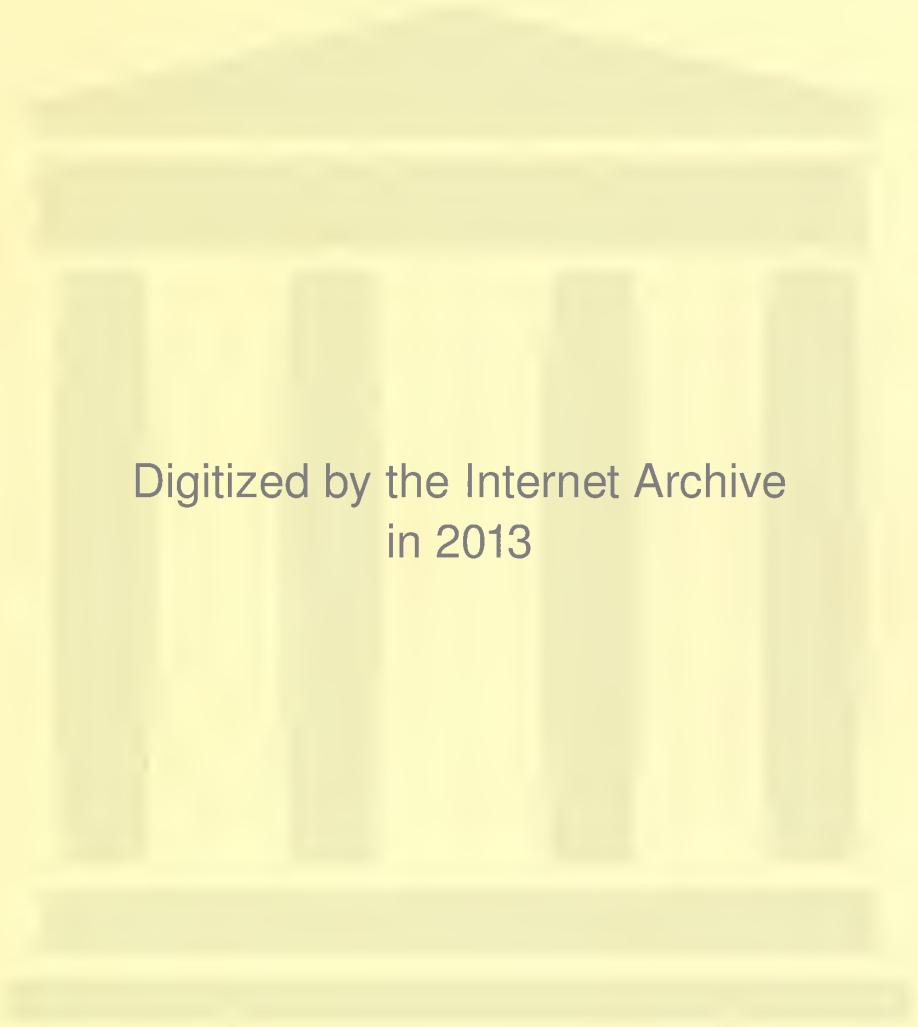
ANNUAL REPORTS
FOR
YELLOWSTONE NATIONAL PARK



ANNUAL REPORTS

FOR

YELLOWSTONE NATIONAL PARK

1920
1921
1922
1923

ANNUAL REPORT

FOR

YELLOWSTONE NATIONAL PARK

1920

Yellowstone National Park.

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 62 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. N. 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, handle 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, motorcycle 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 247 miles of telephone lines.

JURISDICTION OVER OFFENDERS.

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. Meldrum 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, 1920, 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.

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 18 and left on the 19th. While he has only filed a preliminary report on his findings, his recommendations will be that no further 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 gauging 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 gauging 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, Teton, 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 come in contact.

RAILROADS AND HIGHWAYS TO PARK BOUNDARIES.

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 pm. 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 8:00in 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 Twogwotee 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 278.8 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, 30 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 620 miles of trails in the parks, 27½ 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 79,776 an increase of 28 per cent. This great increase in numbers is more remarkable than more 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 1920 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. 2. This is to be compared with 1,255 tourists who entered on August 5, 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 381, arriving at West Yellowstone, Montana, on the Oregon Short Line, on Aug. 3. 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 122 entered the eastern gateway, carrying 430 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.	3,271
Total	79,776

Yellowstone Park Transportation Co.

Entering via the northern entrance	10,658	
Entering via the western entrance	15,395	
Entering via the eastern entrance	4,233	
		30,286

Making trips with private transportation.

With automobiles, paid and complimentary	45,732	
With automobiles, second trip	2,901	
		48,633
With motorcycles	116	
With miscellaneous facilities, including out-of-season visitors to the park	741	
		857
Grand Total		79,776

Private automobile travel.

