

wide, but no material damage was done, as the burning was mostly in down timber and jack pines and in willows in the bottoms along the stream located several miles from the main road.

#### IMPROVEMENTS.

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 23-gauge corrugated steel roofing, painted. The sheds are divided by rows of supporting posts into six double stalls each 22 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 \$292.81

#### NATURAL 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.

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The orders from the War Department direct that the military force now guarding the park be withdrawn, Fort Yellowstone abandoned as a post, and the guardianship of the park transferred to the Interior Department, effective October 1, 1916.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

#### YOSEMITE NATIONAL PARK.

1916 report

W. B. LEWIS, Supervisor, Yosemite, Cal.

#### GENERAL STATEMENT.

The Yosemite National Park, when created by the act of October 1, 1890 (26 Stat., 650), was situated in Tuolumne, Mariposa, Madera, and Mono Counties, Cal., and covered an area of about 1,512 square miles, being 36 miles wide by about 40 miles long. Under the act approved February 7, 1905, entitled "An act to exclude from the Yosemite National Park, California, certain lands therein described and to attach and include the said lands in the Sierra Forest Reserve," 542.88 square miles were excluded and 113.62 square miles were added to the park, making a net reduction in area of 429.26 square miles, so that the area, after the passage of the above act, was 1,082.74 square miles, the park being situated in Tuolumne, Mariposa, and Madera Counties. By act of June 11, 1906, entitled "Joint resolution accepting the recession by the State of California of the Yosemite Valley grant and the Mariposa Big Tree Grove, and including the same, together with fractional sections five and six, township five



south, range twenty-two east, Mount Diablo meridian, California, within the metes and bounds of the Yosemite National Park, and changing the boundaries thereof," there were added to the park the Yosemite Valley, 48.60 square miles; Mariposa Big Tree Grove, 4 square miles; and a strip lying between the latter and the park proper, 2.13 square miles; and deducted by the change in the southwestern boundary, 13.06 square miles; making a net addition to the area of 41.67 square miles. The present area of the park is 1,124.41 square miles.

#### ROADS.

Of approximately 103 miles of roads under the control of the Government, there is only about 1 mile of good, hard-surfaced road. There are about 2 miles of water-bound macadam road on the floor of the Yosemite Valley, which it has not been possible to keep in proper repair, with the result that it is becoming badly rutted. About 5 miles of road on the valley floor have been surfaced with river gravel. This gravel is of an inferior quality, which pulverizes rapidly under wear, and necessitates heavy sprinkling to keep down the dust. The remainder of the park roads are ordinary dirt roads, most of them built years ago, and on account of sharp curves, steep grades, and their narrow width, are not adaptable to automobile travel and the heavy trucking of the present time.

The work, just begun, of the reconstruction of El Portal Road should be continued until the entire road is completed, with a maximum of 6 per cent grade. This should be followed by the improvement of the other roads in the park, in the near future, as the increase of travel will soon make demands upon the present roads, which they will in no way be able to meet.

In order to successfully meet this growing demand, it is urgently recommended that appropriations be made available for three years, or until expended to put the roads in first-class condition. This would be a saving to the Government in the long run, in the decrease in cost of maintenance, which cost is at present very high as compared with the results obtained.

#### BRIDGES.

The question of bridges on the floor of the Yosemite Valley is one that should receive the immediate attention of the department. There is but one bridge at present which has a safe loading capacity of more than 6 tons. This, El Capitan Bridge, a combined steel and wood truss, being safe up to 12 tons, while the Sentinel Bridge, over which the bulk of the traffic passes, was condemned some three years ago for loads exceeding 3 tons.

The inconvenience to the park as a result of this condition is apparent when the question of maintenance is considered, as the heavy road building and sprinkling equipment owned by the park can pass loaded from one side of the valley to the other over El Capitan Bridge only.

The low load capacity of the Sentinel Bridge has resulted in excessive transportation costs to the transportation companies operating in the park, as well as to the park itself, due to the increased length of haul resulting thereby. All freight trucks and heavy passenger trucks en route to points on the north side of the valley are compelled to go via the Le Conte Road and Stoneman Bridge, an extra haul of 2 miles.

The Sentinel Bridge should be first considered and replaced for the accommodation of the transportation of freight and passenger trucks, and should be followed by the replacement of the Pohono, Happy Isles, Stoneman, and Tenaya Bridges with modern structures with load capacities of not less than 15 tons.

