

ANNUAL REPORTS
FOR
YELLOWSTONE NATIONAL PARK

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ANNUAL REPORT

1916

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GENERAL STATEMENT

The Yellowstone National Park, set aside by act of March 1, 1872 (secs. 2474 and 2475, R. S.; 17 Stat., 37), is located in the States of Wyoming, Montana, and Idaho. It has an area of about 2,142,720 acres and an average altitude of about 8,000 feet.

The military force available for duty in the park consists of a detachment of 200 soldiers of the Cavalry Arm of the service, trained in the different Cavalry regiments and detached therefrom for this special service.

The headquarters is located at Fort Yellowstone, but the command also garrisons 15 soldier stations scattered throughout the park, requiring 120 men during the tourist season and 75 during the remainder of the year.

A telephone system connects the soldier stations and the post.

In addition to the military force which is maintained by the War Department, the Interior Department furnishes certain civilian employees, namely, a clerk, scouts, a buffalo keeper, etc.

The officers and men of the military command, and the civilian employees, performed their duties in a most satisfactory manner.

TRAVEL

A severe winter with deep snow was followed by a late spring featured by a gale which continued for five days, doing great damage to the telephone system and closing the roads with uprooted trees. The men of the command repaired the telephone lines and made the roads passable for all kinds of travel.

Though there were many obstacles to overcome, such as deep snows and washouts, the belt line and the north and west approaches were opened on schedule time. The Cody-Sylvan Pass-Lake Road was opened to wagons on June 27, and to automobiles on June 29. The Cody-Sylvan Pass Motor Co. began operations on July 1, as advertised.

The first vehicle came in from the south on June 26.

The Gittenden Road, from the Canyon to Tower Falls, presented the greatest difficulties, as the snow, from 4 to 30 feet in depth, was packed solid for some 6 miles in Dunraven Pass and its approaches. This road was open to wagons on July 2, and to automobiles on July 6.

The aggregate number of persons making park trips during the season of 1916 was as follows:

TRAVEL DURING THE SEASON OF 1916

Entering via the northern entrance with the Yellowstone Park Transportation Co-----	3,853	
Entering via the western entrance with Yellowstone-Western Stage Co-----	3,657	
Entering via eastern entrance with Cody-Sylvan Pass Motor Co	1,293	
Wylie Permanent Camping Co.:		
Entering via northern entrance-----	2,155	
Entering via western entrance-----	<u>2,879</u>	5,034
Shaw & Powell Camping Co.:		
Entering via northern entrance-----	1,361	
Entering via western entrance-----	<u>369</u>	1,730
Old Faithful Camping Co. (Hefferlin Camps):		
Entering via northern entrance-----	333	
Entering via western entrance-----	<u>53</u>	386
With other licensees of personally conducted camping parties--		288
Making park trips with private transportation:		
With automobiles, trip tickets-----	12,926	
With automobiles, season tickets-----	<u>2,004</u>	14,930

With other private transportation, as "private camping parties"----- 2,325

Miscellaneous short trips----- 280
 Winter trips--special excursions to view game----- 2,073

Grand total----- 35,849

The Yellowstone Park Hotel Co. reports that 7,876 people were accommodated at the hotels in the park during the season of 1916, of which 3,862 entered at the northern entrance, 3,653 at the western entrance, and 361 at the eastern entrance.

The Yellowstone Park Boat Co. reports that 2,558 people took the boat trip across Yellowstone Lake during the season, of which 1,237 were traveling with Yellowstone Park Transportation Co., 1021 with Yellowstone-Southern Stage Co., 247 with Wylie Camping Co., and 53 with Shaw & Powell Camping Co.

TRAVEL BY THE DIFFERENT ENTRANCES

From the north, via Gardiner, Mont----- 17,589
 From the west, via Yellowstone, Mont----- 13,261
 From the east, via Cody, Wyo----- 4,593
 From the south, via Jackson, Wyo----- 395
 From the northeast, via Cooke, Mont----- 11

Total----- 35,849

AUTOMOBILE TRAVEL

	Automo- biles	Tourists
Entering via the northern entrance.....	1,264	4,125
Entering via the western entrance.....	1,291	5,234
Entering via the eastern entrance.....	754	2,754
Entering via the southern entrance.....	31	113
Total automobile travel on trip tickets.....	3,340	12,926
Automobile travel, season tickets.....	105	2,004
Total automobile travel on paid tickets.....	3,445	14,930
Entering with Cody-Sylvan Pass Motor Co-----		1,253
Grand total of parties entering with automobiles.....		16,223

The automobile travel is included in the aggregate number of tourists making park trips as shown on the preceding page.

Attention is invited to the fact that parties traveling in automobiles are not included in the reports of numbers accommodated during the season at hotels and permanent camps.

During the year 1916, 202 personally conducted camping permits were issued as follows:

Entering at northern entrance	83
Entering at both northern and western entrances	37
Entering at western entrance	4
Entering at eastern entrance	68
Entering at southern entrance	10

The travel by way of Tower Falls by regular tourists returning to Mammoth Hot Springs from Grand Canyon was encouraged by some of the transportation companies, the Yellowstone-Western Stage Co. alone transporting over this scenic route 698 tourists. Most of those touring the park in automobiles took the Mount Washburn route and were most enthusiastic over the scenery.

In addition to the transportation furnished by the regular companies, movable camp licenses were issued during the season covering a total of 37 wagons and 309 saddle and pack animals, and one special wagon for livery work.

The columns of the daily papers and the orders of the railroad officials to stop the shipment of perishable goods which could not be delivered before the day set for the strike and other reliable information convinced the president of the hotel company that the railroad strike was inevitable. He, in accordance with this

belief, at 11 o'clock p. m. of August 30, decided that all tourists at the hotels be taken direct to the railroad stations. The movement commenced early the morning of August 31, and was so expeditiously managed that the tourists had departed, the help sent away, and the hotels closed by September 2.

The imminence of the railroad strike deterred many from journeying far from home. This is unmistakable, as the travel to the park which was excellent prior to the alarming period of the contention fell to almost nothing for the remainder of the season.

The Wylie Camping Co. closed to tourists early in the month of September. The Shaw & Powell Camping Co. and Old Faithful Camping Co. continued to give tourists full service, as advertised, to the end of the season.

CODY-SYLVAN PASS MOTOR CO.

On June 6, 1916, a concession was granted the Cody-Sylvan Pass Motor Co., authorizing it for the term of one year from January 1, 1916, to establish and maintain an automobile transportation line for the accommodation of persons desiring to enter the park via the eastern entrance. This company operated from Cody, Wyo., to the eastern entrance, thence inside of the park to the Yellowstone Lake, where they turned their patrons over to the transportation companies operating horse-drawn vehicles. The business of the new company was conducted in a very satisfactory manner. A total of 1,295 passengers entered the park

with it, of which 253 were turned over to the Yellowstone Park Transportation Co., 113 to the Yellowstone-Western Stage Co., 710 to the Wylie Permanent Camping Co., 134 to the Shaw & Powell Camping Co., and the balance of 78 were transients. The company also carried a total of 3,109 tourists out of the park from Lake Outlet to the eastern entrance, which were taken from the various transportation companies.

AUTOMOBILES

There were 3,445 automobiles carrying 14,850 tourists from June 15 to September 30. Of these, 2,004 came in on season tickets and 12,846 on the regular tickets of passage. These tourists came from 40 States, and nearly every known make of automobiles was represented. This includes, in addition to the regularly purchased tickets, complimentary tickets to county, State, and Federal officials in the park on official business.

The automobilists almost without exception adhered closely to the automobile regulations and followed strictly the schedules, which proved quite popular.

As the roads approaching the several entrances of the park improve, the automobile travel will increase, and the park will in time become one of the great resorts of the country.

To make this a possibility, the Park-to-Park Highway Association held a most enthusiastic convention at the Canyon Hotel July 24-25

and started a movement for good roads from all the contiguous States to the parks and within the States.

Mr. Robert I. McKay, of Cooke, Montana, to whom a permit was issued last year to use automobile trucks and trailers for transporting ore and supplies between Gardiner and Cooke, Montana, used but one truck and trailer and one utility car last season, and up to this date he has failed to make arrangements for renewal of his privilege. His reports indicate that he expended \$11,857.63 in repairing the roads under his contract with the Department. Similar permits for use of the park roads between Gardiner and Cooke have been given for the present season as follows:

One to Nels E. Solderholm, a merchant of Cooke, for use of one 2-ton truck for hauling his own supplies and employees.

One to G. L. Tanzer, president of the Western Smelting & Power Co., of Seattle, Wash., with mining interests in Cooke, for a 2-ton automobile truck, a 3-ton trailer for same, and a utility or repair car, with privilege of increasing the number to 41 vehicles if desired. These permits were granted under the same requirements as was Mr. McKay's last year—namely, that the licensees pay a fee of \$20 per annum for each truck used, \$10 per annum for each trailer used, and \$10 per annum for the utility or repair car. Mr. Solderholm has had his truck in commission since about July 1. Mr. Tanzer has ordered a truck and trailer, but it has not been received and put into commission.

More than 50 motor cars and trucks have been in use by the different branches of the Government and concessionaires in the park in hauling supplies and work other than transporting tourists.

STEAM GAGING

Mr. C. Clyde Baldwin, district engineer of the water-resources branch of the United States Geological Survey, with headquarters at Boise, Idaho, who has charge of this important feature, has furnished the following report on this work for the year:

Records were obtained from the following gaging stations, which were established during June, 1917:

Madison River, near Yellowstone, Mont.
Gibbon River, at Wylie Lunch Station, near Yellowstone, Mont.
Yellowstone River, above Upper Falls, near Canyon Station.
Snake River, at south boundary Yellowstone National Park.

During July, 1917, the sum of \$1,000 was apportioned from Yellowstone Park funds to assist in carrying on the steam-gaging work during the fiscal year ending June 30, 1917. In consequence plans were made for the installation of a water-stage recorder at the station on Yellowstone River and for the purchase and erection of cables from which to secure current water measurements at this station and also at the one on Snake River.

The installation of this equipment which was in progress at the end of September, 1916, will make it possible to secure dependable records at these stations for high stages of flow.

The water-stage recorder will be located close to the Upper Falls of Yellowstone River and will be housed in such a manner as to permit inspection by tourists. Later it is proposed to post rating tables in prominent places in order to enable tourists to determine from the observed gage reading the actual quantity of water passing over these falls.

Detailed descriptions of the gaging stations, together with summaries of current meter measurements and gage height and discharge data for each will be published in the annual Water-Supply Papers of the United States Geological Survey, Parts VI to XII, respectively, for Missouri River and Snake River drainage areas.

ROADS

The road work in the park is in charge of Maj. Anoa A. Fries, Corps of Engineers, United States Army, who has furnished the following notes on the work in the park under his department.

The sundry civil bill of July 1, 1916, appropriated money as follows for road work in Yellowstone National Park and the adjacent forest reserves on the east and south:

"Yellowstone National Park: For maintenance and repair of improvements, \$152,500, including not to exceed \$15,000 for maintenance of the road in the forest reserve leading out of the park from the east boundary, and not to exceed \$10,000 for maintenance of the road in the forest reserve leading out of the park from the south boundary, and including not exceeding \$5,000 for purchase, operation, maintenance,

and repair of motor-driven and horse-drawn passenger-carrying vehicles to be used for inspection of roads and road work, to be expended by and under the direction of the Secretary of War: Provided, That no portion of this appropriation shall be expended for the removal of snow from any of the roads for the purpose of opening them in advance of the time when they will be cleared by seasonal changes.

"For widening to not exceeding eighteen feet of roadway and improving surface of roads and for building bridges and culverts from the belt-line road to the western border from the Thumb Station to the southern border, and from the Lake Hotel Station to the eastern border, all within Yellowstone National Park, to make such roads suitable and safe for animal-drawn and motor-propelled vehicles, \$30,700.

"For completing the widening to not exceeding eighteen feet of roadway and improving the surface of roads and for building bridges and culverts in the forest reserve leading out of the park from the east boundary, to make such roads suitable and safe for animal-drawn and motor-propelled vehicles, \$6,000."

In addition there remained available on October 1, 1915, about \$13,000 of the \$195,000 appropriated for the same purposes in the sundry civil bill of March 3, 1915 (p. 9. report of acting superintendent, Sept. 30, 1915).

On account of early spring and the desire to expedite work in anticipation of record travel through the park during 1915, due to

The combined influence of the European war and of the San Francisco and San Diego Expositions, work was vigorously prosecuted during the spring and summer of 1915 under the appropriations for both the fiscal years 1915 and 1916, and consequently almost all crews had either exhausted their apportioned funds or completed their work prior to the date of the last report (Sept. 30, 1915).

The work during the present year included general repair and maintenance of the entire system, including the belt line, the north, west, south, and east approaches, both in the park and in the forest reserves on the east and south, and the Cooke City road; widening and improving the west, south, and east approaches, including the east forest reserve; sprinkling of 100 to 112 miles of belt line and north and west approach road; repair and construction of bridges; construction of concrete, wood, and galvanized-iron culverts; clearing of dead and fallen timber from the roadside; reshaping and ditching roads; maintenance of trees, shrubs, vines, and lawns.

In the following summary the work will be divided into that done on the belt line, the north approach, the west approach, the south approach, the east approach, and the Cooke City road.

BELT LINE

GENERAL ROAD REPAIRS.--Owing to the very heavy snows of the past winter and to the late spring, the road over the Continental Divide, between the Upper Basin and the Thumb, was still impassable on account

of snowdrifts as late as June 15, and would have remained so for the first part of the tourist season except for work done voluntarily on the part of the transportation companies and others in shoveling and otherwise breaking a trail through the snow. While this work served to render the road passable for horse-drawn vehicles for the first tourists on June 17, much sooner than would have been the case through the regular seasonal thaw, it also had the effect of permitting the passage of traffic through numerous snowbanks, the continuous melting from which kept the roadbed in wet and poor condition. That, combined as it was with restricting the travel to a narrow, single track, caused very severe rutting of the roadbed, and required considerable urgent repair work to keep the road from becoming impassable. The same was true of the Dunraven Pass road from the Canyon to Tower Falls, and of parts of the east approach road in the park, especially near Cub Creek, although both of these roads were not opened up until somewhat later than the Continental Divide road.

The spring run-off from the deep snows of the winter also caused some washing out of roads over certain stretches, especially along Spring and Dry Creeks between the Upper Basin and the Thumb, and required the constant attention of a small maintenance crew during the early part of the tourist season.

Early in July two flying-grader squadrons, consisting of about three graders each, with a few extra laborers, were sent in

opposite directions around the belt line, starting from Mammoth Springs. These crews shaped up the roads, repaired washouts, cleaned out ditches, and cleaned out and made minor repairs to culverts. In addition, a special crew was necessary to repair the 6 miles of road between Gibbon Meadows and Yellowstone Junction, which had become very badly broken up with ruts and chuck holes. Bad chuck holes between Mammoth Springs and the 15-mile post on the road to Norris were repaired by an emergency crew of about three men sent out from Mammoth Springs in a Ford touring car which was temporarily impressed into service as an emergency repair car.

To assist in maintaining the roads during the tourist season, each sprinkler crew was equipped with a split-log drag; and whenever rainy weather, which was rare during the season of 1916, gave an opportunity for so doing, these drags were used to reshape and smooth out the ruts in the roads. This process is very necessary and would have been more efficacious had there been more rain than was the case during the season just closed.

SPRINKLING AND DRAGGING.—During the tourist season of 1916 a maximum of 110 miles of road was sprinkled, covering practically the same stretches of road as the previous season, and including a portion of the north and west approaches. Although water for sprinkling purposes was plentiful early in the tourist season, continued dry weather during the summer caused some of the wells

from which water for sprinkling was drawn to go dry, so that toward the end of the season it was found necessary to abandon several sprinkler runs, as was the case in 1915. As already stated under "General road repairs," all sprinkler crews were equipped with split-log drags, which were used whenever rainy weather gave an opportunity for doing so, to reshape and smooth out the roads.

FIREHOLE RIVER REALIGNMENT.—This realignment, which will replace several miles of the road lying between the Madison Junction and the Firehole Cascades, was begun in June, 1915, and completed during the season of 1915 for a distance of about 3,500 feet. Work was resumed about the middle of July of this year, and up to the present time about 1,200 feet additional has been completed, making the total completed distance to date about 4,700 feet. This new location involves very heavy rock work, but it will greatly improve the grades and will open up a fine stretch of river scenery, replacing with an unusually attractive road one which is quite deficient in such qualities. The construction of this new road has been greatly assisted by the recent installation on the work of a $3/4$ -cubic yard revolving steam shovel, which will serve to materially reduce the cost of handling the rock material after being loosened by blasting. It is expected that the realignment, the total length of which will be about 7,650 feet, will be completed next season.

GIBBON CANYON.—Two miles of the road along the Gibbon River, between the 15 and 17 mile posts from the west entrance toward Norris, was reshaped and regraded, including two short realignments (300 and 600 feet long, respectively) and the installation of about four corrugated-iron culverts.

VICINITY OF LAKE HOTEL.—The first 5 miles of the road from the Lake Hotel toward the Canyon and the first several miles of the road from the Lake Hotel toward the Tinnab was reshaped and regraded. Twenty-six corrugated galvanized-iron culverts, mostly of 24-inch diameter, were installed in connection with this work.

FREIGHT ROAD—LOWER GEYSER BASIN.—The freight road, 4 miles long, which parallels the main belt-line road between the Fountain Soldier Station and the Excelsior Geyser, having been closed by reason of the unsafe condition of the wooden truss bridge over the Firehole River, about 1 mile from the Fountain Soldier Station, it was found desirable to reconstruct the bridge in question, and also to generally put the road in shape for traffic. In addition to the reconstruction of the bridge already named, the trusses of which were so weak that they collapsed during the building of the new 50-foot bridge, there was also reconstructed the 40-foot bridge over Nez Perce Creek, in the immediate vicinity of the Fountain Soldier Station. The putting of this road into commission again makes possible deviating over it considerable heavy freighting traffic, thus reducing the wear on

the main road between the Fountain Soldier Station and Excelsior Geyser, and furnishing a shorter route for freight traffic, and also gives opportunity for greater freedom in handling automobile traffic past the Fountain Geyser Basin without interference with the horse-drawn traffic.

RESURFACING.--No resurfacing has been done on the belt line during the present season. Two automobile dump trucks were purchased and recently received, and are now in use on the west approach for hauling surfacing material there. In order to take advantage of the cheaper hauling costs, such surfacing as is contemplated on the belt line has been delayed until such time as these trucks will be free to do the work, as the expense of hauling is much less by truck than by team, and by the use of trucks it is therefore possible to surface well and at reasonable cost stretches of the road system which heretofore it has been impracticable to surface except with the poorer materials immediately at hand.

BRIDGES AND CULVERTS.--In line with the policy adopted several years ago of reconstructing in permanent materials the bridges and culverts on the main Belt line, there were built or installed this spring on the sections of road between the Thumb and the Lake and between the Lake and the Canyon, six reinforced concrete slab culverts, four of which were of 8-foot span and two of 3-foot span;

and one double corrugated galvanized-iron culvert, 24-inch diameter, with concrete head walls. All except two of the foregoing structures require to be back filled in order to be placed in commission. Concrete hand-rails were added to the 26-foot double-span reinforced concrete culvert built in 1914 over Otter Creek, about 2 miles from the Canyon Junction on the road to the Lake Hotel. There were also installed some galvanized-iron culverts at other parts of the Belt line, of 18, 18, and 24 inch diameter, as already noted in connection with the reshaping of roads in the vicinity of the Lake Hotel and between the 11 and 13 mileposts from Yellowstone toward Norris; but also in the replacement of small wooden and tile culverts at other parts of the Belt line where they had been broken down and rendered unserviceable by the heavy automobile truck traffic over them this season. In addition, a number of culverts and small wooden bridges were repaired, strengthened, or reconstructed, principally on the road between the Canyon and Tower Falls, many of these being partially or entirely broken down by the automobile traffic. The high steel bridge over the Gardiner River, on the road from Mammoth Springs to Tower Falls, was refloored with lumber.

GUARD RAILS.--Log guardrails were installed at the east approach of the Chittenden Bridge over the Yellowstone River, on both sides of the road.

NORTH APPROACH

On the north approach road, extending from the northern entrance at Gardiner, Montana, to the Belt line at Mammoth Hot Springs, general maintenance and repair work was done, as on the Belt-line road itself, and the first $3\frac{1}{2}$ miles from Mammoth Hot Springs toward Gardiner was sprinkled. The other mile and a half of the road has been treated with a light oil and sand finish in the spring of 1915 and did not require sprinkling during the season just closed.

GARDINER SLIDE.—The slide in the Gardiner Canyon, about 2 miles from the north entrance at Gardiner, Mont., which has given considerable trouble to the Gardiner Road for a number of years, was cut back in the fall of 1914 and the spring of 1915, so that at the beginning of the 1915 tourist season the road was broad and in very good shape. During the summer of 1915 and the winter following the slide gradually encroached upon the road, however, so that early this spring the roadway had been reduced to a width of about 9 or 10 feet. In addition to the old or main slide, the encroachment of which is gradual, there developed in the fall of 1915 a new or secondary slide, several hundred yards nearer Gardiner than the main slide. The slumping off of material at this new slide caused the road about $1\frac{1}{2}$ miles from the north entrance at Gardiner to be blocked several times during the fall

of 1915, and four times during March and April of the spring of 1916. By means of blasting and the use of graders, the road was reopened within a half day ordinarily after the occurrence of slides. In this work the quartermaster of Fort Yellowstone, Wyo., cooperated by furnishing teams and teamsters. In May the road at the main slide, which, as already stated, had become extremely narrow, was very much widened by blasting and grading, which process had to be repeated along portions of the slide once during the summer. Grader work was also required from time to time to smooth off the road surface, made necessary by the heaving up of the same due to the pressure from the slide above. Considerably more work will have to be done on the slide prior to the opening of the next tourist season.

RETAINING WALL.—Early in June a section of the concrete retaining wall which protects the road in the Gardiner Canyon gave way, being undermined by the high water in the Gardiner River, due to the melting of the very heavy snows of the preceding winter. The break was repaired without serious injury to the roadway by means of concrete and the free use of sand bags and steel rods. An adjacent section of the wall was weakened later in the summer by blasting operations in connection with the slide removal, but not so seriously as to make advisable any repair work during the tourist season. The wall will be placed in first-class condition during the present fall.

WEST APPROACH

On the west approach road, which extends from the west entrance at Yellowstone, Montana, to the Belt line at Madison Junction, a distance of $13\frac{1}{2}$ miles, maintenance work similar to that on the Belt line, including sprinkling the $3\frac{1}{2}$ miles nearest to Madison Junction, was done. In addition, the work of widening and improving the road to make it safe for animal-drawn and motor-propelled vehicles has been prosecuted as rapidly as possible since the funds for the fiscal year 1917 were made available early in July.

WIDENING AND GRADING.—During the year widening and grading of the west approach has been extended to include the entire distance from Yellowstone to Madison Junction, the work done this season covering about 2 miles between the 11 and 13 mile posts from the west entrance.

SUBFACING.—During the season of 1915 oil-macadam surfacing, 18 feet wide, was completed for the first 5 miles of the approach, beginning at the west entrance. During the present season a crushed-rock sub-base, 5 inches deep and 10 feet wide, ready to be given an oil finish, has been constructed a distance of $2\frac{1}{2}$ miles, reaching as far as the bridge over the Madison River, about $7\frac{1}{2}$ miles from the west entrance. The narrowing of the oil macadam from 18 to 10 feet has been made because the experience to date has shown that practically all traffic on the west approach is

concentrated on the 10-foot strip, and the expense of the greater width in further construction on the west approach, at least for the immediate future, is not considered justified. To haul the oil for the oil finish there has been purchased a 1,000-gallon, asbestos-covered oil tank and distributor, which has recently been received and will be temporarily mounted, whenever necessary for oiling operations, on the White 5-ton truck purchased by the engineer department last year. This equipment will permit oiling of roads at considerable distances from the railroad without undue expense of hauling and without the necessity of reheating the oil en route. Two $5\frac{1}{2}$ -ton dump trucks have also been purchased to permit the more economical hauling of crushed rock and other surfacing material on this and other work in the park. Both trucks are for the present in use on the west road.

SOUTH APPROACH IN THE PARK

In addition to general repairs, such as were made on the Belt line, the work of widening and improving the south approach for combined horse-drawn and automobile traffic, as specially appropriated for by Congress, was continued.

WIDENING AND GRADING.—The widening and grading of about $1\frac{1}{2}$ miles of road between 6 and 8 miles from the Thumb Soldier station, which was begun during the season of 1915, has now been finished, and, in addition, the road has been widened and graded for a distance

of about 4 miles over the Pitchstone Plateau, covering a stretch located between 17 $\frac{3}{4}$ and 21 $\frac{5}{8}$ miles from the Thumb Soldier station. This latter work has been extremely difficult, the plateau being strewn with large and small bowlders, and has included several minor realignments where better grades and curves could thus be obtained, or where the road could be built more economically on the new location. In doing this work there was used to advantage a heavy power grader drawn by a steam roller acting as a tractor, both of which machines have been newly purchased this season. To complete the improvement of the south approach there is yet required the widening and grading of about 3 $\frac{1}{2}$ miles of road (14 $\frac{1}{2}$ to 17 $\frac{3}{4}$ miles south of the Thumb). This work will probably be completed in time for the next tourist season.

BRIDGES AND CULVERTS.—The Moose Falls Bridge, about 1 $\frac{1}{2}$ miles from the south entrance, was redecked, and two small log bridges were constructed, one about a mile south of the Thumb Soldier station and the other, a 12-foot span bridge, about 4 miles south of the Soldier station. In addition, repairs were made to other log culverts where necessary, and several small log and corrugated-iron culverts were installed in connection with the widening and grading work reported above.

REALIGNMENT 4 MILES SOUTH OF THUMB.—A short realignment, 400 yards long, about 4 miles south of the Thumb, was constructed, including the 12-foot log bridge reported above.

SOUTH APPROACH IN THE FOREST RESERVE

SNAKE RIVER BRIDGE.—During the present season the steel-work was erected for the 100-foot span steel bridge over the Snake River, $2\frac{1}{2}$ miles south of the park boundary, and the reinforced-concrete floor was also constructed. To complete this bridge there is still required the construction of two short log bridges at either end of the main bridge to form the approaches to the shores. These log bridges are just now being started. Owing to the very poor condition of the old wooden bridge over the Snake River, it is very urgent that the new bridge be placed in commission at the earliest possible moment.

DUGOUT REALIGNMENT.—A realignment, about seven-eighths of a mile long, between approximately 5 and 6 miles south of the park boundary, to replace the very bad stretch of road there known as the dugout, was constructed during the present season. This realignment includes the construction of a 70-foot span log bridge and of a number of small log culverts.

GENERAL REPAIRS.—In addition to the more important work in the south forest reserve already noted, considerable work of a general maintenance and repair nature was done to the first 7 miles south of the park boundary.

EAST APPROACH INSIDE THE PARK

GENERAL REPAIRS.—General repairs were made where necessary throughout the entire 26 miles of the east approach inside the

park. As already stated under the work on the Belt line, constant attention was required early in the tourist season to keep the east approach passable, owing to the melting of snow-banks and to the single, narrow track which had been opened through the snow and to which traffic was for the time being restricted.

BRIDGES AND CULVERTS.—The so-called Loop Bridge, east of Sylvan Pass, was replaced by a 25-foot span wooden bridge and a large rock fill at the west abutment of the bridge. The bridge over Pelican Creek was refloored, and numerous other smaller bridges and culverts received repairs made necessary by the heavy run-off from the winter snows and by the traffic of automobile trucks and of the heavy transportation autos entering the park from the Cody entrance. There were also installed a number of galvanized-iron culverts in connection with the widening and grading work hereafter described.

WIDENING AND GRADING.—The work of widening and improving the road to make the same safe for both animal-drawn and motor-propelled vehicles under the special appropriation for this purpose was resumed as soon as the new funds became available in July. The work done during the present season consisted of widening, reshaping, and regrading about $1\frac{1}{2}$ miles of road just east of Sylvan Pass. The improvement of the east approach has now been brought to completion on all except about $3\frac{1}{2}$ miles of the road, between the $9\frac{1}{2}$ and 13 mile posts from the Lake Junction. Of this $3\frac{1}{2}$ miles, a

distance of $1\frac{1}{2}$ miles, between the $9\frac{1}{2}$ and 11 mile posts, had been previously partially widened and improved, and work is now being begun to complete the entire section of $3\frac{1}{2}$ miles.

EAST APPROACH IN THE FOREST RESERVE

WIDENING AND GRADING.--The work of improving the road in the East Forest Reserve to make the same safe for both animal-drawn and motor-propelled vehicles under the special appropriation for the purpose was resumed in July, and during the present season the $2\frac{1}{2}$ miles between the 5 and $7\frac{1}{2}$ mile posts from the park boundary was widened and graded, thus completing the work of widening and grading for the entire $27\frac{1}{2}$ miles of the road.

STEEL BRIDGES.--Work has been continued on the steel bridge, 100-foot span, over the North Fork of the Shoshone River, $2\frac{1}{2}$ miles from the park boundary, and on a similar bridge over Elk Fork, $2\frac{1}{2}$ miles from the park boundary. Both of these bridges, as well as one over the North Fork, $21\frac{1}{2}$ miles from the park boundary, were begun in 1915. During the past year the reinforced-concrete floor of the Elk Fork Bridge was constructed, leaving only the approaches yet to be built for this bridge. At the North Fork Bridge $21\frac{1}{2}$ miles from the park boundary, the erection of the steelwork and the construction of the reinforced-concrete floor and of the approaches remain yet to be done. The steelwork of the bridge over the North Fork, about $2\frac{1}{2}$ miles from the park boundary, known as the Pahaska Bridge, was erected during the year, and the

approaches were constructed. This bridge is now complete except for the construction of the reinforced-concrete floor, which it is expected will be constructed the present fall.

GENERAL REPAIRS.—General repairs were made to the road in the East Forest Reserve wherever required, including minor repairs to log bridges and culverts. The road was repaired and reshaped more extensively between the park boundary and Pahaska, about 2½ miles from the boundary.

COOKS CITY ROAD

BRIDGES AND CULVERTS.—Fourteen galvanized-iron culverts and one log culvert were installed on the road leading from Tower Falls Soldier Station to the northeast boundary of the park, between the Lamar River bridge and the Buffalo Farm, about 4 and 12 miles, respectively, from the Tower Falls Soldier Station.

TWIN LAKES REALIGNMENT.—During the present year there has been constructed a realignment, about 3 miles long, of the road just east of the crossing of the Yellowstone River. This realignment, which passes to the south of the so-called Black or Junction Butte, replaces a portion of the road which was replete with bad grades and curves, and some parts of which, during the spring of the year, have at times been all but impassable because of the mud. The work included the installation of a number of galvanized-iron culverts.

WORK BY ROBERT I. MCKAY.—The work done by Mr. Robert I. McKay and associates, who have mining interests at Cooke City, Montana, about 4 miles outside the northeast boundary, was continued last fall until interrupted by the closing in of the winter season. Mr. McKay and his associates are interested in the upkeep and improvement of the road for the benefit of their motor trucks and trailers. For the operation of which between Cooke City and Gardiner, Montana, for the hauling of ore, Mr. McKay has a permit from the Interior Department. The work done last fall by these interests, after September 30, included a very desirable realignment between Fish and Pebble Creeks, obviating the extremely bad grades of the old road, and the construction of two short realignments between the Soda Butte Soldier Station and the Jackson Crede. Some light graveling was also done on portions of the road. During the present spring Mr. McKay reconstructed the log bridge over Pebble Creek, which was originally constructed by him in 1915, and the center pier of which was undermined by the high waters of this spring.

FISH

Mr. W. T. Thompson, superintendent of the United States fish hatchery at Bozeman, Montana, who also has charge of the summer station on Yellowstone Lake in the park, reports a fairly successful harvest of black-spotted trout eggs, although his work

was hindered to some extent by snow and floods, due to melting of the heavy snows in the early part of the season, and later by the dry, warm weather which lessened the stream flow so as to materially shorten the run of the spawning fish. He also complains of considerable interference by the bears, which were very plentiful and were the source of many complaints during the summer. He reports, however, that notwithstanding these handicaps his total harvest for the summer amounted to 7,435,800 trout eggs, which was nearly 2,000,000 more than the previous year. As usual, most of these eggs were "eyed" and shipped to county, State, and Federal hatcheries throughout the United States, but about 200,000 of them that were taken early in the season were hatched out for restocking purposes in park waters.

The fish hatchery is located close to the Lake Hotel and some of the permanent camps and is of great interest to tourists, who are always welcome to observe and to whom an attendant is always ready to explain the workings of the hatchery.

The eggs that were hatched were planted in Clear Creek, Columbine Creek, Pelican Creek, and Bridge Creek, tributary to Yellowstone Lake, and 60,000 were sent out to be planted in Buffalo Fork of Slough Creek, but did not stand the trip and died before reaching their destination.

Seventeen thousand young eastern brook trout furnished by the United States fish hatchery at Bozeman, Montana, were planted

in Nez Perce Creek on June 30.