	Automobiles.	Tourists.
Entering via the northern entrance	4,204	14,962
Entering via the western entrance	4,025	14,000
Entering via the eastern entrance	4,395	15,550
Entering via the southern entrance	874	3,223
Total	13,498	48,635

Motor cycle travel.

	Motor cycles.	Tourists.
Entering via the northern entrance	26	36
Entering via the western entrance	31	44
Entering via the eastern entrance	22	35
Entering via the southern entrance	1	1
Total	80	116

Private automobile travel.

	Auto-mobiles	Tourists
Entering via the northern entrance	4,309	14,961
Entering via the western entrance	4,015	14,570
Entering via the eastern entrance	4,400	15,530
Entering via the southern entrance	778	3,272
Total	13,502	48,333

Motor cycle travel.

	Motor cycles	Tourists
Entering via the northern entrance	27	36
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 transportation.			
1920				
North	4,236	15,454	10,658	28,112
West	4,045	15,105	15,395	30,505
East	4,424	15,635	4,233	19,868
South	881	3,224	.....	5,894
Total	13,586	49,491	30,286	79,777 *
1919				
North	3,498	13,433	9,353	22,786
West	3,792	14,661	8,897	23,558
East	2,860	10,430	3, 025	13,455
South	625	2,462	.....	2,462
Total	10,773	40,986	21,275	62,261 #

* Includes 84 motor cycles, carrying 116 passengers.
# Includes 56 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 Visito
	Cars.	Visitors		
1920				
North	4,230	15,455	10,658	26,11
West	4,056	15,126	15,395	30,52
East	4,417	15,656	4, 233	19,87
South	875	3,271	.....	3,27
Total	13,578	49,490	30,286	79,77
1919.				
North	3,498	13,453	9,353	22,78
West	3,792	14,661	8,897	23,55
East	2,860	10,430	3,025	13,45
South	623	2,462	-----	2,46
Total	10,773	40,996	21,275	62,26

Includes 30 motorcycles and 116 tourists.
* Includes 36 motorcycles and 56 tourists.

Name of State:	North		West		East		South		Total	
	Cars	Passengers	Cars	Passengers	Cars	Passengers	Cars	Passengers	Cars	Passengers
Alabama	2	5			2	4			4	9
Arkansas	3	11	4	20	13	44			20	75
Arizona	5	15	22	62	10	32	2	12	39	121
Colorado	45	147	94	299	335	1117	12	43	486	1606
California	179	503	291	893	73	235	21	67	564	1698
Connecticut	9	25	1	4	1	2			11	31
Delaware	1	3	1	3	1	4			3	10
Florida	8	21	5	13	16	44	1	3	30	81
Georgia	1	3	1	3	2	6			4	12
Illinois	111	351	30	94	177	590	4	11	322	1046
Indiana	46	164	12	36	74	248			132	448
Iowa	133	453	40	141	227	805	5	20	405	1419
Idaho	68	242	1220	4642	50	190	281	1143	1619	6217
Kansas	35	126	62	205	224	772	15	53	336	1156
Kentucky	2	4	3	12	8	31	1	3	14	50
Louisiana	1	4	3	13	7	89			11	46
Montana	1829	6179	658	2705	374	1368	14	50	2675	10302
Maryland	3	9			4	12			7	21
Massachusetts	14	39	2	8	19	64			35	111
Maine	1	4			4	14			5	18
Michigan	76	226	15	58	135	436	2	7	228	727
Mississippi					6	19	1	5	7	24
Missouri	46	157	37	125	169	597	4	14	256	893
Minnesota	206	754	15	55	96	351			317	1160
New York	42	136	12	41	67	222			121	399
New Mexico	3	8	8	30	14	50			25	88
New Jersey	7	20	3	10	15	46			25	76
New Hampshire	2	8			1	6			3	14
Nevada	1	2	25	78	4	15	3	10	33	105
Nebraska	89	307	60	211	414	1445	13	37	576	2000
North Carolina	1	6	1	2					2	8
North Dakota	173	677	8	32	55	215	1	2	237	926
Oklahoma	30	105	49	196	190	707	8	34	277	1042
Ohio	54	147	23	53	127	365	3	9	207	574
Oregon	74	238	108	374	18	59	7	17	207	688
Pennsylvania	20	74	8	27	52	167			80	268
Rhode Island	1	3							1	3
South Carolina	1	3	1	3	2	7			4	13
South Dakota	131	475	8	38	85	305			224	818
Texas	15	50	54	184	170	593	10	35	249	862
Tennessee	4	12	1	5	5	15	1	2	11	34

