ANNUAL REPORT

OF THE

DIRECTOR OF

THE NATIONAL PARK SERVICE

TO THE

SECRETARY OF THE INTERIOR

FOR THE

FISCAL YEAR ENDED JUNE 30, 1931
AND THE TRAVEL SEASON, 1931
The functions of this branch are to handle all land matters concerning the areas, the granting and compaction of deeds for use in condemnation proceedings, and the settling of private funds for condemnation and purchase thereon for the care of visitors.

22 employees.

The general supervision of visitors, recreation, facilities for the use of the public, and other personnel matters, supervises tickets, and controls admission and other operations.

6 employees and 5 field employees.

The functions of this branch are to handle all land matters concerning the areas, the granting and compaction of deeds for use in condemnation proceedings, and the settling of private funds for condemnation and purchase thereon for the care of visitors.

6 employees and 3 field employees.

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9 employees.

Has charge of engineering design and planning, all road, tunnel, and forest road construction projects; site of potential water development and irrigation and maintenance equipment.

35 employees.

The functions of this branch are primarily to adjust to govern these areas and everything in them by the public and licensee thereof, from stationery and routine allowance and regulations for supply, stationery, printing, and binding.

22 employees.

Has general supervision of visitors, recreation, facilities for the use of the public, and other personnel matters, supervises tickets, and controls admission and other operations.

6 employees and 5 field employees.

The functions of this branch are to handle all land matters concerning the areas, the granting and compaction of deeds for use in condemnation proceedings, and the settling of private funds for condemnation and purchase thereon for the care of visitors.

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The Secretary of the Interior,

Washington, D.C., October 14, 1931.

SIR: It is a pleasure to submit to you this fifteenth annual report of the National Park Service. At the outset may I express to you the gratitude of the members of our organization for your sympathetic interest in and support of the activities of the service both in Washington and in the field. Your visits during the past summer to Rocky Mountain, Mesa Verde, Yosemite, Sequoia, General Grant, Lassen Volcanic, and the Great Smoky Mountains National Parks gave you opportunities to review several very important projects. Moreover, your words of encouragement to the men and women of these mountain parks were most inspiring and were highly appreciated by them and by me.

This report does not conform strictly to the fiscal year for various special reasons. It is desirable to record here the results of the season's operations, many of which were hardly more than begun at the close of the last fiscal period. We have long had a "travel year" which terminates September 30, approximately the end of the tourist season in most of the national parks. As the closing date of this period about coincides with the submission date of the annual report, our operations are recorded up to that date. This report, therefore, is for the year ended September 30, 1931, while our financial affairs are discussed in the proper place as of June 30, 1931, the close of the regular Government fiscal year.

There was nothing spectacular in the work of the National Park Service during the past year, but steady progress was made in all lines of activity.

Congress, as usual, gave consideration to many important legislative measures affecting the national park and monument system. Altogether in its last session, which ended March 4, 1931, the Congress passed 22 bills involving National Park Service activities. During the entire Seventy-first Congress a total of 47 bills affecting the national parks and national monuments was enacted into law.

Appropriations for the 1932 fiscal year, under which we are now operating, total $12,754,250. Compare this figure with $12,113,435 available in last fiscal year, but which included $2,078,000 allocated from emergency employment funds. The funds available in the 1930 fiscal year were $7,818,817.18. Cash donations for park and monument development purposes in 1931 amounted to $65,157.12. In
addition to the Federal appropriation, authority was given to the Secretary of the Interior to enter into contractual obligations on road and trail work up to a total of $2,850,000. Revenues were $940,364.79, against $1,015,740.56 in 1930 and $849,272.95 in 1929.

Travel to the national parks and national monuments this year has been especially interesting. Rail travel further decreased, this time approximately 30 per cent, due, of course, to general economic conditions. Travel by automobile increased. Total travel for the year was 3,544,856, as against 3,246,656 for the travel year ended September 30, 1930. This is a net increase of 9.18 per cent.

Most of our visitors this year were traveling on very limited budgets. In the present trying times, as never before, they appreciated our varied accommodations built to meet the requirements of all pocketbooks. On the other hand, however, limited patronage of all types of accommodations and services supplied by operators doing business under department franchise caused losses that are serious, and necessarily brought to a standstill projects involving further investment of capital.

The normal operations of the National Park Service were carried on throughout the year. Our permanent appointed personnel both in Washington and in the field on October 1, 1930, was 512. It is now 582. The service activities in protection and operation of the parks and monuments, maintenance of improvements, and in construction of new projects contributed substantially to unemployment relief. The average number of per diem employees on the monthly pay roll for the period from January 1, 1931, to September 30, 1931, was 1,332, ranging from a minimum of 184 employees in January to a maximum of 3,008 in July.

The National Park Service is now a Civil Service bureau as completely as any similar organization in the Federal Government. On August 10, 1931, the President, on recommendation of the Secretary of the Interior, covered the park superintendents and monument custodians into the Civil Service. During the year most of these officers were reallocated to grades and salaries more nearly commensurate with the dignity and responsibility of their positions.

The area of national parks is now 12,542.46 square miles, or 8,027,216.36 acres, an increase of 110.83 square miles, or 71,177.69 acres, since our last report. The national monuments now embrace 6,394.31 square miles, or 4,092,363.28 acres, an increase of 2,670.28 square miles, or 1,708,895.40 acres, during the year. There are now 22 national parks and 34 national monuments under the National Park Service.

Several major road projects were completed during the year, while others are being pushed to completion. Notable projects under way are the Wawona Road and tunnel in Yosemite, the Generals Highway between Sequoia and General Grant Parks, the Trail Ridge Road in Rocky Mountain, the Transmountain or Going-to-the-Sun Highway in Glacier, the Rim Drive in Crater Lake, the Colonial Parkway between Williamsburg and Yorktown, and the Summit Drive along the crest of the Blue Ridge in the proposed Shenandoah Park.