WILD ANIMALS

Due to natural conditions, and the fact that wild animals have been protected for many years, the park is rapidly becoming known as the largest wild bird and animal preserve in the United States, if not in the world. In addition to 194 varieties of birds, including many varieties of waterfowl, that have been observed and recorded in the park, antelope, deer (both black-tailed and white-tailed), elk, moose, wild buffalo, bears, mountain sheep, coyotes, gray wolves, and mountain lions are notable, and many of the smaller animals such as beaver, foxes, lynx, otter, marten, mink, marmots, skunks, red squirrels, chipmunks, weasels, badgers, porcupines, etc., are numerous.

ANTELOPE

Most of the antelope winter in one herd near the north line of the park and are held from leaving to the lower country outside by the high woven-wire fence extending from the mouth of Gardiner River west to Sepulcher Mountain. The antelope, together with the deer and mountain sheep, were fed hay during the winter; 193 $\frac{1}{2}$ tons that was on hand from the alfalfa field near the north entrance was so fed, and as this was not sufficient, due to the very severe winter, about 7 tons additional of baled hay was purchased for the

purpose. Improvements were made of the alfalfa field as follows: About 15 acres were fertilized and the loose surface rock picked off. About 35 acres were disked, reseeded in bare spots, and dragged. The work of irrigating the field, cutting, curing, and stacking the hay, was again done by contract, at a cost of \$5 per ton for the hay in stack. About 120 tons, from two cuttings of the field during the past summer, are on hand for the coming winter.

DEER

Both the black-tailed and white-tailed varieties are very tame and seem to be thriving. The black-tailed deer are quite numerous, and many of them, like the elk, doubtless stray outside of the park and are killed by hunters in the open season.

ELK

The snow was very deep and winter very severe throughout the park, and due to this fact the elk, which are by far the most numerous of any kind of game in the park, came down to the lower levels in immense herds in January, February, and March, so that the matter of capturing them for shipment was a comparatively easy one, and there was no trouble in securing all that were wanted for shipment. The unusual number of elk, antelope, deer, and mountain sheep in the immediate vicinity of the northern entrance

also attracted many winter visitors. The Northern Pacific Railway Co. ran several special excursion trains to Gardiner from Montana points during January and February, and a total of about 1,992 tourists made special trips to see the game. As high as 7,000 elk were counted between Fort Yellowstone and a point about a mile west of Gardiner--most of them along the main road--on January 27, a day when the weather was particularly severe.

On account of the very severe weather it was predicted that the loss of game during the spring months would be great, but this prediction did not prove true, and the men who in April made a careful census of the elk reported but few dead animals found, and that most of them were in excellent condition. Due to the deep snows and a rather late spring the elk remained down in the valleys and lower altitudes much later in the spring than usual. Under authority of the department shipments of 618 head of elk were made during the winter, as follows:

Pennsylvania-----	100	Utah-----	50
Alabama-----	50	Louisiana-----	40
Texas-----	20	New York-----	50
Minnesota-----	2	Idaho-----	50
Colorado-----	50	Washington-----	50
Georgia-----	2	Montana-----	50
Department of Agriculture-----	100	North Dakota-----	4

Under authority of the department dated February 15, 1916, representatives of the United States Biological Survey and of the United States Forest Service of the Department of Agriculture were in the park March 2 to 14, inclusive, taking a census of the elk

and studying their winter conditions, and such assistance as was practicable was given them here. A copy of their complete report has not been furnished this office.

In accordance with instructions from the department, beginning April 5, 1916, a very careful census was made of the elk belonging to the northern herd in the park and just along its borders outside on the north and northeast; 29,544 elk were found in this herd and 1,958 more were accounted for--namely, 1,000 (estimated) killed in adjoining States during the open hunting season, 611 shipped from the park under authority of the department, 90 shipped from just outside of the park by the authorities of Montana to other points in the State, and 257 counted that had been killed for their teeth in the State of Montana not far from the park line after the close of the open hunting season. An unusual increase in the Jackson Hole herd south of the park, as found by the representatives of the Department of Agriculture referred to above, indicated that a number of the northern herd had probably migrated to the southern herd during the past year.

The severe storms of the last days of December and the month of January drove the elk out of the park in large herds. Certain lawless individuals took advantage of this opportunity and slaughtered them recklessly. The section of Montana where the unlawful killing of elk took place is a strip of rough country from 12 to 15 miles

long, measured in the direction of the northern boundary line of the park and extending northerly to a width of 8 miles, lying wholly without the park and embracing the country about Gardiner and Jardine.

The hunting season in Montana closed December 15, 1915, and there were no elk reported outside the park in the section under consideration at that time. So the slaughter took place during the closed season. A fairly careful search by park scouts of the strip of country above mentioned resulted in the finding of the bodies of 257 elk which had been killed for their teeth.

During the past summer more elk than usual have been seen along the traveled roads, and patrols who have seen them in large herds at higher levels state that there are an unusual number of young with the cows.

MOOSE

Moose are so timid and are so much scattered in many sections of the park that it is practically impossible to get a reasonable estimate of their numbers, but they are frequently seen in small herds, and there is little doubt that they have been on the increase for several years under the protection afforded them by the park and the adjoining States. Last season the State of Wyoming sold special licenses to kill one bull moose to each licensee during the open season, and limited the number to 50. I am informed

that those who bought such licenses had no difficulty in securing their moose.

BUFFALO

WILD HERD.—In July and August a special attempt was made to look up the wild buffalo in the park. Their condition was found very satisfactory. Seventy-two in all were found, of which 10 were this year's calves.

TAKE HERD.—The main herd is kept on Lamar River, near the mouth of Rose Creek, 30 miles east from headquarters. This herd now numbers 276 animals, as follows:

	Males	Females	Total
Number Oct. 1, 1915 (last report).....	122	117	239
Born summer of 1916.....	34	22	56
Total to account for.....	156	139	295
Died or disposed of during the year.....	10	9	19
Balance now in the herd.....	146	130	276

Of those disposed of, one 5-year-old bull and one 6-year-old bull were shipped to Corpus Christi, Tex.; two 2-year-old bulls and four 3-year-old cows to Wind Cave National Park; one 6-year-old bull to Kansas City, Mo.; and one 4-year-old bull to Denver, Colorado, all donated by the department but shipped at the expense of

of the parties receiving them. An 8-year-old cow and a 4-year-old bull were killed by fighting among the herd. Two young cows that were not in very good condition got into a swamp and were not strong enough to extricate themselves. One of the oldest bulls in the herd was killed, apparently by a poisonous weed; and an old cow died in the same manner and her calf was raised on one of the domestic cows kept for that purpose. A 4-year-old cow was drowned in an irrigation ditch in the lower field. An old bull that was not in good condition was gored to death by the others while they were being "rounded up." A male calf that was born latelast fall, and had never been in good condition, also died.

In the cases of those that died, wherever practicable, the heads, skins, skulls, etc, were saved and shipped to the National Museum as specimens.

Sixteen of the old bulls were brought in to Mammoth Hot Springs on June 15, where they were held during the tourist season as a show herd.

About 220 tons of excellent hay was cut and stacked at the buffalo farm on Lamar River for winter use of the tame buffalo herd. The cost of cutting and stacking this hay was about \$4.72 per ton, plus the work of the regular employees and the 4-horse work team used at the buffalo farm. About 400 rods of the woven-wire fence around the upper field on Rose Creek was

rebuilt and minor repairs made to the balance of the fence. The roofs and trimmings of the log buildings were painted, the work being done by regular employees.

Due to the increasing herd of buffalo, it will be necessary to plow up, fence, seed, and irrigate additional land for meadows, and arrangements are being made to do this late this fall or early next spring. The buffalo are grazed in the open as much as possible. It was necessary to feed hay beginning January 13 last winter.

A veterinarian of the Department of Agriculture visited the park and vaccinated the young buffalo for hemorrhagic septicemia early in December.

BEARS

Many complaints were received during the summer of depredations by bears, which were particularly plentiful and very much in evidence during the tourist season throughout the park. Many of those that live around the camps in summer get mischievous, and as they grow older they become bolder and finally are positively dangerous and eventually have to be killed. Six black bears and two grizzlies have been killed for this reason during the past season; one small black cub, with a can stuck on its foot, was killed to prevent further suffering, and two small black bears died near headquarters from unknown causes. One tremendous grizzly bear attacked and

injured two men asleep in camp near Indian Pond, on the Cody Road north of Yellowstone Lake, about the middle of August. Efforts were made to locate and kill this bear, but without success. On the evening of September 7 three men in the employ of the United States Engineer Department were in camp on the Cody Road about 10 miles east from the outlet of Yellowstone Lake. They were attacked in the middle of the night, apparently without provocation, by a bear, which was probably the same one referred to above, and one of their number, Frank Welch, of Electric, Montana, was dragged some distance and so badly mauled and injured that he died a few days later in the hospital at Fort Yellowstone.

Efforts were again made to kill this bear, and on the evening of September 8 a very large grizzly, believed to be the same one, was killed by exploding a charge of dynamite under him by means of an electric battery.

Bears were captured and shipped from the park under authority of the department as follows: On August 10 a pair of grizzlies, male and female, 2 to 3 years old, to the park commission at Virginia, Minnesota. The same date a pair of yearling brown bears, male and female, to Madison Ecological and Aquarium Society, Madison, Wis., and a young female grizzly to the commissioner of sanitation, San Antonio, Texas. A young male

grizzly was also sent to San Antonio, Texas, on September 26. These shipments were all made at the expense of the cities receiving the bears.

COYOTES AND WOLVES

Coyotes are numerous. From October 6, 1915, to June 30, 1916, two special rangers were employed by advice of the United States Biological Survey for the purpose of exterminating carnivorous animals in the park. They succeeded in shooting and trapping 83 coyotes, 12 wolves, and 4 mountain lions. The skulls and such of the skins as were desired as specimens were sent to the National Museum, and the other skins were sold and the money deposited to the credit of the park revenues. Other park employees succeeded in killing 97 coyotes, making a total killed of 180. Two young male wolves captured in the spring of 1915 by the employees at the buffalo farm were shipped alive on November 16 to the National Zoological Park.

MOUNTAIN LIONS

Mountain lions are quite in evidence during the winter, when their tracks are found in the vicinity of the large herds of elk. Four were trapped and killed last winter.

MOUNTAIN SHEEP

The mountain sheep wintered in excellent condition. Signs of sheep scab were noticed on three of them in Gardiner Canyon, and plans were made to dip them, but by the time the arrangements were completed they had gone so far back in the mountains as to make it impracticable to capture them, and later reports indicated that those that were apparently diseased were much improved as the spring advanced and grass was available.

BIRDS

A number of new names were added to the list of birds observed in the park through the observations of Mr. M. P. Skinner, who made the original list, until it now totals 104 varieties. Several of the varieties of water birds are found in the park the year round, as there is plenty of open water in winter due to hot springs and geysers.

PROTECTION OF GAME

Extra rangers were employed during the open season for hunting in the adjoining States in order to protect the park boundaries from hunters who might purposely or accidentally stray over the line. The supervisors and other employees of the national forests adjoining the park, as well as the State game authorities, cooperated with the park

authorities in protecting game, and several important arrests were made and convictions secured.

On June 28, 1916, an act of Congress was approved amending the act of May 7, 1894, to protect the birds and animals and to punish crimes in the park so as to provide a maximum penalty of \$500 or six months' imprisonment, or both, and costs, instead of \$1,000 and two years as heretofore. This change will greatly simplify the matter of trials for offenses in the park, as under the original law the United States commissioner in the park was not authorized to dispose of cases that came before him, but could only have a hearing, and if the facts justified, hold the offenders to trial before the United States district court, which made the proceedings tedious and often very expensive for the Government.

Seventeen snowshoe cabins were repaired and supplied for winter use of patrols.

VIOLATIONS OF LAW

The highway robber who held up the coaches near Madison Junction on July 9, 1915, has not been apprehended. Edward B. Trafton was tried in the United States district court in Cheyenne, Wyoming, in December, 1915, and found guilty of holding up the coaches in the park on July 29, 1914. He

is now serving a five-year term in the United States prison at Leavenworth, Kansas.

Most of the cases of persons found hunting in the park during the open season in adjoining States were apparently accidental, due to ignorance of the whereabouts of the park line, which is not always well marked, and in rough country is sometimes hard to find. The cases of apparent willful violations of law in regard to hunting occurred mostly during the closed season in the adjoining States by professional hunters.

SANITATION

During the tourist season frequent inspections of hotels and camps were made by officials of the Interior Department and officers of this command.

During July Mr. J. A. Hill made a special inspection of hotels and camps to determine the quality and manner of handling of food supplies. An inspection of the manner of slaughtering and handling the meat supply in the park was made September 6-9 by an expert from the Department of Agriculture on request of the Interior Department.

Two men with a 2-horse team and wagon were kept on the move all summer keeping the camping grounds in a sanitary condition and caring for the earth closets maintained for public use throught the park.

Special sanitary camps for parties traveling in private automobiles and carrying their own camp equipment, located at Mammoth Hot Springs, Upper Geyser Basin, Grand Canyon, and Lake Outlet, were constructed in the early part of the summer. These camps consist of a large shed for housing of automobiles, with a capacity of 12 cars at each point, toilets for men and women, and cooking grates. Dry wood is provided at each place, and at Mammoth Hot Springs electric lights and running water are also provided, all without charge to the tourist. These facilities were appreciated and should be improved upon and the sheds changed to provide for increased travel.

FOREST FIRES

The latter part of the season was very dry and special attention had to be given to fire patrols.

A forest fire was reported at Upper Geyser Basin, about 500 yards east from Old Faithful Geyser, on August 2. It was controlled by the soldiers stationed at that point, assisted by employees of the near-by permanent camps, after it had burned over about 3 acres. It was kept under control by the soldiers for several days until finally extinguished by a hard rain. It was probably started by a picnic party.

On the afternoon of August 25 a small fire was reported about 7 miles south from Fort Yellowstone and about a mile from the main road. One scout and a detachment consisting of a noncommissioned officer and 10 soldiers were sent out and succeeded in extinguishing it the same evening before much damage was done, although it smoldered and had to be carefully watched for several days afterwards. About half an acre was burned over. The cause of this fire was not determined.

On the evening of September 13 a forest fire broke out on Cougar Creek, about 5 miles from Riverside Station, in down timber and jack pines. Such men as could be spared from a road camp in that vicinity assisted the men from Riverside Soldier Station in extinguishing it after it had burned over about 4 or 5 acres. Under a high wind it broke out again on September 21 and spread rapidly. The men from the road crew were again called upon, and 35 soldiers from Fort Yellowstone, under a commissioned officer, were sent out to fight the fire. The following day the number of soldiers was increased to 70 men, and the fire was well under control by the morning of September 25 and was extinguished completely by a hard storm ending in snow on September 26 and 27. This fire burned over a strip about 2 miles long and in places a half mile wide, but no material damage was done, as the burning was mostly in down

timber and jack pines and in willows in the bottom along the stream located several miles from the main road.

RECREATION

Four sanitary automobile camps were established at Mammoth Hot Springs, Upper Geyser Basin, Outlet of Yellowstone Lake, and Grand Canyon. At each camp was constructed a shed 60 by 32 feet, 8 feet high at the eaves, frames built of poles cut in the park and covered with 20-gauge corrugated steel roofing, painted. The sheds are divided by rows of supporting posts into six double stalls each 32 by 10 feet, each stall to hold two automobiles, making a total capacity of 12 automobiles to each shed. The sheds cost an average of \$293.61.

MINERAL PHENOMENA

No notable permanent changes were recorded in the action of the geysers and hot springs during the year. Many of them appeared to be more active than usual for a few weeks in the early part of the summer, due to the increased amount of surface water from the exceedingly heavy snows of last winter.

Hyson Terrace, one of the most beautiful of the terraces at the Mammoth Hot Springs, dried up last fall, but started up again the latter part of February and was fairly active until nearly the close of the tourist season, when it dried up again

and has broken out in a new place just above the old terraces.

A double vent geyser broke out at the Thumb of the Lake early in May, and at first played every 2½ hours to a height of from 75 to 100 feet, but it gradually dwindled and quit playing entirely the latter part of July.

Under special permit of the department a few parties visited the park during the past winter for the purpose of taking moving pictures of geysers, and several others visited the park during the summer season for the purpose of securing moving pictures.

Assistant to the Secretary of the Interior, Hon. Stephen T. Mather, and party visited the park officially from July 22 to July 31. The Superintendent of National Parks, Mr. Robert B. Marshall, was in the park from September 3 to 14. Mr. Horace M. Albright, assistant attorney, Interior Department, was in the park September 13 to 18.

The orders from the War Department direct that the military force now guarding the park be withdrawn, Fort Yellowstone abandoned as a post, and the guardianship of the park transferred to the Interior Department, effective October 1, 1916.

The Interior Department is organizing a ranger force to replace the troops.

In 1886 troops of the Cavalry Arm of the military service marched into the park, pitched camp, and took up the important

duties of making this magnificent reservation a pleasant place for people to visit and a home for the wild game. Many officers and men look back upon their service here with the keenest pleasure. Their duties have been well and creditably performed, and the 30 years of military control will be memorable ones in the history of the Yellowstone National Park.

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This year has been epoch making in Yellowstone National Park history. The entire concession system has been re-organized; large 10-passenger automobiles, especially adapted to the requirements of tourist travel have superseded the ancient stagecoaches; the regular park tour has been extended to include Dunraven Pass and Tower Falls, regions of splendid scenic quality; and the development of the park as a great summer resort, instead of a region to be glimpsed in four or five days of hasty travel, has been initiated. All of these projects have been revolutionary in their scope, and it is worthy of note that they were largely advanced and made effective during the tourist season without inconveniencing the public or interfering with its pleasure in any manner.

A BAD SYSTEM AND SERIOUS PROBLEM.

The reorganization of the concession system of the park was the most important accomplishment of the year. There had been numerous corporations and individuals engaged in furnishing transportation service, hotel and camp accommodations, photographic supplies, etc., and many of them had for years rendered indifferent service to the public.

There were different transportation lines operating from the northern and western entrances in the business of carrying visitors from the park terminals of the Northern Pacific and

Union Pacific Railroads, respectively, through the reservation to the various hotels; there were two large camping enterprises (Wylie and Shaw & Powell companies), and one small poorly equipped camping concern engaged in the business of carrying passengers from the northern and western entrances and accommodating them in camps of a more or less permanent nature. There was an automobile concern, owned and operated by the two transportation companies and by the two large camping companies, none of which controlled the stock or the policies of the enterprise, which was engaged in the transportation of passengers from the terminus of the Chicago, Burlington & Quincy Railroad, at Cody, Wyoming, through the eastern gateway to the Lake Hotel, where connection was made with the horse-drawn stage lines on the "loop" or circle route through the park. There was one hotel system involving a very large investment which embraced five hotels and two fully equipped lunch stations.

There naturally followed constant friction among so many groups of concessioners. This was particularly true of the transportation companies. Many of the concessions in the park were operated in an uneconomical manner, and the cost of this inefficiency in management was borne by the traveling public, not in the form of exorbitant charges for service, but in unsatisfactory and insufficient service.

The small camping company, after two years' operation with meager equipment and under incompetent management, had demonstrated clearly to the department and to the traveling public that it was utterly incapable of rendering permanent camp service that would even approach the standard of service established by the department. Its elimination from the park was inevitable.

Moreover, the time had come for the motorization of all transportation service in the park, and the all-important question was whether the corporations engaged solely in the transportation business and the two large camping companies should each be permitted to motorize its stage lines, or whether an adjustment of interests should be made whereby a single responsible automobile transportation line should purchase the necessary motor equipment and control all transportation service in the park. If the latter course should be chosen, large property interests necessarily would have to change hands on a fair and equitable basis. The determination of this basis involved the solution of many difficult problems. On the other hand, vast quantities of equipment, hundreds of stagecoaches, great forests of harness, scores of barns, blacksmith shops and corrals, several permanent camps and lunch stations and the Fountain Hotel would be rendered useless by the installation

of motor transportation service without regard to the manner in which it should be effected.

The motorization and reorganization problems were therefore closely, yes, intimately related and were amazingly intricate.

THE PRINCIPLES OF REORGANIZATION.

The department finally concluded to grant a single transportation concession. The grounds upon which this decision was based were:

First. Because it would be uneconomical to permit the establishment of more than one transportation line on the Yellowstone roads with each touching the same point, just as it would be uneconomical to run more than one street-car line on a single street; also because each would require a separate management, a separate overhead expense account, and a separate operating supply base; likewise because there would necessarily be duplication in the establishment of garages, gasoline stations, etc.

Second. Because more than one line would be difficult to control by the park authorities, as questions of right of way on the roads would constantly arise for adjustment; and because there would be friction at railroad terminals, hotels, and other starting points in the handling of passengers.

Third. Because with more than one competing transportation system the tourist would be subjected to importunities and harassment at railroad terminals by rival solicitors, chauffeurs, and information clerks; and because the economic waste involved in the operation of the several systems would increase the cost of park tours.

Fourth. Because the investment required to establish a satisfactory transportation line in Yellowstone Park with necessary operating bases, supply stations and garages, would be very large, and it would be doubtful if more than one line could be operated at a profit.

Having determined the principles that would guide the motorization of the transportation service, reorganization of all of the important concessions was necessary before the new transportation concession could be granted. This was finally accomplished by mutual agreement between the various transportation, permanent-camp, and hotel interests. A money consideration accomplished the elimination of one transportation company and the motor line operated from Cody, Wyoming. An adjustment of property interests and another cash consideration passing to a party that wished to withdraw from the camping business made possible the abandonment of the transportation features of the permanent camping business and the combination of the two

important permanent camping concession. The third camping company was denied a renewal of its franchise.

When the reorganization reached the stage where there remained but one hotel company, one transportation company, and two camping companies that had disposed of their transportation privileges and combined their other property interests with the consent of the Department, the policy of permitting the establishment of a single hotel enterprise, a single permanent camping business, and a single motor transportation line, as three Government-regulated public-utility monopolies, was adopted.

THE YALLOSTONE PARK CAMPING COMPANY

Accordingly, the Yellowstone Park Camping Company was organized by the former Tylic and Shaw & Powell camping interests and the permanent camping franchise was granted to it. The motor-service privilege was granted to the Yellowstone Park Transportation Company and the Yellowstone Park Hotel Company was permitted to remain as the hotel concessionary. Contracts were entered into with all of these companies, and arrangements were made early in the spring for operations under the new agreements. The permanent camping company abandoned 10 of the camps and lunch stations operated by its predecessors, the Tylic and Shaw & Powell companies, built one new camp at Mammoth Hot Springs, and reconstructed the five remaining camps

of the old system; the hotel company abandoned the Fountain Hotel in Lower Geyser Basin and its two large lunch stations at Norris Basin and the West Thumb of Lake Yellowstone; the transportation company purchased 100 ten-passenger automobiles and 16 seven-passenger cars specially designed for the park service, and installed a high-class motor transportation line. The stagecoach of the Yellowstone passed into history; a new era for the park dawned with the opening of the 1917 season.

CIRCLE TOUR EXTENDED

As I have stated, the circle tour of the park was extended this year to include the Dunrover Pass and Tower Falls regions, thus eliminating the Canyon-Norris trip and offering the visitor an opportunity to see a section of the park that contains some of the choicest bits of Yellowstone's scenery. Moreover, the schedule of the transportation line was arranged to give the visitor as much time as possible at the points of greatest interest--Mammoth Hot Springs, Upper Geyser Basin, Yellowstone Lake, and the Grand Canyon of the Yellowstone. A third advantage of the new motor system was the arrangement that the railroads and the transportation company perfected whereby it was made possible for park visitors to enter via one gateway, tour the park, and leave via another gateway. This arrangement was in effect throughout the season, and hundreds of visitors took advantage of the opportunities it offered for

touring via diversified routes. For instance, 40% tourists entered via the Galy gateway and left the park via the Gardiner or northern gateway, 40% entered via the western gateway and departed in the Galy direction, 20% entered via the northern entrance and went out of the park at the western gateway.

YELLOSTONE NATIONAL PARK: ALL-SUMMER TOURS

The all-summer tourist idea has not yet, of course, received such expression in actual work by concessioners, but the Service has entered upon its methodical development. For one thing, the Service, in cooperation with the Bureau of Fisheries, began the stocking of many lakes and streams not heretofore inhabited by fish; market fishing for hotels and camps in waters near these tourist centers was prohibited in order that angling might be better sport for the park visitor; new trails radiating in all directions from the hotels and camps were constructed; and other preparations and plans for the rapid development of the more general public use of Yellowstone Park were formulated.

The concessioners will now be required to encourage stop-overs in the park by offering side trips from the hotels and camps to points on the new trail system, boat trips, fishing trips, visits to interesting points, such as the Petrified Forests, the Buffalo Park, Jackson Hole, and the Cooke City region. Mountain climbing will be encouraged, and in the near

future provision will be made for the establishment of golf links and tennis courts.

Yellowstone Park has tremendous recreational advantages that are only just beginning to be appreciated. It will take time, however, to convince the general traveling public that it is worth while to spend more than five or six days in this great playground.

"CONTROL" THAT DOES NOT CONTROL

The possibilities of the Yellowstone region are so numerous that the mere thought of them inspires enthusiasm to begin their development, but when an officer of the National Park Service stops to consider what control the Interior Department and the Service have over this vast park his enthusiasm turns to discouragement and regret. The Department of the Interior controls the concessioners and prescribes the character of service that they must render to the public. It also authorizes the rates that may be charged for service. Its officers supervise the admission of automobiles to the park and the care of the wild animals. The water system and electric light plant at Mammoth Hot Springs are under the control of this department; so is the telephone system.

But here its authority ends. All road and trail construction is under the Engineer Corps of the Army, and the protection of the park is intrusted to soldiers. The Army engineers report

to the Chief of Engineers in Washington; the commander of the patrolling troops reports through the commander of the Western Army Department to the War Department; the supervisor of the park reports to the Director of the National Park Service. The supervisor is supposed to be the executive of the park, yet he has no control over the improvement of the protection of his reservation. He understands the handling of tourist traffic, he knows the necessity for accomplishing improvement work with the needs of the traveling public constantly in mind, he is familiar with the problem of protecting the forests and wild animals of the park; nevertheless, unless the engineer officer and commanding officer of the troops voluntarily place themselves under his general jurisdiction, he can not formulate or carry out a proper administrative policy for the park, nor can he advise the National Park Service as to the manner in which the park is being operated. He can not even open the park at the beginning of the season, yet the Park Service is charged by the traveling public with every failure to make conditions for touring satisfactory. Engineer officers are changed every two or three years or more often, and the commanders of the troops and the soldiers themselves come and go under the orders of the War Department; there is no opportunity for these officers to gain a thorough knowledge of administrative methods of the National Park Service before they are moved on to other spheres of activity.

The War Department recognizes this and is especially anxious to rid itself of the duty of maintaining Old Fort Yellowstone and providing for the protection of the park.

ONLY ONE WAY TO EFFICIENCY.

The National Park Service under the direction of the Secretary of the Interior is charged by the act establishing the bureau with the "supervision, management, and control" of the national parks, including Yellowstone, but this Service has no effective control of this important member of the park system, because it cannot control, supervise, or manage its protection or its improvement. This, in a single sentence, describes the status of the government of the Yellowstone today. The park may be likened to a great three-headed monster which is difficult to manage anyway because of its great size, but uncontrollable because of the diverse activities of its three heads. Legislation designed to remedy this unfortunate and really serious situation should receive the early consideration of the National Legislature.

In all of the other national parks, with the exception of Crater Lake, where road construction is also under the Engineer Corps of the Army, full powers of "supervision, management, and control" are exercised by the Interior Department.

THE PARK TELEPHONE SYSTEM

During the past year the Service has devoted much attention to the improvement of the telephone system. Many miles of the system have been reconstructed, and some additions to the lines have been built. This work is still in progress. It is essential that excellent telephone service be maintained at all times in order that the various patrolling stations in the park may promptly report to headquarters all forest fires, accidents, violations of the rules and regulations, and conditions generally in the outlying sections of the park. This work of reconstruction should be continued until the entire telephone system is rebuilt. From a financial standpoint the telephone system is also entitled to consideration as an important public utility.

FIRE LANES AND SCENIC TRAILS

The Service has also maintained several hundred miles of fire lanes and has constructed numerous additional lanes. These lanes are built on a very satisfactory grade and will splendidly serve the purposes of a tourist trail system. They lead into the great scenic sections of the park, out to lakes and streams teeming with fish, far away into the foothills of the Absaroka Range, where the herd of wild buffalo ranges, into regions of strange geological formations, and they afford park tours touching the same important points of interest that the road

system includes. We may now invite the traveler to visit the Yellowstone and offer him the choice of an automobile tour of the great park or a horseback trip over the fire-lane system, where there is greater opportunity for communion with nature, its wild flowers, its trees, and its rippling streams, where wild animals, gentle and unafraid, are to be seen in abundance, and where all is fresh and calm and beautiful.

Next year, it is proposed to build a broad new trail around Lake Yellowstone, penetrating the moose country and another region of striking scenery. This trail will also make a remarkable fishing territory readily accessible.

OPENING OF THE SOUTHERN GATEWAY.

The road system of Yellowstone National Park consists of 278.8 miles of automobile highways and 24.75 miles of secondary roads. The system includes 106.5 miles of road in the forest reserves east and south of the park. Improvement of the road system was continued during the year, and hard surfacing of the main roads was begun under an initial appropriation of \$20,000. The completion of the road in the Shoshone National Forest east of the park made possible the opening of the scenic Cody or eastern gateway, which the Burlington Route has developed by the establishment of through train service to Cody, connecting with the automobile transportation line to the park. The road in the Teton Forest south of the park has opened the wonderful Jackson Hole country, with its beautiful lakes and its imposing

mountains of the Teton Range, great, jagged, snow-covered peaks that rise perpendicularly from the surface of the lakes in the valley. During the 1917 season, for the first time, automobiles were operated from the Lake Hotel to the Jackson Hole on a regular schedule.

With the opening of the southern gateway the park came to possess four entrances and four great feeders to the "loop" road system connecting the important points of interest. Two of these feeders in the adjacent forest reserves, as I have pointed out, are maintained as a part of the park road system on the correct principle that as they are used almost exclusively by visitors to the park their maintenance should not be placed as a burden upon the counties in which they lie, counties that are only sparsely settled and contain little taxable property in proportion to their size.

The status of the roads in Montana leading directly to the north and west gateways is similar in many respects to those of the Wyoming feeders, and it is a question as to whether or not Federal aid should be authorized in the maintenance of these roads which are used principally by park tourists. This matter invites thorough investigation because the exceedingly heavy motor traffic on the north and west approach roads has impaired them, and is each year placing a heavier maintenance burden upon the counties in which they lie. The ability of

these county organizations to bear this burden is the phase that deserves serious study.

In this connection it is proper to state that there has been at all times perfect cooperation between the State authorities of Montana and Wyoming and the National Park Service in protecting the park interests and in making conditions attractive for travel to the park. The municipalities of the two States have been active in providing free automobile camps for the use of motorists. The State game commissions of the two States have actively assisted in the protection of the wild animals of the park in the seasons when they have been driven from their natural habitats by stormy weather. The State and county highway authorities have rendered consistent aid in improving road conditions. Relations have been most harmonious.

GREATEST WILD ANIMAL SANCTUARY.

The killing of wild animals, except predatory animals when absolutely necessary, is strictly forbidden in Yellowstone Park by law. The park is therefore the greatest wild-animal sanctuary in the world. We endeavor to refrain from calling it a game sanctuary, because park animals are not game in the popular sense of the term. The park is, however, the great source of game supply for the surrounding territory, and the States of Wyoming and Montana have wisely sought to assist

in the protection and control of this supply.

The State of Wyoming for many years has pursued a broad policy of game conservation, with the result that wild animals are carefully protected not only in the park region but in all sections of the State. Another result is that hunting may be permitted in proper seasons on State lands without impairing the game supply, and to the delight and satisfaction of the sportsman. On the other hand, Montana is rapidly developing a similar policy of game conservation, and the State game warden is cooperating with the National Park Service in the protection of animals in the region adjacent to the north and west boundaries of Yellowstone Park. Each State has established game refuges immediately along the borders of the park, thus increasing in an important degree the protection afforded their game. The cooperation of the two States was particularly valuable during the past winter when snow almost unprecedented in the history of the Northwest drove thousands of elk, antelope, and other animals beyond the park boundaries. Park rangers, State game wardens, and forest rangers carefully watched them through the long period of recurring storms, and every effort was made to prevent the loss of these wandering and hungry animals.

All of the animals that could not find sustenance and were accessible to the park authorities, particularly the bighorn

sheep and deer and the antelope, were fed hay during the period of heavy snowfall in extremely cold weather.

EFFECTIVE WINTER CARE OF THE ELK

There was little loss among the animals to which this special care was given. The death rate among the very old and very young animals was higher, because of loss of strength from long conflict with the elements rather than from hunger. Large quantities of hay were also fed to the accessible elk, but the elk loss was considerably larger than that sustained by the herds of other animals, because they wandered over many square miles of territory outside of the park and ranged in localities far from the roads and beaten paths. It is important, however, to observe that the percentage of loss in herds of domestic animals in the region surrounding the Yellowstone was considerably greater than the loss in the elk herds.