Name of State	North		West		East		South		Total	
	Cars	Pass-engers	Cars	Pass-engers	Cars	Pass-engers	Cars	Pass-engers	Cars	Pass-engers
Utah	15	48	667	2563	11	36	136	536	829	3183
Virginia......	8	27	1	2	5	18	......	......	14	47
Vermont	1	4	......	......	1	3	......	......	2	7
Washington ..	320	1067	189	606	55	211	5	17	569	1901
Wisconsin	136	443	13	42	64	207	1	3	214	695
Wyoming	83	317	32	105	914	3506	95	345	1124	4273
West Virginia	10	41	1	5	8	27	......	......	19	73
Dist. Columbia	4	9	1	5	5	16	2	9	12	39
Canada	44	163	6	33	6	21	1	4	57	221
Hawaii	1	2	2	6	......	......	......	......	3	8
Mexico	......	......	1	7	......	......	......	......	1	7
Total	3899	13837	3793	14029	4315	15866	649	2401	12661	45683

Complimentary cars, unclassified by States .... 35 :......
Motorists entering in complimentary cars, unclassified by States. ......: 79
Cars and motorists entering, second trip, unclassified by States. 806 : 2901

Grand total, all cars and motorists, classified and unclassified........................13502 :48,663

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, 48,603 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 camps 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	50,162	18,775	68,937
Geysers Camp	65,705	19,320	85,025
Canyon Camp	66,904	21,054	87,958
Lake	34,589	16,070	50,659
Camp Roosevelt (Lower Falls)	7,933	2,658	1,0591
Totals	225,293	77,877	303,170

YELLOWSTONE PARK CAMPS COMPANY
Livingston, Mont.

Report of Meals and Lodgings 0 1920 Season.

YELLOWSTONE PARK CAMPS COMPANY.

- - - - - - - - - - - -

M E A L S

	MAMMOTH	OLD FAITHFUL	LAKE	CANYON	ROOSEVELT
Guests	50,162	65,705	34,589	66,904	7,933
Employees	25,395	23,726	20,261	25,718	8,115
Totals	75,557	89,431	54,850	92,622	16,048

LODGINGS

Guests only 18,775	19,320	16,070	21,054	2,658

Total meals to guests - - - - - - - - - - - - - - - 225,293

Total meals to guests - - - - - - - - -	225,293
Total meals to employees - - - - - - - - -	103,215
Total - - - - - - - - - - - -	328,508
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.

HPB-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 Lower Falls. The latter, however, was not one of the regular stopping points for railroad 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 intense 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 remodelling 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, 3½-5 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 assessment 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 entr[illegible] way; of the Oregon

Short Line Railroad at the West Yellowstone, Montana, gateway; and of the Burlington Railway at Cody, Wyoming, 55 miles east of the eastern gateway, June 20th to September 20th, inclusive. This company had in operation 120 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 30,236 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 2,500 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 149.4 to 302.7 miles, averaging 211.9 miles. The standard rate for any of these trips is $25.00, 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 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 schedules. 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 a.m. 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

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 135 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
Aproved June 10,1920. Yellowstone National Park

Time table No. 1
Gardiner to Mammoth

Gear	M.P.H.	Miles	STATIONS	Stops	Time 1st Car Arrives	Your Car Arrives	Your Car Did Arrive
2	lo	.0	Gardiner, Mont.		11.35 am		
3	15	0.1	Entrance Arch		11.36 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, P.F.				
3	10	4.7	Change to 3rd Gear		11.56 am		
	10	4.9	Mammoth Hotel		11.57 am		
		5.4	" Camp		12.00 m		

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 fillin station near Whittaker's general store at Canyon Junction has just been begun.

MISCELLANEOUS SERVICE.

Mr. J. E. Haynes, official photographer, maintained picture shops at his headquarters at Mammoth Hot Springs, Old Faithful, and Lower Falls. He also sold his photographic wares from stand 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, andalso 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. C. 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 5½ 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.

Mesdames 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 inquirers 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 inquirers, 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 Glimpses 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 776 sets were given out free. The August bulletin is quoted belo

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 Wasson 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 20.

THE SNOWPLOW.

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 Dunraven Pass.

All of the main loop roads were ready for traffic on June 20, the first day of the season, except the Dunraven Pass road. This, however, was opened on June 28, 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 25. 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 Belt Line:— To care for this loop system and its crossroad from Norris Junction to Canyon Junction, sprinkling and maintenance (section) crews were stationed at Mammoth Hot Springs, Beaver Lake, Gibbon Meadows, Madison Junction, Excelsior 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 Arnica 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 effecti 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. Likewis 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, 1½ miles of road

were widened, one 18-inch C. I. culvert and one 24-inch C. 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 gravelling 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 complete 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 8 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 Lower Junction-Mammoth road from about August 1 to September 12. This crew furnished the Geode Creek fill and placed a 2-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-Norris 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 Norris.