#### TRAILS.

Of approximately 650 miles of trails within the park, 175 miles can be classed as good, requiring small improvements only to put in first-class shape. Some of these, such as the Yosemite Falls Trail, the Nevada Falls Trail, and the Tenaya Canyon Trail, have been constructed through extremely difficult country, and are examples of first-class trail construction.

One hundred and forty-five miles of the park trails are classed as fair, while the remainder, approximately 280 miles, should be reconstructed practically throughout. These latter are located principally in the northern part of the park, north of the Grand Canyon of the Tuolumne. This part of the park, here-



tofore little visited and practically unknown, is beginning to attract attention, and will continue to do so still more with the establishment of lodges, as proposed, for the accommodation of the tourist. It will, therefore, be necessary, in order to popularize that part of the park, which possesses unsurpassed mountain scenery, to reconstruct many of the trails, thereby insuring travelers against danger.

It is urgently recommended that three entirely new trails be constructed during the coming year, viz, the extension of the Washburn Lake Trail to join with the Isberg Pass Trail near Harriet Lake, 3 miles; from the McClure Fork of the Merced, three-fourths mile above its junction with the Merced to Tuolumne Pass, via Babcock and Eimerick Lakes, 8 miles, replacing present trail from same initial point to Tuolumne Pass, via Vogelsang Pass, 9 miles.

#### POWER PLANT.

The marked increase in the use of light and power, as compared with the previous year, is shown by the increase of 65 per cent in the output of the plant. In order to supply this demand, the plant has run practically to capacity during much of the busy season, and it is fortunate that work is in progress for the construction of a new plant which, in addition to supplying electricity for light and power, will also be able to supply electricity for heating and cooking.

#### BUILDINGS.

The buildings in use for the housing of the Government employees are, for the most part, the cottages formerly used by the War Department, located near the Yosemite Falls Camp. All of these buildings, with the exception of three, have been sealed and are fairly satisfactory as winter quarters. The other three should be sealed before the coming winter, having been constructed, as were the others, for summer use only.

#### WATER SUPPLY.

The increased demand for water, due to the installation of El Capitan Camp and the laundry and swimming tank at Yosemite Falls Camp, has been such that there have been occasions when it could not be supplied from the regular water supply. In order to fill the Yosemite Falls Camp swimming tank, it has been necessary to turn the river water into the mains at the power house. This has been objectionable, resulting in bursting of pipes in one or two instances, and the mixing of the river water with the domestic supply of pure spring water has brought complaint from water users.

The present headworks at the spring develop probably 60 per cent of the available supply. By additional headworks probably 90 per cent of the available supply could be developed. This amount, to be used for domestic purposes only, would, undoubtedly, suffice for many years. In order that it would do so, however, it would be advisable and necessary to develop a separate supply from the river for use in swimming tanks and baths.

#### MEDICAL SERVICE.

The present building in use as a hospital is the same, slightly remodeled, as formerly used for that purpose by the War Department, and contains three rooms for patients, a small operating room, a nurse's room, and a reception and consultation room. Three other rooms are utilized as living quarters by the physician and his family.

One hundred twenty-three cases were treated in the hospital during the year July 1, 1915, to June 30, 1916, and 1,566 calls were made outside. As many as seven patients have been cared for at one time in the hospital, necessitating crowding and the utilization of all available space, the surplus being cared for on cots placed in the operating and nurse's rooms.

The heavy tourist travel necessitates not only the maintenance of a medical service and hospital, but the isolation of the park from first-class hospital facilities would seem to demand that such a service be of a high order. With the present facilities nothing but emergency cases can be cared for, and in order to supply the want it will be necessary to replace the present inadequate building with a new one with a capacity of about 25 beds. In connection with this, but separate from the hospital, there should be erected quarters for the physician and his family, as the present condition of maintaining quarters in the hospital is unsatisfactory, both from the view of the patients and the physician.



## SANITATION.

Up to the present time nothing has been done toward the installation of a complete sanitary and sewage-disposal system. During the past season there have been as many as 5,000 people in the valley at one time, and for a period of three months the number has averaged close to 3,000. The danger of stream pollution is evident when it is considered that much of the sewage empties directly into the river or its tributary streams. That there has never been a typhoid epidemic in the valley below, where people are dependent on the Merced River as a water supply, as a result of stream pollution in the Yomesite Valley, is nothing short of remarkable.