Under the Leavitt Approach Road Act of January 31, 1931, the Red Lodge-Cooke City and the Moran-South Boundary approaches to Yellowstone, the connecting road between Sequoia and General Grant
Parks, and the Desert View-Cameron approach at Grand Canyon have been started.

The Bureau of Public Roads continues to render extraordinary service to the National Park Service under the interbureau agreement. Its engineers take a keen interest in landscape preservation and are to-day building for us the most beautiful and spectacular roads in the world.

Our own landscape architectural division now embraces 20 professional architects and landscape architects. They are preparing the general plans for the development of the national parks and monuments, designing structures, making planting plans, and supervising all improvement work in the field from the standpoint of landscape protection. Notable projects under way are the restoration of grounds and gardens at Wakefield, the Carlsbad elevator station, the Mount Rainier Sunrise Ridge development, the Glacier Park-Many Glacier campground, the Crater Lake rim improvements, the Yosemite Glacier Point Highway and Valley restoration, the Colonial Parkway, and the clearing of the shores of Jackson Lake near Grand Teton Park.

The engineering division at San Francisco literally has hundreds of jobs in progress. It bought $348,000 worth of equipment during the year and the construction projects which it aided or supervised involved a total expenditure of $1,800,000. Among its more important undertakings are the High Sierra Trail in Sequoia Park, the Carlsbad elevators, the Hot Springs water impounding and distribution system, the Wind Cave electric and water systems, the Sunrise Ridge power plant, water system, parking area, and camp grounds in Mount Rainier Park, the Crater Lake electric system, the Mesa Verde well drilling for water, preparation of the Yorktown Battlefield for the sesquicentennial celebration, and many roads, trails, and buildings of unusual interest and value. There are 34 permanent employees in the engineering division, not counting resident engineers in several large parks.

The new Branch of Research and Education established just before the submission of my last annual report was expanded during the year by the addition of a park historian in the Washington office, and a widely known naturalist in the field.

Great strides were made in the extension of our educational activities. The museum on the shore of Lake Yellowstone and the Trailside Museum at Obsidian Cliff showing columnar basalt and obsidian, both in Yellowstone, were completed under funds made available by the Rockefeller Foundation. The Sinnott Memorial in Crater Lake National Park, authorized by Congress in memory of the late Representative N. J. Sinnott, for many years chairman of the House Public Lands Committee, was completed during the summer and dedicated by the congressional committee on July 16. The Rocky Mountain Park information office and museum was put in service, and at Petrified Forest and Casa Grande monuments new administration buildings to contain museum departments were authorized and are under construction.

The grand total of contacts made through the educational staff was 2,813,821.
The National Park Service cooperated notably with the United States Yorktown Sesquicentennial Commission in preparing for the sesquicentennial celebration by handling all of the construction work at Yorktown and taking over the details of purchasing, disbursing, and accounting for funds. This has placed an extra burden on the Washington office, both through the detail of certain of the personnel to Yorktown and also by the assistance furnished in general planning and supervision and the assuming of such special duties as handling the details of printing.

Excellent results have been attained in the development of the George Washington Birthplace National Monument at Wakefield, Va., established last year. The rehabilitation of the birth house and ancient kitchen was completed, and plans made for the planting of colonial gardens. It is planned to have this entire development completed before the commencement of the George Washington bicentennial celebrations.

The designation of the Eastern National Park-to-Park Highway last April was an important milestone in eastern park and monument developments. This highway connects the Great Smoky Mountains National Park, the Colonial and George Washington Birthplace National Monuments, and the proposed Shenandoah and Mammoth Cave National Parks.

The Mather Memorial Parkway in the State of Washington, through the efforts of the Rainier National Park Advisory Board and State and national cooperation, is now a reality. This is especially gratifying since the project is one in which Director Mather took a keen personal interest during the last months of his service activity. A bill signed March 4 authorized a memorial to Mr. Mather in the park system of the District of Columbia.

I am very proud of our low fire record, for we have gone through a year of grave hazard, due to the cumulative effects of one extremely dry summer followed by another, with the intervening winter one in which the precipitation in the northern parks was only about half the average. Considering these conditions, and the fact that fires have raged in country adjacent to the national parks, conflagrations have been held to a minimum within park boundaries. Although the expenses incurred in fire fighting were much above the normal, they are far below what they would have been in such an unusual season were it not for the intensive study and development of fire prevention and suppression methods during the past few years.

INSPECTIONS OF THE NATIONAL PARK AND MONUMENT SYSTEM

Under the leadership of the acting chairman, Hon. Frank Murphy, of Ohio, the subcommittee of the House Appropriations Committee in charge of the Interior Department appropriation bill made two western trips after the adjournment of Congress on March 4. On the southwestern trip in April and May the committee inspected the Mammoth Cave project, Hot Springs, Carlsbad Caverns, Mesa Verde, and Grand Canyon National Parks, and the Aztec Ruins, Petrified Forest, and Casa Grande National Monuments. Senior Assistant Director Demaray accompanied the party.
OFFICIAL INSPECTION OF NEW SEWAGE SYSTEM IN YOSEMITE VALLEY, YOSEMITE NATIONAL PARK

TUNNEL ON NEW WAWONA ROAD IN YOSEMITE NATIONAL PARK, 4,230 FEET IN LENGTH, IS NOW NEARING COMPLETION
GENERAL VIEW OF YORKTOWN, SHOWING THE CENTENNIAL MONUMENT AND 
THE SHORE OF THE YORK RIVER

SCENE AT CELEBRATION FIELD DURING THE SESQUICENTENNIAL OBSERVANCE 
OF THE SURRENDER OF CORNWALLIS AT YORKTOWN
On its second trip I joined the committee, which visited, in June and July, Rocky Mountain, Zion, Bryce Canyon, Grand Canyon (North Rim), Sequoia, General Grant, Yosemite, Lassen Volcanic, Crater Lake, Mount Rainier, and Mount McKinley National Parks. Illness held me in Alaska when the committee returned to the States, but its members visited Grand Teton Park and the Sunrise Ridge section of Mount Rainier Park before turning home in mid-August. Many Indian reservations and reclamation projects were also inspected on both trips. The Hoover Dam project was inspected July 3 en route to California.