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, scarrifier and gas roller, tore up, reshaped, and rolled 5½ 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 Pahaska. 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 $3,000, a log crib was built to protect the big Elk Fork Bridge. The crib was built of logs, with log floor and rock fill. It is 200 feet long, 5 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 Lower 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 Lamar 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 Baronett Bridge, and the Lamar 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, 5½ mil

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 Lamar 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 324½. 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 324½ 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.

Name of Trail	Length in miles	Miles built 1920	Miles cleared out and repaired, 192
Sportsman Lake	20		20
*Sepulchre Mountain	7		7
Fawn Pass	24		24
*Snow Pass	5		5
Riverside	26		26
*Crystal Spring	2		2

Name of Trail	Length in miles	Miles built 1928	Miles cleared out and repaired, 192
*Lake of the Woods	8		8
*Mesa 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	3½	3½	
*Norris Pass	1½		1½
*Sheridan	14		14
*Shoshone	15		15
West boundary	60		60
Snake-Beckler Trail	22		22
*South Boundary	53		53
*Upper Yellowstone	35		35
*Jones Pass	17	17	
*Canyon-Lake	14		14
*Lamar	48		48
*Crebo Lake	9		4
*Storm Peak	21		21
*Washburn	20		20
*Mt. Washburn	7		
Specimen Ridge	12		

Name of Trail	Length in Miles	Miles built 1920	Miles cleared out and repaired, 192
Amethyst Mt.	7		
*Fossil Forest	1		
Crystal Creek	1		
*Turkeypen	7		
*Knowles	8		
Hellroaring	15		15
Crevice	5		
Hellroaring-Lemar	12		12
*Slough Creek	12		
*Steamboat Point	7		7
*Frost Lake	7	7	
*Heart Lake	8		8
*Lake Shore	11		11
*Lower Falls	½		
*Uncle Tom	½		
*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 camps 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 bath room 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.

[illegible] 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 Harebell 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 o

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 Sylvia 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 3/4-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 Sylvia 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 camps 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 2½-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, 1,800 feet long, to the camps company's Old Faithful Camp. The camps 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 300 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-Norris line consisted of two grounded circuits on the same poles, splitting at Norris 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 Norris, 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-Norris 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 Dunraven 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 Norris 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 Lower Falls Station was practically rebuilt.

Immmerable small electric storms throughout the park during July and August caused many cases of slight damage to 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 45½-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 Lamar 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 Lamar 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 252 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 $1.57 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 milepost signs were placed between Lake Junction and Canyon Junction, between Canyon Junction and Lower Falls Junction, and between Lower 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 167 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 167 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 employee 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 elk herd of tame buffalo.

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 148,260 kilowatt hours, which was disposed of as follows:

Electric current sold..... 18,184 kilowatt
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 $6,189.67. 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 18,184 kilowatt hours sold bringing in a revenue of $909.20.

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 Bechler 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 SOUTHERN RIVER REGI

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 erected.

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 Bechler River Ranger Station in the southwest corner. I spent two days examining the basins of Falls River, Mountain Ash Creek, Bechler River, and Boundary Creek, as well as reservoir sites south of the park. After completing this work a trip was made up the Bechler 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 6,512,000, of which 5,682,400 were collected from Yellowstone Lake and tributaries, and 829,600 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, 1,951,300 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 . . . . . (The Leadville Hatchery furnished part of the men engaged in making the collection in the park.)	1,000,000
Given to Department of Naval Service, Canada, in exchange for salmon eggs	200,000
Sent to Glacier Park Hatchery	243,000
Sent to Bozeman Hatchery and distributed from there.	2,417,000
Planted in Yellowstone Park	1,951,300
Total	5,811,300

From these statistics, it is evident that of 6,512,00 fish eggs collected in the park, but 5,811,300 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 2 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 1920 SEASON.