I have dwelt upon this care of the animals during the long, cold winter, because there was severe and unjust criticism of the National Park Service on account of losses that occurred in the elk herds. The Service, and even the department, were arraigned for the alleged neglect of their charges, and many demands were made even after the worst storms had passed that the wild animals should be fed forthwith. As a matter of fact, all of the animals that needed feed and could be reached were fed, and every other precaution to save them from death or

injury was taken. Furthermore, all the hay stored in the park was used and then all supplies elsewhere available were purchased and carefully rationed out to the animals. The effectiveness of this work is best indicated by the relatively small actual losses.

There is no ground for adverse criticism, because all was done for the animals that it was humanly possible to do. In this connection, commendation is due the park ranger force for the efficient work accomplished. The members of this force braved tremendous hardships at times during the winter while engaged in watching the animal herds.

The spectacle of the wild animals in the snows of the Yellowstone in winter is one of the most interesting that one can imagine. In 1916 excursions to the park for wild animal observation were offered by the Northern Pacific Railroad, and were very well patronized. The extreme cold and fierce storms of the past winter, however, made the operation of excursions of this character inadvisable.

Many fine photographs of the animals in the Gardiner Canyon during the winter storms have appeared in various magazines during the year and have attracted much attention.

THE PROVISIONS OF THE WINTER

In the winter it is not difficult to catch the elk. The Service accordingly makes a practice of allotting these

animals to States, counties, municipalities, and other governmental organizations and public institutions for exhibition purposes where their future protection is assured. This practice has obtained for several years. During the past year 496 elk were shipped from the park. Many more will be shipped during the winter that is approaching. Approximately 300 head have already been allotted.

BISON HERDS INCREASED

The bison herds in the Yellowstone continue to grow apace. The tame herd now numbers 330 animals, and the herd of wild bison, the only herd of its kind in the world, numbers 67. This latter herd ranges in the east-central part of the park on the headwaters of the Lamar River and in other valleys close to the base of the Absaroka Range.

The report of the park supervisor on page 191 contains much interesting data on the wild animals of the Yellowstone.

THE SCENIC GATEWAY

During the summer of 1916 the opening of the scenic Cody gateway of the park was the sensation of the season. The marvelous grandeur of the Shoshone Gorge, the Shoshone Dam, the second highest structure of its kind in the world, the beautiful lake that it forms, the fantastically carved canyon of the North Fork of the Shoshone, Sylvan Pass in the Absarokus, and the beautiful vistas to be obtained all the way from Sylvan

Road to Lake Yellowstone, surprised and overwhelmed the hundreds of visitors that selected this new route into the park. This route was still more popular during the 1917 season.

CLIMAX OF YEARS WORKS TO BEYOND.

During the season of 1917 the scenic southern gateway was formally opened to the traveling public by the establishment of the new scheduled automobile service to the Jackson Hole from the Lake Hotel, of which mention was made in the discussion of the park road system. The scenery of this beautiful region is vastly different from that of the territory east of the park through which the Cody road runs, but it stands shoulder to shoulder with it in quality. The splendid scenery of both may only be described by profusely using superlatives. The road into Jackson Hole leaves the main road system at the West Thumb of Lake Yellowstone and proceeds in a southerly direction over the Continental Divide Dam through a forest of unusual density; thence along the shore of Lewis Lake, nestled in the timber and well stocked with fish; thence across the Lewis River below a point where the stream roars down a gorge forming two splendid waterfalls, the upper 80 feet and the lower 50 feet high; and thence across the Hitchstons Plateau to the southern gateway on the Snake River.

From this point the road proceeds down the picturesque valley of the Snake to beautiful Jackson Lake at the base of the Teton Mountains. A striking portion of this range, including Mount Moran and the Grand Teton, towers above the Lake in astounding magnificence.

All who took advantage of the opportunity to visit this region during the summer were thrilled by its splendors. One traveler of large experience made the statement that this was "the climax of Yellowstone scenery." Another said the region was "more wonderful than Wonderland (meaning Yellowstone) itself." All who gave the status of the region any thought declared that it should be added to the park.

This is precisely our view of the destiny of the Jackson Hole. A suggested boundary for this addition embraces the Teton Range to and including the Grand Teton and the road from Victor, on the Union Pacific system; thence it follows along the hydrographic divide north of Buffalo River, thence to the Continental Divide, thence around the headwaters of the Yellowstone to the east boundary of the park. The area described by this line is not large, and its inclusion in the park should receive the early consideration of Congress.

The principal roads in this region are already being reconstructed and made ready for heavy automobile travel. In the meantime the Wyoming authorities are improving the highways

running northwest from Rawlins and Lander and north from Cheyenne and other points in southern Wyoming. Of the projects involving additions to national parks, this proposed Jackson Hole addition to the Yellowstone is one of the most meritorious

THE NORTHWESTERN GATEWAY TO THE YELLOWSTONE

Another gateway that deserves more attention than has been given to it in the past is the northwestern entrance from Bozeman, Montana. The road from Bozeman leads up the Gallatin River through a splendid scenic region and connects with the main road system of the park at the western gateway. Automobile parties following this road from the west gateway or the main highway from Livingston on the north to Bozeman will find little difficulty in making an interesting trip to the Lewis and Clark Cavern National Monument, near Sappington, Montana. It is planned next season to open this cavern for the inspection of the traveling public. It is one of the most extensive caves in the United States.

YELLOWSTONE TOURIST TRADE SUBSTANTIALLY INCREASED

Yellowstone Park enjoyed a heavy tourist patronage during the 1918 season, substantially exceeding that of the preceding summer. A comparison of yearly totals shows a slight advantage in favor of 1918 over 1917, which was attributable wholly to

to the special wild animal excursions during the early spring of 1916. These trips, as I have explained, could not be repeated in the spring of the current year because of the intense cold and unusually deep snows. The legitimate summer travel of this season, however, exceeded that of last year, and the increase in private automobile travel to the park this year is particularly gratifying. Cars to the number of 5,703 entered the various gateways of the park this season, as against 3,445 in 1916. Tables analyzing the Yellowstone travel are printed in the report of the acting supervisor of the park on page 117. The tables on page 191 show the yearly increases in the number of visiting automobiles since motor traffic was permitted in 1915; also the increase in automobile revenue which, of course, means better highways in the park.

Hundreds of motoring parties entered the park with their own equipment and supplies, and camped near the lakes and streams or in the public automobile camps which are maintained by the National Park Service. Many other parties toured the park in their private cars, stopping each night at hotels or permanent camps.

FREE AUTOMOBILE CAMPS BEING IMAINED

The free public automobile camps are located at Mammoth Hot Springs, Upper Geyser Basin, Yellowstone Lake, and the Grand Canyon. In each of these camps there is a spacious

structure for the shelter of cars, plenty of water for drinking and cooking purposes, grates to be used for cooking, and toilet facilities. The camps are policed by park employees and a small truck is used for carrying away garbage and keeping the camping grounds strictly sanitary. This system of free automobile camps will be extended in the park as the demand for them increases. The continued improvement of roads leading to Yellowstone Park from eastern points and the complete establishment of the park-to-park highway will tremendously encourage the automobile travel in the park.

YELLOWSTONE RAILROAD ROUTE

Railroad traffic to the park this year was somewhat less than that reported last year, but was nevertheless gratifying. Three railroads reach Yellowstone. The terminus of the Northern Pacific is at Gardiner, Montana, which is reached by travel over the main line of the Northern Pacific to Livingston, Montana, thence up the scenic canyon of the lower Yellowstone River to the park boundary. The ride from Gardiner, the northern gateway, to Mammoth Hot Springs through the Gardiner Canyon is also very interesting. The famed Eagle Nest Rock is in the Gardiner Canyon and a herd of park antelope usually range on the meadow between the mouth of the canyon and the north boundary. It is in this region that the wild animals

gather in the winter time. The Northern Pacific line to the park was the first to be established.

The second oldest line is the Union Pacific branch line to the western gateway at Yellowstone, Montana. Trains from the east connect with this line at Ogden, Utah, but usually the traveling public prefers to visit both Ogden and Salt Lake City in connection with the Yellowstone trip. The line to the western gateway is also scenic, particularly the Rees Pass section of the route where the railroad crosses the Continental Divide. The ride from Yellowstone, Montana up the Madison River to the junction of the Gibbon and the Firehole Rivers, which form the Madison, is most attractive. At this point the western gateway road connects with the main road system.

It is also worthy of note that in connection with the park trip through the western gateway connection may be had at Salt Lake City with the Salt Lake Route for Lund, Utah, at which place an automobile line is prepared to carry passengers into the beautiful Zion Canyon, Mukuntuweap National Monument. Connection may also be made at Salt Lake City and Ogden with the Denver & Rio Grande lines for Mesa Verde National Park, the Royal Gorge, etc.; also with the Southern Pacific and Western Pacific lines for California and with the Oregon Short Line subsidiary of the Union Pacific for the Northwest.

The third railroad route to Yellowstone National Park is the Burlington Route, with terminus at Cody, Wyoming. From Cody the scenic trip to Yellowstone Park is made as described elsewhere in this report. Cody may be reached from two directions, via the Burlington route. One line, from the southeast, passes through Sigeston, South Dakota, where connection may be made for Hot Springs, South Dakota, and Wind Cave National Park, thence through Sheridan, Wyoming, near the Devils Tower National Monument and the Big Horn Mountains, thence through Billings, Montana to Cody. The other line runs north from Denver and Cheyenne to Casper, thence down the brilliantly colored and fantastically carved Wind River gorge through Thermopolis, where there are hot springs possessing recognized curative properties and a State zoological park, and on to Cody. The two Burlington lines join at Franconia, Wyoming, in the Shoshone reclamation project, one of the largest and most successful of the Government reclamation enterprises.

RAIL ROUTES TO YELLOWSTONE

These three railroads interested in promoting Yellowstone travel have authorized the sale, during the park season, of round-trip excursion tickets covering railroad transportation to the park via the lines of any one of these routes and return

via the same route or via the lines of one of the other two routes. Thus during the 1917 season, as I stated on a preceding page in connection with the motorization of intrapark transportation, visitors to Yellowstone Park for the first time had the privilege of entering the park at one entrance and leaving it at any one of the other gateways, except, of course, the southern gateway, which has not as yet been developed as a railroad entrance.

ANNUAL REPORT

FOR

THE FEDERAL RESERVE BOARD

1913

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September 28th, 1918

The Director,
National Park Service,
Washington, D. C.

Sir:

Reference to my annual report dated September 27, enclosed herewith, corrections and additions will be transmitted at an early date as follows:

Statement of travel, pages 7 to 9 will later be brought down to date.

Page 15, report of C. Clyde Baldwin not yet received; will be transmitted soon as received.

Page 30, report of Mr. W. T. Thompson, Supt. Fisheries State, not yet received. Will be transmitted soon as received.

I hope a little later to have a few interesting photographs to illustrate some of the main features of the enclosed report, and will transmit them.

Very respectfully,

Acting Superintendent.

Inclosure.

The Director,
National Park Service,
Washington, D. C.

Sir:

In compliance with your request of August 23, 1918, I have the honor to submit annual report of condition of affairs in, and the management of, Yellowstone National Park during the past fiscal year.

The Yellowstone National Park was set aside by act of Congress approved March, 1872 (secs. 2474 and 2475, R. S.; 17 Stat., 32), as a pleasure ground for the benefit and enjoyment of the people and placed under the control of the Secretary of the Interior. It is situated principally in northwestern Wyoming but laps over a little more than two miles into Montana on the north and almost two miles into Montana and Idaho on the west. Its dimensions are about 62 miles north and south and about 34 miles east and west, giving an area of about 3,348 square miles, or 2,142,720 acres. Its altitude is 6,000 to 11,000 feet.

During the first fourteen years of its existence as a National Park, the Yellowstone was administered by civilian superintendents, appointed by the Secretary of the Interior, assisted, when funds were available for salaries, by a few civilian scouts. At that time the country was new and wild, and filled with lawless characters of all sorts. This method

of governing the park was sometimes unsatisfactory for the reason that funds were insufficient to employ enough scouts to properly police the vast area to be protected, and I understand that in some instances the employees were selected for political reasons without reference to their adaptability for the duties required. By Act of Congress approved March 3, 1883, the Secretary of the Interior was authorized to call upon the Secretary of War to make the necessary details of troops to guard the park, but it was not until August 20, 1886, that the civilian force was finally relieved by officers and enlisted men of the United States Army as guardians of the park, the Commanding Officer of troops serving also in the capacity of acting Superintendent of the park under the direct supervision of the Secretary of the Interior. Many most efficient and able officers of the Army have held the responsible position at the head of the administration and protection of Yellowstone Park, and records were established of which they may well be proud. But conditions have changed, and the National Parks have grown in number and popularity to such an extent as to warrant the establishment by Congress of a regular Bureau in Washington for their administration and management under modern business methods, and this Bureau has been recognized as the natural and proper medium through which all park activities are to be prosecuted, by the Act of Congress approved July 1, 1918, (Candy Civil Bill) which provides the total sum of

\$334,920.00 for administration, protection, maintenance, and improvement in Yellowstone National Park. Under this act the Corps of Engineers of the Army was, on July 1st, relieved of the duties of building and maintaining roads, bridges and other improvements. The responsibility of the protection of the park has been taken over from the commanding officer of troops, the stations in the park have been garrisoned by civilian rangers, and orders are expected daily for the permanent abandonment of Fort Yellowstone, releasing the troops which are needed by the War Department for important work elsewhere.

Park Headquarters are located at Mammoth Hot Springs, 5 miles from the northern entrance. Fifteen Ranger Stations are maintained at convenient points throughout the park, and these are connected with Headquarters by 270 miles of telephone lines. There are 270.0 miles of main road and 24.75 miles of secondary road to maintain inside of the park, and 106.5 miles of main road to maintain in the forest reserves adjoining the park on the south and east. Nearly 400 miles of fairly well marked trails are also available for use of those desiring to travel on horseback.

TRAVEL

Before the opening of the tourist season, much doubt existed as to the probable effect of the war conditions on tourist travel to the National Parks, and many, more especially the concessioners, were very pessimistic as to the prospects. In

March it was officially announced through the press that the Yellowstone Park tourist season would extend from June 25 to September 15. From March until the season finally opened, many rumors were current to the effect that the park would not open due to war conditions, and these had to be contradicted many times. It was not until June 17th that I was notified by wire that the hotels would not open, and this information going out through the press and by various other methods was often interpreted to mean that the park was closed, and doubtless resulted in travel being discouraged to a considerable extent. The lateness of this announcement resulted to some extent in hardship to other concessioners, but the Camping Company profited by the change, as it left to them all travel except those providing their own camping facilities, instead of dividing it with the hotels. This enabled the Camping Company to make a fair showing and operate at a reasonable profit, whereas if the hotels had also been opened, both would have operated at a loss.

The latter part of May and early in June the weather was much warmer than usual, and in June 2.97 inches of rainfall was recorded, which was about one-third more than the normal for June. These conditions, taken together, resulted in extremely high water, with an immense amount of damage to roads from wash-outs. The railroad on the Park Branch to Livingston was washed out in several places so we had no train into Gardiner from

June 12th to June 21st, inclusive, and it was not until June 19th that arrangements were finally made to bring the mail from Livingston by automobile. The road through Gardiner Canyon was washed out so as to be impassable after June 10th, and the old road over the hill back of Mammoth Hotel, which was repaired at an expense of about \$4,000, has been in use ever since. This was no special disappointment, however, as we had expected the Gardiner Slide to close the canyon road permanently, and the old road had been put in condition for travel with this in view. The old road is longer, narrow, and very slippery after heavy rains, but it is considered only for temporary use until the Gardiner Canyon road can be restored, and an appropriation of \$50,000 is now available for that purpose. One-way schedules were necessary on it about train time, when travel was heaviest, and while no serious accidents occurred, much inconvenience was caused by meeting of vehicles on this road.

The roads to Norris and the west side of the park were open at the end of May.

On the day of opening for tourist travel, the roads on the regular park tour were open for travel except from the eastern entrance to the belt line, and between Canyon and Tower Falls through Dunraven Pass. The regular travel was routed through Dunraven Pass beginning July 8th, but on a few occasions during the season, when heavy storms have occurred, it was not considered

safe, and the regular cars came in via Morris. The road between the eastern entrance and Cody was very badly damaged by the June floods, and for a time the chances for travel from that direction looked slim. But the citizens of Cody did much temporary repair work at their own expense, and succeeded in getting a special appropriation of \$25,000 additional to the regular appropriation, for repairing the unusual damage between the Lake Hotel and Cody. A few private automobiles came in from the Cody entrance on July 24, but they had to be dragged across two huge snowbanks in Sylvan Pass with ropes, and it was not until July 15th that the road was considered safe for regular travel, and the Yellowstone Park Transportation Company established its regular daily schedule to trains at Cody.

The bridge across Lamar River, on the road between Tower Falls and Cooke City, was washed away on June 11th, and from then until August 6th travel to Cooke was relayed from Lamar River, which was crossed in a small car hung on a wire cable.

The Transportation Company maintained a regular twice-a-week service to Jackson Hole, beginning July 15th, but it was not patronized to any great extent.

The aggregate number of persons visiting the park during the year ended September 30, 1918 was as follows:

Yellowstone Park Transportation Company:

Entering via the northern entrance.....	1037
Entering via the western entrance.....	1136
Entering via the eastern entrance.....	311
	3086

Making park trips with private transportation:

With automobiles, paid and complimentary.....	15,330	
With automobiles, second trip.....	628	
	<u>17,228</u>	
With motorcycles.....	25	
With bicycles.....	3	
With other transportation as "private camping parties".....	474	17730
Miscellaneous short trips.....		<u>130</u>
Grand total.....		21186

As a matter of economy, the National Park Service required the Camping Company to open but three of its permanent camps, namely, Mammoth, Geysers, (at Upper Basin) and Canyon, thus saving the expense of running the Lake Camp, the camp at Lost Creek, near Tower Falls, and the lunch station near the western entrance. This arrangement required a much less overhead expense, and gave better assurance of a paying business at the beginning of a very doubtful season, and caused but very little, if any, dissatisfaction on the part of the tourists. Instead of staying one night at Lake Camp, the distance from Upper Basin to Canyon was covered in one afternoon's drive, leaving an extra day for viewing the more interesting wonders at Upper Basin and Canyon. The Camping Company reports that 68,257 meals and 26,407 lodgings were served at the camps during the season:

TRAVEL BY DIFFERENT ROUTES:

From the north, via Gardiner, Montana.....	7499
From the west, via Yellowstone, Montana.....	6225
From the east, via Cody, Wyoming.....	4399
From the south, via Jackson, Wyoming.....	537
From the northeast, via Cooke, Montana.....	<u>60</u>
Total.....	21186

PRIVATE AUTOMOBILE TRAVEL.

	Autos.	Tourists.
Entering via the northern entrance.....	1511	5263
Entering via the western entrance.....	1938	7341
Entering via the eastern entrance.....	1127	3992
Entering via the southern entrance.....	174	562
Total.....	4710	17228

A fee of \$7.50 was charged for automobile tickets of passage and \$2.50 for motorcycle tickets of passage, which were good for the entire season. Complimentary tickets were issued to officials of adjoining States or counties, and to officials of the Federal Government, visiting the park officially.

ADDITIONAL TRAVEL BY STATES

A statement showing the automobile travel, by states, in Yellowstone National Park, for the season of 1918 follows:

Private Travel in Yellowstone National Park, by States.

	North Entrance	West Entrance	West Entrance	South Entrance	Totals
Alaska		3			3
Arizona		12	22		34
California	2	30	14	4	50
Colorado	95	266	84	11	456
Connecticut	66	137	291	9	503
Delaware	2	2	6		10
District of Columbia			14	2	16
Florida	3				3
Georgia		3	30		33
Idaho	68	2370	26	276	2692
Illinois	64	41	47		152
Indiana	31	29	10		61
Iowa	119	59	76	2	256
Kansas	44	167	141	8	360
Kentucky	2				2
Louisiana		6	5		11
Massachusetts	5	2			7
Michigan	29	22	50		101
Minnesota	126	17	21		164
Mississippi	2	3	12		17
Missouri	26	76	122	2	226
Montana	3071	1605	390	4	5070
Nebraska	78	95	376		549
Nevada	5	54	9		68
New Jersey	3	4	10		17
New Mexico		10	29		39
New York	24	21	14	2	61
North Dakota	276	34	31		341
Ohio	31	25	34		90
Oklahoma	14	59	170		243
Oregon	109	190	21		299
Pennsylvania	17	6	14		37
Rhode Island	2				2
South Dakota	111	10	91	4	216
Tennessee		3	5		8
Texas	13	54	91		158
Utah	68	1637	35	114	1854
Vermont	3				3
Washington	379	197	92		668
West Virginia		4			4
Wisconsin	103	27	13		143
Wyoming	180	147	1658	95	2090
Canada	50	10	3	6	69
Foreign	5898	7294	3790	519	17101
Unclassified					629

All but a very small percentage of tourists visiting the park traveled by motor transportation. The total travel, as compared with the past three years, was small. But it was better than many anticipated at the beginning of the season, although the number coming to the park by rail was relatively small, due to the fact that the railroads rather discouraged travel for pleasure during the busy war times.

Camping shelters, wood and toilet facilities, were furnished free to parties touring with their own cars and camping out. While we did not always have sufficient labor available to give these camps proper attention, they were appreciated and complaints were few.

No movable-camp licenses were issued for wagon and saddle horse transportation.

Special permits were issued to parties holding properties in the mining camp of Cooke, Montana, to use their motors for hauling supplies to and from Gardiner, Montana, through the park as follows:

Nels E. Soderholm.
 Yellowstone Mining Corporation.
 Western Smelting & Power Company.
 Buffalo-Montana Company

These parties have done comparatively little hauling, and what they have done has been rather expensive for them, due to the fact that they expended considerable money repairing the road and bridges after the high water had washed them out in many places.

Motor cars and trucks were generally used by different branches of the Government, and by concessioners, in handling regular business in the park. Special permits for these were issued without charge.

CONCESSIONS

All concessioners operating in the park showed their usual fine spirit of co-operation, and complaints from the public resulting from any friction between different interests were practically unknown during the summer.

As in every line of work, due to unusual war conditions, all kinds of labor and supplies are scarce, and economy under all conditions is a virtue. Consequently additions to plant, improvement of buildings, and similar work that can be postponed, is discouraged, and only actual necessary expenditures for maintenance is encouraged. For these reasons, many improvements under consideration by concessioners were not made.

The Yellowstone Park Hotel Company did not open any of its hotels in the park, and only a keeper for each hotel was employed.

The only accommodations available in the park were at the Mammoth, Upper Basin, and Canyon Camps, operated by the Yellowstone Park Camping Company. The fact that the hotels did not open, made business fairly good for the Camping Company, even though travel was light. As a rule the accommodations were excellent, and complaints were few. A new building was constructed at Mammoth Camp, for office, dining room, and amusement room, and while it is not

satisfactory from an architectural standpoint, it serves its purpose well and added much to the comfort and pleasure of the public. A garage for taking care of private automobiles was also built at Mammoth. At Upper Basin Camp but little improvement work was done, due to scarcity of labor. A new laundry was constructed. An extension to the log dining room, commenced late last fall, is still unfinished, though it was badly needed during the height of the season. At Grand Canyon Camp a rough log building was erected for use as a laundry, and a large warehouse and a garage are under construction.

The Yellowstone Park Transportation Company operated the only transportation line in the park, and handled all travel from the trains at Gardiner, Yellowstone, and Cody. As this kind of travel was light, only a small part of the extensive plant of this company was in use during the season. The service was improved over the 1917 season; drivers were usually careful, and attentive to passengers, and complaints were few. A new garage, 50 x 200 feet in size, was built by this company close to the Lake Hotel late last fall, but has not been put in use as there was no stopping place at the Lake during the season.

Practically no business was done by the Yellowstone Park Boat Company during the summer, as there was no opportunity to patronize the boats, due to the lack of accommodations for the night at the Lake Outlet. A few of the motor and other boats were inspected by

a representative of the Steamboat Inspection Service, for use in case there was any demand for them. The Hotel Company's store at Lake Outlet was run by Mr. C. A. Hamilton, as a branch of his main store at Upper Geyser Basin.

Mr. George Whittaker had his post office store at Mammoth Hot Springs open throughout the year. He also ran a general store at Grand Canyon, during the tourist season, his contract with the National Park Service having been extended for a term of years to cover this additional business. The Hotel Company's extensive vegetable garden, located at the head of Gardiner Canyon, and which was planted as usual last spring for use of hotels, was taken over by Mr. Whittaker when it was decided not to open the hotels, and the crops have been marketed by him, mostly to our road construction camps, at cost. This was done at a loss to the Hotel Company, and with but little, if any, profit to Mr. Whittaker, at my request as food conservation measure.

Mr. C. A. Hamilton did a fairly good business at his general store at Upper Basin, and also ran the Lake Store, as heretofore noted.

Mr. J. E. Haynes kept his shops at Mammoth and Upper Basin open throughout the season, as well as maintaining booths in the three permanent camps. He also kept the picture shop and information bureau at Tower Falls open during the most of the summer. A small frame building, formerly belonging to the Yellowstone-

Western Stage Company at Ranzoth, was, with permission of the National Park Service, moved to the rear of his residence and studio, for use as a storehouse.

The bath house at Upper Geyser Basin was operated under the concession to Frances E. Brothers throughout the season. A total of 2290 persons used these baths, of whom 2029 were tourists and 26 were park employees.

Business was fairly good at the ice cream parlors and curio shop operated by the owners, Mesdames Bryor and Trischman, and this store was kept open throughout the season.

The permit issued during the season of 1917 to Jay Viloux and Jim Barber, of Gardiner, Montana, to cultivate an acre of ground in Turkey Pen Pass, on Yellowstone River about two miles above Gardiner, was renewed and extended to cover about four acres of land.

Mr. Robert I. McKay, who holds a permit authorizing him to construct a metal-surfaced road through the park between Gardiner and Cooke, Montana, as a means to permit of the development and marketing of valuable mineral resources in Cooke, made no progress except to do some surveying for his right-of-way.

STATEMENT OF REVENUE RECEIVED

Revenues were collected from concessionaires, sale of automobile and motorcycle tickets, etc., as follows:

Sale of automobile permits.....	32,880.30
Collections from concessioners.....	26,057.51
Camping Party Licenses.....	172.00
Sale of electric current.....	1,220.61
Sale of water.....	176.89
Miscellaneous collections.....	724.35
Total.....	<u>\$ 63,332.46</u>

HYDRAULIC WORK

The following memorandum of work done in the park under this head is furnished by Mr. C. Clyde Baldwin, District Engineer of the Water-resources branch of the U. S. Geological Survey, Boise, Idaho, under whose direction it is carried out:

MEMORANDUM OF HYDRAULIC WORK, OCTOBER 1, 1917, TO SEPTEMBER 30, 1918.

Records were obtained at the following gaging-stations which were established in 1913:

Madison River, near Yellowstone, Montana; Yellowstone River, above upper falls, in Yellowstone Park; Snake River, at South Boundary of Yellowstone National Park.

Because of frequent changes in the personnel on duty at the different gaging stations and because of periods when some of the stations were unoccupied, the gage height records are perhaps less satisfactory than in former years, but still suffice to afford records at each station except the one on the Yellowstone, throughout the greater part of the year. The latter was temporarily discontinued during the winter months.

Two series of actual current meter measurements were obtained at these stations during the year by Survey engineers. During the month of June a reconnaissance was also made of Tower Creek in the vicinity of Tower Falls. Because of the high stage of the stream at that time and the fact that no camp was to be maintained in the vicinity during the season of 1918 it was not deemed advisable to install a new station.

A recording gage and the necessary materials for its installation at the Madison River station were purchased during the year

and the actual construction work will be done during the present month (October).

Signs for the guidance of tourists were purchased and installed during the year at each of the three above-mentioned gaging-stations.

Acknowledgments should be made for transportation and subsistence which was furnished free to Survey engineers as during July 1917 by the transportation and camping companies, during the regular park season.

Detailed descriptions of the gaging-stations together with summaries of current meter measurements and discharge data for each will be published in the annual Water-Supply Reports of the United States Geological Survey, Parts IV and III, respectively, for Missouri and Snake River drainage areas.

While such co-operation as was possible was given Mr. Baldwin by scouts employed by this office, and by soldiers at stations under the Commanding Officer at Fort Yellowstone, changes at the gaging stations have necessarily been so frequent that the work has been rather unsatisfactory during the past year; instructions have been given to rangers recently taking over these stations to give due attention to the rendering of these reports, and of those to the U. S. Weather Bureau, which are also of interest and value.

WEATHER RECORDS

A branch office of the U. S. Weather Bureau is maintained at Mammoth Hot Springs in the park, in charge of Mr. C. E. Lawton, Observer, and under his direction and by the use of instruments furnished by his office, temperature and precipitation records are made at 6 of our park stations. These records are of such interest

and practical value.

ROADS AND IMPROVEMENTS

During the early history of the park, and up to the end of June, 1894, the construction of roads, bridges, etc., in the park was accomplished by special appropriations under the Secretary of War, administered by officers of the U. S. Engineer Department. From July 1, 1894, to June 30, 1899, this appropriations act was worded so as to permit its expenditure under the Secretary of the Interior, through the park superintendent, when it was again changed back and placed under charge of the Engineer Department of the Army. This was again reversed, by the Sundry Civil Bill approved July 1, 1918, which placed all activities in Yellowstone Park under the jurisdiction of the Secretary of the Interior and the National Park Service. Therefore, for the period to the end of June, 1918, this work was done under the direction of the Chief of Engineers, represented here since November 1, 1917, by Major George E. Verrill, E. S. C. Major Verrill has been relieved and gone to another station, therefore the following notes on the work accomplished under his direction have been taken as best they might, from his reports:

General road construction and maintenance was continued as late in the fall of 1917 as the weather permitted. Warm weather in the spring of 1918 melted the snow rapidly so that small crews were put on general repair work during May and as much work done

as funds on hand permitted.

In general the work accomplished was as follows:

NORTH APPROACH:

The Gardiner Slide, which for several years has been giving increasing trouble, threatened to entirely close the north approach road. Throughout the summer of 1917 the road was kept open by a small crew, and at the end of October the steam-shovel was put at work cutting off the top of the slide and throwing the material into the river. Work was continued until January 16, 1918, when the general condition of the road was considered good. However, as soon as the frozen ground began to thaw, the slide movement became so rapid that it was considered impracticable and too expensive to attempt to keep the road open. To keep a means of communication open, work was begun repairing and realigning the old freight road over the hill. Grades were reduced from a maximum of 20% to 10% and necessary bridges and culverts constructed. As an emergency road a width of 10 feet was adopted and no graveling or other improvements attempted. It was necessary to realign 10,000 feet of road and widen and repair the entire five miles; total amount expended was \$4,150.00. Early in June a sudden spell of hot weather, followed by heavy rains, caused an exceptionally high freshet in the Gardiner River, which resulted in the complete destruction of nearly 1 mile of the road through the Gardiner

Canyon, causing the abandonment of this road and necessitating the entire use of the old freight road as a means of communication with Gardiner and railroad transportation. Owing to the character of the material of which this road is composed it is very slippery and muddy in wet weather, but has served its purpose satisfactorily by reason of the fact that it was built as a temporary road only until the main road could be repaired.

WEST APPROACH:

Nine and one-half miles of this road from the west boundary have been finished during the past four years with oil macadam. Of this the first five miles are in excellent condition, the oiled surface being 18 feet wide and showing little signs of wear. On the remaining $4\frac{1}{2}$ miles the surface is only 10 feet wide, and in many places is raveling and breaking badly, so that the general condition is hardly considered fair. The remaining 4 miles have not been surfaced but the road is in good condition.

SOUTH APPROACH: (In the park.)

General repairs were continued as late in the fall of 1917 as the weather permitted, but due to heavy snow no work was done in the spring of 1918. The general condition of the road is good, except for the numerous wooden bridges and culverts. These are comparatively temporary, and should be replaced when practicable.

SOUTH APPROACH: (In the Forest Reserve.)

General maintenance on 25 miles of this road and construction

work on Pilgrim Creek Bridge were continued until late in October. The 36-foot bridge over Pilgrim Creek was about 95% complete at this time, and needs only a small fill at the north end and head rails.

Unusually high waters endangered all bridges during the month of June, and only strenuous efforts by rangers saved the bridges at Pilgrim Creek and Snake River. Small damage was done the approaches to the Pilgrim Creek bridge, but the east end of the north pier of the Snake River bridge ~~settled~~ settled about 2 feet, badly twisting the steel truss of 100-foot span, but not seriously damaging it.

EAST APPROACH: (In the park.)

General repair work was continued until late in October, when Sylvan Pass was blocked with snow. At this time it is still closed so that no work can be done. High water during June, 1918, took several piles out of the bents under the Yellowstone River bridge, but its use is not impaired. The small bridge near Pelican Creek was washed out but can be crossed.

EAST APPROACH: (In the Forest Reserve.)

General maintenance work was continued until the end of the season throughout the 20 miles of road. Exceptionally high waters, said to be the highest on record, washed the road out in about 22 places, in most cases taking out the entire roadway, undermined the east abutment of the Pahaska Bridge and the west abutment of the

North Fork bridge, as well as taking out the west approach of the North Fork bridge. As a result, the road is impassable at this time, but it is understood that the people of Cody and vicinity are at work making temporary by-pass roads.