The committee worked continuously, carefully studying the 1933 estimates on the ground, and gained a very comprehensive view of our plans of the present and future and our accomplishments in improvements already completed or under way. The members of the Appropriations Committee making one or both of these trips were Congressmen Frank Murphy, of Ohio; B. L. French, of Idaho; J. W. Byrns, of Tennessee; E. T. Taylor, of Colorado; and W. W. Hastings, of Oklahoma. Several members of the Public Lands Committee of the House also made the trips just described. They were Congressmen Don B. Colton, of Utah; A. T. Smith, of Idaho; Scott Leavitt, of Montana; and W. R. Eaton, of Colorado. Congressman Robert Luce, of Massachusetts, made the entire second trip and Floor Leader Tilson was in the party from time to time, especially in the national parks of the Southwest.

In addition to the parks visited with the committee I also inspected Hot Springs, Great Smoky Mountains, Grand Teton, and Yellowstone National Parks, the Shenandoah project, and George Washington Birthplace, Colonial, Scotts Bluff, Colorado, and Muir Woods National Monuments.

Several members of the Special Senate Committee on the Conservation of Wild Life Resources visited Mount McKinley, Yellowstone, and Grand Teton Parks. The Senators visiting one or more of these national parks were Chairman F. C. Walcott and Senators Peter Norbeck and Key Pittman.

Inspections by the Secretary have been mentioned. The First Assistant Secretary and the Assistant Secretary visited several parks while on official tours. The Secretary of Agriculture inspected road construction in many of the large western parks.

Representatives of foreign countries interested in the promotion of national parks abroad also visited several of the major national parks. Notable among these were their royal highnesses, the Prince and Princess Takamatsu of Japan, who visited the Grand Canyon and Yosemite National Parks. They expressed amazement at the degree of perfection attained by the National Park Service in preserving the parks, while at the same time making them so thoroughly useful to great numbers of people. Another source of comment was the diversity of accommodations provided for visitors. His royal highness was particularly interested in the campgrounds, since camping is quite foreign to Japanese civil life.

Following the royal couple, the Hon. Mamoru Kishi of Tokyo, Japan, a member of the Nippon Parliament, with Mrs. Kishi, visited the United States by order of the Japanese Government for the specific purpose of studying the national parks. The Japanese
Diet at its last meeting passed laws designating five areas as national parks, and in this connection wished to gain a thorough understanding of the national-park system of the United States. Plans and photographs of national-park buildings, bridges, and roads were furnished Mr. Kishi, through the Japanese consul at San Francisco.

In discussing his impressions at the headquarters office in Washington, Mr. Kishi stated that he believed the success of our national park system was due to the high caliber of its personnel, and expressed the belief that if the national parks of Japan were to be developed successfully, leading citizens of Japan must take a serious interest in them, entering the new Japanese park service even at personal sacrifice if necessary.

**NATIONAL PARK STANDARDS**

The high standards governing national park establishment and protection were strengthened both administratively and from the standpoint of legislation during the past year.

Two bills enacted into law had a very definite influence on standards. One was H. R. 8534, approved by the President on March 3, 1931, which abolished Sullys Hill National Park in North Dakota and turned it over to the Biological Survey as a game preserve. This park had no place in the system, as it did not conform, in any respect, to established national-park standards. This law sets a precedent for removal of substandard parks from the system. While the Sullys Hill act does not deal with qualifications of new parks, by inference it effectively proclaims what ought not to be a national park.

The other measure was Senate bill 196, approved on January 26, 1931, the Nye-Colton Act, which "purifies" (if we may so express its function) the national park system. As certain of the parks were created, their organic acts contained authority for the Secretary of the Interior to grant certain privileges which, if granted, would have been inconsistent with the purposes for which the parks were established. For instance, mining was permitted in Grand Canyon and Mesa Verde National Parks; summer homes were permitted in Glacier and Lassen Volcanic Parks; and railroads might have been authorized in Lassen, Rocky Mountain, and Glacier. Many of these authorizations were repealed by Senate bill 196, thus placing the national parks affected on a par with others to which such executive discretion did not extend. It does not, however, bring all of the national parks under exactly the same degree of protection. For example, grazing, under the National Park Service act of August 25, 1916, may be permitted in any park except Yellowstone, mining is still authorized in Mount McKinley, and use of farms and homes is allowed in the Great Smoky Mountains Park under certain circumstances.

Our ideals contemplate a national park system of primitive lands free from all present and future commercial utilization, but, like all ideals, they can not be uniformly attained in this day and age. New
national parks are likely to be few in number. In regard to them, there is no reason to believe that it will be any easier to secure ideal organic acts establishing future national parks than it was to attain the ideal in earlier legislation. The Yellowstone Park act set up at once the ideal park. There were a few others, including Zion, Bryce Canyon, and Carlsbad Caverns, but most of the greatest of our parks were created by acts of Congress which met one or more local requirements, either real or fancied.

In the few remaining park projects involving the public domain, there can be no doubt about the advisability of adding their lands to the system. If park status is not accorded them soon it will be too late to do so. In each case the scenic features are outstanding and the project is in every way worthy, but there may be, and probably will be, a local requirement inconsistent with the ideal park that must be met. We take the position that it is better to bring these areas into the system on this basis than leave them with all their natural glory to subsequent general utilitarian exploitation. Such a policy is exactly the one that Congress followed in establishing the present national park system. The same policy has been followed by Canada and other nations. Any other system would probably have netted us just one park, the Yellowstone. Moreover, any other policy, strictly applied to existing parks, would require fatal delimitation of boundaries in order to exclude small areas affected by commercial development prior to the park establishment or under some provision of the organic act. An example is the Sherburne Lake and Two Medicine Lake districts of Glacier Park, both encumbered with irrigation reservoir easements. Another is Grand Canyon, which still harbors mining claims not yet passed to patent.