DATE	WATERS	NUMBER
	Eastern Brook Trout.	
June 9	Glen Creek	10,000
....	Obsidian Creek	10,000
July 17 ...	Gibbon River, at Virginia Meadows	8,000
Aug. 21 ...	Nez Perce Creek, in Lower Geyser Basin	5,000
	Upper Firehole River near Lone Star Geyser.	5,000
		38,000.
	Rainbow Trout.	
Aug. 27 ...	Gibbon River, in Gibbon Meadows	40,000.
	Black Spotted Trout.	
Aug. ...	*Bear Creek, invicinity of East Road.....	4,000
	Cub Creek, in vicinity of East Road.....	3,000
	Tributary to Sylvan Lake (East of Lake)..	6,000
	Lake Eleanor	4,500
	Middle Creek, three-mile post to ranger S.	30,000
	Crow Creek, near park boundary	5,000
	Delacy 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
	Lister Creek, in vicinity of 12-mile post, West Thumb	20,000
	Tributary streams of Lewis River, near 9-mile post, West Thumb	30,000
	*Crawfish Creek, west of road & above falls	12,000
	*Beula Lake	7,000
	*Falls River, near forks, vicinity Beula 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	30,000
	*Falls River, in vicinity of 2-mile post west (Calfee 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	20,000
	# Tributary to Falls R., near Bechler River	7,000
	# Boundary Creek, about 2½ 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	50,400
	Lamar River, above Buffalo Farm	50,000
	Soda Butte Creek, near northeast entrance	87,000
	# Cache Creek	63,000
	# Buffalo Creek, near park line	63,000
Sept.2....	# Tower Creek	76,000
3....	# Hellroaring 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	5,000
	Pelican Creek	42,000
	Hatchery Creek	15,000
	One-Mile Creek	10,000
	Hatchery Creek	25,000
	Flat Mountain Arm	60,000
	Clear Creek	46,200
	Chipmunk-Grouse	72,000
Sept.	Columbine Creek	150,000
	Cub Creek	180,000
	Clear Creek	100,000
	Thumb	110,000
		1,951,300

*Waters previously barren.
#Fish had to be planted with pack 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 503,200 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 875,200 planted by the U. S. Bureau of Fisheries in the small streams around the Lake, and one lot of 84,700 planted in the very headwaters of Bechler River on September 13. This lot was handled from Lone Star Geyser to destination with a pack train furnished by Mr. Wm. C. 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 25, 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 Lamar 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 rewarded 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 lackinaw 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

22d-23rd when from fifteen to twenty-eight inches of snow fell 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, 192[illegible]. 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 storm 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 ranges, there has been 830 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. 24, 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 herd.-- 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 snows 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--Lane herd.--One calf was born in October after the date of my last report. This herd became uneasy even before the first big storms 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, 385 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 225 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 graze. 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. Norris, and 450 tons of hay were put up for the coming winter at the Buffalo Farm and 325 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 42 more calves have appeared and the tame herd now totals 442 animals.

On June 13th, 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 anoth 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 Farm and entered without any apparent fear. He was thin but still seemed a healthy specimen. The buffalo keeper took him to the Farm and fed him milk, bread, etc., but the sheep finally died.

Seven sheep were seen near Lower 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 mammal.

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 irrigati 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 abutting 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 crop 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 32,967 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 37,192. Beginning April 5, 1916, a careful count showed 29,544 animals in the herd, and 1,958 were known to have been killed during the hunting season and shipped out alive to new ranges and city parks, thus accounting for 31,502. 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 212 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 22 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 5,500 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,[illegible] 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 disasterous winter which our wild animals have ever had to face, our rangers estimated the survivers 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 293 tons of hay available for feeding them, in addition to that provided for buffalo and the domestic stock. On October 22d 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 passable. 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 870 tons of alfalfa hay were purchased, at $25. 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 $30,038.39, 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 $4,703, 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	353.00
Mr. William C. Greeg, Hackensack, New Jersey	2000.00
Mr. H. M. Blackmer, Midwest Refining Co., Denver, Colo.	500.00
Hon. Stephen T. Mather, Director, National Park Service	350.00
	$ 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 $25. 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 3,500 elk. This hay cost a total of $61,209.23 of which $4,705 was donated as above, and the balance of $56,506.23 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 wit 1429 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 effecting the welfare of the buffalo and other animals, and particularly emphasizes the mildness 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.

	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	Average for Winter
Lowest Temperature									
1918-1919 (Mild)	17	-5	-20	-5	-2	-6	15	17	
1919-1920 (Cold)	-6	-19	* -31	-11	-8	*-25	*-3	24	
Average Temperature									
1918-1919 (Mild)	44	27	21	22	19	29	39	47	31
1919-1920 (Cold)	*30	23	15	23	21	24	31	45	26.2
Normal Temperature (33 years)	42	29	22	18	20	26	37	47	30
Total Precipitation									
1918-1919	2.27	0.66	0.39	0.88	1.64	1.00	1.41	1.29	1.1
1919-1920	2.69	0.80	2.15	0.28	1.02	1.95	1.33	2.84	1.6
Normal Precipitation (33 years)	1.14	1.44	1.82	2.24	1.84	2.18	1.80	1.91	1.7
Total Snowfall									
1918-1919	5.0	5.9	3.7	10.0	18.2	9.8	7.8	3.7	8.2
1919-1920	*26.6	6.4	27.7	* 2.9	12.3	20.0	4.8	3.2	12.7