COOKE CITY ROAD:

The maintenance crew was removed from this road in September, due to scarcity of labor, and no further repair work done until May, 1918, when a small repair crew was sent over the entire length. However, the high water in June took out the log bridges over the Lamar River, about 180 feet long, and Soda Butte and Pebble Creeks, thus completely closing traffic. This road is used principally by private interests in Cooke City, so that at this time traffic is being maintained by a cableway across the Lamar River and detours, with fords across the smaller creeks.

MAIN RAIL LINE:

General repairs and grader work were continued throughout the season. An early spring allowed flying grader crews to get out in May. Frequent rains made the roads muddy and easily rutted, and so far no sprinkling has been necessary.

Work was continued on the Firehole Realignment until October 23, 1917, at which time 5,700 feet had been completed; another 1,000 feet was about 50% complete, and the remaining 1,000 feet had not been started.

Work on the waterbound macadam base between Morris and Mammoth Hot Springs was discontinued in September, due to scarcity of labor.

and what was left was left gravelled 2,400 feet on the same road in the vicinity of the Hoosoes. Using dump trucks this road was gravelled an average of 13 feet wide and 5 inches deep. When rolled this made an excellent road. The cost was at the rate of \$2,000.00 per mile.

An attempt was made during June, 1918, to oil the macadam base, laid during the season of 1917, and 19,000 gallons of heavy oil were purchased and stored at Gardiner. Due to wet weather only one section, 1050 feet long and 14 feet wide, was oiled by the close of the year.

Bridge and culvert work was done as follows:

1 reinforced concrete culvert 4' x 2' 7" x 42' in Dunroven Pass, 9.2 miles from Canyon Junction.

1 reinforced concrete culvert 4' x 2' 7" x 30' Yancy Creek, 1.5 miles west of Tower Falls Station.

1 reinforced concrete culvert 6' x 4' x 72' at Goods Creek, 10 1/2 miles east of Mammoth Hot Springs on Tower Falls road.

1 double reinforced concrete culvert, each opening 6' x 2' 7" x 12' on Swan Lake flats, five miles south of Mammoth Hot Springs.

Some kind of culvert being built at Apollinaris Spring, 10 miles south of Mammoth Hot Springs. (Not completed.)

COAL NEED:

Due to the fact that it was seemingly impossible for the department to purchase a supply of coal for the winter, an old

mine was opened on the face of Mount Sverts in October, 1917. 467 tons of coal were mined and delivered to headquarters and served all purposes. The total cost of the coal, including development, timbering, and hauling, was 39.27 per ton.

HERMIT PEAK ROAD:

During the spring of 1918 general repairs were made and two log bridges were built on this road, making it safe for vehicular traffic.

HEADQUARTERS:

5,500 feet of roads in the vicinity of Mammoth Hot Springs and Fort Yellowstone were graveled to a width of about 20 feet, during the spring. After the snow melted general maintenance of the grounds in the vicinity of Fort Yellowstone and at the northern entrance was continued. Tentative plans for engineer quarters were prepared and submitted during the winter. Plant and equipment at Headquarters was put in repair so as to be in first-class condition for the season's work.

PLATFORMS AND BOARD WALKS:

Ten landing platforms at various points of interest, originally built to accommodate passengers alighting from horse-drawn vehicles, were lowered to accommodate automobile passengers. In the Norris Geyser Basin 722 linear feet of new walk was built and 246 linear feet of old walk repaired. At the Thumb 185 feet of old walk was repaired, and at Tower Falls a landing platform was built with steps leading to the top of the bluff.

The Sundry Civil Bill, approved July 1, 1918, under National Parks, page 49, reads:

"Yellowstone National Park, Wyoming: For administration, protection, maintenance, and improvement, including not to exceed \$7,500 for maintenance of the road in the forest reserve leading out of the park from the east boundary, not to exceed \$7,500 for maintenance of the road in the forest reserve leading out of the park from the south boundary, for repairing roads in the park and in adjoining forest reserves from Lake Hotel to the Cody entrance, \$25,000; not to exceed \$7,600 for the purchase, operation, maintenance, and repair of motor-propelled passenger-carrying vehicles, and including food for buffalo and other animals and salaries of buffalo keepers, \$269,520, to be expended by and under the direction of the Secretary of the Interior: Provided, That not exceeding \$2,000 may be expended for the removal of snow from any of the roads for the purpose of opening them in advance of the tourist season.

"Hereafter road extensions and improvements shall be made in said park and in harmony with the general plan of roads and improvements to be approved by the Secretary of the Interior.

"For continuing the widening to not exceeding eighteen feet of roadway, improving the surface of roads, and for building bridges and culverts from the belt-line road to the western border, from the Truck Station to the southern border, and from the Lake Hotel to the eastern border, all within Yellowstone National Park, to

make such roads suitable and safe for animal drawn and motor-propelled vehicles, \$15,400.

"For a new road around the Gardner Slide, \$50,000.

"For resurfacing and for finishing the belt line with oil macadam, the unexpended balance of the appropriation for the fiscal year nineteen hundred and eighteen is made available for the fiscal year nineteen hundred and nineteen."

Under the provisions of this bill the improvement and maintenance work has been combined with the work of administration and protection of the park, under this office, the maintenance and improvement work being under the direct charge of Mr. George H. Goodwin, Civil Engineer, National Park Service.

By this combination this Department has undertaken to make a saving of at least \$20,000.00, and this I am confident we shall be able to do, in addition to eliminating needless friction and division of authority, and giving much greater efficiency.

At the beginning of the season most of the roads of the park were in the worst condition that they have been for years. The high waters of the last of May and the first of June, - the highest that have been recorded for years, did great damage to most of the roads, and certain sections of roads were entirely washed away and many of the bridges and culverts were either damaged or washed out.

The north entrance road, from Gardiner to Harroth Hot Springs, which was built by General Chittenden in 1900, and which is the most used entrance to the park, was very badly damaged by the floods of the Gardiner River, about three-fourths of a mile of the road through the Gardiner Canyon being entirely washed out, and the bridges were either washed out or the piers undermined and settled out of level. Most of the damaged section of the road had been originally constructed at a large expense, as it was built on a location largely reclaimed, from the original river channel, and consisted of rock and earth fills retained by concrete and stone revetment walls. This section of road was so completely destroyed that a new road will have to be constructed through the canyon on the opposite side of the river, which will involve some very heavy construction, but it will avoid the so-called Gardiner Slide, which has given so much trouble during the past two years and that has at times, for short periods, closed the road to travel.

The eastern entrance, or Goly road, was also badly damaged both within the park and through the National Forest, east of the park, which road is also maintained and improved by this Department. Not less than twelve serious washouts occurred, some of which were several hundred feet in length, and all of which required rock or timber revetment to prevent the Shoshone River from again washing out these pieces of road. Considerable damage was also done to the new steel bridges recently erected as the abutments were badly

undermined and settled and the approaches were washed out.

On the Snake River road, or southern entrance, several small structures were washed out as were the approaches of the Pilgrim Creek bridge and one of the abutments of the new steel bridge across the Snake River was so badly undermined that the bridge was thrown out of transverse level fully two feet, all of which necessitated heavy repairs, both within the park, and in the forest reserve south of the park.

The Belt Line or "Loop Roads" in the park were not so badly damaged as the north, east, and southern entrance roads, but many of the cross drainage structures proved incapable of conveying the floods and were washed out as were many short sections of roads paralleling the streams.

The Corps of Engineers, U. S. Army, made such repairs to the roads as were possible prior to July 1st, and got all of the southern, loop road, the northern and western entrance roads open to travel at the beginning of the park season, either by the construction of temporary roads, as in the case of the northern entrance, or by making the necessary temporary repairs to the damaged roads. The southern and eastern entrance roads were open to travel about the second of July. Most of the first preliminary temporary repairs on the Cody road through the National Forest being made by the people of Cody in order that automobile tourists that had come to the Cody gateway might enter the park as planned.

Great credit is due the public spirited citizens of Coiy for their energetic and timely efforts in this work.

In addition to the ordinary maintenance and repair work of the roads in the park and the sprinkling of some of the driest and most dusty stretches, some of the roughest and heretofore badly rutted sections of road, were graveled and otherwise improved. Between two and three miles were regraded and graveled between Apollinaris Spring and Morris Basin. Eight steel bridges were also painted and two small concrete culverts and a number of corrugated culverts were installed.

The temporary log bridge across the Lasser River, which was built by the mining interests of Cooke City, to replace the structure washed out, was strengthened and otherwise improved to accommodate truck hauling, and a crew is at work improving the Cooke City road.

The extreme shortage of labor made it necessary to confine the work to the most needed and minor repairs and to delay the heavy reconstruction work until the park tourist travel had closed for the season, when it is proposed to repair the Snake River bridge, reconstruct the Coffin Canyon road, and complete the repairs of the Coiy road. The general average maintenance and repair force averaged about 150 men and seventy teams, whereas to have maintained and completely repaired the roads during the season would have required at least 350 men and one hundred teams.

FISH

The Hatchery, located on the shore of Yellowstone Lake near its outlet, was operated during the summer as usual by the United States Fish Commission, under the direction of Mr. W. T. Thompson, the Superintendent of the Hatchery at Nezperce, Montana. An attempt was made to supplement the work of collecting eggs of the blackspotted trout in the park, by gathering those available at a small lake in Soda Butte Creek, near Soda Butte Station, generally known as Fish Lake. (Not shown on the map.) A man was sent in on June 11th to make this collection, but the same day the Lamar River bridge was washed away, so the eggs could not be brought in without great expense, and the project was abandoned. Mr. Thompson has furnished me with the following notes on his work in the park for the season of 1918:

Fish fry of other varieties were not shipped in for planting in park waters last spring, as usual, on account of the unusual difficulties attending their transportation.

Fishing was excellent throughout the summer, and many fine catches were taken by tourists and employees. No violations of the law were reported. Exemption was made as to number to be taken in one day, in favor of the Camping Company, so as to provide the tables at the camps with trout, which are a great treat for tourists.

WILD ANIMALS

The fall of 1917 was beautiful and warm, and winter did not come until late. The road to Sylvan Pass was not opened until

October 20; to Snake River until November 7th; and as late as November 23d the going was good on the west side of the park as in summer. Even December was 3.6 degrees warmer than normal, so the game animals were in splendid condition and had plenty of excellent winter range left for them when the severe weather came again in March, which was 3.4 degrees warmer than normal, and uncovered considerable grass on the foothills, making in all a rather short and favorable winter for elk, deer, antelope, and mountain sheep, and the loss among them was slight.

The fair weather in October, November and December, was a disappointment to hunters, for the elk and deer did not come down where they were easily shot, and but few were killed by legitimate hunting in the adjoining states. Special attention was given to the care of these animals by the four scouts employed, but they were unable to cover the park lines entirely during the hunting season, and the enlisted mount park stations, to whom this work was entrusted, were mostly unacquainted with the country, and, in many cases, did not take this duty seriously. I am satisfied that this part of the protection of the park was badly neglected, and it was fortunate that the fair weather kept most of the wild animals up in their summer range in the mountains beyond the reach of hunters.

From January 5th, nearly every day to March 19th, hay was fed

in the vicinity of Gardiner, and along the road as far as Mammoth Hot Springs, to the deer, mountain sheep, antelope, and about 3,500 elk that came in for it. About 350 tons of hay was fed, of which 100 tons was cut on the field near Gardiner and the balance was purchased from nearby ranches. The wisdom of trying to feed any large number of elk is questionable; but it is necessary to preserve the small numbers of mountain sheep, deer, and particularly the antelope, by supplying them with hay when most needed during the severe winters. The elk, which are much more numerous, can be cared for outside of the park, by saving winter range and raising or buying hay for them in the adjoining forest reserves, but the antelope are too few to risk their loss outside of the park.

Special attention was given to the care of these animals, by our most experienced men, and five additional scouts were hired for this purpose during the winter months, as the troopers who garrisoned the park stations were inexperienced in this line of work. Numbers estimated from 3,000 to 4,000 again left the park and went down the Yellowstone Valley for several miles, apparently not so much in this case by necessity of finding forage, - for the natural food in the park was plentiful and easy to get at all winter, - as such as from force of habit from the preceding winter, when they were starved out by deep snow and severe weather in the park, and found refuge among the haystacks on the ranches below. Again, the U. S. Forest Service and the State Game Wardens cooperated with the

National Park Service, to protect these animals against ruthless slaughter by poachers, with good results. Even then unmistakable evidence was found in February and March of the killing of fifty elk by poachers, 34 of which were cows, probably killed for meat, and 16 bulls, killed for tusks or heads. One or two arrests were made by the forest rangers, and the accused turned over to the State Game Warden for trial. Most of these elk returned to the park in April and May.

ANTelope

The antelope wintered in excellent condition, most of them just inside the north line fence near Gardiner. On November 29th some dogs from the town of Gardiner got among them and frightened them badly, and while probably none of them were killed, it was several weeks before they recovered from their fright and returned to the alfalfa field and vicinity. A few were killed by coyotes during the winter, but aside from this the loss was negligible. About 700 was the largest number seen in any one day, but no special pains were taken to make a complete count of the herd. The antelope did not bother about trying to leave the park, as in previous winters. They became accustomed to the presence of elk on the feeding grounds, and mingled quite freely with them.

DEER

About the usual number of deer was noted, of both white-tailed and black-tailed varieties. Slightly more than a hundred of them, mostly black-tailed, came in for hay during the severe

weather, but most of them remained scattered throughout the mountains along the north line of the park as forage was not hard for them to obtain. Six black-tailed deer were captured by representatives of the U. S. Biological Survey, assisted by our scouts, on April 15th, and shipped to the Montana Bison Range.

ELK

Elk were numerous, tame, and in excellent condition throughout the winter. At least 3,500 of them came down to the feeding grounds around Headquarters and the northern entrance, and those which have acquired the habit of coming down are becoming tamer and more dependent upon the hay each year. While no accurate count was made of the herds of elk during the past year, more than 20,000 were seen in the park in the month of January, with no special effort having been made to count all of them. The Gallatin herd always winters outside of the park, and reports of forest rangers at that time indicated at least 2,000 of the northern herd outside in the forest reserve, north of the park. During the summer many small herds of cows, with their calves, have been seen close to the main roads by tourists and others, and at the present writing it is safe to state that the elk are in first-class condition, with a good crop of calves, and excellent prospects for plenty of food for the coming winter, as the reserves are in

fine shape, due to a very wet summer. The gradual invasion of that part of the natural winter grazing ground of the elk adjoining the park, by settlers taking up land, and by grazing permits in the National Forests, to some extent, threatens the preservation of the elk, particularly during severe winters, and remedial measures should be agreed and acted upon, by the States, the Forest Service, and the National Park Service, at an early date, before it is too late to do so without great expense. But I seriously question the theory advanced by some, that they are likely to be entirely exterminated by these conditions, as we have sufficient winter range for fifteen to twenty thousand elk within the boundaries of the park itself during ordinary winters, and many thousands survived the winter of 1916-17 without leaving or being fed, and this was positively the hardest winter on record in this country. Representatives of the United States Forest Service, under direction of the Forester, Colonel W. A. Graves, have been making a study of this situation as regards elk grazing in the National Forests near the park, and are still so engaged. The "Greater Yellowstone" addition to the park, to include the Teton Mountains on the south, will, if made, assist in solving the question of winter grazing for the southern herd of elk, but as this herd winters almost entirely outside of the park, it would seem that at present the burden or responsibility rests entirely upon the State of Wyoming and the Forest Service to reserve for it sufficient winter feed. The same may also be said of

the Gallatin herd, which winters in the Gallatin National Forest in Montana. But these herds being to the park in summer, and since their preservation and protection for the benefit of the public should be and is the aim of all, the full cooperation of the three parties who can control the situation together, is vital. This is even more important in handling the northern herd, which frequently passes back and forth across the park line several times during the winter. It would seem best, if possible, to provide adequate winter grazing for these elk, rather than to endeavor to go to the expense of buying or raising hay for common use, as the latter course is likely to result ultimately in the elk becoming entirely dependent upon being fed hay in winter. But this is a problem which is being worked out, and which should be solved and put into effect soon. Elk from the park herds were shipped and otherwise disposed of as follows:

Shipped to other states, public parties, etc., under authority of the National Park Service, at the expense of the parties receiving them:

To the State of Idaho, February 2, 1918, by freight, in 2 cars.....	50
To the City of Aurora, Ill., February 10th, by express, crated.....	2
To the City of Ft. Worth, Texas, February 19th, by express, crated.....	1
To the City of Crookston, Minn., February 21st, by express, crated.....	2
To Elk Run, Mont., March 18th, by freight in one car.....	25
To the State of Arizona, March 20th, by express in large car.....	50

To the City of Mexico, Missouri, March 20th, by express, crates.....	4
To the City of Mexico, Missouri, April 16th, by express, crates, to replace one shipped earlier, that died en route.....	1
Total shipped.....	145
Wls killed by accident in making captures of above for shipping.....	9
Killed by hunters in country adjoining the park during the open season, and reported.....	240
Killed by poachers in the National Forest north of the park.....	50
Killed by poachers inside of the park, and evidences found.....	10
Killed by mountain lions, wolves, and coyotes, and evidences found.....	87
Found dead from unknown causes.....	10
Total known to have been taken from park herds.....	566

I regret that in several of the cases of apparent poaching in the park the evidence was found in the near vicinity of soldier stations. A black-tailed deer was butchered on the night of October 20th, on the west side of Capital Hill, in plain sight of my front door and that of the Commanding Officer, who lived in the adjoining house. Cases of poaching were more frequent than I have ever known them before, and no arrests were made for this violation of law.

MOOSE

Moose are frequently seen, and seem to be well scattered over most of the park. About 90 have been seen in the Upper Yellowstone country since September 1st. On at least three occasions during the summer they have been seen from the main road in the park.

WILD HERD

Wild Herd: This herd was located in Birch on Lamar River and in Pelican Valley, but not counted. Four calves, present with that part of the herd seen, indicated a fair increase. They appeared to

have wintered well.

Tran Herd: The tran herd, located on Lamar River, is increasing rapidly and is in excellent condition. There are now a total of 385 animals, namely 178 males and 207 females, from 1 to 22 years old, and 60 calves born during the past summer, sex undetermined. One year ago, October 1, 1917, there were 170 males and 191 females. One 7-year-old bull was disabled and had to be killed on February 29th, and its carcass was donated as a specimen to Hastings College, Nebraska. A 3-year-old cow broke through the ice in the pasture and was drowned on March 8th. A bull calf was hooked to death on April 15th; a 4-year-old bull was found dead on Specimen Ridge in June; and a 4-year-old cow was found dead near the same location on July 1st, in both cases cause unknown. The 1917 crop of calves were vaccinated for hemorrhagic septicemia on November 3rd and again on November 18th, by Dr. F. C. Swaney, a veterinarian of the Department of Agriculture. Under your authority dated November 6th, Dr. Swaney returned on November 18th and 17th, and castrated 60 per cent (48) of the male calves, (20 of the 1916 and 28 of the 1917 crop.) No serious results were noted. The usual show herd of 15 tame buffalo was brought in to Mammoth for the benefit of sightseers at the beginning of the tourist season, but they broke through the fence after about four weeks' stay, and went back to the main herd; and due to shortage of help to herd them we were unable

to bring them back. 271.90 acres of meadow land across the Lamar River, and about 3 miles above the present buffalo farm, were plowed during the season of 1917, to be seeded later to grass. Of this land 61.6 acres were seeded to rye last fall, to be cut this fall for hay, and has recently been cut and stacked, producing about 100 tons of good hay. Last spring 65 acres, which was partially disced and harrowed last fall, was cultivated further and sowed to oats, also with the intention of cutting it for hay, but the harrow quit during the summer and could not be replaced, and the buffalo tramped this and kept it eaten off until it was too short to harvest. The balance of the plowed land has been summer fallowed and more rye will be sowed this fall for next year's hay crop. Eventually, when this land has been worked sufficiently to make it smooth, it will be seeded to grass. A half-mile of main irrigation ditch was built in connection with this cultivated land, but it is not yet completed. The 200 acres of meadow land was kept irrigated, and cut for hay. The tame buffalo were grazed most of the summer on Specimen Ridge, Mount Morris and vicinity.

BEARS

A few grizzly bears were seen during the summer, but they were not numerous. A large one was caught in a trap in October to be shipped to the City of Butte, Montana, but broke away and escaped. Black bears, which were very plentiful, are seen and admired by everybody, and are one of the greatest attractions in the

park. Naturally shy and inoffensive, the bears in the park are seen so often and fed by so many people, that they lose all fear, and as they get older and larger, they often become dangerous and have to be killed to protect human life and property. In July complaints of the depredations of bears were bitter, and several automobiles were damaged by bears tearing up the upholstery. Nine bears were killed, and one was found dying near Lake Camp with a bad wound on its head from a stone which laid close by, wielded, probably, by some angry tourist.

BEAVERS AND WOLVES

These animals have done much damage to other game, and for that reason much pains have been taken to hunt them down and trap them. The expert hunters were employed as scouts during the winter, and spent most of their time hunting and trapping. Steve Atkins, the famous guide and mountain lion hunter, was also employed for several weeks with his pack of lion hounds hunting lions, wolves, and coyotes, and the U.S. Biological Survey sent one of its hunters here for a time last spring, but he was not so successful as were some of our own men, and was finally called away by the draft. Another Biological Survey hunter, Mr. W. D. Claxton, has been working on the Upper Yellowstone since August 1st, and is trapping and hunting wolves and coyotes along the park line, on both sides of it. In all 190 coyotes and 36 wolves were killed in the park during the year. While there are more of these animals in the park than are

desirable, I am of the opinion that there are not so many found among the game animals as there are among domestic animals in farming communities outside, as I have been informed by the State Game Warden of Montana that during 1917 there were killed 848 coyotes in the County of Gallatin, 1533 in Park and Beartooth Counties, and 301 in Carbon County.

MOUNTAIN LIONS

Twenty-three mountain lions were killed in the park during the year. These were hunted by Steve Elkins and Scout Anderson, with trained dogs.

MOUNTAIN SHEEP

Mountain sheep seemed to be thriving and were seen frequently during the winter along the road to Gardiner. The winter was so mild that the sheep seldom came down for hay, and our attempt to bait them into a corral, to capture and dip them for sheep scab, failed. But no sign of the scab, which was in evidence the previous winter, was noticed on them, and it was hardly necessary to treat them. The Mount Everts' band can usually be found within an hour's ride from Headquarters, from October to May, inclusive, and are easy to approach and photograph. Fourteen fine rams were seen and approached by parties on saddle horses to within a hundred feet on the north end of Mount Everts on May 7th.

BEAVER

These most interesting animals are in evidence in nearly every

streams in the park. Their dens and houses may be seen from several points along the main roads, and they can be seen at work if one cares to take the pains to visit their homes just before dark.

OTHER ANIMALS

Porcupines, which a few years ago seemed to have disappeared from the park, are now numerous and are frequently seen along the roads. Rabbits, gophers, red squirrels, chipmunks, and woodchucks, are much in evidence, and are seen by all visitors. Lynx, bobcats, foxes, otter, martin, mink, weasels, coon, skunk, muskrat, etc., are found, but are not often seen.

The development and protection of the wild animal life in the park, which was only considered of secondary interest for many years, has become to be generally known as a feature of utmost importance to the public. Our animals are becoming tamer and more is seen of them, from year to year; and I doubt if anything in the park creates a more lasting interest and pleasure in the minds of most tourists than does a small herd of elk or a few scattering deer seen along the road; a herd of bison in the pasture at Harroth, or on Lower River, where the main herd is kept; a porcupine along the roadside, which the driver will be careful to avoid, if his car is not equipped with puncture-proof tires, and best of all, the bears, which frequent the camps and hotels, where they hang for food, although they are already so fat that they can

hardly climb a tree if startled. And in winter it is well worth a trip across the continent to see the herds of elk, deer, antelope, and mountain sheep that may be found at or near the northern entrance. It is certainly a paradise for moving picture artists, in search of pictures from real life, that will always command interest before any audience.

RESEARCH OF ANIMALS

Arrangements were made to capture and dip for scab, the small band of mountain sheep that winters on Mount Everest and in Gardiner Canyon, but the winter was so mild that they did not often come down for hay, and as there was no evidence of the scab appearing again, the work was postponed.

The tame buffalo calves were, as usual, vaccinated last fall against hemorrhagic septicaemia.

A few buffalo cows from the tame herd, which were known or suspected of habitual abortion, were separated from the main herd for the period when the disease is most likely to be contagious, and sample of stomach contents of an aborted calf were forwarded to the Bureau of Animal Industry, Washington, D. C., for examination and analysis. If this disease is the contagious form, it is not especially prevalent.

BIRD BIRDS

Nearly two hundred varieties of birds have been noted in the park as summer residents, and are listed in our Circular of Information, which is distributed to visitors. Quite a number of

these remain during the winter. Canada Geese, ducks, and other waterfowl on the lakes and rivers are very tame, and of much interest to tourists.

PROTECTION OF GAME

The Tuntzy Civil Bill, approved June 12, 1917, (Public No. 21, 65th Congress) which provides funds for National Parks, provided that "No part of this appropriation or the revenue of the Yellowstone National Park shall be used for payment of salaries for the protection of the park, authorized by the act of March third, eighteen hundred and eighty-three, to be performed by the detail of troops." This legislation made it necessary to re-garrison Fort Yellowstone which, by mutual consent of the War and Interior Departments, had been abandoned on October 1, 1916, and a squadron of Cavalry arrived on June 26, 1917, and such duties as pertained to protection of the game, etc., in the park, devolved upon the commanding officer. These troops were inexperienced in work such as pertains to protection of national parks and wild animals, and were not properly equipped so far as transportation and other necessary articles are concerned. On December 29th this squadron was relieved by one troop of Cavalry from another regiment, even less experienced in the class of work which they were sent for. Arriving so late in the season, they had no opportunity whatever to acquaint themselves with the territory to be covered in protecting the game animals, and were able to do but

little good in this direction during the winter. These conditions were not conducive to successful work in the line of protecting the wild animals in the park, and the results are shown by the lack of arrests for poaching and other violations of law, and the evidences of poaching and violations which have been noted.

VIOLATIONS OF LAW

At least nine cases of violation of the law regarding the killing of wild animals were recorded, but no arrests were made, and the evidence was not sufficient to take action in any case. One of these, the killing of a black-tailed deer, occurred on the grounds near Fort Yellowstone, and two elk were killed within a few hundred yards of the Gallatin Soldier Station, which burned soon afterwards, and which was garrisoned by a sergeant and two men, who are both under charges at the present time for stealing automobile tires in the park and trying to sell them in Gardiner, the latter part of August.

Camp fires have been left burning in a few instances, but usually at one of the regular main camping places, where they were soon discovered and extinguished without any damage having occurred.

The regulation prohibiting the sale or serving of intoxicating liquor in the park, and the Federal law, prohibiting its being introduced into military camps or quarters, have together acted as a deterrent in keeping it out of the park during the past year. But considerable difficulty has been had by the military authorities

by worthless characters in the town of Gardiner furnishing it to enlisted men, indirectly, and the Commanding Officer has usually found it necessary to maintain a military guard at the soldier station near the town. Two men, whom the Commanding Officer was satisfied were furnishing whiskey to his men, were, at his request, debarred from entering the park on the ground that they were undesirable, and the order debarring them is still in force.

On July 25th a tourist stopping at Upper Geyser Basin was arrested on the charge of treasonable utterances, and his case has been turned over to the Department of Justice at his home in Memphis, Tenn., for proper action.

On September 23d complaint was filed with the United States Commissioner against John McPherson, of Gardiner, Mont., for transporting tourists through the park without proper license. He was tried September 26th, pled guilty, and was fined \$50.00 and costs.

SANITATION AND HEALTH MEASURES

The special camps for automobile tourists were maintained at Mammoth, Upper Basin, Lake, and Canyon, and were appreciated. They were kept supplied with fuel for camp fires, and cleaned up as often as men could be spared to do the work.

On the basis of a complaint to the National Park Service late in the summer of 1917, to the effect that the water used by the Hotel Company at Upper Geyser Basin was not good, the United States

Public Health Service sent its laboratory car "Hamilton" to Gardiner, arriving on June 8th, in charge of Lieutenant Everett Judson and his corps of four assistants. Automobile and truck transportation, and such assistance as practicable, were furnished him, and during the following four weeks he made a careful test of all waters in the park that are ever used for drinking or culinary purposes. While his report has not been received, he made a few suggestions of immediate necessity in regard to the water in use at some points, more particularly at the Upper Basin Camp, which was presumed to be particularly good, but which he found dangerous. The Camping Company took immediate action, and boiled all drinking water until they could make a connection with the reservoir of the Hotel Company, where the water was found to be especially good.

All milk cows in use in the park for furnishing fresh milk to the public were given the tuberculin test by inspectors of the Bureau of Animal Industry, before the opening of the tourist season.

There is much to be done in the park in the way of improvement in sanitation, especially around the permanent camps.

FIRES

No forest fires of any consequence occurred during the year. The past season was so unusually wet that there were but few days when there was any danger of a fire spreading to any great extent, had any started.

The Callahan Soldier Station, located about one mile inside of the park on the County road leading into the park from the northwest corner, was destroyed by fire on the afternoon of Sunday, March 10th, while occupied by a non-commissioned officer and a private belonging to Troop "D" 11th Cavalry. This station was built by the War Department in 1910, at a cost of \$5,312.00. The man at the station claimed that the fire started from a defective concrete chimney which showed cracks large enough to emit sparks. A new log ranger station, to take the place of this one, has been built on the park line, about a mile from the site of the old one, and a small log barn has been built in connection with it. The old barn was not destroyed, but it is too cumbersome to permit its being moved to the new site.

TELEPHONE LINES

Telephone lines During the season of 1917 a total of 49-1/2 miles of telephone line was rebuilt at an average cost of \$160.33 per mile, and 14 1/2 miles were repaired - mostly heavy repairs - at an average cost of about \$70 per mile, the most of which was included in my last annual report. Eight miles of new line were constructed late last fall, between Mammoth and Soda Butte Station, and the balance of this line was repaired so it would do until it could be rebuilt. There are still 27 miles of this line in a bad state of repair, which should be rebuilt as soon as labor can be procured to do the work. The material is all on hand, and poles were cut

during the past summer, peeled and skidded so as to dry out and season well before they are used. A new switchboard was purchased to replace the old one at Headquarters, and this is now being installed. No heavy repairs, or construction work, has been undertaken during the present season, due to lack of labor.

Firelanes: The extensive work of constructing and rebuilding firelanes, was continued to early in November, when it became necessary to stop on account of bad weather. The total work of firelanes during the last fiscal year, most of which is listed in my annual report for 1917, consisted, up to December 31, 1917, in constructing 111-1/2 miles at an average cost per mile of \$47.32, rebuilding 79 miles at an average cost of \$43.08 per mile, and repairing 175-1/2 miles at an average cost of \$14.83 per mile. During May and June of this year a new firelane was constructed from a point on Yellowstone River about 3 miles above Gardiner, along the north bank of the river to Slough Creek, a total distance of about 20 miles, at a cost of \$96.60 per mile. While this was rather expensive, due to the fact that about 2 miles of it was through granite boulders and slide rock, it will be most useful as a trail, as it can be used by pack animals throughout the winter, being located where but little snow falls, and makes the winter habitats of wild game easy of access.

Two men with saddle and pack animals have been employed during August and September in going over the trails and cutting out the

fallen timber and making other slight necessary repairs. 27 1/2 miles were covered.

Marking boundary lines: About 21-1/2 miles of the north line of the park between Gardiner and Slough Creek were cut out on the line and blazed through the timber and marked by placing additional monuments close enough together so they could be seen through the open places. This work is important, as in many places this line was not plainly enough marked for hunters who were not acquainted with the country, and they frequently get in trouble by getting in- to the park with unsealed firearms.

SIGNS

A complete list of metal signs for roads, trails, objects of interest, needed for the guidance of the public, was made up, and the signs will soon be delivered.

Buildings: During June a new ranger station was built at the northwest corner of the park, to replace the Callista Soldier Station which was burned in March. The new building consists of a one-story log house 16 x 50 feet, with log annex for kitchen 16 x 16 feet, and a porte cochere in front, large enough to permit an automobile to drive in while being registered. All with shingled roof, coiled inside throughout, and the main building divided by two partitions into three rooms. Double floor, brick chimney, walls chinked inside and plastered outside. The material for floors, trimmings, etc., was hauled in over very bad spring

roads, under great difficulties. The logs were cut near by in the park. A substantial log barn 16 x 16 feet in size, with dirt roof, was also constructed in connection with the house.

Cultivation of land: One hundred and seventy-nine acres of land was plowed on Linnar River, about 3 miles above the present buffalo farm and on the opposite side, in addition to about a hundred acres plowed last season and reported fall of 1917. This makes a total of 278.9 acres of land now under cultivation there preparatory to seeding it to grass for hay for tame buffalo and other animals, which is now in various stages of cultivation, as noted herein under the heading of "Buffalo". Half a mile of main / ditch was also constructed in connection with the cultivation of this land. The alfalfa field at northern entrance, containing 45-1/2 acres, became foul from weeds and foptail and was plowed up and sowed to oats to be cut as a forage crop.

About two hundred tons of wild hay has been cut at Yanopy and Morris, for subsistence of work teams and saddle and pack animals. Some of this will be baled and some fed from the stack. At present price of hay, this will affect a large saving, and more would have been harvested but for scarcity of labor.