Other steps taken during the year to strengthen our protective policies in line with maintenance of park standards were announcements clearly stating our stand on control of predatory animals, setting forth our rules against extermination of any species of wild life and against use of poison, and also our restrictions in use of steel traps. We further broadcast our policies on exotic species of flora and fauna, and particularly directed that so far as possible exotic plants in private gardens in parks and monuments be eliminated. Importation of exotic animals and fish, of course, is prohibited. Additional policy statements in line with our ideals will be ready during the coming year.

LAND PHASES OF NATIONAL PARK AND MONUMENT ACTIVITY

Consolidation of the present national park and monument system through the acquisition of alienated lands at strategic locations within their confines and park extensions has been the outstanding feature of the land activities of the National Park Service during the past year.

No new parks were established. In fact, the number of national parks under the administration of the service at this writing is one less than last year, due to the elimination of Sullys Hill. There are now 22 national parks, with a total area of 12,542.46 square miles, or 8,027,216.36 acres.
NEW NATIONAL MONUMENTS

Two new national monuments were established, bringing the number now administered by the National Park Service to 34. The combined area of all monuments in the system under the service is 6,394.31 square miles, or 4,092,363.28 acres.

The Colonial National Monument was established by presidential proclamation on December 30, 1930, in accordance with legislative authority granted the preceding July. Already 1,960.76 acres of land in the area have been acquired. Practically all the lands acquired are in the Yorktown Battlefield area, where the sesquicentennial anniversary of the surrender of Lord Cornwallis, commander of the British forces in the culminating battle of our war for independence, will be celebrated October 16 to 19, 1931. A small tract of land on Jamestown Island is now government-owned, and as opportunity offers and funds are available, it is planned to acquire further areas on the island, in Williamsburg and Yorktown, and along the connecting parkway.

The State of Virginia had made an appropriation of $100,000 for the purchase of Jamestown Island for donation to the United States as its contribution to the Colonial National Monument. Unfortunately, the condition of the State treasury, due to the financial depression, was such that it was impossible for the governor to comply with the provision that he must certify to the comptroller, in writing, that the payment of the State appropriation would not, in his judgment, create a deficit in the general funds of the State treasury. This, of course, he could not do at this time. He has assured the National Park Service, however, that an item of $100,000 for this purpose will be placed in the next State budget and will have his hearty support.

The Canyon de Chelly area of 83,840 acres was given national-monument status by presidential proclamation dated April 1, 1931. Canyon de Chelly not only contains ruined cliff dwellings considered by archeologists as among the most important so far discovered in the Southwest, but it is also remarkable from a scenic standpoint, because of its interesting wall sculpturing and unusual coloring.

ACQUISITION OF ALIENATED LANDS

The work of eliminating private holdings within national parks and national monuments was continued and excellent progress made. A million dollars was made available for the purchase of such holdings in the 1931 appropriation act. Of this, $200,000 was made available immediately, with authority to expend it in full payment of the emergency purchase of certain lands, with the understanding that the funds later would be matched on a 50-50 basis by subsequent donations. The remainder was to be spent only when matched by equal amounts of donated funds. The 1932 appropriation for land-purchase purposes is approximately the same as that for 1931.

Before reporting on land matters of the past year, I wish again to register a vigorous protest against a land acquisition policy which demands that the land-purchase fund be met on a 50-50 basis by private funds. The generosity of private individuals in aiding in the purchase of these lands is greatly appreciated by Government
officials and conservationists generally, but the service should not be placed in the position of having to solicit funds from private individuals for this purpose. The acquisition of these lands is vital to the efficient and economical administration of the national parks and monuments, and should be treated as a Government administrative problem. At this point I also want to stress the fact that there are a great many other vitally important private holdings remaining in both the parks and monuments which should be acquired without further delay.

In line with the above recommendation, the National Park Service is making a thorough survey of the alienated land situation and will soon have worked out a definite program of land purchases. At the present time it is estimated that there are 95,138.60 acres of alienated lands in all of the national parks and monuments.

Meanwhile, during the fiscal year ended June 30, 1931, private land purchases involved 81 separate transactions at a total expenditure of Government funds amounting to $749,204.86, and brought 8,917.82 acres of land into Government ownership. By the end of the 1931 fiscal year all of the 100-per-cent money, both for the 1931 and 1932 fiscal years, had been spent or allocated. The incurring of obligations against the remaining balance of 50-per-cent money, amounting to $548,915.27, will be deferred to future years as a measure of cooperation in the President's economy program.

Yosemite.—The acquisition of the Cascade property in Yosemite National Park was one of the most important purchases of the year, since it marked the final elimination of all private lands on the floor of Yosemite Valley. Negotiations were also conducted for the acquisition of several other important tracts of land in this park, but none of these were actually consummated.

Another Yosemite project of importance involves certain private lands in the Wawona region just outside the park, for which negotiations are now in progress under authority granted in the appropriation act of 1932. Further authority was given for the addition of these lands, when purchased, and 5,664 acres of public lands in the vicinity, to Yosemite National Park by presidential proclamation. Topographically this area belongs in the park. Its addition will afford better game protection and will also protect the Wawona-Mariposa Road now under construction.

Rocky Mountain.—Rocky Mountain National Park profited by the elimination of private ownership of the Horseshoe Inn property. Negotiations for acquiring three other holdings which are seriously affecting park developments are in progress. Because of the many private holdings within the authorized boundaries of this park, it may be many years before they can all be extinguished and the boundary lines properly worked out.

