with the exception of 81° on July 10, 1919, is the highest temperature recorded in any month during the past 50 years. The period of warm weather ended August 13, with a maximum temperature of 88° at Mammoth, which equals the highest of record for August in the past 50 years. In the afternoon and evening of July 22 a severe local storm crossed the park in an easterly direction, accompanied by a heavy downpour of rain, which caused much damage to the roads at a number of places.

Railroads and Highways to Park Gateways

Four railroads carried passengers to park gateways during the season. The Northern Pacific, with terminal at Gardiner, Montana, the northern gateway, operated two trains daily over its branch line from

Livingston, carrying sleepers from Chicago, St. Paul, St. Louis, and Omaha, and Portland and Seattle. One of these trains was the Yellowstone Comet, a solid Pullman train from Chicago to the park. The Union Pacific System operated its Yellowstone Special between Salt Lake City and West Yellowstone, the western gateway, each day of the season. Also daylight trains, called the Yellowstone Express, between Bozartelle and West Yellowstone, were operated by the Union Pacific, connecting at Bozartelle with trains from St. Louis, Denver, and Portland.

The Chicago, Burlington and Quincy Railroad operated three trains daily into Cody, the eastern gateway town. These trains carried sleepers from eastern and northern points.

The Chicago and North Western Railroad operated one train to and from Lander, Wyoming, the southern gateway town, each day, which train arrived in the evening and departed in the morning. The Lander-Yellowstone Transportation Company, beginning June 25, 1923, operated standard national park buses each day between Lander and Moran, taking a day and a half for the trip with night stop-over at Brooks Lake. At Annetai Inn, near Moran, tourists transferred to the care of the Yellowstone Park Transportation Company for the trip to the Lake Hotel and Lake Camp, which were reached in the late afternoon of the second day from Lander.

No new high-ways to the park were opened during the year, but several approach roads were improved, including the graveling of a section of the West Yellowstone-Tahton road.

Railroad and Other Publicity

The public utilities of the park cooperated generously in making available the services of an extremely able writer, Mr. H. W. Frantz, to handle park publicity, and Mr. J. E. Haynes, the official photographer, rendered invaluable aid in providing photographs and doing photographic work.

Before the opening of the season the publicity representative established direct contact with the foremost press agencies and news picture distributing companies in America, and as a result an exceptionally wide distribution of park publicity material was secured throughout the season. Besides various special articles written to meet the needs of particular services numerous statements were broadcast to park mailing lists, including foremost newspapers in all sections of the country.

The visit of President Harding and his official party afforded an exceptional opportunity for placing material of every character regarding the park. Prior to the arrival of the party several statements and special articles of a historical character were distributed. The personnel of the official party in the park included nearly twenty-five newspaper men and half a dozen press photographers. Memoranda covering every phase of park activities were furnished for their information and convenience.

The publicity and advertising departments of the railroads, particularly the Northern Pacific, Burlington Route and Union Pacific,

have conducted extensive press campaigns, besides issuing numerous beautifully illustrated booklets and folders. Photographic material sent out by them has been widely used. The Chicago and Northwestern Railroad, the Rock Island Lines and the Denver and Rio Grande eastern Railroad issued new and very attractive folders on the Yellowstone.

Travel in 1923

This year 136,328 people visited the park as compared with 98,223 last year, and an increase of 40,129.

There was an increase in rail travel this year of 11,449 over last year. The western entrance shows an increase of 6,081 by rail; the northern entrance 5,256, and the eastern entrance 2,103;

187 came in via the Lander or southern gateway. All entrances showed an increase in automobile travel; 5,478 at the east; 10,404 at the north; 4,098 at the west; and 6,582 at the south.

The West entrance continues to lead in rail travel, while the Gardiner, or northern entrance, leads this year as the motorists' favorite gateway.

The largest number of park entrants registered in a single day in the history of the park was 2259 on August 7th. Compare this with the high figure of last year, 1,983 on July 23rd, and 1,669 on August 6, 1921. The heaviest train travel arriving at a single gateway was 574 at West Yellowstone by the Union Pacific System on August 7th. It is interesting to note that during the 1923 season there were 10 days with over 2000 visitors entering the park.

There was an increase of 28,209 in motor travel over last year.

The heaviest motor travel at park gateways on one day was 470 automobiles carrying 1623 tourists on July 17th, compared with 337 automobiles carrying 1,151 tourists on August 7th, 1932. The southern, or Snake River entrance, enjoyed the largest motor travel for a single day on July 29th, when 177 cars carrying 600 people entered the park.

It is estimated that each day between July 20th and August 15th, there was an average of 10,000 people in the park. Practically two-thirds of the visitors to the park were motorists in their own cars, most of whom camped out and carried their own equipment. Visitors represented every State in the Union except Delaware. Alaska, Philippine Islands, Hawaii and the Panama Canal Zone were also represented. Among the foreign visitors were citizens of England and 7 other countries belonging to the British Empire and many other foreign countries including Belgium, China, Cuba, Denmark, France, Germany, Holland, Japan, Mexico, Poland, Sweden, Switzerland. Also several countries of South America.

Total Season Travel by Regions - 1922 and 1923

District	Fall Visitors		By Automobile Cars		By Motorcycle Motorcycles		By Rail- road, Horse- back, etc.		Pre- Season Visitors	TOTAL 1922
	1922	1923	1922	1923	1922	1923	1922	1923		
North	24,114	24,114	8,928	25,000	41	72	242		43,456	
East	23,114	23,114	8,492	23,151	23	44	217		44,997	
West	7,497	7,497	7,728	23,494	22	49	292		33,314	
South	197	197	4,387	24,027	21	44	24		24,774	
Pre-Season Total								278	278	
TOTAL	44,804	44,804	27,535	92,774	101	207	1,140	572	129,228	
1923										
North	10,891	10,891	9,448	18,154	47	71	492		29,762	
East	12,024	12,024	4,981	17,724	41	61	601		30,574	
West	9,804	9,804	7,944	20,028	26	65	527		28,778	
South	78	78	1,648	9,580	8	8	100		9,774	
Pre-Season Visitors								310	310	
TOTAL	32,804	32,804	23,821	65,686	122	195	1,720	900	69,526	

Includes 1,000 cars and 8,448 visitors entering zone during the season of 1922 and 924 cars and 2,198 visitors entering zone during the season of 1923.