It therefore appears essential that steps be taken at once to install a complete system of sufficient capacity to take care of the present and future needs of the whole valley. The public camps should be supplied with flush toilets, and a crematory for the proper burning of garbage should be installed to take the place of the present primitive, even though effective, method of burning in pits.

## FOREST FIRES.

No serious damage was done by forest fires during the past year, all fires reported having been easily brought under control by the park rangers, assisted by other park employees.

## CLEARING OF THICKETS AND UNDERBRUSH.

The existence of thickets and dense growths of underbrush in certain timber areas on the floor of Yosemite Valley and in the Big Tree Groves and the slashings left on the cut-over lands adjacent to the park timberlands along the Wawona Road and along the west and south boundaries of the Mariposa Big Tree Grove constitute a menace of large proportions in the consideration of fire protection. Fires originating in such thickets or slashings, and with a favorable wind, quickly become uncontrollable and large areas are apt to be burned over before they can be stopped from spreading.

Such thickets should be thinned out, and in cases where the slashings adjoin park timberlands fire lanes should be cleared out of sufficient width to obviate any danger of fires spreading to the timbered areas.

## INSECT CONTROL.

Some three years ago the department realized the necessity of instituting a campaign against the various classes of beetle depredating on the park forests. Since that time much effective work has been done with the result that, with one exception, all of the infested areas have been brought pretty well under control. The one area which has failed to yield to control is located in the Cathedral Basin, near Lake Tenaya. This area is forested almost entirely by lodge-pole pine. While other areas, since control operations were initiated, have shown each year a marked decrease in attacks, this one shows a very marked increase. A recent examination by Assistant Forest Entomologist J. M. Miller, of the Department of Agriculture, indicates that unless severe measures are taken in this area in the near future the entire lodge-pole stand will be exterminated. He estimates that under no condition can more than 50 per cent of the stand be saved, and then only in the event control operations on a large scale are promptly undertaken.

## LOGGING OPERATIONS.

Logging operations on private and Government lands within the park have been prosecuted on a large scale during the past year by the city and county of San Francisco in its development of the Hetch Hetchy project and by the Yosemite Lumber Co., but more principally the latter.

The latter company has cut over during the last year about 370 acres of timberland lying within the boundaries of the park. A small percentage (42 acres) of this has been cut under restrictions whereby trees were left for seed and scenic purposes.

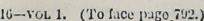
The city and county of San Francisco has cut over about 900 acres of a total area of 1,200 acres to be cleared in the Hetch Hetchy valley. Of the total 1,200 acres to be cleared, about 400 acres is Government land. In addition to this it has cut over 120 acres of its own lands on what is known as Canyon Ranch.



SCALE OF MILES

2 1 0 2 4 6

After Topographic Sheet of Administrative Map of  
Yosemite National Park by U.S. Geological Survey





## PATENTED LANDS.

Attention has been called in previous annual reports to the necessity for the abolishment, either by purchase or exchange, of private land and timber holdings within the park. Agreements have recently been made by which the Government acquires from the Yosemite Lumber Co. some 200 acres of timberland along the Wawona Road and 360 acres from the city and county of San Francisco near Hog Ranch. This is in addition to acquisitions immediately following the act of Congress of April 9, 1912. There is also a proposition now being considered for an exchange between the department and the Yosemite Lumber Co. by which the department would acquire the bulk of the lands within the park boundaries in the vicinity of the Merced and Tuolumne Big Tree Groves.

## RANGER SERVICE.

The present ranger force consists of 1 chief park ranger, 1 assistant chief park ranger, 1 special park ranger in charge of maintenance of roads, trails, etc., 1 special park ranger in charge of timber cutting in connection with the operations of the Yosemite Lumber Co. and the city and county of San Francisco, and 3 regular park rangers, and 19 additional temporary rangers are employed during the months of heavy travel.

## INFORMATION BUREAU.

The bureau of information established last year was continued in operation in charge of one of the park rangers.

The opening of the roads on the floor of the valley at the beginning of the season of 1916 to general automobile travel greatly augmented the interest of motorists in the park, and the consequent increase in motor travel during the 1916 season, as compared with that of 1915, demonstrates the popularity of this action on the part of the department. The rule of one-way travel was rigidly adhered to at the beginning of the season. Later, however, as dangerous curves were eliminated, and narrow stretches of the roads were widened, the roads were gradually opened to two-way traffic until at present the freedom of the roads is given to the motoring public under proper speed regulation. With such regulation of speed the valley roads are reasonably safe, and it is recommended that during the coming season all restrictions as to direction of travel be eliminated, except that of one-way traffic on the Big Oak Flat and Wawona grades. On these grades travel should be restricted, as at present, to going and coming on alternate hours.