*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)	June	July	Aug.	Average
Average Temperature (Warm)	59	65	61	61.67
Normal Temperature (33 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 293 went to Canada. It has been estimated that about 8,000 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 dail 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 Corwin 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 caring 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 band 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 Game Reserve 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 24th. 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 uncoaled 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 Laws permitted unreasonable slaughter by naming 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, 1,420 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 Platt National Park, Sulphur, Okla.,express..	3
"	13	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.	2	To Sonora Experiment Station of Texas	5
Feb.	14	To City of Allentown, Pa.	3
March	2	To Jasper Park, Canada	98
"	28	To Sonora Experiment Station, Texas	2
"	3	To San Antonio, Texas.....	2
April	10	To New Mexico	50
			449

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

Winter	1911-1912	137
"	1912-1913	538
"	1913-1914	99
"	1914-1915	375
"	1915-1916	618
"	1916-1917	496
"	1917-1918	145
"	1918-1919	101
"	1919-1920	449
		2,958

Depredations by elk.--No 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 Montana 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 northwest 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 snows 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 no 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 Laws 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 difficult

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 range 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 Bechler 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 quick 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 Lower Falls, five miles from Mammoth. At this point, it was a common occurence 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 Lower Falls and the other open, low-lying parts of the Park. The little cottontail 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 pine 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, wolverines, 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, jumping mice, 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 21st to hunting and trapping the carnivora, 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 Lower 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 li e, 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 that 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 scare 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, 1919, 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 amusement 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 as 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 sapsuckers, 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 tanagers, tree and cliff swallows, yellow and Audubon warblers, dippers or water ousels, mountain chickadees, townsend 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 pairof 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 shrewd 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 bird. 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 features of the park. Whether it was the songsters of June and July, the nesting osprey at the Canyon, the wonderfully tame herons 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-lore.

ELK.

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 met 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 Lower 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 Lower 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 Volcano by July 6. Fireweed began to bloom about July 20, and soon the park was filled with its flaming, bright-hued 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.

Fringed 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 camass 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 medley of many blossoms. This was due, no doubt, to a late spring, well-distributed rains, and plenty of warm sunshine.

GEYSERS, HOT SPRINGS, AND MINERAL DEPOSITS.

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 algous matter in the Hymen Terrace.

At Norris, the Constant has practically discontinued operations, and its activity has been transferred to the Whirligi Geyser directly across the footpath. The Monarch and the Bathtub have not played at all. The Black Growler 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 63 minutes in July, and a little less than 64 minutes in August. The Daisy Geyser played at an average interval of 76 minutes in October, 1919, when its close similarity to Old Faithful was notable, 96 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 of which I have any record. 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 Sawmill Geysers. The Castle Geyser has been very irregular and disappointing. After a quiescent period extending over several years, the Lioness and the two Cubs 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 motor-cycle 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 6,388 acres, and the total cost of fighting fires was $29,943.05.

FUEL.

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	20	cords.
" " " " " green "	80	"
Cut by Yellowstone Park Camps Company, standing and down dead timber	275	"
Cut by Camps Company, green timber	35	"
Cut by Hotel Company, green timber	1550	"
Total for firewood	1959	"