Trail Trips

Being particularly interested in the use of trails I am glad to report more extensive use of Yellowstone's trails for the season just closed than the park has enjoyed heretofore. The largest parties on the trails were: The Valley Ranch Parties, one of which consisted of 28 girls attending high school and college in the East, and the other including 57 boys. The Yellowstone Park Camps Company cared for a trail party which covered the principal points of interest in the park via the Howard Eaton Trail. The outfit of this party was similar to the one used by the late Howard Eaton. C. C. Moore, of Dubois, Wyoming, again brought in a party of boys and covered most of the trails. The Prairie Club, of Chicago, sent nearly 40 of its members to the park. They spent the period August 7-20, inclusive, here, traveling from one center of interest to another via automobile, and from each center, with a permanent camp as a base, hiked over all radiating trails. They also covered the grandest of the Glacier country.

From the University of Chicago, Dr. Geo. B. Fuller brought students of Botany, who with Camp Roosevelt as a base made many walking trips on the trails. Likewise, from Lorain College, Dr. A. D. Hildg of the Department of Geology and Dr. W. S. Merrill, Department of Botany, conducted a party of geology and botany students, and with a base near the foot of the Gallatin, covered many trails.

Mountain Climbing

Of equal interest to the use of the trails is the information that the Grand Teton was climbed this year for the first time since

1898. Dr. Albert Klingswood, of Lake Forest, Illinois, and Miss Eleanor Davis, of Colorado, members of the Colorado Mountain Club, ascended the mountain on August 27th. Two days before this ascent three students from the University of Montana - Quinn Blackburn, Andy de Pierre and B. F. Dinsap, made the ascent. The Grand Teton is 13,967 feet in altitude and was climbed the first time in 1872 by Mr. H. P. Langford, first superintendent of the Yellowstone, and Capt. James Stevenson, a geologist and member of the 1872 Hayden Survey. It was climbed again in 1898 by Rev. F. Spaulding, of Erie, Pennsylvania, and Messrs. W. G. Owen, Frank Peterson and John Shives, of Wyoming.

National Park Service Activities

Work of the National Park Service relates to administration, protection, and maintenance of the park and its improvements, construction of new improvements, supervision of the public utilities and individual operators and a wide range of miscellaneous matters. There are 336 miles of roads in the park, 810 miles of trails, besides several hundred miles of game trails used by rangers on patrol; 263 miles of telephone wires; approximately 100 buildings, including Fort Yellowstone, a plant worth in excess of \$1,000,000; a large amount of machinery and equipment; power plant; water systems; 8 highly developed automobile camps and 40 automobile camps of which development has started; the buffalo ranch and three hay ranches; also several isolated hayfields.

Administrative Department

Headquarters Office. During the year from six to eight clerks were employed in the headquarters office on general correspondence, files, personnel, purchasing, disbursing, time-keeping, miscellaneous financial matters, information and a wide range of other duties in this and to other parks. Approximately 12,000 pieces of mail were received and 12,000 dispatched.

Appropriations. Appropriations made available since the date of the last report are as follows:

<u>Date</u>	<u>Purpose</u>	<u>Amount</u>
Jan. 24, 1923	Administration, Protection and Maintenance	250,000
" 24, 1923	Construction of Physical Improvements	62,000
		<u>312,000</u>

Revenues for 1923: Revenues collected during the 1923 fiscal year were as follows:

Automobiles & Motorcycles	127,612.08
Hotels & Camps	28,799.44
Transportation	22,242.97
Stores	6,081.98
Miscellaneous	5,421.10
Total	<u>230,167.57</u>

All of these funds were deposited to the credit of miscellaneous receipts in the United States Treasury.

Revenues for the 1924 fiscal year will amount to \$250,000-\$300,000.

Personnel

During the year the maximum number of employees on the payroll was 109 appointees and 287 temporary mechanics, skilled laborers, laborers, etc., a total of 396 on July 31st. The minimum number of employees on the payroll occurred during the month of February, when there were 68 appointees and 8 others on the rolls.

Engineering Department

Park engineer in charge, with one assistant. Last autumn the Bechler River survey was completed. The winter was spent by the engineers in working up notes on this survey, making maps, profiles, plans, etc. They also prepared comprehensive reports on future construction work in the park, and developed plans for the 1933 season.

Road Opening and Maintenance. The spring was late in opening and in order to gain access to the Lake Hotel to continue construction of the annex, the Hotel Company paid the expense of operating the caterpillar excavator. The plow left headquarters on April 18th, reached Norris May 4th, Canyon on the 6th, and the Lake on the 18th. Roads to West Yellowstone and Old Faithful opened on May 8th. Other roads were opened as follows: West Gallatin, June 10th; Continental Divide June 18th; Sylvan Pass June 14th; Detouron Pass June 23rd; South entrance June 24th; South side Mt. Washburn June 25th, north side July 7th.

During the park season 25 road camps were operated, from which each crew maintained an average of 14 miles of road. One hundred

twenty-five men and forty-seven teams were employed for a period of approximately three months. In addition to the road maintenance work twenty-seven men and thirty-five teams were required to operate the sprinkling system. One hundred and seven miles of road was sprinkled twice daily during the season.

Road Improvements. A twenty-five man crew worked all season making general improvements to road in the vicinity of Morris Junction. At several places the roadway was widened on curves by blasting off sharp rock points; one at Beaver Lake, two between the 14 and 15 mile posts, and two between the 18 and 19 mile posts on the Mouth-Morris Road, one at Virginia Cascades and another on Standing Hill on the Morris-Canyon Road. The Morris-Medicine Junction road has been fully gravelled and rolled from Morris Canyon Basin to the lower end of Gibbon Meadows. This work of widening and graveling will be continued down through the Gibbon Canyon.