NATURAL PHENOMENA

The small geyser that broke out at Morris in the timber across the road from the Black Boulder last season, showed no activity during the summer.

A pool near the road at the 15-mile post south from Mammoth Hot Springs, played muddy water to a height of about 40 feet, several times during the summer.

At Mammoth Hot Springs, the overflow from the large spring partially changed its course back to the south side, but the greater part of its overflow is still over the north side of the terrace. Hyacin Terrace was active most of the summer, but has recently died out again, which is a common occurrence with this terrace.

ACCIDENTS

No serious accidents to regular transportation cars were recorded, and in but few cases to private automobiles.

On June 10th, an employee of the Transportation Company ran his private automobile - a new "Dodge" car - over the precipice into the canyon of the Yellowstone River at the Needles, about 1/4 mile below the mouth of Tower Creek. He scrambled out as the car was going over the edge. The bank at this point is several hundred feet in height and practically perpendicular. The Yellowstone River was at its highest stage, and the car evidently struck the water, for no trace of it could be found until several weeks later fragments large enough to be recognized as belonging to a "Dodge" car were found about a half a mile below.

On two occasions "Ford" cars belonging to the Yellowstone Park Camping Company, and in use for that company, have been overturned or run over the bank. On both occasions the driver came

out without injury, but his companion was injured, - once having an ankle broken, and the other instance the pelvic bone was injured.

On September 6th a "Cadillac" car was overturned at Out Creek, on the Gody entrance road, injuring one lady in the party quite seriously. Luckily two other cars arrived on the scene within two or three minutes afterwards, and took the occupants in to the Lake Outlet, where they were cared for by the keeper. The Army Surgeon from Fort Yellowstone went out with the Hotel Company's ambulance, and gave them medical attention, and next day they returned home by rail from Yellowstone, Montana.

On July 21st Sergeant Arthur E. Brewer and Private Victor Hunterfield, both of Troop "C", 11th Cavalry, stationed in the park, were fishing from a small boat in a lake near Soda Butte Station, and the boat overturned and both were drowned. The exact details of the accident are not known, as no one else was present at the time.

On August 30th, Mr. Frank P. Fritchard, of Philadelphia, who was touring the park with the regular companies, died suddenly from heart trouble in the dining room at Canyon Camp.

PERSONNEL

The title of "Supervisor" of various National Parks, was changed to "Superintendent", effective November 1, 1917.

Due to the great demand for labor everywhere, on account of the World War, it has been necessary to curtail much work that,

under other conditions, should be done, and to devote such energies as were available to necessary maintenance, and replacements caused by floods, fire, etc. Naturally, it costs much more to accomplish results than when times are normal, and this is not entirely due to high cost of labor and supplies, but partially to the fact that efficiency cannot be secured when men do not care whether they work or not, for they know they can go elsewhere and get employment at a high rate of pay whenever they feel like it.

Many excellent permanent employees have been lost because they were drafted, or desired to secure positions closer to the War. The operations of the draft, including registry of men on dates fixed; subscriptions to Liberty Loans and War Savings; Red Cross work, etc., all have taken much time from other duties. But these additional duties have been faithfully and obediently performed, with a keen realization of the fact that our first duty lies in doing what we can in that direction. Subscriptions to the Second and Third Liberty Loans from employees amounted to \$9,700.00, and War Savings Stamps to the amount of \$1,730.90 were purchased. In December last a Branch of the Red Cross was organized among park employees with a membership of about 120, which has since been increased to about 150. Funds have been collected and turned in to the Chapter amounting in all to \$1,032.58, and such work in the line of knitting, sewing, etc., has been accomplished by the ladies of the branch.

RECOMMENDATIONS

The addition to the Yellowstone Park of a large tract of land south of and adjoining the park, to include Jackson Lake and the Teton Mountains, would be an everlasting public benefit. This proposed addition includes mountain scenery, which is comparable to the finest in the world.

Honorable Franklin E. Lane, The Secretary of the Interior, visited the park October 7th to 8th, 1917, making the trip from Yellowstone to Upper Basin, Thresh, side trip to Moran, Wyoming; Lake, Canyon, Tower Falls, Mammoth, side trip to Gardiner; Norris, and back to Yellowstone. Several suggestions made by him relative to signs, guard-rails, and clearing of timber along the roads, so as to afford a better view of the road ahead, and of interesting features, have been complied with as far as practicable.

Mr. Horace H. Albright, Assistant Director of National Parks, was in the park and vicinity June 27th to August 13th, 1918, assisting in the organization of a ranger force to take the place of troops, the taking over of the improvement and maintenance of work from the War Department.

Very respectfully,

CHESTER A. LINDSLEY

Acting Superintendent.

October 5, 1918

The Director,
National Park Service,
Department of the Interior,
Washington, D. C.

Sir:

Reference to my annual report dated September 25, forwarded on September 28, I inclose herewith pages 26 to 30, inclusive, relative to roads, which please substitute for pages of the same numbers in the manuscript originally forwarded; also pages 7, 8, and 9, on the subject of park travel, which have been revised to bring the travel down to and include September 30th.

There is also transmitted a sheet on which is noted the travel by States, so far as it is obtainable at the present time.

Is it your desire that this travel report be brought down to include October 10th and telegraphed to you on that date? The report of travel just rendered covers the period from October 1, 1917, to and including September 30, 1918, and includes all last winter's travel.

Very respectfully,

Acting Superintendent.

Incls:

ANNUAL REPORT
FOR
YELLOWSTONE NATIONAL PARK
1919

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October 29, 1919.

The Director,
National Park Service,
Department of the Interior,
Washington, D. C.

Dear Sir:

The Yellowstone Park Camping Journal has furnished the missing data regarding meals and lodgings served during the past season, which are wanted for my annual report. Please complete the paragraph on page 23, which follows the paragraph giving meals and lodgings at hotels, so it will read as follows:

<u>Government Camps:</u>	Meals	Lodgings	Total
Arrowth Camp -----	39,710	11,821	51,531
Capehorn Camp -----	22,816	16,231	39,047
Canyon Camp -----	60,479	17,125	77,604
Yoho (Emergency only) -----	1,735	1,376	3,111
Camp Roosevelt (TOWER Halls) -----	1,091	1,615	2,706
-----			-----
Totals-----	125,831	48,168	173,999

Very truly yours,

H. M. ALBERTSON,

Superintendent.

October 25, 1919.

The Director,
National Park Service,
Department of the Interior,
Washington, D. C.

Dear Sir:

Reference to my annual report for the Yellowstone National Park for 1919 recently transmitted to you, it is requested that the name of Richard V. Tomison, Idaho, Wyoming, including the words "(Complete report not yet submitted)" be stricken out from the list of the parties holding taxable domestic party licenses.

Upon investigation it is found that Mr. Tomison passed through the park with a pack train and a party of friends who were not paying him for the trip, and therefore he is not subject to paying a license fee.

The words to be stricken out are found on page 67 of the report.

Cordially yours,

Herman H. Albright,

Superintendent.

October 13, 1919.

Dear Sir:

Upon a careful rereading of the annual report for Yellowstone Park, I find that the following corrections seem necessary:

On page 5, in the next to the last line of the first paragraph, the word "rangers" should be changed to "tion".

On page 16a the following paragraph should be inserted before the last paragraph on the page:

"On August 5, 1919, 1,255 tourists entered the park, the greatest number entering in any one day in the history of the Yellowstone. The greatest number of private automobiles entering in one day was 202 on August 4, 1919."

On page 17 the number of meals and lodgings served in permanent camps during the summer is still to be supplied. For some reason or other the camping company has not been able to expedite the compilation of its statistics, to such an extent as to get the figures we require for this table. They will follow in a few days.

On page 50 the paragraph regarding the tannery herd of buffalo should be changed to read as follows:

"The tannery herd of buffalo is located on the Lamar River near the mouth of Iron Creek. At present the herd consists of 415

animals, having increased from a herd of 21 animals purchased in 1907. Ninety calves were born during the year, 8 of which were born in October. Five of these, however, were killed recently while the herd was being vaccinated, leaving but 85 alive at the present time, of which 50 are males. Thirty of these bulls were castrated."

"The following data relating to the buffalo calves were compiled on October 15, 1939:

90 calves born since last annual report	52	males	37	females
Killed while being vaccinated October 7 and 15.....	5		2	
Total alive.....	50	males	35	females"

Then the following new paragraph should be inserted:

"Of the entire herd 85 animals, including all of the calves, have just been vaccinated for hemorrhagic septicaemia. Besides the calves already mentioned, one of the old cows was killed during the process of vaccination.

On page 63, in the second line of the last paragraph, the word "mother" should be inserted at the end of the line, so that this particular clause may read "among them one or two families consisting of mother and calf."

On page 66, in the last line of the para, the word "disagitated" on page 66 is incorrectly spelled.

On page 70, in the third line, the sentence should begin "He is now engaged" in stead of "he is not engaged."

On page 10¹, in recommendation No. 11, the word "diligent" should be corrected.

Referring to the data regarding Glacier National Park as needed for your report, please change the number of acres in the Two Medicine district that was burned over in the big fire from 500 to 3,000.

Cordially yours,

WILSON W. WILSON

Superintendent.

The Director,
National Park Service,
Washington, D. C.

YELLOWSTONE NATIONAL PARK

Horace H. Albright, Superintendent,
Chester A. Lindsey, Assistant Superintendent,
Yellowstone Park, Wyoming.

GENERAL DESCRIPTION.

The Yellowstone National Park was reserved from the public domain by act of Congress approved March 1, 1872,^{1/} and dedicated as a "pleasuring-ground for the benefit and enjoyment of the people." When established the park was situated in a vast region which had been divided into a few territories and practically all of which was embraced within the great Louisiana Purchase area. When these territories were finally changed to States and the surveys were made of these new commonwealths, it was found that while the park was principally in Wyoming, it extended more than two miles into Montana on the north and almost two miles into Montana and Idaho on the west.

The park is rectangular in shape, with east and west sides about 60 miles in length and north and south boundaries 54 miles long. The total area of the park is 7,313 square miles, or 4,720,720 acres, of which 3,114 square miles or 1,990,960 acres are in the State of Wyoming, 193 square miles or 124,720 acres are in the State of Montana, and 106 square miles or 67,040 acres are in the State of Idaho. It is the biggest park in the United States, and next to

^{1/} Secs. 2474 and 2475, U.S., 17 Stat., 33.

the highest peak in the world, being exceeded in area only by Jasper National Park of the Dominion of Canada.

The altitude of the park is 6,000 to 11,000 feet.

The boundaries of the park have never been changed since they were first established in 1872. However, it is proposed now to extend the park lines to include the Teton Mountains, the headwaters of the Yellowstone River, the valley of Pacific Creek, and the country north of the Buffalo Fork of the Snake, taking in an area of approximately 1,205 square miles, most of which now lies in a forest reserve and two State game preserves. All of this land was withdrawn from settlement on July 8, 1910, in aid of pending legislation.

ADMINISTRATION OF THE PARK.

For fourteen years after its establishment, Yellowstone National Park was administered by civilian superintendents appointed by the Secretary of the Interior. With the exception of the first superintendent, H. P. Langford, one of the explorers of the park, who served five years without salary or any other emoluments, and without assistance, these officers were aided by a few scouts.

In the early eighties some very unsatisfactory conditions connected with the administration of the park were aired in Congress, and the result of these findings was the enactment of a law approved March 3, 1883, authorizing the Secretary of the Interior to call upon the Secretary of War for details of troops

This is the existing force, but the authorized force includes a chief park ranger and four assistant chief park rangers. During the tourist season a temporary force of from 25 to 30 park rangers is employed to check automobiles at the various gateways, to control traffic on the highways, to protect the geysers, hot spring and other formations, and to fight fires, or to perform any other service required.

The ranger force is uniformed during the tourist season and presents a very striking appearance; in the fall, winter, and spring these men patrol the trails in plain clothes, and are very effective in protecting the park from poachers and other trespassers.

I am particularly proud of the present ranger force and its achievements of the past season when the demands upon it were tremendous. It has demonstrated beyond peradventure of a doubt that it is far more capable of protecting this great reservation than were the military forces. These park rangers have the interest of the park at heart, they love its wild life, its forests, its lakes and streams, and they are ready to protect these features regardless of the conditions under which this must be done. They come ~~into~~ closely in contact with the tourists in the summer season, and their courteous treatment of these visitors has prompted many words of commendation of the force, even by people who have been arrested by them for violation of the rules and regulations.

On the other hand, the soldiers were here to-day and gone to-morrow. Some took the same deep interest in the park that the park

rangers do, but in most cases they were care free and unconcerned with the problems of protecting the reservation. It was always necessary, even when the military forces were here, to employ a group of civilian scouts who knew the park to care for the wild animals and to guide new troops to their outposts, the latter, unfortunately, an all too frequent duty.

ADMINISTRATIVE WORK IN THE PARK.

Since July 1, 1918, the superintendent has been vested with full powers of supervision of the improvement and maintenance of roads, trails, buildings, and all other engineering work, much of which was formerly exercised by a district engineer officer of the Corps of Engineers of the U. S. Army. In other words, control of the administration, protection, maintenance, and improvement of the park is now exercised by the superintendent for the first time since the early eighties. This centralization of authority in one head, with one office, has resulted in effecting several important economies, and has made it possible to correlate the various activities of the park in a peculiarly satisfactory and effective manner. The new organization is not entirely complete, and another year may elapse before everything is running with desired smoothness, but perfectly balanced operations are on the way.

HEADQUARTERS.

Fort headquarters are located at Mammoth Hot Springs, 5 miles from the northern entrance. Fifteen ranger stations are maintained at convenient points throughout the park, and these are connected with headquarters by 260 miles of telephone lines.

The abandoned Fort Yellowstone buildings are now the headquarters structures. In one of these buildings the post office is maintained, but early next year we hope to remodel the bachelor officers' quarters in the old fort for use as an administration building and museum. A museum here is a most needed institution in connection with the educational work of the Service, and should be established very soon. Likewise the new administrative building will have a large and fully equipped information office, with a sufficient supply of publications on the entire park system to meet all tourist inquiries.

Park Ranger H. T. Skinner is now engaged in collecting specimens of geysers and hot spring formations, mammals, birds, wild flowers, etcetera, for the national exhibits.

A member of the ranger force is a County U. S. marshal for Wyoming, and most of the park rangers are County State game wardens of Wyoming, Montana, and Idaho.

JURISDICTION OF OFFENSES.

Exclusive jurisdiction of felonies and misdemeanors, including violations of the rules and regulations, committed in Yellowstone Park is vested in the Federal Government. A resident U. S.

Commissioner has authority in cases of misdemeanor or violation of the regulations to impose fines up to \$500, to sentence offenders to imprisonment of not exceeding six months, or to impose penalties of both fine and imprisonment. In felony cases the Commissioner has power to determine probable cause for holding a suspect, and he may hold him for trial by the U. S. District Court for Wyoming. Whenever a felony or misdemeanor not covered by the laws of the United States is committed in the park, the laws of the State of Wyoming will govern the action of the court or court commissioner, as the case may be.

Hon. John W. Helgeson has been U. S. Commissioner for the park since 1894, when the jurisdiction act of May 7, 1894, went into effect.

WEATHER BUREAU.

Reports of temperature, precipitation, wind, sunshine, etc., have been furnished by the branch office of the United States Weather Bureau which is maintained at Mammoth Hot Springs. Such observations as are made here were supplemented by temperature and precipitation records made by the rangers at Norris, Riverside, Galleria, Snake River, Lamo, and Soda Butte Ranger Stations. The office was in charge of Mr. George W. Lester, Observer, until October 2, when he was relieved by Mr. Edgar Fletcher.

The winter of 1918-19 was one of the most remarkable for mildness of weather on record. This is shown not only by weather re-

ports of temperature, precipitation, etcetera, but by the fact that the winter was so open that it was not necessary to feed hay at any time to the wild animals. Trucks were able to travel the road between headquarters and Tower Falls all winter. Teams came in from the west entrance on January 15th without shoveling snow, and trucks went to Canyon as early as May 19th, both of which are very unusual.

RAILROADS AND HIGHWAYS TO THE ENTRANCES.

There are four principal gateways to Yellowstone National Park, and three are accessible by both train and automobile. The fourth has no train service.

Northern Gateway.

The northern or Gardiner gateway is reached via a Northern Pacific Railway branch line from Livingston, Montana. The Northern Pacific operated two trains a day over this branch during the season. Through Pullman service to and from both eastern and western points to the north gateway was maintained. The town of Gardiner is situated on the park line, and is 53 miles from Livingston.

An automobile highway follows the railroad. This road is a part of the Yellowstone Trail and the National Parks Highway, two great transcontinental routes. It is also a part of the three main routes to Glacier National Park, the Yellowstone-Glacier See line Highway, via Livingston, White Sulphur Springs, and Great Falls; the Geyser to Glacier Highway, via Livingston, Bozeman, and Helena; and the Flathead Valley Route via Livingston,

Butte, and Missoula. This northern approach road was in good repair most of the summer, and part of it is now being rebuilt under funds provided by Park County and the National Government under the Federal Aid Road act.

Eastern Gateway.

The eastern or Cody gateway is reached by automobile service over an excellent highway maintained by the State and the National Park Service from the town of Cody, 53 miles from the park boundary. The railroad service to Cody is maintained by the Chicago, Burlington, and Quincy Railroad, which operated two trains a day during the past season, making connections at Billings with trains of the northern Pacific and Great Northern routes and at Billings and Francis with its own trains for the East and Denver, respectively. Through Pullman service was maintained, which made travel to Cody particularly comfortable and convenient.

The automobile road between Cody and the Grosvenor National Forest boundary, a distance of 27 miles, was maintained by Park County, Wyoming, and citizens of Cody until July 1, 1919, when the duty of maintaining this section was taken over by the State Highway Commission. The road through the Grosvenor National Forest, a distance of 28 miles, was maintained by the National Park Service in accordance with the provisions of the sundry civil appropriation act. This entire highway is a part of the Yellowstone Highway which traverses Wyoming from Cheyenne to Cody and the park by way

of Douglas, Casper, and Thermopolis. It is also on the Black and Yellow Trail, a transcontinental route that is being greatly improved and vigorously promoted at the present time. The Black and Yellow Trail crosses the Big Horn Mountains by way of the beautiful Ten Sleep Canyon.

The Cody approach road has never been in better condition than it was during the past season, and, considering the exceedingly dry summer, the roads across the State of Wyoming were in very fair condition.

In late July, accompanied by officers of the Glacier and Yellowstone park transportation companies and other parties interested in the development of Interpark travel, I made a trip from the park headquarters to Denver, a distance of 809 miles, in 20 hours and 45 minutes.

Western Gateway.

The western or Yellowstone gateway is reached by the Yellowstone Park branch of the Oregon Short Line Railway, which operated nightly during the past season as all- Pullman train known as the Yellowstone Special. This train left Salt Lake in the early evening and arrived at the western gateway at 8:00 a.m. the next day.

Automobile roads lead to this gateway from Utah and Idaho points, and sections of the National State highway system approach this entrance by way of the Ruby Valley and Virginia City, the

Madison River Valley, and the Gallatin Valley. With the exception of the road following the direct route from Ashton, Idaho, to Yellowstone, Montana, most of these highways were in good condition for automobile travel during the past summer. The road between Ashton and the park entrance, however, was in an extremely bad condition, and as a result many motorists make long detours in order to avoid this road. Plans are now under way to improve this bad approach road before the opening of next season.

Southern Gateway.

The southern or Snake River entrance at the present time has no train service. Automobile roads lead to this entrance from Riverton and Lander, Wyoming, by way of the Wind River and Snow-gate Pass; from Rock Springs and Pinedale, Wyoming, by way of Hoback River and the Jackson Hole; from the Teton Valley, Idaho, via Victor, Idaho, the terminus of the Teton Valley branch of the Oregon Short Line, and Teton Pass; and from Ashton, Idaho, by way of Squirrel Meadows and the head of Jackson Lake, a road that is now in a bad state of disrepair.

The Teton Pass road has been in excellent condition for travel throughout the summer. The Wind River and Hoback River routes have been passable for automobiles, but have not been very satisfactory for travel, due to the great amount of reconstruction work that has been carried on. It is expected that both of these routes will be in a much better condition for travel next year. Both of

them are being rebuilt under cooperative agreements between the State of Wyoming and the Federal Government, under the Federal Aid Road Act, the Forest Service also supplying funds from its highway appropriation.

There are two other entrances which are becoming increasingly important.

Northern Gateway.

The northern or Gallatin entrance is reached by a road which leads from the thriving city of Bozeman through the superbly colored and beautifully carved gorge of the Gallatin River. This road is now being rebuilt with State, county, and Federal aid funds, and when completed will doubtless become one of the most popular approaches to the park.

Northeastern Gateway.

The northeastern or Cooke City entrance will be reached by a road which is being constructed from Red Lodge and Deer Creek, Montana. This new road will traverse the Beartooth Mountain range and will be a very scenic approach. I have no information as to when this road will probably be completed, but in all likelihood it will be several years before it reaches the park boundary. In the meantime the Cooke City region is accessible from the northern entrance by way of the Lamar River Canyon and the canyon of Soda Butte Creek, on the park highway system.

THE MAIN ROAD SYSTEM.

There are 271.8 miles comprising the main *highway* system of the park, and there are 21.77 miles of secondary road within its boundaries. These roads, with the distance between junction points, are shown clearly on the attached map.

In the adjacent National Forest, east of the park, we are charged with maintaining 30 miles of the main loop approach road, and in that part of the Teton National Forest which is comprehended in the plan to extend the park boundaries we are required by law to maintain approximately 30 miles of the main highway leading to the southern entrance of the park. Should the park be enlarged, this obligation will extend to the upkeep of considerable additional mileage along the north side of the Buffalo Park of the Snake River and the larger part of the road from Ashton, Idaho, toward the present southern entrance.

The work that was performed on all of the roads under our control is outlined in another portion of this report.

TRAIL AND TOURIST SYSTEM.

There are between 400 and 500 miles of trails in the park, over 400 of which are fairly well worked, and over 300 miles of which are particularly good tourist trails. All of the trails are used by the rangers for fire patrols.

The work accomplished in preparing this trail system is discussed in another part of this report, as are also the extensions

of the trail system that ought to be undertaken in the early future.

TRAVEL OF THE 1919 SEASON.

All travel records of Yellowstone National Park were broken during the 1919 season. Never in the history of the park have so many people enjoyed its opportunities for recreation and sight-seeing as came here for that purpose this year. Furthermore, the tourists this season saw more of the park than usual, there was a general tendency to cover all of the main roads and make as many side trips as possible.

The spring conditions for travel were good. Snow left the roads earlier than usual, and on the opening day of the season, June 20th, the main belt line and all of the extreme roads were open to public use. The first day of the season saw the hotels and restaurant cars filled to their capacity, and this condition continued until practically the close of the season on September 20th.

It is with a feeling of pride and happiness that I call attention to the increase in the use of the trails of the park during the year. The people who toured the park with pack trains all expressed themselves as tremendously pleased with their trips. They all had wonderful opportunities to see the wild animals under the best conditions, and of course they enjoyed thrilling rides through scenic regions that are hardly surpassed in any national

path. Most of the trail parties also covered the territory south of the park that it is proposed to add to it, with the Cotton Mountains.

The aggregate number of persons visiting the park during the year ended October 12, 1919, was 62,261. The following tables show some very interesting analyses of this travel figure:

Travel by different entrances:

From the north, via Gardiner, Mont. -----	22,786
From the west, via Yellowstone, Mont. -----	23,688
From the east, via Gulp, Wyo. -----	13,435
From the south, via Moran, Wyo. -----	2,152
Total -----	62,061

Yellowstone Park Transportation Co.:

Entering via the northern entrance -----	9,333
Entering via the western entrance -----	8,897
Entering via the eastern entrance -----	3,025
Total -----	21,255

Making trips with private transportation:

With automobiles paid and complimentary -----	37,724	
With automobiles, second trip -----	2,152	.. 39886
With motorcycles -----	56	
With licensed mobile and pack trains -----	129	
With miscellaneous facilities, including out-of-season visitors to the park -----	915	
		<u>1100</u>
Grand total -----	62,061	

Private automobile travel:

	Automobiles	Trucks
Entering via the northern entrance -----	3478	12601
Entering via the western entrance -----	3783	14900
Entering via the eastern entrance -----	2853	10770
Entering via the southern entrance -----	683	2515
Totals -----	10797	39886

Motorcycle travel:

	Motorcycles	Trucks
Entering via the northern entrance -----	30	31
Entering via the western entrance -----	9	14
Entering via the eastern entrance -----	7	11
Totals -----	46	56

The following tables are given for the purpose of covering the travel of this season with the number of visitors entering the park in 1918, the war season: 1917, the season of average travel since the admission of automobiles to the park; and 1915, the Panama-Pacific Exposition season. These tables give in the first column the number of automobiles and in the case of the 1918 and 1917 statistics the number of motorcycles entering the park; in the second column the number of visitors in the park is shown by reference to entrances, those entering via Soda Butte Ranger Station or the northeast gateway being listed with the eastern entrance visitors; the next column shows the number of visitors reaching the north, west, and east entrances by rail; and the last column gives the total number of visitors by entrance.

1919				
Entrance	Aut. Transpn.	By	Total	
	Cars	Visitors	Rail	Visitors
North	3498	13433	9333	22766
West	3792	14661	8897	23550
East	2860	10430	7023	13473
South	623	2462		2462
TOTAL	10773	40986	21273	62261

1917				
Entrance	Aut. Transpn.	By	Total	
	Cars	Visitors	Rail	Visitors
North	1528	6027	1957	7984
West	1243	7366	1136	8702
East	1128	4114	333	4447
South	175	542		542
TOTAL	4074	18049	3426	21495

1/ includes 36 motorcycles carrying 36 people.

2/ includes 16 motorcycles carrying 16 passengers.

1927

Entrance	Pvt. Cars	Transp. Visitors	By Rail	Total Visitors
North	1904	764 2	3776	13419
West	2298	9075 1/	9435	14690
East	1355	5061	1874	6035
South	36	356		356
TOTALS	5793	32117	13285	35400

1916

Entrance	Pvt. Cars	Transp. Visitors	By Rail	Total Visitors
North	36	3004	14569	17463
West	392	2775	29756	32521
East	153	1197	352	1550
South	5	71		71
TOTALS	686	7247	44677	51851

1/ Includes 104 people entering via the southeastern gateway.

Mio	28	115	15	56	93	179	3	9	110	319
Nebron	66	343	140	318	15	40	3	12	246	913
Pennsylvania	19	91	5	16	23	84	1	4	48	195
Rhode Island	2	5	0	0	0	0	0	0	2	5
South Dakota	101	323	7	20	76	295	1	2	185	605
Texas	7	19	20	97	77	265	1	6	105	347
Vermont	1	4	2	8	7	22	2	9	12	43
Utah	16	99	660	2956	11	43	117	486	804	3438
Virginia	4	8	0	0	0	0	0	0	4	8
Wisconsin	1	7	1	4	1	5	0	0	3	12
Wyoming	200	862	175	675	56	216	0	0	495	1762
Alabama	79	207	8	33	42	116	3	3	180	438
Arkansas	48	172	42	139	693	2799	1	2	878	3387
California	0	0	0	0	4	12	0	0	4	12
Colorado	2	3	2	3	0	0	0	0	4	8
Connecticut	41	169	26	113	8	22	0	0	78	304
Delaware	0	0	0	0	1	2	0	0	1	2
District of Columbia	0	0	0	0	0	0	1	0	1	2
Florida	0	0	0	0	0	0	1	0	1	2
Georgia	0	0	0	0	0	0	1	0	1	2
Idaho	0	0	0	0	0	0	1	0	1	2
Illinois	0	0	0	0	0	0	1	0	1	2
Indiana	0	0	0	0	0	0	1	0	1	2
Iowa	0	0	0	0	0	0	1	0	1	2
Kansas	0	0	0	0	0	0	1	0	1	2
Kentucky	0	0	0	0	0	0	1	0	1	2
Louisiana	0	0	0	0	0	0	1	0	1	2
Maine	0	0	0	0	0	0	1	0	1	2
Massachusetts	0	0	0	0	0	0	1	0	1	2
Michigan	0	0	0	0	0	0	1	0	1	2
Minnesota	0	0	0	0	0	0	1	0	1	2
Mississippi	0	0	0	0	0	0	1	0	1	2
Missouri	0	0	0	0	0	0	1	0	1	2
Montana	0	0	0	0	0	0	1	0	1	2
Nebraska	0	0	0	0	0	0	1	0	1	2
Nevada	0	0	0	0	0	0	1	0	1	2
New Hampshire	0	0	0	0	0	0	1	0	1	2
New Jersey	0	0	0	0	0	0	1	0	1	2
New Mexico	0	0	0	0	0	0	1	0	1	2
New York	0	0	0	0	0	0	1	0	1	2
North Carolina	0	0	0	0	0	0	1	0	1	2
North Dakota	0	0	0	0	0	0	1	0	1	2
Ohio	0	0	0	0	0	0	1	0	1	2
Oklahoma	0	0	0	0	0	0	1	0	1	2
Oregon	0	0	0	0	0	0	1	0	1	2
Pennsylvania	0	0	0	0	0	0	1	0	1	2
Rhode Island	0	0	0	0	0	0	1	0	1	2
South Carolina	0	0	0	0	0	0	1	0	1	2
South Dakota	0	0	0	0	0	0	1	0	1	2
Tennessee	0	0	0	0	0	0	1	0	1	2
Texas	0	0	0	0	0	0	1	0	1	2
Utah	0	0	0	0	0	0	1	0	1	2
Vermont	0	0	0	0	0	0	1	0	1	2
Virginia	0	0	0	0	0	0	1	0	1	2
Washington	0	0	0	0	0	0	1	0	1	2
West Virginia	0	0	0	0	0	0	1	0	1	2
Wisconsin	0	0	0	0	0	0	1	0	1	2
Wyoming	0	0	0	0	0	0	1	0	1	2
Totals	3871	11804	3789	13767	2793	10104	370	2119	10129	37684

Complimentary cars, unclassified by States..... 17
 Motorists entering in complimentary cars, unclassified by States..... 60
 Second/A entry cars, unclassified by States..... 591
 Motorists in second entry cars, unclassified by States..... 2162
 Grand total, all cars and motorists, classified and unclassified.....10737 39886

ADMISSION AND PASSES.

A fee of \$7.50 was charged for automobile tickets of passage and \$3.50 for motorcycle tickets of passage, which were good for the entire season. Complimentary tickets were issued to officials of adjoining States or counties, and to officers of the Federal Government visiting the park officially.

ACCOMMODATIONS.

The above tables disclose the most interesting fact that of the grand total of 60000 visitors to the park, approximately two-thirds came here in their private automobiles. Of these probably 60 per cent brought with them their own camp equipment, and in most cases used and appreciated our special camp grounds where wood, water, toilet facilities, and, at Mammoth Hot Springs, electric lights, were furnished without charge.

At times during the summer these camp grounds were overcrowded, and before the opening of next season they must be expanded and new areas opened for this use. Likewise, more wood must be provided, and a considerable sum of money must be expended in improving the water and sanitation facilities. The popularity of these camps fully warrants their development on a large scale.

Of the 15,679 tourists who came to the park by rail, and utilized the facilities of the Yellowstone Park Transportation Company, making the complete park tour, 10,402 were accommodated at the hotels

and 8,537 at the permanent camps. We have no data as to the accommodations furnished to people who made short trips in the park or toured only a part of the reservation with the Yellowstone Park Transportation Company. This group of visitors numbered 2596.

Likewise we have not been able to compile statistics of the number of private motorists who secured accommodations at the hotels and permanent camps, but, as I have stated, it is estimated that about 60 per cent of these visitors brought their own camp equipment with them. This is a conservative estimate, hence not more than fifteen or sixteen thousand individual automobilists purchased meals or lodgings or both at the hotels and camps.

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

Hotels:

	Meals	Lodgings	Total
Mammoth Hotel -----	71,210	17,707	88,917
Old Faithful Inn -----	61,218	18,530	79,748
Canyon Hotel -----	21,348	20,596	41,944
Totals -----	153,776	56,833	210,609

Permanent Camps:

Mammoth Camp -----
 Geyser Camp -----
 Canyon Camp -----
 Lake (Emergency camp only)
 Grand Roosevelt (Gower Falls) -----

Figures to

follow in one week.

Totals -----

SERVICE TO THE PUBLIC.

At times during the season the hotels and camps were filled to overflowing, and there were occasions when people had to be turned away from the establishments at the Grand Canyon of the Yellowstone, despite the fact that both the hotel and camp at this point are much larger than the plants at Mammoth Hot Springs, Upper Geyser Basin, and Lake Yellowstone. This was due to congestion at the Canyon, owing to lack of accommodations at the Lake. Nevertheless, remarkably good service was furnished to the public by both the hotel and camp companies, and few complaints regarding unsatisfactory treatment at the hands of the companies have been made to my office, or to the Service, so far as I have been advised.

That service should have been so uniformly satisfactory is especially worthy of note because both the hotels and camps had great difficulty in securing and keeping sufficient competent help to operate their several plants. Time and again during the summer they were almost brought to the point of closing the doors of one or more resorts, due to lack of enough assistance to keep them in operation. Laundry help was particularly hard to secure.