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. Baldrum, during the period from October 15, 1919, 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. 28	Bert Gant	Hunting wild animals	Fined $25 *
	Robt. Gant	" " "	Discharged
	R. J. Bush	" " "	Fined $25 *
Oct. 31	P. G. Gilkerson	Shooting a gun	Fined $50 *
Nov. 10	R. 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
1920			
June 30	A. C. Green	Defacing formation	Fined $10 *
	D. R. McLendon	" "	(
	W. C. Terry	" "	(
June 30	A. B. Strode	Violating fishing regulations	Fined $ 5 *
July 2	N. R. Laferty	Speeding	Fined $20 *
July 2	G. L. Meyers	Defacing formation	Fined $20 *
July 7	C. 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 Dreher	Defacing formation	Fined $25 *
July 21	C. A. Garrett	Violation traffic rules	Fined $25 *
	J. R. Mack	" " "	Fined *
July 24	J. C. Lamer	Defacing formation	Fined $10 *
	E. Douglas	" "	Fined $10
July 27	G. R. Smith	Defacing formation	Fined $10 *
July 28	E. R. Eldridge	Violating fishing regulations	Fined $10 *
July 29	R. F. Keller	Defacing formation	Fined $25 *
July 30	L. L. Paisley	Speeding	Fined $25 *
July 31	J. M. Smart	Leaving camp fire burning	Fined $25 *
July 30	T. C. 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. Naughton	Leaving camp fire burning	Fined $10	*
Aug. 3	Arthur Hamden	Defacing formation	Fined $10	*
Aug. 5	Harold Whitaker	Disorderly conduct	Fined $10	*
	Sam Moore	" "	Fined $10	*
	George Manger	" "	Fined $10	*
	Frank Zotti	" "	Fined $10	*
	Lucian Touchstone	" "	Fined $10	*
	Tom Schlichde	" "	Fined $10	*
Aug. 6	George Merringfield	Speeding	Fined $25	*
Aug. 7	H. Keith	Defacing formation	Fined $20	*
Aug. 7	H. L. Howell	" "	Fined $ 5	*
Aug. 9	J. Martin	Speeding	Fined $25	*
	C. Huych	"	Fined $25	*
Aug. 9	H. H. Kasai	Defacing formation	Reprimanded	
Aug. 9	Oliver Kimball4	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 $20	*
Aug. 11	E. W. Lambert	"	Fined $20	*
Aug. 12	M. F. Smith	Defacing formation	Fined $10	*
Aug. 13	C. T. Dutton	" "	Fined $25	*
Aug. 13	F. G. Smith	Leaving camp fire burning	Fined $10	*
Aug. 16	George Brown	Defacing formation	Fined $10	*
Aug. 16	M. F. Cleary	" "	(Fined $65	*
	W. O'Malley	" "	(Fined	

Date of Trial	United States vs.	Charged with	Action Taken	
Aug. 17	R. Linquist	Defacing formation	Fined $ 1	*
Aug. 20	H. Taylor	" "	Fined $10	*
Aug. 16	H. H. Byrd	Speeding	Fined $20	*
Aug. 18	E. L. Beveridge	"	Fined $25	*
Aug. 21	C. I. Ross	Leaving camp fire burning	Fined $10	*
Aug. 23	C. M. Benton	Speeding	Fined $25	*
Aug. 31	N. Slater	"	Reprimanded	
Aug. 24	H. S. Erickson	Defacing formation	Fined $10	*
Aug. 25	J. A. Smith	" "	Fined $20	*
Aug. 27	A. LaBolle	" "	Fined $ 1	*
Aug. 28	R. H. Mateon H. Huntoon L. Wallis	Obnoxious conduct " " " "	(Fined $75 ((	*
Sept. 9	C. A. Hamilton Ernest Witherson Joe Sious Adolph Peters	Cutting green timber " " " " " " " " "	(Acquitted (on' cond (dismissed.	
Sept. 3	W. L. Clove C. C. Clove	Speeding "	Fined $10 Fined $10	* *
Sept. 9	William Laplin	Petty Larceny	Fined $100	**
Sept. 9	Fred Anholt Mark Horchert	Cutting knotted trees " " "	Fined $5 Fined $5	* *
Sept. 13	J. I. Miller	Speeding	Fined $25	*
Sept. 14	Elias Mauja	"	Fined $25	*
Sept. 20	C. A. Hamilton	"	Fined $25	*

*Costs were assessed in addition to fine.
**Rifles forfeited to the United States.

In addition to the foregoing arrests, there were four arrests for defacing formations, 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.

	Nature of Business:	Effective date of Contract:	Date of Expiration:
Yellowstone Park Hotel Co.	Hotels, news-stands, laundries, etc.	3-21-17	3-21-37
Yellowstone Park Camps Co.	Permanent camps, news-stands, laundries, etc.	3-26-17	1-1-37
Yellowstone Park Transportation Co.	Automobile transportation line, sale of gasoline, oil and other automobile supplies and garage service.	3-21-17	3-21-37
Yellowstone Park Boat Co.	Power boats, rowboats, and other transportation on Lake Yellowstone	(2- 7-13 (5-19-14	2-7-33 2-7-23
J. E. Haynes	Photographs, photographic supplies, guide books, etc.	1- 1-17	12-31-27
C. A. Hamilton	General store, gasoline, oil, etc., at Upper Geyser Basin. and General store, gasoline, oil, etc., at Outlet of Lake Yellowstone	1- 1-19 1- 1-20	12-31-28 12-31-28
George Whittaker	General store, gasoline, oil, etc., at Mammoth Hot. Springs. General store, gasoline, oil, etc., at Grand Canyon.	3-13-13 4-20-18	3-13-23 3-13-23
Desdemona Pryor and Griesbaum	Curio 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. McKay	Construction of metal surfaced road connecting Gardiner and Cook City.	1-29-20	1-29-40
Howard Eaton, Wolf, Wyo.	Conducting camping parties through the park, using saddle and pack outfits.	1-1-20	12-31-20