The road through the Gardiner Canyon was widened for a distance of about 400 feet at a place near the 8 mile post from Gardiner. Seventeen hundred cubic yards of rock was blasted from the sandstone cliffs above the roadway, then placed on the embankment with a steam shovel.

The road through Golden Gate and across Swan Lake Flat was gravelled in June before the opening of the season. Altogether $\frac{1}{2}$ miles was well gravelled and $\frac{1}{2}$ miles slightly gravelled. After grading and shaping, the gravel was rolled with a steam roller.

Construction walls and Guard Rails. The construction of masonry walls and log guard rails was confined to the Canyon section this year, as there seemed to be a greater need at that place for more adequate protection. Altogether 2225 linear feet of standard log guard rails were built, 983 feet of which was constructed on the Inspiration Point Road and 1242 feet near the Chittenden Bridge. A masonry wall was built to replace some rotten log cribbing. The wall extends 384 feet south from the Canyon Arch bridge; it contains 508 perch of masonry and has an average height of 10 feet. Also 454 feet of log guard rails were built between the 2 and 4 mile posts east of Mammoth toward Snow Falls.

Construction of Buildings. At the Lewis River maintenance camp, there was built a log mess building 18 x 26 feet, and a log stable 18 x 30 feet. At Durraven Pass, a frame barn with log trim will be built, and at Old Faithful, a combined winter ranger quarters and winter mess hall will be built this autumn.

In the Mammoth automobile camp, a standard comfort station building, 18 feet 6 inches by 22 feet was built and all plumbing fixtures installed; a similar building and the same size as the comfort station was also built for a laundry.

At Canyon automobile camp, four comfort stations 18 feet, 6 inches by 22 feet were completed ready for plumbing. Here also a new water system was constructed by the engineering and sanitation departments, the former building a 24,000 gallon concrete reservoir. This project is described below with other camp development work.

The old Bear Falls ranger station will be rebuilt in October. A new barn will be built at this station.

Construction of Sewer Systems. Old Faithful sewer systems were completed early in the spring, and put into commission. Under a new appropriation of \$25,000, a complete sewer system and disposal plant, are being built to protect Lake Yellowstone and its outlet river from pollution by sewage from the Lake Hotel, Lake permanent camp, ranger station, auto camp, store, etc. Construction of the system requires the laying of 2072 lineal feet of 6 inch pipe, 2320 lineal feet of 8 inch pipe, 18 manholes, and a reinforced concrete sedimentation tank 14 by 48 feet, with apparatus for sterilization of effluent.

Hot Road Construction. To eliminate the necessity for through travel passing by the Lake permanent camp, a new road one-half mile in length was constructed along the lake shore. The roadway was graded 22 feet wide and surfaced 22 feet wide with gravel.

A new road 20 feet wide and 250 feet long was constructed at the Mammoth permanent camp, to connect with the Buffalo Corral road.

Miscellaneous Improvements. Rock point blasted off at Escalator Canyon; road widened for 150 feet; 75 cubic yards excavated.

An opening 30 inches wide was cut in the dam on Glen Creek at the intake of the water system, and gate placed to provide means for flushing the diversion reservoir.

To provide a way to utilize the surplus water at the reservoir for the headquarters laund a 9 inch hole was cut in the northwest

corner of the reservoir and a gate valve placed to control the flow. 300 feet of steel pipe was laid to carry the water under the road.

A concrete spillway was built to care for overflow water at the reservoir. Wooden bridge there, replaced by a 24" iron culvert with a concrete head wall. Fill made over culvert.

Beahler River Survey During September and October 1922, a preliminary survey was made for a proposed road to start at Lone Star Junction, follow the Firehole River to its source, thence over the Continental Divide and down the Beahler River to the south boundary of the park. The length of the road was found to be approximately 30 miles. The survey notes were computed in the office, from which a map and profile were made.

Sanitation Department

This department, in charge of the master plumber, cooperated closely with the engineering department in construction work. It also had constant aid and advice of the U. S. Public Health Service officers on duty here, including Mr. H. B. Brown, in general charge of all sanitation work in the national parks, and Mr. A. P. Miller, detailed to Yellowstone again for the third year of service here.

Public Arts Camp Development At Tower Falls, a new water system was completed. Water from Tower Creek is raised 150 feet through 500 feet of 2 inch pipe to a 2000 gallon cement reservoir by a hydraulic engine. By this system 3000 gallons of water a day is supplied to the camp by 1,000 feet of 2 inch pipe.

At Mammoth camping grounds, 700 feet of $1\frac{1}{2}$ inch pipe was installed to supply water to the new comfort station and laundry unit. The plumbing (2 toilets) was installed in the comfort station, and the laundry will be equipped soon. Water here will be heated by electricity. Six double laundry tubs will be installed.

At Canyon camping grounds, a new water system is being installed. Three large hydraulic engines will lift water 180 feet to a 24,000 gallon concrete reservoir, and will be distributed to the camp through 3400 lined feet of 4 inch main line pipe and several hundred feet of $1\frac{1}{2}$ laterals. Two of the hydraulic runs will operate at once with a capacity of 24,000 gallons a day. Water will be taken from G-seeds Creek in which a dam 24 feet long and 6 feet high has been built for diversion of water. Four comfort stations have been built and will be equipped before next season.

At Old Faithful camping grounds, the water system last year proved inadequate and this spring the $1\frac{1}{2}$ inch water mains were removed and 6,500 feet of 4 inch G.I. pipe was installed in their place. Also the two comfort stations were completed. These contain 20 toilets and 4 wash basins.

At Madison Junction camping grounds, another large area was cleared of brush and the water system extended to it by laying 1000 ft. of $1\frac{1}{2}$ inch pipe. Four toilets were built there.