LAKE HOTEL AND PERMANENT CAMP.

This discussion leads naturally to the situation at Lake Yellowstone, where the hotel and permanent camp were both closed during the season. In the first place, they were not in proper condition to open. Many necessary repairs had to be made to the hotel, and

the permanent camp was in reality out of existence. The latter was torn down in the autumn of 1917 in preparation for the building of a complete new plant. A new central structure was begun, but snow caused the early cessation of work, and of course war conditions prevented rebuilding last year. It would have been impossible to have rebuilt the camp during the spring of 1919.

But quite aside from the physical difficulties in the way of opening the Lake resorts, the labor situation was such that it would have been practically impossible to have secured crews for either place.

Work is in progress now on the rebuilding of the Lake Camp, and the hotel is undergoing extensive repairs with a view to full operations next season. An exceedingly attractive log building of ample proportions is being constructed at the camp. This will be used as a dining room and lobby, and will be in most respects more interesting and attractive than any building in the park except Old Faithful Inn and the Canyon Hotel. A new kitchen, new comfort stations and flush toilets, and a general rearrangement of tents will constitute the bulk of the other improvements that will be made in this camp before next season.

At the Lake Hotel the improvements that will be the most noteworthy will include a porte-cochere in front of the central entrance of the hotel, built with faithful adherence to the colonial architecture of the hotel itself. The old porch floors will be replaced

by concrete walks, and the grounds in front of the hotel will be improved by planting.

Taken in connection with the new store that will be built at the Lake by C. A. Hamilton, and the new filling station of the Yellowstone Park Transportation Company, the improvements at this point will go far toward making it the most popular tourist resort of the park. The establishment of a large new public automobile camp is another project that we hope to complete next year at this point, and if authorized a new ranger station and information office will also be erected here.

SPECIAL CAMP SERVICE.

The Yellowstone Park Camping Company operated its Camp Roosevelt near Lost Creek, in the Tower Falls region, during July and August, and accommodated a considerable number of people who sought service in that scenic section of the park. This camp is destined to be very popular as a fishing and riding resort. It is in the neighborhood of some of the best fishing waters in the park, and is a radiation point for numerous very interesting trails.

During the summer, it likewise furnished emergency service to tourists at the temporary camp it maintained at Yellowstone Lake in connection with the construction of its new camp buildings.

TRANSPORTATION SERVICE.

The Yellowstone Park Transportation Company maintained first-class service to and from all park gateways, connecting with regular

trains at Cody, Wyoming, and Gardiner and Yellowstone, Montana; and in addition operated cars regularly twice a week in both directions between Upper Geyser Basin and B. D. Sheffield's Teton Lodge at Moran, near the upper part of the Jackson Hole. A total of 414 tourists availed themselves of this Jackson Hole trip, and apparently all came back enthusiastically in favor of placing the magnificent Teton Mountains in the park as contemplated by pending legislation.

During the summer the transportation company had in service 100 ten-passenger automobiles and 17 seven-passenger touring cars, and with all of this equipment it was often necessary to operate them on double shifts in order to move all of the people who wanted travel in the park. Arrangements are now being made to increase this equipment materially before the opening of next season.

Garage, gasoline and oil, and repair service was maintained by this company at Mammoth Hot Springs, Upper Geyser Basin, Lake, and Grand Canyon.

Considerable trouble was experienced during the early part of the season in controlling the operation of the cars of the transportation line on the park highways. Many of the drivers of the cars were careless and irresponsible, and refused to observe the rules and regulations. These were dismissed or punished or had both penalties meted out to them as fast as they could be caught and brought to headquarters. Others persisted in the idea that

they had the right of way on the roads, and were constantly compelling private motorists to let them pass, even though they were not behind their schedule or had other good reason for moving ahead. It took some weeks to get all of these drivers to understand that they had to submit to regulation, that they did not have the right of way, that they had to respect the rights of the private motorist, and that they had to exercise the utmost care of the lives and property in their hands. In extenuation of the offenses of some of these boys, it may be said that they had just been discharged from the aviation and motor truck services of the Army and found driving passenger cars over the park roads too simple a task. Even when going at high speed they could not realize that there was any danger, or that any passenger might feel timid.

INFORMATION SERVICE.

An information desk was maintained in the Superintendent's office during the tourist season, and was visited by many tourists. Here were sold Geological Survey contour maps of the park and certain park pamphlets, and information circulars of the various national parks and other literature of value to the public were distributed free of charge. The Government information circular is a very popular pamphlet, of inestimable value to travelers. It is in great demand and its publication and free distribution should under all circumstances be continued. Automobile maps and circulars of information of other parks were also distributed in considerable quantities.

Automobile maps and information pamphlets relating to Yellowstone Park were also distributed by rangers at each entrance to the park, and a sticker with important regulations printed on it, together with a warning about forest fires printed in brilliant red ink, was posted on the windshields of all cars coming into the park.

At his Tower Falls photographic studio, Mr. J. E. Hayes maintained a free information bureau for the benefit of the public.

RECREATION SERVICES.

Mr. J. E. Hayes, official photographer, operated picture shops at Mammoth Hot Springs, Upper Geyser Basin, and Tower Falls; and also photograph stands in all hotels and camps. His film developing and printing department was heavily patronized by Kodak users.

General stores were maintained at Upper Geyser Basin and at Lake outlet by Mr. C. A. Hamilton, and similar establishments were maintained by Mr. George Whittaker at Mammoth Hot Springs and at Canyon. Meekness Fryer and Criselman operated a curio store and ice cream parlor at Mammoth Hot Springs.

At Upper Geyser Basin, Mr. Henry P. Brothers operated the Geyser Baths. He reports that 3499 persons used these baths, of whom 1577 were park employees.

All of these enterprises gave unusually satisfactory service to the public, and complaints of improper treatment of visitors were few.

ROAD PAVEMENT WEAR.

The road system of the park was subjected to worse wear and tear this year than ever before. The lack of rain caused the roads to keep in a thoroughly dry condition, and with the sun constantly shining, sprinkling on the sections of the highways that are subject to this treatment was not as effective as usual in holding down the dust. Furthermore, winds were frequent and in the course of the summer considerably impaired certain sections of the road by blowing off top surfacing material.

The tremendously heavy motor travel, of course, was the agency that impaired the road system most. As the statistics already quoted show, 10,737 private automobiles toured the park this season. Let us assume that the equivalent of 2,500 such cars were operated by the Yellowstone Park Transportation Company, making a total of 13,237 pleasure cars on the roads during the summer. Let us further make the conservative estimate that these cars traveled over 200 miles of the road system. Using these figures to determine the use of the roads, we find that the total travel for the season was 2,647,400 motor miles. As there were 62,361 tourists in the park during the summer, the passenger miles traveled were 12,473,200 — a stupendous travel for a road system that has practically no permanent or semi-permanent surfacing of any kind. Some stretches of the road are gravelled and part of the west approach is surfaced with oil macadam, but these sections are such a small part of the

whole that they might well be omitted from consideration.

As I have stated, the traffic figures under discussion are very conservative. They do not include hundreds of motor miles of truck hauling, considerable motorcycle use, and an amount of horse-drawn traffic that is hardly negligible. Other factors should be considered, too, in determining the full use of this road system, but I have given enough data to make it perfectly clear that we must soon begin the paving of at least the main belt line highways, if they are to be expected to be kept in condition for the enormous traffic of the future, that is inevitable.

In the long run paving will be cheaper and infinitely more satisfactory. The worst section of the belt line should be paved first, then a program covering the pavement of other parts of this main road system should be undertaken. Such a program would require several years to execute, but as it progressed the cost of maintaining the system would be considerably reduced each year.

It would be a splendid step to begin the paving next year under an appropriation of, say, \$100,000. In this connection it may be recalled that in the sundry civil act of June 12, 1917, the following appropriation was made for Yellowstone Park which would seem to indicate that Congress intended to have at least the main belt line paved: "For resurfacing and for finishing the belt line with oil macadam, \$20,000."

ROAD MAINTENANCE AND IMPROVEMENT.

During the past year, the work of repairing and improving the road system has been entirely under the control of the National Park Service, and has been executed under the direction of the superintendent of the park and engineers of the bureau.

In the fall of 1918, general road construction and maintenance was continued as late as the weather conditions permitted, and in the spring of 1919 small crews made necessary repairs to roads and bridges. Some sprinkling was done in June, but the system was not entirely organized until the early part of July. Owing to the extreme dryness of the season, many sources of water supply failed, thus making it necessary to place double tanks on two of our 7-ton trucks to make sprinkling possible where water was not available. For three weeks in August the road crews, except those on sprinkling duty, were used in forest fire fighting, compelling a cessation of all work of repairing and improving the highways. Most of the work of the season was, therefore, confined to ordinary maintenance and repair activities with much interruption and costly moving and changing of camps, corrals, and equipment.

The following is a brief summary of the work accomplished along these lines, together with some construction work performed since the date of the last report:

Main Belt Line: -- On the main belt line, in addition to ordinary repair and upkeep, including sprinkling, the following work was accomplished:

On the Harroth to Norris road 3 miles of graveling was completed, two miles on the Norris end and the remaining mile at Beaver Lake and at Indian Creek.

Four miles from the Lake on the Wash to Lake road, 1500 feet of road was reshaped and gravelled.

At the Canyon the approaches to the Chittenden Bridge were improved and the sharp turns in the Artist Point road were removed.

Three miles of the Furuvren Pass road were widened and the bad turns improved. Four fills were made over culverts. Two concrete culverts, each 4' x 6' x 45' long were constructed. Six concrete culverts were lengthened about 13 feet to carry the fills. One hundred and twenty feet of 10-inch galvanized iron culverts were installed, and 100 feet of 24-inch. The remaining work to be done on the Furuvren Pass road includes the making of fills over deep ravines into which concrete culverts have been placed, and widening one mile of road, most of which is rock work.

At Coode Creek and Elk Creek, on the Tower Falls road, fills were made over concrete culverts built in 1917.

The large steel bridge over Cascade Creek at the Canyon was painted and retainted. The steel span over the Gardner River, the arch over Tower Creek, and the steel bridge at the Montana-Wyoming State line on the north entrance road were painted and repaired.

North Approach: -- In October proposals were opened for the construction of three-fourths of a mile of road around the Can-

liner slide, on the opposite side of the Gardiner River from the old road. The contract was awarded to Gibbons and Reed, who commenced work on November 1st. The contract quantities were 42,000 cubic yards of excavation, of which a large percentage was rock, 500 cubic yards of reinforced concrete, 500 cubic yards of loose rock wall. Also included in the contract was the wrecking of one 75-foot span steel bridge and replacing it on newly constructed abutments. The above contract work totalled \$42,000.00. In addition to the contract work, \$19,350.00 was expended in graveling the road, salvaging two steel bridges, and providing protection against the slide during the Gardiner River. It is no doubt the proper solution of the slide problem, and in fact all appearances a guarantee against any future trouble from this source. This new piece of road was open for travel on April 14, and was entirely finished before June 1st.

East Approach: --- Nine and one-half miles of this road from the west boundary have been finished during the past four years with oil macadam. Of this the first 5 miles are in excellent condition, the oiled surface being 12 feet wide and showing little signs of wear. On the remaining 4½ miles the surface is only 10 feet wide and in many places is raveling and breaking badly, so that the general condition is poor. The remaining ½ miles have not been surfaced, but the road is in good condition. No repairs to the macadam, owing to the labor shortage and lack of funds, were made this year, but it is imperative, in order to save the remaining part of the

road, that these repairs be made next year.

East Approach (in the park).-- Very light grader work, ditching for drainage, and repairs to wooden culverts was the extent of the work done on this road. The Fishing Bridge over the Yellowstone River at the Lake Outlet was repaired. All damaged and missing piles were replaced, and an ice-break of piling was constructed up stream from each bent of the bridge.

East Approach (in the Shoshone National Forest).-- The 30 miles of the Cody approach road in the Shoshone National Forest was maintained in excellent repair. General bridge and road upkeep was continued throughout the season. Unfinished repairs to revetments damaged by the washouts of the spring of 1918 were completed. One king post bridge with 30-foot span was erected of logs to replace the old wooden bridge over Starbuck Creek. Approaches to the Grinnell Creek bridge were made, and the road one-fourth mile eastward was widened and the alignment improved.

South Approach (in the park).-- Light bridge and road repairs were made in July. There are over 200 wooden culverts on this road, the majority of which will be replaced by galvanized iron culverts next year.

South Approach (in the Teton National Forest).-- A small crew made light bridge and road repairs from the south boundary of the park to the neighborhood of Moran. Three and one-half miles of road in the vicinity of the Pilgrim Creek bridge were improved and

the necessary culverts installed. Ten feet of the concrete decking on the north end of the Snake River bridge was replaced. At Moran 4,700 linear feet of road was gravelled 10 feet wide and 6 inches deep.

Cooks Site Road.— The large steel bridge over the Yellowstone River was painted. Light bridge and road repairs, with a few minor grade improvements, were made from the Tower Falls Junction to Pebble Creek. We also made a survey for a new bridge site over the Lamar River.

TRAIL REPAIRS.

Two trail crews with pack transportation were employed most of the summer, except when the work was interrupted to take care of forest fires, in cutting out fallen timber and making slight repairs to grades and corridors on trails so as to render them passable for saddle horses. The total number of miles gone over was as follows:

Lamar River-Mary Bay Trail	48 miles
Upper Yellowstone Trail	35 miles
South Boundary Trail	33 miles
Hillem-Park-Riverside Trail	27 miles
Riverside-Mountain Trail	15 miles
Hellroaring-Clough Creek Trail	8 miles (part)
Clough Creek Trail	13 miles
Shoshone Trail	16 miles
Shoshone Trail	20 miles
Total	217 miles

MARKS.

The metal signs purchased last year showing road junctions and mile post signs were placed on posts made of old 1½-inch pipe.

printed. Many of the signs showing names of objects of interest, trails, stokers, have not yet been placed, due to lack of skilled labor for this work.

TELEPHONE AND TELEGRAPH LINES.

Of the 263 miles of grounded telephone and telegraph lines maintained by this office in the park, 207 miles underwent quite extensive repairs during the past season, as follows:

From	To	Miles	Character of Repairs
Headquarters	Cardiner	9	Poles reset, wires tightened.
Headquarters	Upper Basin	48	Poles reset, wires tightened.
Canyon	Thurb	31	Poles reset, wires tightened.
Lake Junction	Sylvan Pass	19	Heavy repairs for first 13 miles, $\frac{1}{2}$ mile new line re-located to avoid snowslides through the Sylvan Pass.
Sylvan Pass	East Entrance	7	Light repairs.
Thurb of Lake	South Entrance	23	Light repairs.
Pirchold Cascades	East Entrance	16	Light repairs.
Headquarters	Red Butte Sta- tion	25	Reset all poles for 29 miles and tightened wires; balance 6 miles light repairs.
Swan Lake Flats	Gallatin Road	23	Poles reset; wire tightened.

Connection was made with the Eastern Union Telegraph lines in April, 1919, by attaching to the wire in the park leased by the Yellowstone Park Hotel Company. This gives us a connection for our official messages directly from our office to Helena, Montana, instead of having to file them at the hotel in summer and telephone them to Cardiner in the winter.

The whole telephone and telegraph system in the park ought to

be reorganized on a scale that will provide adequate service by the Government at reasonable rates, for all concessioners and the public. The maintenance of a telephone line in the park is necessarily expensive. At least one-half of our 269 miles of line runs through timber, most of which is lodgepole pine which is easily uprooted by winds, and much damage occurs from fallen timber. The timber available in the park for poles is almost worthless and lasts in the ground but a few years, necessitating rebuilding frequently. If all lines in the park can be consolidated under Park Service control, their use by all interests will warrant the expense of more substantial construction with consequent improved and cheaper service. At present the Government line serves the camping company and connects our headquarters with ranger stations, road camps in summer, and with the railroad station and business houses in Gardiner.

A separate wire connects at the north entrance with the Mountain State Telegraph and Telephone Company's long distance line. Our lines are connected through a 50-drop switchboard with power rings to 40 telephones at headquarters, 20 on park lines, and 8 in the village of Gardiner, and in summer reaches all hotels in the park through the hotel company's switchboard at Mammoth Hot Springs.

BUILDINGS AND OTHER STRUCTURES.

At headquarters one double set of officers quarters in the abandoned fort was converted into flats suitable for four families.

One of the large stone cavalry stables was remodelled to accommodate the blacksmith shop, machine shop, and garage.

The ports in the Gardiner gateway arch were closed and sealed up, making a temporary automobile checking station.

Two small frame buildings were erected about one mile south from Gardiner, for use as temporary storehouses for TNT explosive which was received from the surplus stock of the War Department. At one time we had 200,000 pounds of this explosive stored in these buildings.

Two camps were developed for use of private camping parties traveling in automobiles at Mammoth Hot Springs. The first one that was improved consists of the old wagon sheds near Mammoth Camp. Here open fireplaces were built for cooking, flush toilets with sewer connection installed, and the grounds lighted by electricity, and first-class water piped in. The second was developed later under the hill in the edge of the timber by the lower bridge, where the ground was cleared of fallen timber and debris, running water piped to the grounds, and earth closets provided.

The Bechler River ranger station in the southwest corner of the park was painted, and a new root cellar was built, all by labor of the regular ranger force.

A new snowshoe cabin was built on Maple Creek by the rangers at Riverside Station, late in the fall of 1916.

About 2 1/2 miles of fences inclosing the fields at the Buffalo Farm on the Lamar River were rebuilt with new posts, and the corners, shoots, and squares necessary in handling the large herd of tame buffalo were also rebuilt.

LANDSCAPE WORK.

A vista was cut through the woods from the Upper Falls-Mammoth Hot Springs Road, in order that beautiful Smith Falls might be opened to the view of tourists traveling over this road.

Another vista was cut below the Upper Basin-Mammoth road in order that Buck Lake might be better observed by passing visitors. This lake is a perfect gem in a setting of dense forests, and the vista that opened it to public gaze was much appreciated.

On the Mammoth Hot Springs formation much dead wood and other debris were removed, making a great improvement in the appearance of some of the terraces, among them Angel Terrace, one of the most remarkable and beautiful terraces of the Mammoth Hot Springs district.

All of this work was done under the supervision of Landscape Engineer Lunsford, who also directed some landscape work at the Mammoth Camp and at other resorts in the park.

WATER SUPPLY AND POWER PLANT.

Water System.— The water supply furnishing park headquarters at Mammoth Hot Springs, including all concessionaires, park employees, Mammoth Hotel, and Mammoth Camp, with water for domestic purposes, watering lawns and for running the power plant, is drawn from

Panther Creek and Gardner River, 7 miles north, and from Glen
 Creek 4 miles south. At the mouth of Panther Creek are located
 two concrete diversion dams and head gates, which divert the water
 for 18,400 linear feet north through reinforced concrete pipe 24
 to 27 inches in diameter, to the head of Golden Gate, where it is
 emptied into Glen Creek. At a distance of 7,200 feet down stream
 the water is again taken from the stream by a diversion dam and
 headgate and is carried in vitrified pipe varying in size from
 18 to 24 inches in diameter to the main reservoir. This is a con-
 crete structure pentagonal in shape, in size about 151 by 145 feet,
 and 10 feet deep at the lowest point, located just across the road
 from the largest terrace of the Mammoth Hot Springs. Its capacity
 is 2,025,000 gallons. This storage capacity is supplemented by
 the old reservoir which is located immediately adjoining and above
 the main one, of earth construction, capacity 2,000,000 gallons,
 filled by the overflow from the main reservoir. For domestic uses,
 watering lawns, etcetera, the water is carried by mains to the
 buildings and grounds, so arranged that they can be connected
 directly with the reservoir, or connection can be made with a small-
 er reservoir some distance higher and southward, thus giving
 higher pressure in case of fire. The watershed is guarded from
 contamination to the extent of prohibiting camping on it, and
 tests of this water have shown it to be reasonably pure.

The hotel company has an adequate water supply at all of its
 hotels in the park. But the supply for the camps at the Upper
 Basin and Canyon is neither adequate nor satisfactory from several

standpoints, and there is much to be done to develop a good supply of pure water at these points, as well as several others where it is desirable to establish public camps for use of tourists traveling in their own automobiles.

Power Plant.-- Water is conducted from our two reservoirs at Mammoth Hot Springs to the hydroelectric power plant through a penstock 26" in diameter, 2,000 feet long, with a drop of 510 feet, made of riveted sheet steel laid mostly on top of the ground and painted. This penstock is so connected and supplied with valves that water can be used from either or both reservoirs. The power plant is housed in a modern building of reinforced concrete structure with tile roof, concrete floors, steam heated and lighted with electricity. The main building is 31 by 76 feet in size, with a wing 11 by 46 feet for housing the penstock and control valves, and a concrete tail race and weir. The water is delivered to three De Olier turbines with Francis runners, each rated at 260 H.P. under 300 feet head and 600 R.P.M. The speed is governed by Lombard type L 1 governors. These turbines are directly connected to three Westinghouse revolving field alternators, each three-phase, 60 cycle, 150 K.W., 2300 volt, 37.7 amperes per terminal. The exciters are also Westinghouse belted to main alternators each having a capacity of 8 K.W. at 125 volts. The switchboard is a modern one, with voltage regulators, oil switches, and necessary instruments. A small machine shop with power lathe, emery wheel, and air compressor in connection and power room makes it a very complete plant.

This plant furnishes electric current for lighting all buildings at Mammoth Hot Springs, including the Mammoth Hotel and Mammoth Camp. The extensive grounds at headquarters are also lighted from this plant, by means of eighty 90-watt tungsten lamps, arranged in series of 20 with shunt coils. It also furnished power to our shops and those of the transportation company. The total production of the plant for the past year was 143,560 kilowatt hours. This production is limited at times by supply of water, but is sufficient for all needs up to the present date. The power lines and street lighting fixtures which have been in constant use since 1903 are showing wear, and will have to be replaced within a year or two.

Other electric plants for lighting purposes are maintained in the park by the Yellowstone Park Hotel Company at Old Faithful Inn and Canyon Hotel, both run by steam power, and by the Yellowstone Park Camping Company for lighting Canyon Camp, run by a gasoline engine which also pumps water to the camp from Yellowstone River.

ICE.

During the past winter 237 tons of ice was harvested at Mammoth by regular park employees and stores.

LEWIS AND SHOSHONE.

I am advised that there are several irrigation projects under consideration which propose to raise the water in Lake Yellowstone and Lewis, Shoshone, and Heart Lakes, as well as flood the basins

of the Falls and Snake Rivers in the southwest corner of the park, all of the water to be stored thereby to be used in Idaho. It is understood that it is proposed to take the Yellowstone Lake water through the continental divide in tunnels.

I am not advised as to the use that will be made of this water, but I know that these lakes and basins can not be used as storage reservoirs without seriously injuring the scenic beauty of Yellowstone Park and greatly impairing, for generations to come, its usefulness as a national playground. Furthermore, this commercialization of its waters would constitute a precedent for encroachment of other interests that have been held away from the park since early days. Once the park is opened to exploitation of its natural resources, anything may afterwards happen to it.

FISH COMMISSIONER'S VISIT.

For the purpose of making a careful study of the fish supply of Yellowstone National Park and to ascertain by personal inspection what ought to be done to extend and improve the opportunities for catching fish in the waters of the park, Dr. H. M. Smith, Commissioner of the United States Bureau of Fisheries, spent the period between July 25th and Aug. 14th in the park. His survey of the park waters was most complete, and from the data that he has collected he expects to develop a policy for the extension of the operations of his bureau in the park that will make this reservation one of the greatest fishing resorts of the world. Doctor Smith also collected data that will be used in the publication of information on the fish of the park supplementary to that already available.

One of the factors in the fish supply of the Yellowstone National Park is the white pelican. It nests on two small islands in Yellowstone Lake and the adult birds wander widely in search of food, which consists almost exclusively of live trout. The annual consumption of fish by young and old pelicans is large. The question is whether the consumption is so great as to justify or require a thinning out of the pelicans. Doctor Smith while in the park during the summer visited the pelican islands for the purpose of taking a census of the young birds and their parents, and of estimating the quantity of fish consumed annually.

FISH PLANTING.

The United States Fish Hatchery located near the outlet of Yellowstone Lake was operated during the summer season as usual under the direction of the superintendent of the federal hatchery at Bozeman, Montana, Mr. W. E. Thompson, who states that regardless of the unprecedented dry season the operations were quite successful. Eggs of the native, or blackspotted, trout were collected during July and August as follows:

From tributaries of Yellowstone Lake:	
Pelican Creek	1,569,000
Clear Creek	1,804,500
Gib Creek	254,500
Columbine Creek.....	718,000
Miscellaneous small streams be- tween Lake Hatchery and Gard--	234,700
Clear, Gib, and Columbine Creeks in August	1,668,000...6,208,700
From Fish Lake, near Lake Butte Station	<u>625,000</u>
Total harvest for the season	<u>6,973,700</u>

According to the Commissioner of Fisheries and the hatchery officers, an encouraging feature of the season was the very large proportion of young spawning fish appearing in the various streams, apparently the result of plants made in the past few years, and indicating a return of fish in their former abundance before the depredations of the pelicans, gulls, osceoters, had made inroads on the stock in Yellowstone Lake.

A consignment of eastern brook trout was shipped from the Boxwood Hatchery to the park on May 29th for planting. A full load of brook and rainbow trout was delivered at the same point early in September. And a total of 572,000 of the young blackspotted trout hatched in the park were returned to the waters of the small streams tributary to Yellowstone Lake by the employees of the hatchery. A full list of the numbers planted is as follows:

Eastern Brook Trout:

<u>Date:</u>	<u>Waters:</u>	<u>Number:</u>
May 29	Lava Creek	9,000
	Clen Creek	10,500
Sept. 3	Blacktail Creek	10,500
	Upper Firehole River	4,000
	Little Firehole River	4,500
	Non Perce Creek	5,000
	Hallard Lake	4,000
		<u>47,500</u>

Rainbow Trout:

Sept. 3	Gibbon River	40,000
	Clen Creek	15,000
	Lurine Creek	15,000
	Panther Creek	17,500
		<u>87,500</u>

Blackspotted Trout:

July and August	Planted from fish hatchery in small stream tributary to Yellowstone Lake from which they were taken.....	500,000
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Total fish of all kinds planted in park waters... 707,000

The operation of this sub-hatchery is most important, since it is almost the sole source of supply for eggs of the native trout for Federal, State, and local hatcheries. For this reason alone it is essential that the waters of Yellowstone Lake and its tributaries be kept well stocked.

On the other hand, I am of the opinion that a considerably larger portion of the fish nurtured in the Yellowstone Lake Hatchery ought to be returned to the waters of the park. In this connection I call specific attention to the fact that 6,873,700 eggs were col-

placed in the watershed of Yellowstone Lake, and only 500,000 young trout were returned to these waters. I understand that the percentage of fish hatched from eggs in a hatchery is very much greater than a similar number of eggs would produce under absolutely natural conditions, and I do not extend that an insufficient number of young fish were planted in tributaries of Yellowstone Lake this year, but I do express the opinion that more young blackspotted trout should have been placed in other streams in which they would thrive and which are now barren of fish or not well stocked.

PLACING OF TROUT.

During the early part of the season tourists reported good catches of trout, and until well along in August the sport was greatly enjoyed by visitors to the park, particularly those who brought their own camping equipment and established themselves near good fishing streams. All of the tourists who made trail trips had no difficulty in obtaining plenty of fish.

During approximately the last month of the season, which it may be remembered is one-third of the entire tourist season motorists and others who toured the route of the park had great difficulty in catching any fish at all. This lack of success must be attributed largely to the fact that there were so many people fishing in the park during the first six weeks or two months of the season that the streams became considerably depleted.

Next year it is proposed to make a census of the amount of

fish caught in the park by visiting tourists, in order that we may gain accurate information as to the condition of the fish supply. It is proposed to do this by asking motorists and other visitors at the park entrances to keep an account of the fish taken from the waters of the park and report their figures to the rangers at the gateways that which they leave the reservation.

Our records indicate that black bass were planted in 1899 in Goose Lake, situated in Lower Sevier Basin. No trace of them was ever found, but during the past year several parties have reported positively that they caught a good string of yellow perch in these lakes, and they can be accounted for only by assuming a mistake was made in planting them instead of the black bass.

Very recently a catch of lamp-looked salmon (*Salmo salago*) was made in Lewis Lake. This fish was planted in the park waters in 1909, but had not been seen since that year. So certain were we that the lamp-looked salmon reported this year were either rock bass (*Salmo leucostictus*) or brown (*Salmo fontinalis*) trout. These specimens of fish were given the most careful consideration by men who are familiar with all of these species, but it was finally concluded by all that the Lewis Lake catch was a salmon and not a trout.

WILDERNESS SERVICE CENTER.

For many years it has been the practice to permit the catching of fish in some of the waters of the park, particularly in Yellowstone Lake. For table use in the hotels and camps, those catches,

however, to be made after the opening season had ended. Because of the apparent depletion of fish in so many streams of the park this year, I reached the conclusion that this practice ought to be discontinued, and by an order made effective August 15, 1919, the further catching of fish for table use in the hotels and camps, except by tourists in strict accordance with the rules and regulations, was prohibited.

Between the opening of the season and the effective date of this order the Yellowstone Park Hotel Company took 5,327 pounds of fish from Yellowstone Lake and the Yellowstone Park Camping Company took from the same waters 2,164 pounds.

WILD ANIMALS.

The weather conditions for the wild animals were ideal during the past year. Forage grasses were abundant last fall, as there had been plenty of rain all summer; the winter was mild and snowfall light, enabling the animals to get at the grass without difficulty. Consequently there was scarcely any loss whatever among the elk, deer, antelope, and mountain sheep. The loss from legitimate hunting in the adjoining States was also slight, as pleasant weather lasted through most of the hunting season. The elk and deer did not leave the park while hunting was permitted.

The new ranger force which on October 1, 1918, relieved the soldiers as protectors of the wild life, proved to be a great improvement in this line of work, and evidences of poaching within

the boundaries of the park were very rare. They were also able to give much special attention to the care of the wild animals, preparing to feed hay if necessary, killing carnivorous animals that prey on others, etcetera. About 100 tons of alfalfa hay were purchased from nearby ranches for feeding these animals, but for the first time in several years the winter was so mild that there was no necessity for feeding hay to wild game, and the stacks were held over for next winter's supply. For the same reason the animals were widely scattered during the winter and were not easy to count and keep track of.

The past summer has been exceedingly dry. To begin with, the snowfall of last winter was light, spring opened up earlier than usual and melted what little snow there was stored in the mountains, and during June, July and August there was less rainfall than was known for many years. The consequence is that the range lands are baked and the grass is stunted and dried to the very mountain tops. The prospects for food for our wild animals during the coming winter are, therefore, most discouraging. The same conditions have prevailed throughout the State of Montana and other mountain States near the park; and this shortage of forage crops is recognized and is being met by shipping thousands of domestic cattle to eastern States where forage is plentiful and reasonable in price. Hay is a very scarce and high priced. The situation would seem to be almost a critical one for the elk, demanding the utmost efforts to prevent

a tremendous loss of these animals. Preparations are being made to meet it in the best possible manner. About 300 tons of wild hay will be available on Slough Creek where it is hoped large numbers of the elk which usually leave the park if forage is not plentiful there or covered with snow, can be held. One hundred tons of hay bought a year ago is still available; about a hundred tons of oat hay is being harvested on the field at the north entrance; and allotments have been secured and about 470 tons of alfalfa hay in stack have been purchased from the farmers nearest the park down the Yellowstone Valley. We shall therefore have about 870 tons of hay available for feeding wild animals during the winter, which should, with careful handling, do much towards keeping the northern herd of elk from starvation. We also have a call on an additional 100 tons of hay in the Yellowstone Valley which can be purchased if needed. Alfalfa hay that cost \$18.00 per ton in the stack last year is worth \$25.00 a ton now.

Elk and deer are seen much more frequently in summer by tourists than before the automobiles came into general use, for the reason that people travel later in the evening and earlier in the morning, when the animals are out feeding. Small herds of elk, and a few scattering deer, were seen by busy travelers. Moose frequently, and in at least one instance wild buffalo, were seen by tourists traveling with saddle horses over the trails.

Antelope:

The antelope wintered as usual near the northern entrance, but were so much scattered that a careful count of them could not be made. During the summer they have ranged well back in the hills of the northern section of the park, and are apparently in fine condition at the present time. A female antelope lost at the Buffalo Farm when very young has become a pet of the family of the buffalo keeper and attracts much attention at the big farm where she makes her home.

Deer:

The deer, like the antelope, were scattered, and but few of them were around headquarters for something to eat. Immediately after the tourist season closed this year a herd of about 10 mule deer and a group of three white-tail deer took up their range on the Lewis about headquarters, and as I write this I can observe the former herd feeding in front of the office.

Elk:

The elk, by far the most numerous of any of our wild animals, wintered in splendid condition. Regardless of the fact that forage was plentiful inside of its boundaries, several thousand elk left the park and went into the Shoshone National Forest and down the Yellowstone River valley, possibly from force of habit from preceding winters when they were obliged to go out in search of food. These, however, were carefully guarded from poachers by forest rangers, and it is believed that practically all of them found their way back to the park in the spring.