	Nature of Business:	Effective date of contract:	Date of Expiration:
Howard Eaton, Wolf, Wyo.	Conducting camping parties through the park, using saddle and pack outfits.	1-1-20	12-31-20
Simon Snyder, Ishawooa, Wyo.	do		
I. N. Larom, Valley, Wyo.	do	1-1-20	12-31-20
Moore, Ft. Washakie, Wyo.	do	1-1-20	12-31-20
Dresson C. Ramsey, Cody, Wyo.	do	1-1-20	12-31-20
H. C. Marvin, Cody, Wyo.	do	1-1-20	12-31-20
W. H. Jordan, Cody, Wyo.	do	1-1-20	12-31-20
Joe Jones, Cody, Wyo.	do	1-1-20	12-31-20
N. W. Frost, Cody, Wyo.	do	1-1-20	12-31-20
Earl F. Crouch, Wapiti, Wyo.	do	1-1-20	12-31-20
Steve Elkins, Gardiner, Mont.	do	1-1-20	12-31-20
Bowden, Red Lodge, Mont.	do	1-1-20	12-31-20
Nels A. Soderholm, Cooke, Mont.	Hauling own employees, supplies, freight, and Government officials and employees from Gardiner, Mont., to Cooke, Mont., using one 2-ton truck, numbered 1.	1-1-20	12-31-20
Frank Lind, Gardiner, Mont.	Hauling U. S. mail between Gardiner and Cooke, using 1-3/4-ton truck.(Also hadel express).	1-1-20	12-31-20

W. D. Marlow, Livingston, Mont.	Hauling freight (ore and supplies) between Cardiner and Cooke, using eight 5-ton trucks operated on special schedule.	1-1-20	12-31-20
Yellowstone-Western State Col, St. Paul, Minn. - Yellowstone, Mont.	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 truck to remove it from the park.	1-1-20	12-31-20
Dr. W. A. Cracbuck, Yellowstone Park, Wyoming.	Practice medicine and surgery, and to sell drugs and druggists' sundries in Yellowstone National Park.	7-31-20	7-31-21

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

January, 1920 -	F. L. Hiscock, of Cody, Wyo., for the Fox Film Corporation, of New York City.
Jan. and Sept.-	A. C. Lucier, of Powell, Wyo., for the International Film Service, New York City.
Jan., Feb., & July -	Jesse C. Gill, of Portland, Oregon, for the Adventure Scenic 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. Murrud, of Sunset-Murrud Pictorial Company, of California.
August -	L. M. Lewis, of Minneapolis, Minn.
Aug. & Sept. -	Norman McClintock, of Pittsburgh, Pa.
August -	Norval 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 26 by way of the northern entrance, having motored from Helena, Montana, with U. S. Senator T. 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 Lone 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 18th.

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 29 at the Lake Hotel.

Governor S. V. Stewart of Montana visited the park July 26 to 29th with Secretaries Payne and Daniels.

Governor John J. Cornwell of West Virginia was here from July 26 to 30th, inclusive, accompanied by Ex-Governor Henry D. Hatfield on the same State.

Governor L. B. 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 26. The following members of the Committee were in the party:

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

Accompanying the party were Hon. W. J. Sinnott, Chairman of the Public Lands Committee, Mr. J. B. Beadle of the Reclamation Service; and Mr. A. R. 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

Norris Basin, where they remained over night. On July 20 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 21 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. A. Henderson of Nevada;
U. S. Senator, Miles Poindexter of Washington;
Hon. C. F. Hicks of New York;
Hon. Hatton Sumners of Texas;
Hon. Carl C. Riddick 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, L. E. Adams, and General Passenger Agent, A. L. Craig, and Passenger Traffic Manager, W. H. Basinger of the Union Pacific System; General Passenger Agent, D. S. Spencer of the Oregon Short Line.

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

Vice President C. J. 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 25 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 Holt's, of Cody, Wyoming; Scott Leavitt, of Great Falls, Montana; and H. M. Burbens, 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 8.

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 motored 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. Evarts, 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. Herbert 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 Shrine, 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 Associati 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. Coates 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 20, 1920. Residents of the park attended the wedding.

Deaths:— On April 21 Forest Ranger W. P. Johns, while returning from one of his patrols through the park and about 1½ 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 1½ 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 concusions. 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 jumpe from the car and landed against a stump.

On July 4, Dr. J. N. 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. Pelpin, 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 swayed 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 Rosary 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, 1½ 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 [illegible]. Crawford, 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 Emigrant, 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 Blaere, 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 pictures 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 tremendously 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. New trails should be built, particularly for the purpose 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.