At the two mile post inside the park's east line, a small camp ground was developed by a dam in a little stream diverting water through 1000 feet of $1\frac{1}{2}$ pipe to a fair camp area. Toilets were also installed.

Miscellaneous: Water was put in the Lake Ranger Station and at Mammoth, headquarters, the water and sewer systems were kept in excellent condition. A new water system was installed to irrigate the lawns at headquarters.

Mosquito Control: At Old Faithful, Lake, Canyon and Camp Roosevelt, mosquito control was undertaken this spring, with good results, especially at Lake, where the mosquito evil was largely eliminated. This work will be pushed vigorously in the spring of 1924.

Landscape Engineering Activities

The landscape engineer made two trips to the park and passed on sites for new building designs for new structures of all kinds, location of telephone lines, etc. Much landscape work was accomplished. The old ranger stations at Old Faithful and Lake and their appurtenant buildings were raised and the premises cleaned up. Hotel telephone lines above Mammoth and from Firehole Cascades to West Yellowstone were rebuilt away from the river and mountain views, and out of the open spaces. Considerable cleaning up was done about the hotels, camps, stores, garbage dumps, etc.

Protection Department

This department is under the leadership of the Chief Ranger and its work was most efficiently accomplished during the year. Until June 15th the force consisted of the Chief Park Ranger, 3 Assistant Chief Ranger and 23 Park Rangers. On June 15th there were added to

the force as temporary rangers.

Winter Activities: During the winter months regular and special patrols were made for the purpose of game protection and observation. Special efforts were made to obtain accurate estimates of the number of wild animals of the various species inhabiting the park. Road patrols during the spring months to drain snow water off the surfaces and prevent washouts were made as usual.

Summer Activities: During the summer the work of the ranger force was greatly expanded. The work of caring for visitors increases in proportion to park travel, and the force has been busy checking traffic at park gateways, protecting hot spring and geyser formations, guiding visitors, rendering information service, lecturing, patrolling roads by motorcycle, etc. In addition to these duties the regular work of fire fighting and prevention, care of wild life, etc., was carried on.

Forest Fires: There were but three small fires in the park, and none of these caused any serious damage. The most threatening fire was in the Deep Creek region but was quickly brought under control by rangers.

Trail Maintenance and Improvement: We have at present 610 miles of trails in the Yellowstone Park. Approximately 25 miles of new trail was built. In addition to the above the remaining 585 miles was cleared of timber and repaired. Work on trails has not been as extensive as had been hoped due to labor shortage, but some

very fine trail building was accomplished, notably the construction of the new Sepulcher Mountain Trail and a connection between this trail and the Shaw Pass Trail. During the coming autumn a new trail via Lava Creek, Storm Peak, etc., from Mammoth to Canyon will be built. The Howard Eaton Trail was formally dedicated on July 19th, 1923.

Fish Planting: All records were broken this year for the collection of eggs of black spotted trout at Fish Lake and in the tributaries of Lake Yellowstone. Likewise, all records were broken for the number of eyed eggs and fry planted in the park and the number of fry hatched in the Lake Yellowstone hatchery. The success of this year's fish cultural work is to be attributed largely to Mr. C. F. Giller, District Supervisor of the U. S. Bureau of Fisheries, but we also received splendid cooperation from the Fish and Game Commission of the State of Montana. The Commission gave us the fingerlings mentioned in the table below and also loaned a truck and many cans for use in fish planting.

	1921	1922	1923
Total collection of black spotted trout eggs from park waters	5,986,000	16,751,920	21,570,000
Number of eggs collected in park, hatched and returned to park waters or planted as eyed eggs	2,571,600	7,373,600	12,795,000
Total number fish planted in park			
Black spotted trout collected in park	2,571,600	7,373,600	12,795,000
Black spotted trout received from Montana State Hatchery	16,000	1,000,000	
	2,587,600	8,373,600	12,795,000

	1921	1922	1923
Eastern Brook Trout from outside hatcheries.	62,000	115,000	100,000
Rainbow Trout, received from Montana State Hatchery.	50,000	120,000	100,000
Grayling received from Montana State Hatchery	1,000,000	---	---
Total Fish Plants for year	4,000,000	2,000,000	12,000,000

Buffalo Ranch Operations

At the Buffalo Ranch the principal improvement to be mentioned was the completion of the clearing and plowing of 200 acres of land on the south side of the Lamar River in the Ansthyt Creek watershed. Approximately 100 acres of this land was sowed with oats and this crop was harvested for hay. The tame buffalo herd which numbered 570 animals when the last report was written now numbers 672; since the last report 102 calves have been born.

On November 25, 1922, the main herd was released from behind the drift fence; feeding hay began December 17th. Calves, with the exception of 8 young ones born in the Fall, were taken from their mothers and fed in the corrals. There were 41 males and 65 female calves. 22 males were castrated. On February 20th calves were turned into the big herd. About this time the herd was taken to the south side of the Lamar and fed there until March 21st. 200 tons of hay were fed to the buffalo during the winter. There were 7 cows and 5 bulls shipped for zoological gardens during the year and 4 bulls that were dangerous were destroyed, their hides and heads saved.

Hay Ranch Operations

The following table shows the hay fed at the various park ranches during the past winter and the approximate amount put up this season. As the greater part of this year's hay has not been in the stack long enough to measure it is not possible to give accurate tonnage at present.

Location	On Hand Fall 1932	Fed Winter 1932-1933	Left Spring 1933	Available Fall 1933	Put up 1933
Buffalo Ranch	525	225	225	775	800
Slough Creek	415	420	5	505	500
Gardiner	225	45	125	225	25
Twoys	70	70	70	45	45
	1235	345	425	1415	1170

Predatory Animals

During the year 220 predatory animals were killed, 221 coyotes and 8 wolves.

Natural Features of the Park

The park naturalist and the rangers made observations of the wild-life conditions, game, forests, flowers, etc., and the following information regarding the natural features of the park is based on these observations:

Game Conditions: The past year can be considered as excellent from the standpoint of park game. Brought during June turned out

forage on the principal winter ranges, but the winter was of such a nature that but few animals were forced down, and our loss among all animals did not run over two per cent.