Glacier.—Efforts were continued to relieve the situation in Glacier National Park, where the many private holdings have always more or less handicapped administration. As reported last year, it was found necessary to allot $198,000 out of the $200,000 of the 100 per cent funds to acquire private holdings about the south end of Lake McDonald. This year, out of the 1932 appropriations, approximately $55,000 of the 100 per cent fund has been allotted for this purpose. When all deals under these allotments have been con-
summatized, the menace to park administration in the Lake McDonald region will have been largely removed.

Despite these accomplishments, there still remain many sections in Glacier National Park where private holdings require immediate acquisition to prevent damage to important scenic areas and to insure proper control of the park.

Zion.—Eight different properties, totaling nearly 660 acres, were purchased in Zion National Park. These lands were located at the mouth of Zion Canyon and controlled the park entrance. All unsightly structures are now being removed or razed. The service acknowledges with keen appreciation the cooperation of Mr. Carl R. Gray, president of the Union Pacific System, and his associates; also the assistance of the officers of the Mormon Church in Utah, and the individual families who had resided on these holdings for 35 to 50 years.

General Grant.—In General Grant National Park, $20,000 from 100 per cent funds was expended in the purchase of 20 acres of land which had been subdivided into town lots. The money expended in this instance was returned to the Government in full by the saving of an equal amount of road construction funds through the alignment made possible by public ownership of this tract.

Grand Canyon.—In addition to the privately owned lands acquired throughout the system, some State lands within the boundaries of the Grand Canyon National Park were exchanged for lands on the public domain. The State still owns 24,599.27 acres within the park and it is hoped these will be covered by lieu land selections as rapidly as possible.

There are only a few privately owned lands in the Grand Canyon National Park, but these are located along the Rim Drive and are proving very troublesome. One holding in particular has become a definite nuisance through the erection of galvanized iron structures and the placement of signs thereon. Unless it becomes possible to acquire this property it may be necessary to relocate the drive, at heavy expense, in order to insure proper landscape development and afford visitors a view of the type of scenery they expect to see in the national parks.

**ADDITIONS TO EXISTING PARKS AND MONUMENTS**

The following additions to national parks and national monuments were made during the year to round out these areas from the standpoint of satisfactory natural boundary lines and to add desirable lands:

Mount Rainier.—Through an extension of the east boundary line of Mount Rainier National Park to follow along the ridge of the Cascade Mountain Range, 34,000 acres were added to the park under congressional authority of January 31, 1931. The top of the mountains makes a natural boundary line between the national park and national forest, and puts the entire watershed on each side in control of one administrative unit.

The inclusion of this new section makes possible the location of a new scenic highway to connect the present park development at Longmire in the southeastern portion of the park with the develop-
ment in the Sunrise area in the northeastern corner. This project has already been approved, the location studies made, and contract let for the construction of the first short section of the road. This new highway, after leaving Longmire, will pass by the Reflection Lakes, down to Stevens Canyon, over the Box Canyon of the Muddy Fork of the Cowlitz River, and then up over the Cowlitz Divide and down into the Ohanapecosh River Basin. From there the highway will continue up the valley to the newly designated Stephen T. Mather Memorial Highway.

Bryce Canyon.—Through congressional action, based upon a special bill worked out in cooperation with the Forest Service and the General Land Office, 22,068.52 acres were added to the Bryce Canyon National Park and 1,266.72 acres of park land restored to national-forest status. The area of the park is now 35,240.08 acres.

Wind Cave.—The boundary lines of the Wind Cave National Park were extended by act of Congress dated March 4, 1931, to include several springs and a right of way for a water main, in order to insure the development of an adequate water system. The total area of the park is now 12,095 acres.

Acadia.—Steady progress has been made in adding land to Acadia National Park. A total of 1,379.30 acres was acquired during the year by private parties and turned over to the Government without cost, bringing the park area up to 11,500 acres.

Monument additions.—By presidential proclamation 11,010 acres were added to the Petrified Forest National Monument, 8.68 acres to the Aztec Ruins, 1,926.35 acres to the Pinnacles, and 1,609,600 acres to the Katmai National Monument.

PENDING BOUNDARY PROBLEMS

There still remain before the National Park Service several important boundary adjustments which should receive favorable consideration in the early future to facilitate good administration and preserve areas of national-park caliber. Prominent among these are the following:

Carlsbad Caverns.—From time to time lands have been withdrawn for study as to the desirability of adding them to the Carlsbad Caverns National Park by presidential proclamation in accordance with existing congressional authority. It is planned this fall, after the close of the tourist season, to have all Carlsbad withdrawals carefully studied so that a definite recommendation may be made to the department as to the lands needed there for park purposes.

Grand Teton.—Last year’s annual report outlined at some length the work that has been done by the Snake River Land Co., a corporation organized by Mr. John D. Rockefeller, jr., to purchase and manage ranch properties in the Jackson Hole, pending their final transfer to the United States for park and game-preserve purposes. Over 30,000 acres of these lands are now ready for transfer to the United States for addition to the Grand Teton National Park when Congress shall have enacted the necessary legislation.

Yellowstone.—The final report of the Yellowstone Boundary Commission, based on inspections of areas involved in the proposed adjustment of the southeast, south, and southwest boundaries of Yel-
lowstone National Park, was submitted to Congress by the President and printed as a congressional document.

The retention of the Bechler River Basin in the park was definitely recommended by the committee in this report.

It further recommended the addition to the Yellowstone of about 52,480 acres of land directly south of the extreme eastern portion of the park. A minority report submitted by one member agreed with the report as a whole, except that it recommended the addition of the entire Yellowstone River Basin of 217,600 acres to the Yellowstone. This proposed addition would extend the eastern and southeastern boundaries of the park to the Great Continental Divide, making a natural boundary line.

The main report, while recognizing the scenic value of the entire proposed addition, does not recommend the inclusion at this time of the land to the east of the present boundary of Yellowstone Park on the grounds that hunting in this area should be continued under State game regulations.