The increase in the northern herd of elk was marked. The losses were small, consisting of a few killed by carnivorous animals, a few more killed outside of the park during the hunting season in Montana, and 100 shipped to South Dakota in March, 1915.

Every person in this country who is interested in the conservation of wild life, who wants to see a supply of big game sustained, who wants Yellowstone National Park to hold its prestige as a great natural preserve, should give attention to the problem confronting us at the present time in caring for the elk. The time is coming when a terrible, long, cold winter is going to kill the Yellowstone elk herds if existing conditions outside the park are maintained. That time may be the coming winter; however, it may be a winter of ten years hence. No one can say when this calamity will strike us, but those of us who know conditions about this park realize that the extinction of the elk is inevitable unless these conditions are changed.

Years ago, when unusually cold winters drove the elk out of the park regions, they found some range on the hills and in the valleys of lower altitudes. One great herd moved northward and another that now ranges most of the year in the Snake River watershed of the park and in State game preserves south thereof, moved southward to the Jackson Hole. Other smaller herds moved down the Snake River watershed on the east, the Madison River Valley on the west, and the Gallatin River Valley on the northwest. Slowly set-

elements on these winter feeding grounds crowded back the elk, and for a time the grazing of cattle and sheep of settlers was permitted right up to the park line, except south and southeast of the park where many years ago the State of Wyoming, with wise foresight, established great game preserves in which the grazing of domestic stock was not permitted. This extensive grazing of stock around the park caused great losses of elk, especially in the Gallatin and Madison herds, which are now represented by comparatively few animals.

Recently, however, the Forest Service has withdrawn considerable areas of adjacent grazing lands from the use of domestic stock, and the State of Montana, of course, has created a number of important game preserves which have aided materially in protecting the elk in normal years, but little has been accomplished yet by any agency in anticipation of the winter when complete destruction of the elk will come. The Biological Survey made one move in the right direction when it acquired its elk farm near Jackson, Wyoming, in the Flat Creek district of the Jackson Hole.

Undoubtedly more of these farms must be provided outside of the park for the purpose of raising hay and storing it for use only in winters when the elk can not shift for themselves without destroying hay, grain, and other property of farmers in the path of their migration. The Biological Survey farm near Jackson should be greatly extended, possibly to the purchase of all lands in the Flat Creek

Basin, for the purpose of protecting the southern elk herd against the destructive winter; and another large area in the Yellowstone Valley north of the park should be procured for the similar protection of the northern herd which now leaves the park and goes down this valley in hard winters, destroying farm property and causing other damage. These elk farms would be simply an insurance maintained against destruction of the elk. In open winters such as last winter these elk farms would not be used, all stored hay being retained for times of real need. As far as the park is concerned, there is nothing that we can do to hold the elk when fearful storms drive them from their range within its boundaries or cover it deep with snow.

There is ample summer range for all the elk in the park and the adjacent game preserves of Wyoming and Montana. However, there is a growing demand in the Jackson Hole for grazing privileges in the Teton Game Preserve south of the park, which if secured may seriously impair the summer range of the southern herd. The Buffalo fork region is chiefly sought for domestic stock, but there are some who would pasture cattle up to the south boundary of the park. It is proposed in pending legislation to add all of this region to the park with the headwaters of the Yellowstone River and the Teton Mountains. This territory is also the winter range of several of the smaller bands of elk.

MOOSE:

Moose were seen in nearly every part of the park in small numbers. The rangers from Lake Station saw 67 in Upper Yellowstone and Pelican Valley, on their patrols during the month of January. One of our largest moose herds ranges in the marshes and meadows of the Rochler River and Falls River Basins in the far southeastern corner of the park, and is thriving splendidly. Recent estimates place the number in the herd at slightly more than 500. There is an irrigation scheme being developed which, if approved by Congress, will result in flooding this entire region, and in driving out the moose, probably to destruction. There is also a growing herd of elk in this section that ought to be considered in passing on any use of these park lands for reservoir purposes.

WILDLIFE:

Bill Hart: Reports received during the winter indicate that the wild herd of buffalo is on the increase. During January the rangers from Lake Station saw 55 in Pelican Valley. During April Assistant Chief Ranger Erickson saw 38 on Pelican Creek and a different herd of 35 on Middle Mountain, making a total of 90 animals counted, which is more than have been known for several years back. One member of this herd was found dead at Turbid Lake.

Gene Hart: The tame herd of buffalo is located on Lamar River near the mouth of Robb Creek. At present the herd consists of 41 animals, having increased from a herd of 21 animals purchased in

1902. Ninety calves were born during the year, 8 of which were born in September. Five of these, however, were killed recently while the herd was being vaccinated, leaving but 85 alive at the present time, of which 50 are males. Thirty of these bulls were castrated.

The following data relating to the buffalo calves were compiled on October 15, 1919:

90 calves born since last annual report	53 males	37 females
Killed while being vaccin- ated October 8 and 15	3	2
Total alive	<u>50 males</u>	<u>35 females</u>

Of the entire herd 355 animals, including all of the calves, have just been vaccinated for hemorrhagic septicemia. Besides the calves already mentioned, one of the old cows was killed during the process of vaccination.

One three-year-old bull was donated to the city of Mexico, Missouri, shipped January 19th; one yearling bull was shipped to the city of San Francisco, California, on February 12th, and one three-year-old bull was shipped to the State Game Warden of Wyoming, May 24th.

The 1918 calves were vaccinated for hemorrhagic septicemia by a veterinarian sent for the purpose from the Bismarck, N. D., Office of the Bureau of animal Industry. This work was done on November 10th, and the second time on November 20th and 21st, when 60 per cent of the male calves (16 in number) were castrated.

The winter was so open and forage so plentiful, that up to the end of January it had not become necessary to feed hay to the tame buffalo, but they had been permitted to range for several miles around the farm. The latter part of January a number of them died.

septicemia notwithstanding the fact that for several years the young animals have been vaccinated for this disease. A telegraphic request was sent for assistance from the Bureau of Animal Industry, and Veterinarian I. Hallinan was sent from the Helena, Montana, Office. His investigation indicated the presence of the disease which has been dreaded since it first appeared in the fall of 1911. The herd was taken up at his advice, and fed hay through the balance of the winter. All carcasses of those that died were destroyed by burning. At least 25 buffalo died during this epidemic, and a few more were missing that night have died on the range but the carcasses were not found. A culture has been developed recently that is believed by the Bureau of Animal Industry to be a certain preventative, and the whole herd, including old and young, is being treated with the fresh vaccine as this report is written.

A show herd of 10 buffalo bulls was kept in the pasture at headquarters throughout the tourist season, and was driven up twice daily where tourists could see them. Visitors to see this herd averaged about 100 per day.

Approximately 300 tons of hay are available for winter forage for this herd. This is none too much, but will probably, with careful handling, meet all needs, though it will be necessary to keep the herd out on the range as long as possible before beginning to feed hay. Meadows are being developed and needed that will

eventually yield an abundance of good hay, but the year season was so dry that the crop was short. The main herd was kept on Mount Morris and the higher slopes during most of the summer, so as to save the ranges lower down for late fall and winter grazing.

Bears.

The grizzlies, black, and brown bears were plentiful and much in evidence throughout the park, and attracted so much attention and were so much talked about that the few tourists who failed to see them felt disappointed. These bears were so mischievous that it was necessary to keep a night guard at Upper Basin, Lake Outlet, and Jackson, to prevent damage to private automobiles and camps, and 5 had to be killed at Lake during the summer to prevent damage to property. One medium sized grizzly was killed in September at Upper Canyon Basin, in a fight with a larger grizzly.

In addition to the bears that made a habit of frequenting the regular camping places, garbage dumps were established within walking distance of Upper Basin and Jackson, where bears of all kinds congregated every evening just before dark, and it was a regular practice for people from the hotels and camps to go to see them. A wire was firmly stretched between trees and posts to keep people from going beyond the danger line, and a warning was placed on the wire with a rifle to protect them. This is one of the most interesting features of the park to the majority of tourists, but requires

careful regulation.

But even more interesting than the bear traps were a few clever bears, among them one or two families consisting of mother and cubs, that frequented the highway between the Park and the Lake Outlet, and daily "held up" passing automobiles and begged for food. As a rule the tourists so held up were willing victims of the robbers, 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 appeals of the cubs for candy, peanuts, etcetera. This rule is the most difficult to enforce of all the park rules and regulations, as indicated by the fact that of 20 trials before the United States Court during the past summer for violation of regulations not one was for this offense.

Coyotes, Wolves, and Mountain Lions.

These represent by far the most destructive of the carnivorous animals in the park, and efforts are constantly made to keep their numbers to a reasonable number. Three hunters devoted most of their time from November to March inclusive hunting and trapping them, and quite a number were also killed by rangers on regular patrols. Altogether there were killed in the park during the year, 227 coyotes, 6 wolves, and 11 mountain lions. The pelts were sold on commission at the big auction sales in St. Louis, by Hunter Brothers and Company, and the net proceeds deposited in

the United States Treasury with other park revenues. The total receipts from this source amounted to \$1,943.49. It is hardly practicable, even if desirable, to entirely exterminate these omnivorous animals, but a certain amount of hunting and trapping each year keeps them down to a reasonable limit. They kill annually quite a number of young elk, deer, antelope, and mountain sheep.

Mountain Sheep

Mountain sheep were seen in about the usual numbers, and were in excellent condition, but they did not come down as often as usual during the winter where they could be seen because there was but little snow on the mountains and a construction camp was located all winter in Gardiner Canyon, which kept them back to some extent from their usual winter habitat.

Beaver.

Signs of beaver, consisting of dams, houses, stumps, and pieces of trees which they cut down for food, are found in many places close to the road, and afford much interest to travelers. Beaver are plentiful and widely distributed throughout the park. A most interesting series of colonies has been established on Elk Creek in the Tower Falls region. From an automobile one may count ten dams, one below the other, on this stream.

Porcupines, Marmots, etcetera.

Other small animals such as porcupines, rabbits, ground

squirrels, redsquirrels, woodchucks, and chipmunks are abundant and seen by nearly all visitors. Several varieties of mice, pocket gophers, lynx, otter, mink, weasels, foxes, martens, skunks, badgers, and bats, are more or less abundant, but are not often seen by tourists.

GRAZING AND FOODS FOR WILD ANIMALS.

The time seems to be approaching when the antelope, deer, mountain sheep, and the large herds of elk, must have more attention in the matter of artificial feeding. The opportunity for raising alfalfa and other tame grasses to be cut for hay for their winter use is ample, but will require the expenditure of several thousand dollars at the beginning, to develop the meadows, and construct irrigation systems.

Since the advent of motor-driven vehicles, grazing of domestic animals is permitted only to the extent necessary to keep the few horses required in the administration and protection of the park, and the cattle actually necessary to furnish fresh milk to the public at hotels and camps. Even the cattle that are slaughtered for meat for hotels and camps are no longer pastured in the park as formerly, but are slaughtered outside and the meat brought in. The summer grazing of cows for milk, saddle horses in use by tourists and engaged in park patrols and other necessary work, and work horses on Government construction and maintenance work, is maintained principally at the higher altitudes, on the

~~summer~~ range for game, which is plentiful. It is the winter range which is getting scarce and which must be carefully guarded. The greatest extent to which it is now used is for wintering the surplus stock (saddle, pack and work horses) belonging to the Government and which is not in use during the winter season. These amount to but from 30 to 60 head, wintered at Kameeys or on Slough Creek, and much of the winter they subsisted on wild hay cut in low places, very little of which would be grazed by the elk. But it is contemplated raising it on a larger scale, to be available for feeding game if necessary. A total of about 250 tons of wild hay has been cut and is now in stack on Slough Creek for such use the coming winter. Arrangements are being made to develop these meadows by draining if necessary, and introducing sod to make a larger quantity of better quality hay.

IRRIGATION OF LAND.

Up to date comparatively little of this work has been done. But the example of the $3\frac{1}{2}$ -acre field located at the northern entrance gate to the park, proves what can be accomplished by cultivation and irrigation of fields for meadows. This field was taken up in 1901 and seeded to alfalfa which is cut and stacked for winter forage for antelope, deer, and mountain sheep. It has yielded many tons of excellent hay for this purpose, besides being a wonderful improvement from a landscape viewpoint. This field, however, has given trouble by foxtail grass coming

in and running out the alfalfa, and it has to be taken up and re-cultivated often. It was broken up last year and seeded to oats, which yielded a crop of 1,675 bushels of oats of unusually fine quality, and 13 tons of the straw was baled for use for bedding at the stables. This season it was again sowed to oats, but owing to the exceedingly high price of hay it was cut green and put up for winter hay, producing about 100 tons. There are a number of tracts where hay can be raised for use of game, and for feeding Government stock in use in the park, much cheaper than it can be bought.

This work has been quite successfully carried on at the Buffalo Farm on Laramie River, where it was necessary in order to procure sufficient forage for the tame buffalo herd. A tract of 70 acres was cultivated and sowed to timothy in 1912, and has yielded a good crop of hay annually ever since. Aside from this tract, we have had to depend upon cutting wild hay in that vicinity for the tame buffalo, but the herd is now getting so big that the supply of hay must be supplemented by starting more tame meadows. There is ample opportunity for this work in the vicinity of the Buffalo Farm, and 275 acres of excellent land has been plowed up. We expect to get between 100 and 200 acres of this seeded to timothy and alsike clover before snow flies. One hundred acres of this land was sowed to oats last spring with a view to cutting for hay, but the season was extremely dry and water for irrigating ran

short, so that the cuts did not grow large enough to cut and only afforded good pasturage for the tame herd of buffalo.

BIRDS.

While scarcely two hundred varieties of birds have been recorded in the park, many of these are seen but rarely. Some of those that are most interesting and seen most commonly are as follows: White pelican, gulls, Canada geese, swans, and several varieties of ducks, are seen on the lakes and larger rivers. Great blue heron are seen along streams and in marshy places. Sand-pipers, killdeers, grebes, loons, osprey, eagles, ravens, crows, Rocky Mountain jays, Clark nutcrackers, blackbirds, robins, western bluebirds, sparrows, swallows, meadowlark, finches, and warblers, are more or less abundant. The northern water ouzel, or dipper, is a most interesting songster that remains all winter. They nest close to the water, usually a swift stream, in late winter or very early in the spring, and their extremely sweet song and frequent diving to the bottom of the swift current for food are bound to attract interest.

The nest of a nutcracker near (Clor nutcracker) was discovered by Mr. W. T. Skinner on a low island in a lagoon southeast of Lewis Lake, and on his second visit on September 6 he saw the parent birds and three young ones old enough to fly. This is remarkable, inasmuch as it is the first authentic record we have on file of this bird breeding in the park, and it is seen rarely seen here.

The unusual dryness of the season has had its effects on our birds as well as on the mammals. Such ground-nesting birds as sparrows, finches, meadowlarks, juncos, grackles, ducks and geese have attained full growth in unusual numbers due to absence of cold, drenching rains during incubation and brooding. Possibly the same result was helped by the paucity of ticks, mosquitoes, and flies, due also to the dry season.

The fall migration of all birds has been unusually early, and the mammals of all kinds and sizes from ground squirrels to elk are seeking winter quarters much earlier than usual.

WATER, THE SPRINGS, AND OTHER FEATURES.

The small pond at Morris located across the road in the timber from Black Grosvenor was seen to play several times during the season.

The Fishing Pond at Shrub played frequently to a height of about 40 feet. This is quite an unusual occurrence, and is thought to be due to the fact that the level of the lake is several feet below the usual low water mark.

During the tourist season, except at night when the formations were obscured, a careful record was kept by the ranger force stationed at Upper Copper Basin, of the activities of the principal geysers in that basin. The results of this record indicate a reasonable regularity in playing and but few changes of importance from previous years. This record shows that the Grand Geysers, one

of the most powerful and beautiful geysers in the Basin, played 31st times during the period June 20 to September 4th, inclusive. Old Faithful, the world's most famous geyser and the object of greatest interest to all Yellowstone Park visitors, played with its usual regularity. The interval between its eruptions this year averaged seventy-five minutes.

The geyser record mentioned above follows:

Consultation with men who have lived in the park for many years developed the general opinion that the geysers and hot springs were less active than usual on account of the extremely dry season due to lack of winter snows, and early spring, and lack of rains during the summer. The paint pots of the park, especially the Mammoth Paint Pots in Lower Geyser Basin, appear to be less active, due undoubtedly to lack of subsurface water.

About September 1, 1919, a quiescent paint pot near the south approach road and a few hundred feet east of the Thumb Ranger Station, belched forth a considerable amount of material of the color and consistency of whipped cream, which ran down the slope toward the hot spring basin. This paint pot is less active now, but is still puffing out some of its peculiar thick liquid.

FORESTS.

The forests of the park are in good condition. There are no tree diseases epidemic here, nor do there seem to be any insect pests attacking the forests. There are evidences that the porcupines are causing injury to more trees than usual, but this is a matter that requires further consideration before any definite statement can be made regarding it.

Natural reforestation is rapidly covering several old fire scars with fine growths of new timber. While traveling on the trails this season I observed some really remarkable examples of reforestation, one young forest about fifteen years old, near Lake Yellowstone, having all trees growing a considerable distance apart

and in other respects thriving as a better growth than its surrounding forests.

FOREST FIRES.

The season was the dryest one in the history of the park, and consequently the danger of forest fires was great. This danger was apparent at the beginning of the tourist season, and extra precautions were taken to prevent them. Special notices were printed requesting care in extinguishing cigar and cigarette butts and matches before throwing them away, and these were pasted on the wind shield of cars entering the park, and otherwise distributed where they could be seen by everybody. Patrols gave special attention to visiting camping grounds to see that fires were put out, and when carelessness was apparent the guilty parties were apprehended if they could be found and tried for violation of the regulations. With the forests as dry as they were during the past summer, cigarette and cigar butts were among the most dangerous fire risks we had to contend with, if not the most dangerous, as they are thrown away carelessly, without thought of the possible consequences. They have been observed here to burn for several minutes after being cast aside, if fanned by a gentle breeze. Of 306 small fires extinguished along the road by our patrols and others during the past summer, about one-fourth were evidently started by cigar or cigarette butts. In spite of the great danger of forest fires on account of the extreme dryness, the heavy travel, and the fact that about 80% of

this park is timbered more or less heavily and dead timber is everywhere in evidence along the roads and trails, we were fortunate enough to be free from serious forest fires up to about July 21st, but from that date until about September 5th we had a succession of fires in various parts of the park that required the use of most of our road crews, the ranger force, and as many extra men from adjoining villages as we could get to keep them within bounds. This seriously delayed important improvement work on roads and trails, and cost about \$25,000.00. The following shows location, date, cause, and extent of the important fires:

<u>Location</u>	<u>Date reported</u>	<u>Extent</u>	<u>Cause</u>
13-3/4 mi. south of Mammoth	June 15	Small	Cigarette stub
Near Norris Hotel	June 15	5 acres	" "
Fall River	July 21	11 acres	Camp fire
Pitchstone Plateau	" 30	7 acres	Lightning
Khumb Station	" 22	Small	Camp fire
Slough Creek	" 24	Small	Camp fire
Spring Creek	" 10	40 acres	Unknown
Kepler Cascades	" 20	3 acres	Camp fire
Kepler Cascades	" 21	2 acres	" "
Gibbon Meadow	" 25	1 acres	" "
Near Canyon Hotel	" 24	Small	" "
Boundary Lake	Aug. 10	15 acres	Unknown
Mountain Ash Creek	" 13	2000 "	Lightning
Blacktail Deer Creek	" 20	8 "	Camp fire
Specimen Ridge	" 21	25 "	" "
Colter Creek	" 25	Small	Lightning
Lewis Lake	" 27	5 acres	Camp fire
Grizzly Peak	" 28	2500 "	Lightning
Shoshone Geysor Basin	" 29	650 "	Unknown
Phlox Creek	" 29	10 "	Lightning
Mirror Plateau	" 29	1200 "	"
Grayling Creek	Sept. 29	200 "	Unknown
Crowfoot Ridge	" 28	Unknown	"

In addition to this list, about 225 camp fires and small fires that had been abandoned were extinguished by ranger patrols, other park employees, and others traveling in the park. Most loyal assistance was given by concessioners in cases of emergency, and in many cases tourists assisted in fighting fires. It is considered extremely fortunate that with all of the large forest fires we had to contend with, none were close enough to the road to disfigure the landscape and most of the timber that was damaged was of no particular value. The principal damage therefore, was in the cost of fighting the fires, and the delay of important work on roads and other projects under way on account of the necessity for taking the men for fighting fires.

Several of the fires burned over old scars and consequently caused no injury to the park aside from the expense of extinguishing them. Such a fire was the one listed above as burning 650 acres in the vicinity of Shoshone Geyser Basin.

FIRE AND OTHER PATROLS.

Discussion of the forest fires of the past summer prompts further mention of the efficient work of the Yellowstone Park ranger force. While fires were raging over hundreds of thousands of acres of forests of the Northwest (and the fire hazard was greater here, probably, than in any other part of this region) the ranger force of the Yellowstone prevented absolutely any fire damage to this park during June and July. It was only when fires

started in the most remote sections of the park or when several fires were spreading at once that the situation became serious. Even in these trying times it took the ranger force, aided by the road crews, only a relatively short time to quell the flames.

Fire patrols were maintained throughout the summer by permanent rangers traversing the trails on horse-back, while temporary rangers on motorcycles patrolled the roads for the purpose of extinguishing abandoned camp fires and preventing violations of the automobile rules and regulations. From every standpoint I feel sure that the use of one or two aeroplanes for fire patrol would be a most desirable aid to our system of protecting this park, and I hope that some arrangement may be perfected before the opening of next season whereby the Army may be able to assign machines for use in the park during the time of greatest danger from fire. It is also desirable that a fire look-out station be established on Mount Washburn. This mountain commands a vast expanse of the best forests of the park.

The use of motorcycles for making road patrols was very successful. Six machines were purchased for this purpose and with five of these in use the roads were covered twice daily, except when rains interfered, or we were short of riders or mechanics. A few more machines are necessary to keep up a proper system of patrols, and these will be purchased for next year.

Eleven snowshoe cabins were repaired by the ranger force late last fall, and supplied with bedding and other necessities for use of rangers making patrols on skis or snowshoes in winter.

A night-watchman has been employed to protect property at headquarters since January 14.

ARRESTS FOR VIOLATIONS OF THE REGULATIONS.

Arrests for violation of park regulations were made as follows:

<u>Charged with:</u>		<u>Action taken:</u>
		Reprimanded: Fined and fined \$5 to \$100 and costs:
Speeding-----	7	11
Breaking, or marrying by writing names on, formations ----	5	-----
Leaving camp fires unextinguished-----		14
Obnoxious conduct-----	<u>2</u>	<u>3</u>
Total-----	14	20

The above list includes only those cases where official action was taken. There were many cases where rangers warned tourists in time to prevent depredations, and in many other cases that were not flagrant reprimands were administered on the spot and the cases were not recorded.

This record of arrests speaks well for the efficiency of the new ranger force and stands out in contrast with the record for last season, when but two trials were recorded and not an arrest was made

for similar offenses under the military protective force.

STREAM GAUGING.

The work of conducting water resource investigations in the park during the season of 1919 was done under the supervision of Mr. Carl G. Paulsen, District Engineer, U. S. Geological Survey, Boise, Idaho, who visited the park August 5th to 7th. Readings were taken at the gaging stations and reports made by the rangers when practicable. A recording gage was installed on Madison River 4 miles from the western park boundary in October, 1916. Summaries of current meter measurements and discharge data are not now available, but will be published in the Annual Water-Supply Papers of the United States Geological Survey for the Missouri and Snake River drainage area.

FRANCHISES AND PERMITS.

The following is a brief statement of the utilities and other enterprises operated in Yellowstone National Park in 1919 for the accommodation and entertainment of the traveling public. They are all operated under contracts with the department or under temporary permits from the National Park Service, under the strict regulation of this bureau as to service and rates. The statement also mentions improvements in these plans made or contemplated by their owners.

The Yellowstone Park Hotel Company operated the hotels at

Mammoth Hot Springs, Upper Geyser Basin, and Grand Canyon of the Yellowstone, from June 20th to September 20th. For reasons already given the hotel at Lake Outlet was not opened this season. The company is now engaged in making extensive repairs to its properties. These include a very attractive porte-cochere for the Lake Hotel and large new female help dormitories at the Canyon Hotel and at Old Faithful Inn. The latter extensions will considerably increase the capacity of the hotels affected to accommodate tourists.

The Yellowstone Park Camping Company operated camps at Mammoth Hot Springs, Upper Geyser Basin, and Grand Canyon during the entire season, and Camp Roosevelt at Lower Falls was run during July and August, but was not large enough to accommodate more than a limited number of people. At the Lake Outlet the company maintained a few tents and served meals to a limited number in cases of emergency.

In May, 1919, Mr. Howard H. Hays, for many years General Advertising Manager of the former Sylvie Permanent Camping Company; during the year 1917 associated with the Union Pacific and Northwestern lines as tour manager; and under the United States Railroad Administration first manager of the Bureau of Service, National Parks and Monuments, purchased the controlling stock interests of the Yellowstone Park Camping Company. Furthermore, Mr. Hays assumed the active management of this enterprise and personally guided its affairs throughout the season.

In the course of the summer and up to the date of this report Mr. Hays has made many notable improvements in his camps and has several very important projects under construction at the present time, chief among them being the fine new central building at the Lake Camp, which I considered elsewhere. Before the opening of next season Lake Camp will be largely rebuilt, and new flush toilets and other sanitary facilities will be installed.

At Mammoth Camp heavy timber supports were placed through the center of the large main building to strengthen its construction and improve its appearance. A new sewer system was built. An ornamental fence was constructed so as to shield the service yard from view from the east side of the main building, where the view is superb; the driveway on this side of the building was discontinued and the porte-cochere removed. The lawn on the west side of the camp was plowed up, cleared, and leveled preparatory to seeding to grass, and a gravel driveway and walk built. In the early future a swimming pool will be constructed in or adjacent to this camp and other extensive improvements will be made. On the part of the Government, the approach to the Mammoth Camp should be greatly bettered from the landscape standpoint.

At the Canyon Camp several new buildings were constructed in strict accordance with the architectural scheme of the camp.

At the Geysers Camp, in Upper Geysers Basin, the new dining room extension was completed and used for the first time on August 22nd,

when a trout dinner was given to the visiting governors' party. A new kitchen is well under way at this camp. If weather conditions permit, a new central building or lodge will be constructed this fall at Camp Roosevelt near Lower Falls, and before the opening of the next season this attractive camp will be expanded and improved in other directions.

The Yellowstone Park Transportation Company operated the only transportation line in the park and met all trains at Gardiner, Montana, Yellowstone, Montana, and Cody, Wyoming, during the tourist season. Service was also maintained on a twice-a-week basis from the belt road to Moran, Wyoming, in Jackson Hole, for parties desiring to take this side trip. One hundred ten-passenger automobiles and 17 seven-passenger touring cars were used in this service.

This company also maintained repair stations at several points in the park and sold gasoline, oil, and other supplies at Mammoth Hot Springs, Upper Geyser Basin, Lake Outlet, and Grand Canyon. It did not, however, carry an extensive assortment of automobile parts. It should be required to carry fairly complete lines of these parts next year.

During the autumn or early next spring the company will construct three very attractive filling stations. They will be built of stone and logs, and will be located near the stores at Upper Geyser Basin, Lake Outlet, and Grand Canyon.

The Yellowstone Park Boat Company rendered little service to the public this season. Its store at the Lake was operated by C. A. Hamilton. This company has very little useful boat equipment. Its big boats are in poor condition and will not meet present demands for service on the lake, and its small boats, except two 45-foot gasoline boats and a few launches, are old, dilapidated, and unsafe. This company has not furnished satisfactory equipment for boat service since 1916. It should be required to purchase new equipment before the opening of the next season and be prepared to meet all demands for row-boat and launch service, as well as for longer trips to the upper arms of Yellowstone Lake. If it can not meet the requirements of the Service some other individual or corporation should be found who will develop the recreational advantages of this beautiful Lake.

Of course the store privilege at the Lake will be exercised next year by Mr. C. A. Hamilton under his new arrangement with the department.

Mr. J. E. Haynes maintained his picture shops at Mammoth Hot Springs, Upper Geyser Basin, and Lower Falls, with photograph stands in all hotels and camps. He was also equipped to develop negatives and make prints for tourists who photographed the features of the park with their own cameras. Mr. Haynes expects to construct a new picture shop at Mammoth Hot Springs before the opening of next season. Plans for the same are now ready to submit to the Service.

Mr. C. A. Hamilton operated his general store at Upper Geyser Basin, and under a subleasing arrangement with the Yellowstone Park Boat Company operated its store at Lake Outlet. In addition to general merchandise and groceries, Mr. Hamilton carried full lines of curios and souvenirs, and also operated gasoline and oil stations. He is now engaged in building a fine new store at the Lake which will take the place of the boat company's store. The new filling stations of the Yellowstone Park Transportation Company at Upper Basin and Lake will be operated by Mr. Hamilton under a cooperative agreement approved by the Service.

Mr. Hamilton expects to arrange for the maintenance of a store next year in the old lunch station of the Yellowstone Park Hotel Company at the Head of Lake Yellowstone where the south approach road joins the belt line system.

Mr. George Whittaker, postmaster of Yellowstone Park, operated his general stores at Mammoth Hot Springs and at the Grand Canyon of the Yellowstone. He also carried stocks of curios and souvenirs, and maintained gasoline stations. Mr. Whittaker is now engaged in building a very commodious and attractive new store on his Canyon site. This building is being erected of logs and will be ready for use next season.

Mrs. Frances Pryor and Trischman continued the operation of their ice cream parlors and curio store at Mammoth Hot Springs. They are

now engaged in remodeling the front of their establishment according to plans approved by the landscape engineer. This improvement will greatly enhance the appearance of this popular curio shop.

The Geyser Baths. The bathhouse privilege at Upper Geyser Basin was transferred by Frances F. Brothers under approval dated December 4, 1918, to Henry F. Brothers, who personally ran the business in a very satisfactory manner during the summer.

Pack Outfits. Movable-camp party licenses were issued during the season in favor of the following-named parties:

	Saddle and Pack Animals.	wagons or Baggage trucks.	Tourists.
Thomas E. Newcomb, Gardiner, Mont..	15	..... --	..... 5
Charles C. Moore, Ft. Washakie, Wyo.	18	..... 2	..... 11
George T. Hopkins, Cody, Wyo.	35	..... --	..... 15
I. H. Laron, Valley, Wyo.	7	..... --	..... 2
L. H. Joy, Teton, Wyo.	7	..... 1	..... 6
Joe A. Jones, Valley, Wyo.	27	..... --	..... 6
Howard Eaton, Wolf, Wyo.	79	..... 6	..... 66
S. H. Leak, Moran, Wyo.	12	..... --	..... 6
Clarence Ryerson, Gardiner, Mont....	10	..... --	..... 2
Richard V. Dennison, Dubois, Wyo. .	(Complete report not yet submitted.)		

This increase in the number of pack trains in use in the tourist business of the park, together with the fact that many of the parties who patronized this class of transportation remained for several weeks, indicates a revival of interest in trail travel which is most gratifying.

Transportation to Cooke: Special permits were issued to parties interested in the development of the mining town of Cooke, Montana, to use their motor trucks and service cars to haul ore and supplies to and from Gardiner, Mont., through the park, as follows:

	Motor trucks	Service cars
Nels E. Soderholm, Cooke, Mont. (merchant)	1 --
Frank R. Lind, Gardiner, Mont. (Con- tractor for hauling U.S. Mail.)	1 --
Western Smelting & Power Co., Cooke, Mont., and Seattle, Wash.	1	..... 1
R. I. McKay, Cooke, Montana	3	..... 1

The permit dated March 23, 1917, held by Mr. Robert I. McKay, covering the construction of a metal-surfaced road through the park connecting Gardiner and Cooke, Montana, was cancelled on November 27, 1918.

Moving Picture Companies. Representatives of moving picture companies operated in the park under special permits from the Service, as follows: Pathe Company, in June; C. L. Chester of New York, in August; Famous Players-Lasky Company of New York, August and September; International Film Service October 7 to 10, to get special pictures of tame buffalo herd.

CONVENTIONS AND SPECIAL PARTIES.

Montana Bankers' Association. Two conventions were held in

the park during the season. On August 8th and 9th the Montana Bankers' Association met at Mammoth Hot Springs. Headquarters were maintained at the Mammoth hotel, and the various sessions of the convention were held in the assembly hall at park headquarters, formerly the post exchange of Fort Yellowstone. The Montana bankers, after transacting the usual business of the association, devoted much of their remaining time to a discussion of road improvement in their State.

National Park Touring Association. On August 11th and 12th representatives of twelve western States met in the assembly hall at Mammoth Hot Springs for the discussion of the interpark highway plan, and for the purpose of devising ways and means of completing the selection of this highway system and marking the same. The development of travel over the park-to-park highway was also one of the topics of the convention program. At the close of the first day's session the National Park Touring Association was formed and the following officers elected: Gus Holm's of Cody, Wyoming, President; G. L. Ramsey of Helena, Montana, Vice President; and L. L. Newton of Cody, Secretary-Treasurer.