Buffalo, East Herd. The condition of the herd of so-called tame buffalo is covered in the paragraph relative to the Buffalo Ranch. Sixteen fine bulls of this herd were kept at Mammoth Hot Springs during the summer season.

Buffalo, Wild Herd. Careful counts and observations relative to the winter range conditions of the wild buffalo were made during the winter. A total of 76 were counted on the Palisad Creek and Lamar River Ranges. This is an increase of 66% in the last 15 years. Estimates made of this herd the last few years have been too high.

Mountain Sheep. According to counts made by rangers last winter, we are able to account for 223 of these animals. As this represents the number actually seen, we no doubt have more than 300 in the park.

Antelope. The rangers were detailed to the sole duty of observing and protecting the antelope this past winter. After deducting the loss of 5 head, we had a net increase of 35, or 13%. To have 223 in the herd not counting this season's increase.

Moose. Moose are scattered in nearly every section of the park. We have made no effort to get a special count of them. However, we shall attempt this the coming winter. The State of Wyoming again issued 50 permits to kill moose, and several more of our park animals were lost by being shot in the Upper Yellowstone as they passed out of the

park.

Deer: Only ten white-tailed deer were seen in the park during the winter. This deer are increasing rapidly, and have been seen in several sections of the park where they have not been known before. 1,000 is a conservative estimate of the number now in the park.

Elk: According to careful counts made during the year we have a total of 14,008 elk in the so-called northern herd of elk. This represents the number actually seen. Our loss from all causes did not total 1%. A herd of 18 was inclosed near the buffalo corral at Mammoth for the benefit of park visitors.

Black Bears: Black and Brown bears have been numerous in all parts of the park. Approximately 20 cubs have been seen during the season just past, which indicates to some degree the rate of increase.

Grizzly Bears: The grizzlies are seldom seen except late in the evening or early in the morning, and then only near garbage dumps. As many as 18 were seen at the Canyon at one time, and several at Old Faithful and Lake. At least three cubs have been seen.

Beaver: Beaver are increasing rapidly, and extending their range to all sections of the park.

Rabbits and Other Small Animals: All our smaller animals are increasing rapidly. Some of the rodents, especially the Thomomys Ground Squirrel, are getting to be a distinct nuisance, and some measures may eventually have to be taken for their control.

Wildlife Birds were as numerous as usual and were present in the park for about the same periods in case of each species as last year.

Insects The forests of the park were thoroughly inspected by Forest Entomologist J. C. Evenden, of the U. S. Bureau of Entomology, on three occasions. He found all of the forests in normal, healthy conditions except the areas of spruce and Douglas Fir along the lower Yellowstone and tributaries, which have been under attack by a defoliator for about three years. Dr. Evenden's investigations here and at his Bureau's laboratory disclosed this defoliator to be a special spruce budworm and he has declared that our forests of spruce and fir are likely to suffer very great damage before the epidemic runs its course. Unfortunately, up to the present time no means of combating this defoliator has been discovered.

Climate A late, cool and rainy spring proved to be very favorable for vegetation in general. The spring flowers were delayed until well into the earlier part of the tourist season. The rains were especially good for the grasses, insuring good pasture and abundant hay for the animals.

A useful addition to the park literature this season is a new book published by Park Photographer J. E. Rynas, "Trees and Flowers of Yellowstone National Park", written by Park Naturalist Frank E. A. Stone.

Geyzers and Hot Springs

At Mammoth Hot Springs the flow over the formations has been more abundant this season than usual. A slump of unconsolidated travertine occurred on the face of Jigster Terrace on July 4, but the damaged portion is now undergoing natural upbuilding again.

At Norris Geyser Basin a certain amount of increased activity was noted in two of the pools of the Hurricane group. Sand-Sustained Geyser continues inactive.

At Lower Geyser Basin activities were normal.

At Upper Geyser Basin activities were normal. Old Faithful maintained an average interval between eruptions of 65 minutes throughout the season. The Geysers played twice. The several small new geysers continued active. A vent formerly marked "Indicator", near Grotto Geyser, had at least two eruptions.

At Hot Tubs activities were normal.

Information Department

Information Office: 23,322 people visited the information office at headquarters during the summer; 8,294 in June, 14,530 in July, 14,048 in August and 2,500 in September. Compare the total of 35,622 with 36,230 visitors to the information office in 1922 and 24,445 in 1921.

Lecture Service: Three lectures were delivered each evening at Mammoth by Park Ranger W. J. Gibbs, before audiences totalling approximately 76,000. During the season a lecture series was initiated at Old Faithful; about 40,000 persons attended these lectures.

Guide Service: Two guides were maintained at Mammoth, and two at Old Faithful, each man conducting two parties a day over the formations. 12,150 visitors were guided over the formation at Mammoth Hot Springs, and 29,851 over the Upper Geyser Basin formations, making a total of 41,991.

Specimens: A number of notable additions were made to the museum this season. A mount of two gray wolves, and one of a mountain sheep were presented by the permanent ranger force. The specimens were obtained and all expense borne by the rangers. A mount of a whooping crane was donated by Hal G. Swarts. Two additional museum cases were installed, one filled with mineralogical specimens and the other with three exhibits. A number of fine game skulls, pictures, and framed maps were obtained and hung.

Visiting Scientists: Special attention was paid to visiting scientists and students, and such facilities as were available, together with the personal services of the Park Naturalist and the Park Lecturer, were placed at their disposal. Professor E. B. Harvey, of the University of Minnesota, worked on the algaes of Mammoth Hot Springs, and Doctors J. C. Higgins and A. L. Day, of the Carnegie Institution made preliminary surveys for proposed work. Classes in botany and geology from the University of Chicago and Earlham College spent several weeks in the park. A regular summer university session is regarded as a good possibility; the project is being actively pushed by Professor Harvey and Park Naturalist Thoma.