The total number of automobiles entering the park during the period October 1, 1915, the date of the annual report, and September 30, 1916, was 4,043, of which 3,843 were from California. This includes, in addition to the regularly purchased tickets, complimentary tickets to county, State, and Federal officials in the park on official business. The travel, segregated as to points of entrance, was as follows:

	Cars.
Alder Creek, Wawona Road.....	2,370
Merced Grove, Coulterville Road.....	426
Crane Flat, Big Oak Flat Road.....	553
El Portal, El Portal Road (cars shipped to El Portal over Y. V. R. R.)....	6
Aspen Valley, Tioga Road.....	106
Tioga Pass, Tioga Road.....	578
Hog Ranch, Hetch Hetchy Road.....	4
Total.....	4,043
Total for previous year.....	2,270
Increase.....	1,773
Increase over previous year 78 per cent.	
Entering park in private automobiles during period Oct. 1, 1915, to Sept. 30, 1916.....	14,527
Entering park in private automobiles during previous year.....	7,377
Increase over previous year.....	7,150

Automobile transportation service on the floor of the valley, initiated during the season of 1915, was continued with increased facilities, running on regular schedules and at fixed rates between camps and hotels and to the various points of interest in the valley.



## VISITORS.

Visitors to the park during the period October 1, 1915, to September 30, 1916, reached a total of 33,396, an increase of 1,748, or 5.5 per cent, over the total of the year ending September 1, 1915, the date of last annual report. This increase is largely due to the increased freedom allowed private cars on the park roads, especially on the roads on the floor of the valley.

## FISH AND GAME.

Since the beginning of the 1916 season a more determined effort has been made to enforce the park regulations as to fishing. The question of the conservation of fish in the park is an important one since fishing is, particularly in the back country, one of the main attractions which draws the tourist to those parts. The transportation of small fry to high mountain lakes and streams is difficult as well as expensive. It is, therefore, very essential, as a factor in fish conservation, that the regulation limiting the day's catch to 20 be rigidly enforced. In addition to this, the work of stocking lakes and streams and restocking others should go on year by year so far as practicable in order that the demand may continue to be met.

Considerable good work is being done by the park rangers in transplanting fish from streams already stocked to those where none exist. This is a very effective method of stocking and should be encouraged.

Since the month of May the State law requiring a State fishing license has been enforced in the park for the first time in many years.

The regulation prohibiting hunting inside of the park is rendering a great service in the protection of game. The park has become, as a result, a great summer feed ground and breeding place for deer, and it is understood from those who are familiar with the conditions that all classes of game, particularly deer, are on the increase. Unfortunately, however, with all its summer feeding grounds and breeding places, the park has practically no winter feeding grounds, due to the high altitude of all of the areas inclosed by the park boundaries. The result is that much of the good work of protection within the park goes for naught when in the fall the deer drift down to the lower altitudes outside of the park boundaries, where they fall prey to hunters who await their coming not far from the park boundaries. A possible solution of this problem would be the creation of a neutral zone of 5 or 6 miles in width along the southern and western boundaries of the park in which hunting would be prohibited at all seasons of the year. Such a zone would open up winter pastures at low altitudes and would do much for the protection and increase of game life within and adjacent to the park.

## FIREARMS.

Approximately 1,500 firearms of various sorts and calibers have been sealed or taken up during the year. At present firearms carried by through automobile passengers are sealed and the owners are permitted to retain possession. In such cases the number of guns sealed is stated on the permit and the seals are broken by the ranger at the point of exit. Those brought into the park by people on foot or horseback are taken up and turned in to the supervisor's office, whence they are shipped to the owner at the latter's risk. This method of handling firearms has proven very satisfactory. There should, however, be incorporated in the firearms regulations a clause stating, in effect, that in cases where arms once sealed are later found with seals broken, or in cases where arms are brought into the park unsealed in direct violation of the regulations, or in cases where there is any attempt to evade the regulations by denial of possession or concealment, said arms shall be promptly confiscated and the party shall forfeit all claim thereto.

## RECOMMENDATIONS.

To meet the demand for new circuits next year, a new switchboard will have to be installed.

It is urgently recommended that these lines be replaced by metallic circuits of No. 9 wire, and of uniform construction.