The new association proposed at once to undertake the selection of the park-to-park highway through cooperation with highway associations. Chambers of commerce, and automobile clubs, and to conduct a scouting expedition over the various routes at an early date. Furthermore, it pledged its support to the department and to

the service in encouraging travel to and between the parks, and in securing large appropriations for park road improvement. Likewise it declared itself in favor of concentrating State funds on interpark highways until they are in first-class condition. The convention adjourned, to meet again at the call of the president, with the understanding that in the meantime a vice president for each western State was to be chosen.

The Governors' Conference. In August the Western Governors' Conference was held in Salt Lake City, and at the conclusion thereof the State of Utah, through its chief executive, entertained most of the visiting governors with a tour of Yellowstone National Park. The party traveled from Salt Lake City to the western gateway on a special train of the Oregon Short Line, arriving on the morning of August 22nd. The tour of the park was made in three days. At Upper Geyser Basin a trout dinner was tendered the party by Mr. Howard H. Hays, General Manager of the Yellowstone Park Camping Company, and several special side trips were arranged by the Yellowstone Park Transportation Company.

The following governors toured the park:

Hon. Simon E. Benson, Governor of Utah;
 Hon. O. A. Larrazolo, Governor of New Mexico;
 Hon. H. J. Allen, Governor of Kansas;
 Hon. John G. Townsend, Jr., Governor of Delaware;
 Hon. Thomas W. Bickett, Governor of North Carolina;
 Hon. R. A. Cooper, Governor of South Carolina;

Hon. Thomas E. Campbell, Governor of Arizona;
 Hon. Ben. W. Olcott, Governor of Oregon;
 Hon. James B. A. Robertson, Governor of Oklahoma;
 Hon. Wm. C. Spraul, Governor of Pennsylvania;
 Hon. Oliver H. Shoup, Governor of Colorado;
 Hon. Lynn J. Frazier, Governor of North Dakota;
 Hon. Robert B. Carey, Governor of Wyoming;
 Hon. Samuel R. McElvie, Governor of Nebraska;
 Hon. Jos. M. Carey, ex-Governor of Wyoming;
 Hon. Wm. Spry, ex-Governor of Utah;
 Hon. Haber M. Wells, ex-Governor of Utah.

Brooklyn Eagle Tour. A large party under the leadership of the Brooklyn Eagle visited Yellowstone National Park July 27 to 31st, inclusive, in the course of a comprehensive tour of American and Canadian national parks. The party came here in two sections from Rocky Mountain Park, one section traveling in a special train and the other making the interpark trip by automobile. The entire party stopped in Cheyenne on July 25th to attend the famous Frontiers' Day Celebration. Leaving here on August 1st this party proceeded by automobile to Helena, Montana, thence by both special train and automobile it proceeded to Glacier National Park. Under special instructions from the Director I accompanied this party from Denver to Glacier Park.

It will be impossible to over-estimate the importance of the tour of the Brooklyn Eagle party, as it was the first party of eastern people to travel between a group of parks by special train and by automobile service, and likewise it was the first party to make an "international interpark" tour.

International Association of Rotary Clubs. This organization held its annual convention in Salt Lake City just prior to the opening of the park season, and on the first and second days of the season more than 800 Rotarians entered the park by the western gateway, making the complete tour.

Massachusetts Forestry Association. This association, under the leadership of its secretary, Harris A. Reynolds, and Dr. Clinton L. Babcock, visited Yellowstone National Park July 4th to 10th, inclusive.

Travel Club of America. A considerable number of members of this club toured the park July 24th to 29th, inclusive. Both the Massachusetts Forestry Association and the Travel Club of America made the Yellowstone trip as a part of a comprehensive tour of all of the big national parks of the West.

United States Chamber of Commerce Party. On August 16th a score of officials of the United States Chamber of Commerce, headed by its president, reached the northern gateway and during the next three days made a complete tour of the park.

APPROPRIATIONS.

The sundry civil act of July 19, 1919, made available for the administration, protection, maintenance, and improvement of Yellowstone National Park the sum of \$255,500, very much less

than has been available annually for the park during the past eight or ten years. Considering further the fact that labor and equipment costs were higher than ever before, this year's appropriations were very inadequate and should be more than doubled next year if the needs of the Yellowstone are to be even approximately met.

REVENUES.

On the other hand, the revenues of Yellowstone Park very largely increased, and at this time it appears likely that they will total \$125,000 for the current fiscal year, or nearly one-half the appropriation for the upkeep of the park. The revenue fund will certainly exceed the cost of the administration of the affairs of the park and the protection of its great area by nearly \$35,000.

The war season of 1918 produced relatively small revenues, but really more than we expected under the conditions. The following is a statement of the receipts of the park for the fiscal year ended June 30, 1919, as deposited to the credit of miscellaneous receipts of the U. S. Treasury:

Sale of automobile and motorcycle permits	\$33,840.04
Collected from corporations and individuals operating stores, permanent camps, the 1/ transportation line, and picture shops,	7,784.92
Camping party licenses	-----
Sale of electric current	886.25
Sale of water	286.80
Sale of hides of carnivorous animals killed by rangers	
Miscellaneous collections	<u>549.08</u>
	\$43,347.00

(carefully check these figures
in Washington.

1/ Hotels not opened in 1918.

PERSONNEL.

All of our men who left to engage in the world war were taken back into our permanent organization except a few who did not care to return. Other discharged soldiers who applied for work were given employment on the temporary force; in fact, at no time during the summer were men turned away, as labor was scarce and it was necessary to raise the pay of laborers to four dollars a day to keep our men from leaving.

Employees of the park purchased War Savings Stamps aggregating \$898.79; Fourth Liberty Loan Bonds aggregating \$14,300; Victory Loan Bonds aggregating \$11,100; and subscribed to the United War Work fund \$474.58. Great interest was also taken in the Red Cross work, and practically all permanent employees and their families belonged to the local branch.

VITAL STATISTICS:

Births: A baby girl, Frances Muriel Stinnett, was born to Mr. and Mrs. Bert Stinnett, our master mechanic, on September 8, 1919.

Deaths: On November 15, 1918, Thomas G. Frazier, buffalo keeper in the park died at the Buffalo Farm of influenza.

On April 24, 1919, Wayne Swaney, three-year-old son of Chauncey M. Swaney, assistant electrician, died of scarlet fever. Two cases occurred in the family, but only one resulted fatally.

On July 18, 1919, James Dexter Hughes, of Gueydon, La., a four-year-old boy traveling with his grandparents, died at Old Faithful Inn from shock caused by burns sustained by backing into a small hot pool the day before at Thumb.

On July 29, 1919, E. M. Hach of Portland, Oregon, died at Mammoth Hotel. He was touring the park in his private automobile. He was a sufferer from tuberculosis and was in a very weak condition when he arrived here. His body was embalmed and shipped to his home.

On August 15, 1919, Mr. Louis D. Boatman of Morrill, Nebraska, touring the park with his aunt and sister, while bathing in Yellowstone River, dived from the bridge across the lake outlet on the Cody road and was instantly killed by striking his head on the bottom and fracturing his skull.

In September rumors became current in and around the park that a man had been killed by a female bear at Old Faithful while he was endeavoring to take a tin can from the nose of one of her cubs. This report has never been corroborated, nor have we been able to trace its source, and I am of the opinion that it was pure fiction.

ACCIDENTS

Considering the unusual number of people in the park during the entire season, serious accidents were exceedingly rare and but one resulted fatally. The most serious accidents noted were as follows:

On July 6th a small boy broke through the geyser formation near

the Giantess Geyser in upper Geyser Basin and burned his feet quite seriously. This was known to be a dangerous place and danger signs were posted, but as is often the case they were not heeded. With increased travel the time seems to have come when more than signs at some places in the geyser basin are needed to keep people out of trouble, as often danger signs are not taken seriously. At this very place one lady asked if it really was dangerous or if the sign gave the name of the geyser. Another said it was not dangerous for she walked over it and did not break through.

James Baxter Hughes, four-year-old son of Mr. R. H. Hughes of Queydon, La., who was traveling through the park with his grandparents, backed into a small hot pool at Thumb, on July 17th, and was so seriously burned that he died of the shock the following night. Undoubtedly this little boy was not being carefully watched by his guardians or the accident would not have happened. Since this occurrence there have been some suggestions submitted relating to the fencing of all hot springs and geysers, but this should not be done for the reason that barriers of this kind would not only be unsightly but would in all likelihood not prevent unguarded children from suffering injury. Furthermore, fences would be extremely costly to install and there are hundreds of hot springs in the park.

On July 30th one of the ten-passenger cars of the transportation company was tipped over through the fault of the driver

speeding around a double curve, about 1½ miles south of Madison Junction. Three of the seven passengers in the car were stunned and quite severely shaken up, but no bones were broken. The driver was tried before the Commissioner for violation of park rules and regulations, and fined \$100 and costs.

The same evening a ten-passenger car with a load of hotel employees out for a "joy-ride" left the road and ran into a tree and telegraph pole. The most serious injury to any of the occupants was a broken arm.

On August 18th, an elderly man touring the park with a party of friends stumbled and fell into the edge of Prismatic Lake at Midway Geyser Basin. Fortunately the lake is large enough so that the water is comparatively cool at the edges, and he was not fatally burned. He was well enough to travel, and left the park with his party on August 18th.

On August 23 a ten-passenger car belonging to the Yellowstone Park Transportation Company and carrying members of the Governors' Party collided with a Ford car traveling in the opposite direction, while rounding a curve in the upper end of Hayden Valley. A lady in the Ford car was thrown out into the road, and the left front wheel of the big car was smashed, but fortunately no one was injured beyond a few slight scratches and bruises. Among the occupants of the car were the governors of Pennsylvania, Oregon, Utah, and South Carolina. I was in a car following closely, and after consultation with the occupants of both cars it appeared to me that the accident was a result of both drivers violating the rules

of the road, and that, under all of the conditions as they were shown, a proper punishment was a reprimand to both drivers, and this was administered by both myself and, later, the U. S. Commissioner, who, upon hearing the evidence in the case, reached the same conclusion as I did.

The same day my official car was struck at Virginia Cascades by a Dodge car driven by a girl 18 years of age. The fenders of both cars were damaged, but no further injury was sustained. Both the girl who was driving, and her father who was in another car ahead, were reprimanded and dismissed. The fact that three of the drivers of the four concerned in these two accidents were quite young convinced me that the regulations should provide an age limit for people permitted to drive automobiles on park roads, and this will be recommended when the subject of revision of park rules and regulations comes up later in the year.

MEDICAL SERVICE.

Notwithstanding the fact that we have available at headquarters a large, modern hospital building thoroughly equipped with beds and bedding, kitchen and dining room furniture, office furniture, heating and sterilizing plant, surgical instruments, and medicines, it has not been practical to make provision for medical service, due to scarcity of suitable men for the work. During the past summer the hotel company has employed a doctor whose services could be had

in emergency, and a trained nurse was stationed at each hotel and camp, but for the other nine months the nearest place where medical attention can be had is at Chico Hot Springs, about 40 miles away. The town of Gardiner, five miles distance, has no doctor or trained nurse.

This situation is almost intolerable, and at the earliest possible date we must make some arrangement for medical service here. If a qualified physician can not see his way clear to establish himself here with the hope of building up a profitable practice, we must seek additional appropriations from Congress to employ an experienced doctor at an adequate salary.

CHURCH SERVICES.

During the past year church services were held in the chapel irregularly, but whenever a minister was available. Rev. J. F. Fritchard, Episcopal missionary from Enigrant, Mont., furnished by the Bishop of Montana by arrangement with the Bishop of Wyoming, filled the pulpit every two weeks during the summer, and other ministers were invited to hold services when visiting the park.

SCHOOL AT HEADQUARTERS.

A private school was maintained during the past winter for the benefit of children of permanent Government employees and employees of the business enterprises who remain in the park the year around the expense being borne by the parents of the children. This is one

of the very few places in the United States under exclusive Federal control where no school facilities of any sort have been provided by the Government, and I feel that some steps should be taken to remedy this situation.

MOTION PICTURES.

Under a cooperative plan developed by the park employees, motion picture entertainments were held once a week beginning December 28, 1918, after the influenza epidemic had subsided to the extent that large gatherings were considered safe. A similar arrangement will be worked out for the coming winter, and it is expected that the citizens of the neighboring town of Gardiner will participate.

RECOMMENDATIONS.

Travel to Yellowstone National Park is increasing with such amazing rapidity and such varied uses are being made of this great reservation by its throngs of visitors that it is very difficult to think of any desirable improvement that should not be made in the immediate future. The needs of the park are very great and certainly require the annual expenditure of considerable larger appropriations than have recently been made by Congress. The more important of the urgent needs of the park follow:

1. The Teton Mountains and the head waters of the Yellowstone River, with much of the country between, should be added to the park. Pending legislation provides for this logical and necessary extension of Yellowstone's boundaries.

2. More funds should be provided for the upkeep of the road system. Under existing high labor and material costs not less than \$300 per mile should be expended on this system next year.

3. A program providing for the gradual paving of the belt line highways should be immediately adopted. Such a program should provide for the paving of sections of these highways according to their cost of upkeep, the most costly sections to be paved first. One hundred thousand dollars should be made available for this work next year.

4. Eighteen years ago the road between the Thumb of Lake Yellowstone and Bridge Bay near the outlet of the Lake was realigned, a very scenic highway being abandoned in favor of a shorter route with heavy grades over a high divide. This scenic road along the lake shore should be restored at once. The existing road is exceedingly hard to maintain, is steep, dusty, and almost devoid of scenic features. Small cars experience great difficulty in negotiating its grades. It can not be sprinkled. The old road when restored would afford a lake drive that would be one of the most popular features of the park tour. It would be about five miles longer but this additional distance is of no importance in these days of motor cars.

5. The road that now runs so close to Lake Hotel and Lake camp should be changed to follow the lake shore from the hotel to the junction of the Cody approach road with the belt line system

at the so-called "Wishing Bridge" over the Yellowstone River where it leaves Yellowstone Lake. This realignment would cost comparatively little, but would tremendously improve conditions at the Lake and would especially benefit the traveling public utilizing the hotel and camp by removing the harassment of noisy automobile traffic at night.

6. The Firehole Cutoff Road between Madison Junction and the Cascade of the Firehole should be completed. The major portion of the work on this scenic road was completed by the Army Engineers, but we have had no funds available to undertake the work of finishing it. It will cost \$25,000 to complete this project.

7. Ever since automobiles were admitted to the park the finest geysers and hot springs of Lower Geyser Basin have been practically inaccessible to motorists. This is because the old wagon road is badly located and wholly unfit for automobile travel. It should be entirely rebuilt and this work ought to be undertaken next year. It will cost approximately \$17,500 to make this improvement. Among other things it will open to all visitors to the park such wonders as Firehole Lake, the Black Warrior, the Great Fountain Geyser, Surprise Pool, Broken Egg Pool, and the White Cone.

8. The City or eastern approach road should be improved by the construction of seven new bridges in the forest east of the

park and by the reconstruction and graveling of approximately 4 miles of that portion of the road between Sylvan Pass and Lake Yellowstone. The south approach road should be improved by the construction of a number of new bridges and culverts and by the elimination of curves and the reduction of grades on certain sections of this highway.

9. The Inspiration Point Road should be improved by considerable work of widening and the construction of guard rails and other protective measures, the establishment of adequate parking places, etcetera. This improvement should also include the construction of a walk along the rim of the Grand Canyon for the use of pedestrians. The present road is not satisfactory for motor travel and is distinctly dangerous to walking parties.

10. There is a crying need for the immediate construction of several large new automobile camp grounds for the use of motorists who bring their own camping outfits into the park. Next year the camps at Upper Geyser Basin, Thumb, Lake Outlet, Grand Canyon, Tower Falls, and Norris Geyser Basin should be improved by the extension of the water system, and much attention should be given to the sanitation of these camps. This free automobile camp system should be progressively extended and improved year by year, and as soon as possible not less than 30 major camps should be made available.

11. Many of the ranger stations of the park are in a

dilapidated condition and should be rebuilt. The greatest need is for new stations at Upper Basin, Lake Outlet, and the Grand Canyon. They should be built next year and should be large enough to accommodate several park rangers, a divisional highway engineer, and a large information office in which maps, national park circulars of information, and other data useful to the public may be made accessible to tourists. Several snowshoe cabins used by the park rangers in winter should be rebuilt.

12. Attractive gateway structures should be erected at the Cody or eastern entrance and at the Yellowstone or western entrance to the park. Plans for the Cody entrance have already been approved but funds have not been available for the construction of this gateway. Both of these entrances are as important as the northern gateway, which already has a very imposing and interesting arch.

13. The National Park Service and the Yellowstone Park Hotel Company each maintains a telephone line, and the hotel company maintains a telegraph line. None of these lines is in satisfactory condition. They should all be consolidated and maintained by the National Park Service as in the case of Yosemite Park. This would make it possible from the financial standpoint for the Government to build and maintain a first-class telephone and telegraph service for the public as well as for the park administration and the business interests of the Yellowstone.

14. More funds should be provided for the seeding, cultivation, and draining of hay lands, in order that larger supplies of hay for buffalo and other animals may be available hereafter.

15. By special authority of law the National Park Service now maintains the approach roads to Yellowstone Park through the forest reserves east and south of the park. Excessive tourist traffic on the north approach road from Livingston to Gardiner is now placing a tremendous burden of road maintenance on the county treasury, which, in view of the large size of the county and the small amount of taxable property therein, is a particularly hard burden to bear. It would seem that the Federal Government should bear the cost of up-keep of at least half of this approach road, and I recommend that this proposition be given the earnest consideration of the Service and of the department with a view to bringing it to the attention of Congress.

16. Gallatin County and the State of Montana, with the cooperation of the Forest Service, are rebuilding the highway through the gorgeous canyon of the Gallatin River north of the park, and within two years will have this work completed. Before this new road is finished we should rebuild our section of the Gallatin Highway and should continue it through to the west approach road. This would mean the construction of from 10 to

12 miles of new road from Grayling Creek to the Madison River.

17. The trail system should be largely extended, and it is particularly important that a new trail be built next year from Trapper Creek, south of Lake Yellowstone, around the arms of the lake and over Chicken Ridge to Heart Lake. Likewise, a new trail should be built up Mountain Creek to Eagle Pass. In order that saddle-horse parties may not have to traverse the much-used motor roads, new trails should be built on the east side of Lewis River from the south entrance to Lewis Lake and from Turbid Lake to the east boundary by way of Jones Pass.

18. Last, but more important than most of the projects I have mentioned, is the need for taking every possible step for the conservation and protection of the wild animals of the park, and especially the elk herds, which are in constant danger of destruction during the winter months through lack of feed while outside of the boundaries of the park.

DEPARTMENT OF THE INTERIOR
NATIONAL PARK SERVICE
Yellowstone national park.
Yellowstone park, Wyo.

Superintendent

November 1, 1919.

To the Editor:

The attached press memorandum contains much data on travel in Yellowstone National Park which will doubtless be interesting, not only to the readers of your automobile section, but also to the Chamber of Commerce of your city, and to the organizations engaged in promoting good roads movements and in encouraging tourist travel to the West.

If you are interested in receiving similar data from the park in the future, please advise us and we shall be glad to keep in touch with you.

Cordially yours,

Horace M. Albright,

Superintendent.

DEPARTMENT OF THE INTERIOR
NATIONAL PARK SERVICE
YELLOWSTONE NATIONAL PARK.

Yellowstone Park, Wyoming,
November 1, 1919.

MEMORANDUM FOR THE PRESS:

During the tourist season of Yellowstone National Park, which closed early in October, all travel records of the great park were broken. The aggregate number of persons visiting the park during the year ended October 12, 1919, was 62,261, an increase of 10,366 over the former record year of 1915, when 51,895 people entered the gates of the Yellowstone. It must be remembered, however, that 1915 was the "Exposition Year", and a large part of the visitors of that year came to the park on side trips en route either to or from San Francisco. The average annual travel for the past ten years, inclusive of 1915 travel, was approximately 26,000, and exclusive of the "Exposition Year" visitors averaged about 26,000.

On August 5, 1919, 1,255 tourists entered the park, the greatest number entering in any one day in the history of the Yellowstone.

AUTOMOBILE TRAVEL.

Even more striking than these figures showing the total travel in the park this year are the statistics of the motor travel -- that is, the number of privately owned automobiles driven through the park, and the number of tourists carried by them. A total of 10,737 cars entered the park during the year, carrying 39,866 people. These cars came from 46 States of the Union, the District of Columbia, Canada, the Canal Zone, and Denmark. North Carolina and South Carolina sent no private motorists through the park this year, but in August Governor Thomas W. Bickett of North Carolina and Governor R. A. Cooper of South Carolina toured the Yellowstone with fifteen other governors. These two States were also represented by a large number of people who came to the park by train.

The greatest number of private automobiles entering the park in one day was 202 on August 4, 1919. This broke all previous records.

The total of 10,737 cars, carrying 39,866 people,

should be compared with the previous record travel by private motorists in 1917, when 5,703 cars, carrying 22,117 visitors registered at the park gates. The private automobile travel for 1919 was nearly double that of two years ago.

MOTORISTS CAMP OUT.

Of the 39,886 people who toured the Yellowstone in their own cars this year, approximately 60 percent, or nearly 25,000, brought with them their own camp equipment, and in most cases used and appreciated the special camp grounds where wood, water, toilet facilities, and, at Mammoth Hot Springs, electric lights, were furnished without charge.

At times during the summer these camp grounds were overcrowded, and before the opening of next season they will be expanded and new areas opened for this use. Likewise more wood will be provided, and a considerable sum will be expended in improving the water and sanitation facilities, provided the necessary funds are made available for the purpose. The popularity of these camps fully warrants their development on a large scale.

TRAVEL BY RAIL.

Of the 21,275 tourists who came to the park by rail, and utilized the facilities of the Yellowstone Park Transportation Company, 18,679 made the complete tour of the park roads. In addition, 2,596 made short trips.

As a rule tourists visiting the park by rail remained nearly five days, while the private motorists spent an average of six days. During the months of July and August there were between five and six thousand people in the park every day, most of them camping out and enjoying the beauties and wonders of their mountain playground in their own way.

Several thousand people spent a considerable period of time in the park this year. This tendency to regard Yellowstone National Park as a great scenic area and vacation land where weeks and months can be spent in healthful recreation is very gratifying to the National Park Service, which is trying very hard to get the public away from the idea that this big park is little more than a land of extraordinary natural phenomena; it is one of the most beautiful scenic regions of the world, and when the magnificent Teton Mountains are added to the park it will not be surpassed by any other mountain region on the face of the Earth.

The following tables show some very interesting analyses of the season's travel, and also some comparisons with touring figures of previous years:

Travel by different entrances:

From the north, via Gardiner, Mont. -----	22,786
From the west, via Yellowstone, Mont. -----	23,553
From the east, via Cody, Wyo. -----	13,455
From the south, via Moran, Wyo. -----	<u>2,462</u>
 Total -----	 62,261

Making trips with private transportation:

With automobiles paid and complimentary -----	37,724	
With automobiles, second trip -----	<u>3,162</u>	39,886
 With motorcycles -----	56	
With licensed saddle and pack trains -----	129	
With miscellaneous facilities, including out-of-season visitors to the park -----	<u>915</u>	1,100

Yellowstone Park Transportation Company:

Entering via the northern entrance -----	9,353	
Entering via the western entrance -----	8,897	
Entering via the eastern entrance -----	<u>3,025</u>	<u>21,275</u>
 Grand total -----		62,261

Private automobile travel:

Automobiles-tourists

Entering via the northern entrance -----	3,478	:	12,621
Entering via the western entrance -----	3,783	:	14,520
Entering via the eastern entrance -----	2,653	:	10,330
Entering via the southern entrance -----	<u>623</u>	:	<u>2,415</u>
 Totals -----			10,737 : 39,886

Motorcycle travel:

Motorcycles-tourists:

Entering via the northern entrance -----	20		31
Entering via the western entrance -----	9		14
Entering via the eastern entrance -----	<u>7</u>		<u>11</u>
 Totals -----		36	56

The following tables are given for the purpose of comparing the travel of this season with the number of visitors entering the park in 1918, the war season; 1917, the season of average travel since the admission of automobiles to the park; and 1915, the Panama-Pacific Exposition season. These tables give in the first column the number of automobiles and in the case of the 1918 and 1919 statistics the number of motorcycles entering the park; in the second column the number of visitors to the park is shown by reference to entrances, those entering via Soda Butte Ranger Station or the northeast gateway being listed with the eastern entrance visitors; the next column shows the number of visitors reaching the north, west, and east entrances by rail; and the last column gives the total number of visitors by entrances.

1919

Entrance	Private Transportation Automobiles (1)	Visitors	By Rail	Total Visitors.
North	3,498	15,435	9,355	22,786
West	3,792	14,661	8,897	23,558
East	2,860	10,430	3,025	15,455
South	623	2,462		2,462
TOTALS	10,773	40,986	21,275	62,261

1918

Entrance	Private Transportation Automobiles (2)	Visitors	By Rail	Total Visitors.
North	1,528	6,027	1,537	7,564
West	1,943	7,566	1,136	8,702
East	1,128	4,114 (3)	353	4,467
South	135	542		542
TOTALS:	4,734	18,249	3,026	21,275

(1) Includes 36 motorcycles carrying 56 people.

(2) Includes 16 motorcycles carrying 25 passengers.

(3) Includes 66 people entering via the northeastern gateway.

1917

Entrance	Private Transportation: Automobiles	Visitors.	By Rail	Total Visitors.
North	1,994	7,646	3,774	13,419
West	2,258	9,055	5,635	14,690
East	1,353	5,061	1,874	6,935
South	98	356		356
TOTALS:	5,703	22,117	11,283	35,400

1916

Entrance	Private Transportation: Automobiles	Visitors.	By Rail	Total Visitors.
North	365	5,094	14,369	17,463
West	392	2,795	29,756	32,551
East	193	1,198	352	1,550
South	9	331		331
TOTALS:	959	7,418	44,477	51,895

(1) Includes 104 people entering via the northeastern gateway.

NAME OF STATE	NORTH			WEST			EAST			SOUTH			TOTAL		
	Cars	Pass.		Cars	Pass.		Cars	Pass.		Cars	Pass.		Cars	Pass.	
Ohio	38	115		16	56		53	139		3	9		110	319	
Oregon	88	343		140	518		15	40		3	12		246	913	
Pennsylvania	19	51		5	16		23	84		1	4		48	155	
Rhode Island	2	5											2	5	
South Dakota	101	328		7	20		76	255		1	2		185	605	
Texas	7	19		20	57		77	265		1	6		105	347	
Tennessee	1	4		2	8		7	22		2	9		12	43	
Utah	16	59		660	2856		11	43		117	480		804	3438	
Virginia	4	8											4	8	
Vermont	1	3		1	4		1	5					3	12	
Washington	260	862		175	675		58	216		3	9		496	1762	
Wisconsin	79	287		8	33		32	116		1	2		120	438	
Wyoming	42	172		42	139		693	2739		95	337		878	3387	
West Virginia	-	-	L				4	12					4	12	
Dist. Columbia	2	3		2	5								4	8	
Canada	44	169		26	113		8	22					78	304	
Canal Zone	-	-					1	2					1	2	
Denmark	-	-								1	2		1	2	
Totals:	3275	11894		3525	13567		2793	10104		538	2119		10129	37684	

Complimentary cars, unclassified by States ----- 17
 Motorists entering in complimentary cars, unclassified by States ----- 40
 Second entry cars, unclassified by States ----- 591
 Motorists in second entry cars, unclassified by States ----- 2162

Grand total, all cars and motorists, classified and unclassified ----- 10737 39886

MAKES OF CARS DRIVEN THROUGH YELLOWSTONE PARK

MAKE	1919	1918	1917	1916
Abbot-Detroit	1	1	3	1
Albright	1	-	-	-
Aleo	1	-	-	2
Allen	7	1	2	1
American	-	-	1	2
Apperson	33	6	19	9
Auburn	11	5	4	5
Austin	1	-	-	-
Bangless	1	-	-	-
Biggs	2	-	-	-
Briscoe	7	6	7	4
Buick	1,360	527	499	290
Bush	1	-	-	-
Cadillac	327	135	190	172
Carter Car	1	-	7	2
Case	47	23	27	26
Chalmers	143	63	97	97
Chandler	151	75	59	53
Chase	1	-	-	-
Chevrolet	227	111	94	52
Cole	46	12	30	13
Columbia	-	3	-	-
Columbia-Knight	-	-	-	2
Crane-Simplex	1	-	-	-
Crawford	1	-	-	-
Crow	-	-	-	1
Crow-Elkhart	4	2	2	-
Cunningham	1	-	-	-
Cycle-Car	-	2	-	-
Davis	-	1	-	-
Detroit	2	-	2	2
Dilep	1	-	-	-
Dixie	1	1	1	-
Dodge	974	395	389	183
Dorris	2	1	-	1
Dort	25	7	17	6
Drummond	-	-	2	-
Elaine	1	-	-	-
Elcar	5	2	-	-
Elgin	23	7	3	-
Elkhart	-	-	-	1
Ely	-	-	1	-
E.M.F.	4	3	2	5
Empire	-	2	1	3
Essex	32	-	-	-
Everett	2	-	-	-

MAKE	1919	1918	1917	1916
Fiat	5	-	-	-
Ford	2,932	1,449	1,684	947
Franklin	158	78	81	58
Frescott	1	-	-	-
Garford	1	-	-	-
Gillette	1	-	-	-
Glide	5	-	3	-
G. H. CO.	-	1	-	-
Grant	22	22	25	12
Great Smith	1	-	-	-
H. A. L.	2	2	4	-
Hartoun	3	-	-	-
Haynes	46	36	50	46
Hays	-	-	1	-
Hollier	6	1	2	1
Holmes	2	-	-	-
"Home made"	-	1	-	-
Honk	-	-	1	-
Howard	-	-	-	2
Hudson	312	142	197	100
Hymobile	161	82	91	58
Imperial	-	-	-	1
International	3	-	-	2
Interstate	6	1	1	3
Jackson	3	3	5	3
Jeffery	25	15	31	12
Jing	-	1	-	-
Jones	1	-	1	1
Jordan	13	-	1	-
King	10	6	6	13
Kissel Car	32	12	15	9
Lancia	-	-	1	-
Lewis	-	1	-	-
Lexington	15	10	8	-
Liberty	12	4	7	-
Loconobile	12	5	5	10
Lovell	-	-	1	-
Lovere	-	-	1	-
Lorier	10	1	7	7
Luverne	-	-	-	1
McFarlan	2	-	-	1
McLaughlin	16	4	5	-
Marion-Handley	2	2	2	-
Marmon	51	22	20	6
Mason	-	-	-	1
Maxwell	172	90	122	78
Mercedes	-	-	-	3
Mercur	7	7	6	1
Metz	1	1	5	6
Michigan	3	-	1	1
Michelin	1	-	-	-
Minerva	-	-	1	-
Mitchell	79	45	49	24

NAME	1919	1918	1917	1916
Molene-Knight	8	8	8	1
Monarch	1	-	-	-
Monroe	3	-	-	4
Moon	3	4	-	3
Nash	120	14	-	-
National	39	21	20	16
Nelson	1	-	-	-
New Era	1	-	1	-
Nichols	2	-	-	-
Nickel	1	1	-	-
Oakland	173	87	111	60
Oldsmobile	213	187	96	52
Olympic	1	3	-	-
Overland	446	243	345	230
Ocean-Magnetic	1	1	-	-
Packard	113	49	55	51
Paige	117	64	58	54
Pathfinder	-	1	4	4
Patterson	4	1	3	-
Penham	1	-	-	-
Pearless	30	7	13	6
Pierce-Arrow	52	13	27	40
Pilot	3	3	2	1
Pope	-	1	-	1
Pope-Hartford	-	2	1	-
Premier	26	13	10	5
Pratt	1	-	-	-
Pullman	3	1	4	-
Rambler	2	1	1	3
Regal	1	-	2	1
Reo	253	149	192	131
Republic	4	-	1	-
Richmond	-	-	1	-
Roamer	3	-	-	-
Roll-Royce	-	1	-	-
Ross	-	-	1	-
Russell	-	-	-	1
Saxon	37	31	51	22
Scripps-Booth	12	4	4	1
Scars	1	-	-	-
Seneca	1	-	-	-
Simplex	-	-	2	1
Special	-	1	-	-
Speedwell	-	-	1	1
Stanley Steamer	4	4	2	-
Standard	3	-	2	-
Stearns-Knight	20	3	9	5
Stearns	-	1	-	-
Stevens	22	4	3	-
Stevens-Duryea	5	-	3	19

MAKE	1919	1918	1917	1916
Stoddard-Dayton	-	1	2	3
Studebaker	473	220	200	226
Stutz	35	8	10	15
Sun	-	-	1	-
Templer	2	-	-	-
Thomas	1	9	-	1
Wardner	1	-	-	-
Wells	76	7	32	26
Win	1	1	-	-
Winn	1	-	-	-
Westcott	2	1	2	-
White	15	9	8	15
Winton	34	8	15	19
Willys-Knight	129	50	60	17
Willys	-	8	-	-
Yale	-	1	-	-
Undetermined	-	2	4	-
Totals	10,189	4,633	5,331	3,340

MOTORCYCLES.

MAKE	1919	1918
Excelsior	6	4
Harley-Davidson	23	12
Henderson	1	-
Indian	6	-
Totals	36	16

YELLOWSTONE
NATIONAL PARK
LIBRARY