Electrical Department

Electric System: The following table shows the total production of the power plant, disposition of current, revenues, etc., as compared with similar data for the fiscal year 1922. 16 new street lights.

The peak load for the year was 124 kilowatts.

	1922	1923
Total production in kilowatt hours	321,340	303,804
Sold to park utilities	51,923.4	39,542.41
Consumed by Government buildings for power, lighting streets and buildings, loss on lines, etc.	153,602.2	231,597.19
Total revenue from sale of electric current during year, at 2¢ per kWh	1,551.17	1,972.48

Telephone System: Including new lines, 283 miles of telephone lines were maintained throughout the season. New grounded lines built were: 2 miles from Lower Slough Creek Ranch to Silvertip Ranch, at park line: 4 miles from Yanceys to Hallroving Cabin: 14 miles from Soda Lake Snowshoe Cabin to Cooke City Ranger Station, at Northwest corner. A phantom circuit has been added to the existing line between Mammoth and Morris and a new metallic circuit built from Morris to Canyon. The telephone line between Gardiner and Mammoth was transferred to cedar poles of the hotel line, while cedar poles were purchased and are now being set between Mountain Station and Old Faithful.

Telegraph and Telephone Statistics

T e l e g r a m s

Government Sent	1,064	Commercial Sent	1,698
Government Received	578	Commercial Rec'd	914

Total calls on Government Switchboard..... 63,197

Mechanical Department

The mechanical department maintained 17 trucks and automobiles, a steam engine, a caterpillar engine, 1 steam roller, compressors, pumps, etc., repaired road machinery including dump wagons, graders, 3 gravel loaders, drags, road tools, fire tools, etc. It also shed between seven and eight hundred horses.

The carpenter did miscellaneous work in the quarters at Mammoth, completed a second new set of quarters in the old guardhouse at the south end of the old "Officers Row", did general repair work to quarters, built truck bodies, built toilet structures for auto camp, made sign boards, etc.

A maximum of 7 men and a minimum of 5 were employed in the shops.

Property and Transportation

Under the direction of the steward and master of transportation 1898.8 tons of material, equipment and supplies were moved from rail-road terminals to headquarters. From headquarters 11 trucks were operated through the park, supplying road camp, construction camp, etc. The total mileage of the trucks was approximately 60,000. A maximum of 15 men were engaged in the warehouse and in transportation work.

Painting Department

The Master Painter and his assistants painted most of the wooden buildings of Fort Yellowstone. The exterior walls of some of the larger buildings were painted, including the Post Chapel and Power Plant at headquarters. In the park the Lake Station and several road camp buildings were stained inside and out. Many trucks and wagons, including the sprinkler wagons, were painted and varnished. About 500 wooden signs were made and painted. All big junction and ranger station signs were repainted.

Improvements by Public Utilities and Individual Operators

Yellowstone Park Hotel Company:

Manmoth Hotel: Installed lavatories in 90 rooms in the old building; added two new bathrooms; changed buffet to location in lobby; equipped dining room with entire new silver service.

Old Faithful Inn: Completed girls' dormitory; built new girls' laundry, and store-room for trunks; third boiler installed, and put in operation in engine room; installed new pressure pump and new hotwater heater; put old Lake Lobby furniture in lobby Old Faithful Inn.

Lake Hotel: Completed new wing; installed new lobby furniture; built fireplace with handsome tile mantle in lobby; built addition to engine room and laundry; rewired and installed new electric light fixtures in 163 rooms of the old building; started new girls' dormitory.

Canyon: Repaired roof of lounge damaged by fire, entire new silver service installed in dining room.

Telephone Line: 15 miles new telephone line built from Madison Junction to West Yellowstone; moved $1\frac{1}{2}$ miles 4-wire telephone line from Mammoth Camp to hills back of Mammoth; two miles of 8 new wires strung on line from Firehole Geodesics to Madison Junction.

Yellowstone Park Game Country

Mammoth Camp: Constructed a magnificent central building, more than 500 feet long and 150 feet wide. The main floor of this building is occupied by the lobby, general offices, dining room and kitchen. The dining room and kitchen. The dining room will seat five hundred guests. Downstairs is a recreational hall with stage. Hall has a seating capacity of one thousand people, and a hard wood floor for dancing. The company also constructed and furnished forty new cottages at Mammoth.

Old Faithful Camp: Sixty new cottages constructed and furnished; Also new dormitory for employees opened.

Lake and Canyon Camps: Fifty new tent units with canvas tops constructed and furnished.

Camp Roosevelt: Twenty-five new tents added.

At all the camps installation of modern appliances and equipment continued. Near the Fishing Bridge at the Lake outlet a delicatessen tent 30 ft. x 40 ft. was constructed in the public automobile camp. This delicatessen served prepared cooked foods

such as soups, roasts, steers, hot biscuits, muffins, pies, cakes; also supplied milk.

Yellowstone Park Transportation Company:

Purchased 20 new 11 passenger cars; 3 new 25 passenger cars; 1 two-ton truck; 6 11 passenger cars and 9 touring cars from Yosemite National Park Company; two Ford roadsters for use of inspectors.

Mammoth: Completed 38 room addition to bunkhouse, including wash-sinks, shower baths, etc. completed addition to mess house.

West Yellowstone: Completed remodeling of old Yellowstone Western Stage Company buildings, including installation of plumbing, electric light system, and water.

Old Faithful: Built new 12 room bunk house.

Lake: Completed new 12 room bunkhouse, new mess-house, and new wash house.

Canyon: Completed remodeling of old transportation building for drivers' bunkhouse. Work will be started shortly on new repair shop and storage garage.

Yellowstone Park Boat Company: This company made no improvements. Its franchise expired February 6, 1923, and a one year permit was granted for this year. Its franchise should not be renewed until it financially reorganizes and obtains equipment for general boating business.