Grand Canyon.—Conferences were continued during 1930-31 with officials of the Forest Service in an endeavor to arrive at an agreement in boundary adjustments for Grand Canyon National Park. Changes on both the north and south rims are very desirable, in order to bring within the park additional range for the protection and preservation of the native wild animals and also certain areas of native plant life which should remain undisturbed.

A study was made of this area during the past summer by Maj. R. Y. Stuart, chief forester, and it is hoped that a boundary agreement may be reached this fall, and the recommendations thereon presented to Congress through the Departments of Agriculture and Interior.

Kings River.—Further study was made during the year of the project to give the Kings River Canyon park status as a new park which would absorb the existing General Grant National Park. The general consensus of opinion at the present time seems favorable to this project.

The only opposition comes from the Kings River Water Association, a voluntary organization formed to supervise the distribution of the supply of water from the Kings River in accordance with established rights, and to initiate and carry on any activities relating to Kings River water matters. The need for such an organization, and the importance of its work, can be fully appreciated only by those who understand the irrigation problems of the farmers of California’s inland valleys and the constant menace of drought conditions that hangs over them.

I personally met the officers of the association just before the close of the 1930 travel year and at that time discussed the park project in detail. Again last July, accompanied by Superintendent White, of Sequoia National Park, and Representative H. E. Barbour, in whose congressional district the area lies, I met the irrigationists and went still more fully into the matter. There is a general feeling of optimism on the part of the proponents of the Kings River Park plan that this new park will shortly be added to the system.
VIEW LOOKING NORTHWARD THROUGH NORTH PORTAL OF PTARMIGAN WALL TUNNEL, GLACIER PARK

NEW ENTRANCE HIGHWAY, MESA VERDE NATIONAL PARK
NEW TRAIL LEADING TO ENTRANCE TO CARLSBAD CAVERNS

OLD TRAIL LEADING TO CAVERN ENTRANCE
Great Smoky Mountains.—Since the assumption of administration and protection of the 158,876.50 acres of land in the Great Smoky Mountains area that were transferred to Federal jurisdiction by the States of North Carolina and Tennessee in February, 1930, excellent progress is reported in the acquisition of lands by the two States, although no further transfers to the Federal Government were made during the past year.

Informal advices at this writing indicate that title to approximately 170,000 more acres will be transferred to the United States very soon for addition to the present limited Great Smoky Mountains National Park. When this is done, approximately only 100,000 acres more need be acquired to supply the minimum necessary for development of the park. The statute provides that no developments, such as exist for the accommodation of visitors in the western parks, can be undertaken in the Great Smoky Mountains Park, until a minimum area of 427,000 acres has been accepted by the Secretary of the Interior. The lands must be within the boundary lines specified by the Secretary, after a thorough investigation by experts of the National Park Service, and the area must be one contiguous whole, with no private holdings remaining in it.

Great credit is due the commissions of both North Carolina and Tennessee for the able manner in which they have surmounted the many unexpected obstacles which have confronted them with a minimum of friction and without precedents to guide them. Upon their request the service has endeavored to cooperate wherever it possibly could with the responsible State authorities.

Supt. J. Ross Eakin, formerly of Glacier and Grand Canyon National Parks, was transferred to the Great Smoky Mountains Park during the winter and already has done much to expedite plans for future work. It is expected that within a month or six weeks it will be practicable to send engineers and landscape architects into the area to make preliminary plans and studies. All this will expedite the development of the area as soon as such development is authorized.

PARK AND MONUMENT PROJECTS

Outstanding among the park projects before the National Park Service are those in the East which have received congressional sanction, and whose establishment awaits only the meeting of certain conditions, primarily those regarding the acquisition of the necessary lands, laid down by Congress.

Since the Great Smoky Mountains area has passed the project stage and now is listed among the national parks, although still limited in status, it will not be discussed here. For information regarding it, see page 57.

Shenandoah project.—The State of Virginia, having secured, through its commission on conservation and development, a decision from the courts that the special law for acquiring the lands within the boundaries of the tract of 327,000 acres prescribed for the proposed Shenandoah National Park was constitutional, has about completed the work of mapping and valuing these lands. It is confidently expected that by the early part of the year 1932 the commission will be in a position to estimate accurately the amount of acreage
that can be purchased with funds now available from both State and private sources.

Construction of the Skyline Drive along the crest of the Shenandoah Mountains in the proposed park area was undertaken under the emergency public works appropriation, in order that employment might be provided in this section of Virginia which suffered severely from the drought and where resultant unemployment created serious economic conditions. Fortunately plans for road work here could be completed in time to carry on the actual construction with the emergency funds, a condition which did not prevail elsewhere. Should another emergency fund be available for unemployment relief next year, and should land acquisition be far enough advanced in other proposed park areas, undoubtedly similar work will be undertaken in them.

Deeds from the State commission on conservation and development, covering the conveyance without cost of a right of way 100 feet wide and approximately 35.41 miles long, were accepted by the Secretary of the Interior on behalf of the United States for the construction of the new highway. In order to provide the utmost employment the work was divided into two contracts and is now in progress.

*Mammoth Cave project.*—At the request of the State authorities the Secretary of the Interior in November, 1930, had studied and designated the proposed boundary lines for the Mammoth Cave National Park project.

As this report is going to press the Mammoth Cave National Park Association reports that it has acquired clear title to approximately 20,000 acres of land in the proposed park area, including Mammoth Cave itself. The association also reports that it has anticipated revenue of $900,000, which it believes will be sufficient to purchase the remaining lands necessary for the consummation of the project. Land purchasing, it states, is progressing better than formerly.

With this excellent report before me I am hopeful that next year I may be able to report the establishment of the Mammoth Cave National Park.