J. E. Hayes, Official Photographer: This operator conducted 10 sales establishments throughout the Yellowstone. The 42 foot addition

to the Mammoth Shop was completed before the season opened, as was the complete refinishing and remodeling of the shop at Upper Basin. A closed body automobile dark room was added to his equipment. Nearly five hundred negatives, including many wild flower studies were added to his collection; and several thousand feet of motion pictures were taken by him. The book on trees and flowers by Frank L. A. Zone, park naturalist, was published in advance of the opening of the season, as were new editions of Langford's "Discovery of Yellowstone Park-1870" and the "Rogues Guide", two printings of the latter being necessary. He is beginning the construction of a new picture shop and finishing plant at Grand Canyon, and will open a shop in Lake Hotel next year, making 12 shops in the chain.

George Whittaker, Merchant: Installed refrigerators and modern fresh meat display counters in Mammoth store; also installed flush toilets in comfort station at Canyon store.

E. A. Hamilton, Merchant: Completed furnishing of Lake store and erected small grocery store in the Old Faithful auto camp. Is now beginning construction of new wing on Old Faithful store and planning new West Thumb store.

Henry P. Anthony: Erected log residence near his bath house at Old Faithful and expects to enlarge swimming pool this autumn.

Franchises and Permits

The following is a list of corporations and individuals to whom long term franchises covering the operation of public utilities in

the park have been granted:

<u>Name</u>	<u>Nature of Business of Contract</u>	<u>Effective date</u>	<u>Date of Expiration</u>
Yellowstone Park Hotel Co.	Hotels, news stands, laundries, etc.	Jan. 1, 1923	Dec. 31, 194
Yellowstone Park Camps Co.	Permanent camps, news stands, laundries, etc.	Jan. 1, 1923	Dec. 31, "
Yellowstone Park Transportation Company	Automobile transportation line, sale of gasoline, oil, and other automobile supplies and garage service.	Jan. 1, 1923	Dec. 31, 194
J. E. Hynes	Photographs, photographic supplies, guide books, etc., also general store at Tower Falls.	Jan. 1, 1921	Dec. 31, 1928
G. A. Hamilton	General store, gasoline, oil, etc. at Upper Geyser Basin, Yellowstone Lake and West Ranch of the Lake	Jan. 1, 1923	Dec. 31, 1934
Geo. Whitaker	General store, gasoline, oil, etc. at Mammoth Hot Springs and Grand Canyon.	Jan. 1, 1923	Dec. 31, 1934
Madame Pryor & Tristram	Conic shop, ice cream and soft drinks.	Jan 1, 1917	Dec. 31, 19
Henry P. Brothers	Swimming-pool baths at Upper geyser Basin.	July 1, 1914	June 30 19

Short Term Permits: In addition to the above long term

permits the following short term permits were granted:

15 permits to conduct sweeping parties through the park using saddles and pack outfits.

4 permits to operate freight, express and mail service between Gardiner and Cooke City.

8 permits to operate moving picture cameras in the park.

1 year permit to the Yellowstone Park Boat Company.

1 two-year permit to Dr. J. M. Wolfe, to practice medicine.

Department of Justice - U. S.

Commissioner's Court

Hon. John W. Malcom, commissioner since 1904, held court whenever there were cases to be tried. During the year, 17 cases were tried by the Commissioner. There were 15 convictions and 2 acquittals. A total of \$792.00 in fines was imposed on defendants found guilty. This amount is inclusive of costs. There were 18 cases of violation of the regulations against speed, 1 case of disorderly conduct, 1 case felony, 1 violation prohibition laws (with five defendants), 1 case of petty larceny.

Post Office Department

The business of the post office shows an increase in proportion to increased travel to the park.

During the unofficial visit of First Assistant Postmaster General John H. Burlant to the park July 10 to 12, his attention was invited to the fact that we have but one post office in the park, and that there were thousands of private campers than in the park who had no

way of having their mail forwarded from one point to another while they were making the tour. He authorized the establishing of city carrier service immediately to take care of this need, and the latter part of July two routes were established, number one running daily from the post office via Harris to Canyon and Lake Outlet, returning twice a week via Snow Junction; and number two daily from the post office to Fountain and Upper Geyser Basin and return.

Department of the Interior

General Land Office: Cancelled applications for reservoir easements on Horn Mtilda and Two Ocean Lakes in the proposed extension. Cooperated in matters relating to townsite of West Yellowstone

Geological Survey: Water Resources Branch. Continued its observation and inspection of gauging stations on park streams. In new gauges installed this year.

Department of Commerce

Coast and Geodetic Survey: In cooperation with the U. S. Geological Survey and the National Park Service this bureau ran precise level lines from Livingston to the park, thence around the loop road system, thence to Cody, thence to Moran, thence to West Yellowstone and on to Idaho Falls. This, for the first time, the altitudes of park features have been accurately determined. Capt. Edward F. Horton, of the U. S. Coast and Geodetic Survey, was in charge of the Survey.

Bureau of Fisheries: In cooperation with the National Park Service broke all records for trout egg collection in the park.

collected 31,570,000 eggs; of which 4,548,000 were planted as eyed eggs and 4,847,000 as fry. Shipped to Glacier Park and elsewhere 10,305,000 eggs. Commissioner Henry O'Malley, head of the bureau, visited the park June 11-20. District Supervisor C. F. Guller personally directed fishcultural work here this year, and the splendid results are to be credited to Mr. Guller's ability, efficiency and enthusiasm.

Department of Agriculture

Wildlife Service: The work of the bureau was continued under Observer E. H. Fletcher. The office was inspected by the Secretary of Agriculture on June 30th, and by Dr. E. J. Cox, of the Chicago headquarters on July 15th.

Bureau of Animal Industry: This bureau supplied vaccine and instruments for vaccinating buffalo against hemorrhagic septicemia but fortunately they were not needed this year.

Bureau of Entomology: Detailed Dr. J. C. Brundson, Forest Entomologist, to study forest conditions. Dr. Brundson made three trips to the park and gave special attention to the spruce budworm infestation near the north boundary in the Halfpocking region.