*Isle Royale project.*—The establishment of the Isle Royale National Park in the State of Michigan, under conditions similar to those governing the eastern park projects, was authorized by act of Congress approved March 3, 1931. The area was studied during August of this year by Associate Director Cammerer, with a view to defining to the State of Michigan just what area should be acquired and tendered to the Government in order to consummate the project. The study was made concurrently with the initial official inspection by members of the Michigan Isle Royale National Park Commission, appointed by Governor Brucker to supervise the acquisition of the necessary acreage.

Following this inspection the Secretary of the Interior certified to the State of Michigan that Isle Royale and all the islands lying adjacent thereto, except Passage Island, should be acquired in this project. The members of the commission are Mr. James MacNaughton, chairman, of Calumet, Mich.; Mr. H. F. Harper, secretary, of Lansing, Mich.; Mr. Edsel B. Ford, of Dearborn, Mich.; Hon. William Alden Smith, of Grand Rapids, Mich.; and Mr. William H. Wallace, of Saginaw, Mich.
Everglades project.—Following the submission of my last annual report, in which was covered the inspection made of the Everglades park project in southern Florida, a favorable report thereon was submitted to Congress by the Secretary of the Interior. Efforts were then made to secure enabling legislation from Congress. The bill passed the Senate, but did not pass the House of Representatives before the termination of the last session. It is understood that similar legislation will be introduced during the coming session, and I earnestly hope that it will receive favorable action and approval. It is a meritorious project of importance to the whole Nation.

INVESTIGATIONS OF PROPOSED PARKS AND MONUMENTS

Eighteen national park and monument projects were investigated during the past year by members of the service staff and reports made thereon to the Washington office.

Despite this progress, at the present time 55 of the national-park projects and 44 proposed national-monument projects await investigation by service experts. While it is believed that many—probably the great majority—of these will not measure up to the high standards of national park and monument establishment, nevertheless it is felt that in justice to the proponents of the projects they should be investigated thoroughly. Most of the investigations of the past year have been made by Roger W. Toll, superintendent of Yellowstone National Park and expert on park and monument standards.

The following is a list of the projects investigated during the year ended June 30, 1931:

Proposed Apostle Island National Park.—Northern Ashland and Bayfield Counties, Wis., along south shore of Lake Superior.

Proposed Bandelier National Park.—Northern New Mexico, including the present Bandelier National Monument now being administered by the United States Forest Service. It now appears that this area should come to the National Park Service as a national monument.

Proposed Death Valley National Park.—East central California.

Proposed Desert National Park.—Several areas have been studied in the Southwest in an effort to locate a typical desert area for national park or monument purposes.

Proposed Everglades National Park.—Southernmost tip of Florida in Monroe, Dade, and Collier Counties. The department has reported favorably to Congress on this project.

Proposed Isle Royale National Park.—An island in the north central part of Lake Superior. Legislation authorizing the establishment of this park has been enacted.

Proposed Kolob Canyon National Park.—Southwestern Utah, near Zion National Park. This area can be made a part of Zion National Park.

Proposed Menominee National Park.—Within the boundaries of the Menominee Indian Reservation.

Proposed Moapa Valley National Park.—In Clark County, Nev., north, south, and west of St. Thomas.

Proposed Navajo National Park.—A section of the Painted Desert; segregated interesting features in the Navajo Indian Reservation and in southern Utah and Arizona. The area includes the Rainbow Bridge National Monument.

Proposed Ozark National Park.—Southwestern Missouri and northwestern Arkansas.

Proposed Upper Mississippi National Park.—Mississippi bottom lands, river bluffs, and natural prairie lands, between Bellevue, Iowa, and Lake Pepin, Minn.

Proposed Comstock Lode National Monument.—Virginia City, Nev.
Proposed Fort Atkinson National Monument.—Winneshiek County, Iowa.
Proposed Great Sand Dunes National Monument.—Partly within the San Isabel National Forest.
Proposed Meteor Crater National Monument.—Near Winslow, Ariz.
Proposed Tower Rock National Monument.—Small island in the Mississippi River about 100 miles south of St. Louis.
Proposed Virgin National Monument.—Lands surrounding the Hoover Dam and Reservoir, Arizona.

EDUCATIONAL AND RESEARCH DEVELOPMENTS

The new Branch of Research and Education in the Washington office, established just before the preparation of my 1930 annual report, was engaged during the year primarily in directing the improvement of educational programs in the parks, including greater service to the public in the way of lectures and field trips.

Necessarily in its first year of work the greater part of the endeavors of the Branch of Research and Education were directed to field personnel matters, including assisting the Civil Service Commission in oral examinations.

The personnel of the branch was augmented by the appointment of Verne E. Chatelain as chief historian on September 10. Mr. Chatelain comes to the service well equipped, through his many years of experience, to supervise the service's activities, many of them new, dealing with history and archeology.

Joseph S. Dixon, an able student of animal life, who has been engaged on a wild life survey of the national parks, personally financed by George M. Wright, was placed on a permanent basis as field naturalist. His connection with the wild life survey will remain unchanged.

With the establishment of the Colonial National Monument a new program dealing with the colonial history of the United States was initiated. Two assistant park historians were appointed at the monument to carry forward plans for interpreting colonial history to its many visitors. The forthcoming sesquicentennial celebration of the surrender of Cornwallis at Yorktown will afford a fine opportunity to test the usefulness of this new program.

The George Washington Birthplace National Monument and several of the southwestern monuments deal directly with history and need historical programs of a kind similar to that being worked out for the Colonial National Monument.

The Educational Advisory Board continued to give helpful advice on difficult problems. A meeting held on February 21, 1931, recommended further museum development in Mount Rainier, Glacier, and Grand Teton National Parks, legal provision for a trust fund committee to handle endowment funds, new and improved relief maps for use in the various parks, and the change of the name "Branch of Education" to "Branch of Research and Education." Funds are being sought to carry out such of these recommendations as require financial outlay.