Treasury Department

Public Health Service: Continued its cooperative work, Mr. E. H. Henson in general charge. Surveyed lines for Lake Mead System, designed system and ordered materials; also directed mosquito control work; analyzed water and milk; inspected kitchens, auto camps

and also A. F. Miller in direct charge here. Dr. J. H. Wolfe appointed acting assistant surgeon in December, 1922, and is charged with work of inspecting hotels, camps, etc., analyzing waters and milk, and general care of health of community. Assistant Surgeon General W. F. Draper was here in July.

Opening of the Park

On June 20th, 1923, the park was formally opened by appropriate ceremonies at the north entrance arch at Gardiner. Dr. John Wesley Hill, President of Lincoln Memorial University, representing President Harding and the Secretary of the Interior, Hon. Robert Work, delivered the principal address. In this speech, Dr. Hill pleaded for complete and perpetual preservation of the national parks from all forms of commercial exploitation. His address will remain for all time a powerful protective agency against destruction or modification of national park ideals.

Visit of the President of the U. S.

Enroute to Alaska, President Harding, Hon. Harding, the Secretary of the Interior, Hon. Robert Work, the Secretary of Agriculture, Hon. Henry C. Wallace, the Speaker of the House of Representatives, Hon. Frederick M. Gillett, Admiral Hugh Ransom, U.S.N., and about seventy other officials and newspaper correspondents, visited the park, spending two days here. The President's special train arrived

at Gardiner at 6 A. M., Saturday, June 30th, and left July 1st at 9 P.M.

This distinguished party covered the main loop road system in the two days at their disposal. After breakfast at Mammoth Hotel the party inspected the terraces and the elk, buffalo and wolves at the Buffalo Corral, then proceeded to Old Faithful, stopping at Norris Geyser Basin, Mammoth Point Pools and Excelsior Geyser. Luncheon was had at Old Faithful Inn and the night was spent there. During the afternoon the party saw Old Faithful, Riverside, Grotto and Grand Geysers in eruption. Leaving Old Faithful at 9 A.M. July 1st, the party crossed the Continental Divide, stopped an hour at Lake Yellowstone near the fish hatchery, where the President fed some bears, and reached Grand Canyon for luncheon. In the afternoon, both sides of the Grand Canyon were covered, and the return to Mammoth and Gardiner via Dunroan Pass completed the trip. The President saw buffalo, elk, antelope, deer and bear and any smaller animals. The weather was clear and beautiful and nothing occurred to delay the party or cur the pleasure and comfort of the trip.

Howard Eaton Trail Dedication

On the afternoon of July 19th the Howard Eaton Trail was dedicated by appropriate ceremonies held at Sheepsters Cliffs on the Gardiner River, seven miles south of Mammoth Hot Springs, where Howard Eaton made his first camp in the park each year. There were between four and five hundred people present at the ceremonies and

among them one hundred and ten members of the Brooklyn Teachers' Association. Members of the Eaton family were present. At the beginning of the ceremonies a large picture of Howard Eaton on his favorite mount was unveiled. Ceremonies attending the dedication were aided by the Shrine Patrol from Livingston and a delegation of members of the Order of Elks, Howard Eaton being a Shriner and an Elk.

At the conclusion of addresses by Col. Henry Hall, Director Stephen T. Mather, Congressman Chas. E. Winter, of Wyoming, and ten members of the Brooklyn Teachers' Association party, Dr. Alexander Lyon and Dr. Wm. Elbert, a tree was planted in the midst of Howard Eaton's camp by his brothers, Alden and Willis, assisted by Ed Hinshart, son of Mrs. Mary Roberts Hinshart. When this ceremony was over a trail party lead by Chief Ranger Woodring started on the Howard Eaton Trail. A beautiful black horse in the train was riderless, emblematical of the loss of Howard Eaton.

Gifts to the Park

Director Mather contributed \$200 for purchase of equipment for the Chapel and to aid in securing visiting clergymen for services in the Chapel. Mr. C. W. Farahan, of St. Paul, gave a first edition of Lord Dunsen's book, "The Great Divide" to the library and several fine geological specimens to the museum. Mr. Hal G. Swarts gave to the museum a very valuable mounted specimen of whooping crane. The permanent ranger force gave the museum fine mounted specimens of timber wolves and a bighorn ram.

Vital Statistics

There were 5 births and 3 deaths in the park during the year.

Medical Services

Dr. J. Hank Wolfe, conducted the medical services in the park during the year and reports that he cared for 346 cases during the year and made 349 calls.

School

School opened September 11, 1922, and closed May 18, 1923. There was an average enrollment of 19 pupils, 11 boys and 8 girls; number of classes 4; Teacher, Mrs. Laurie L. Marriott. The school was maintained by contributions of parents and park employees.

Religious Services

Services were held in the Chapel at least twice and sometimes three or four times every Sunday during the tourist season, and every second Sunday during the balance of the year. They were usually conducted by Episcopal or English Lutheran ministers from Livingston, Montana, or by Roman Catholic priests traveling through the park, but other denominations were represented occasionally, when their ministers were available.

Recommendations

1. That the park be extended to include the Teton Mountains, headwaters of the Yellowstone and other country naturally belonging to the park.
2. That all irrigation and other projects that would result in exploitation of the park be continued and killed as they are proposed.

3. That more and larger funds be provided to widen, improve the drainage, and surface improved but heavily traveled roads; also to finish the Firehole Cutoff, and build the Great Mountain Geyser Road and the Bechler River Road, and rebuild the lake shore road between Arrow Creek and Bridge Bay.
4. That funds be granted to continue sanitation work, to build a sewer system at Grand Canyon and do more extensive mosquito control work.
5. That the hospital be reconditioned and better equipped, making possible more complete and effective medical and surgical services.
6. That more funds be provided for upkeep of roads, trails, telephoning lines and other improvements; for the ranger service; for the Buffalo and other ranches; and for public camping grounds.