Dr. John C. Merriam, chairman of the board since its establishment, resigned this position during the year because of increased work in other activities. Dr. H. C. Bumpus, of the American Association of Museums, was appointed to the chairmanship. Mr. Waldo G. Leland, a historian of high standing, was appointed to fill
the vacancy on the board caused by the resignation of Doctor Merriam.

A forward step in organizing the field naturalist work was the appointment of an experienced park naturalist to cover the southwestern monuments. Most of his time during the summer was devoted to the Petrified Forest National Monument, but plans for organizing ranger naturalist work in the other monuments will be developed during the coming year.

THE EDUCATIONAL PROGRAM IN THE PARKS

Educational programs were augmented in practically all of the parks. With the appointment of a park naturalist in Hawaii National Park, work here took on an organized aspect. Likewise in Lassen Volcanic National Park the responsibility of developing a program was fixed and a beginning made. Rocky Mountain National Park for the first time started evening lectures and formulated a program with the appointment of a permanent park naturalist. Campfire programs were begun in Grand Teton National Park and this feature received impetus in practically all of the parks.

Auto trips guided by naturalists, often called auto caravans, continued to hold the spotlight as a new development with great appeal to the public. One caravan, starting at Old Faithful in Yellowstone, contained more than 300 cars and more than 800 persons.

Plans have been formulated to establish naturalist work in Acadia and Carlsbad Caverns National Parks.

Attendance records indicate that for the first time more contacts were made in those parks furnishing educational programs than is represented by the travel records for those parks (see graph on page 139). Field trips to the number of 4,613 were offered with a total attendance of 218,830, of which auto caravans took care of 77,004. Lectures, 6,604 in number, attracted 1,105,354 persons. When museum attendance is added, the grand total of contacts made reached 2,513,821.

MUSEUMS

Though final construction, including landscaping, of the Fishing Bridge Museum in Yellowstone was not completed, the bird room and the geology room were opened to the public early in August. The biology room will not be ready until next summer. "Related story" exhibits have been made a feature of the bird groups. In addition to mounted specimens of the diving birds there are diagrams and explanations of the anatomy which makes these birds excellent divers. Flight mechanism is explained as a "related story" exhibit to the pelican group. Relief maps and diagrams with simple text, prepared by Dr. E. J. Raisz of Columbia University, make plain the geologic story of this region.

The Trailside Shrine at Obsidian Cliff was also opened to visitors. Built of basalt in rustic style, this station is designed to be helpful to every person who wishes to know the origin and interrelations of volcanic glass.

The attractive stone building constructed on the rim of Crater Lake, as a memorial to Representative Nicholas J. Sinnott, of Oregon, from funds appropriated by Congress, was completed dur-
ing the year and dedicated to public use on July 16, 1931, by mem-
bers of the House Public Lands and Appropriations Committees.
The building with its broad parapet looking out over the lake serves
as an orientation point for all park visitors. A gift of $5,000 from
the Carnegie Institution of Washington has made possible the in-
stallation of instruments and exhibits which will assist the visitor
in interpreting the geologic history of Crater Lake. As at Yavapai
Station in Grand Canyon, telescopes, specimens, and diagrams will
make the geologic story clear. Dr. John C. Merriam, president of
the Carnegie Institution of Washington, who is supervising the in-
stallation of exhibits, spent some time in Europe seeking ways and
means of providing the public with interpretative materials. In-
stallations will not be complete until next year.

The information office and museum erected in Rocky Mountain
National Park with Government appropriations was completed and
opened for use early in the summer. Among its exhibits are some
fine habitat groups of local birds and small mammals donated by
the Jonas Brothers, noted taxidermists of Denver. The Colorado
Museum of Natural History cooperated in securing specimens and
in the preparation of accessories to the groups.

At Mariposa Grove of Big Trees, in Yosemite National Park, the
old Galen Clark cabin was replaced with a new replica designed to
serve as a museum and information station. A relief model of
California at one end of the exhibit room indicates the position of
every important grove of giant sequoias.

The Tharp log, a hollow Sequoia log in Sequoia National Park,
which was being used by a pioneer as a home when John Muir vis-
ited that region, has been restored and contains many interesting
historical exhibits.

At the north rim of the Grand Canyon a small museum was estab-
lished in the tower room of Grand Canyon Lodge. This room was
very generously made available by the Union Pacific.

Through the generosity of the Hawaiian Volcano Research Asso-
ciation and Hui O Pele funds, an excellent structure of volcanic
rock and metal has been constructed at Uwekahuna Bluff. It con-
sists of a large lecture room, approximately 50 by 25 feet, with
adjoining small rooms for office and photographic laboratory space,
and a museum room 40 by 20 feet, adjoining which is the seismograph
room.

The museum at Longmire Springs in Mount Rainier National Park
has been remodeled and the displays greatly augmented and im-
proved. The University of Washington made several donations to
the new arrangement of exhibits.

Exhibits in the temporary museum at Grand Teton National Park
received new arrangement, and many pioneer relics have been added.

With the completion of the combined new administration building
and museum at Petrified Forest National Monument this winter, there
will be need for the installation of exhibits to portray the geologic
history of this region and to display specimens already assembled in
the temporary museum. A museum wing in the new administration
building at Casa Grande National Monument will also be ready for
occupancy.
At present there is little of interest to the visitor at the Dinosaur National Monument in Utah. Plans now being developed, however, will make this monument of outstanding interest. The plan includes the embossing of an actual skeleton of a dinosaur on the rock wall, the proper housing of it, and the building of roads, trails, and camp grounds. A special committee has looked over the situation on the ground and a cooperative plan has been developed whereby the American Museum of Natural History will do the excavation necessary and the Park Service will handle construction details.

UNIVERSITY FIELD CLASSES

Use of national parks by field classes appears to be on the increase. Oftentimes such trips are to the nearest park, but in some instances a tour is made of many parks with emphasis on ecological studies. Clark University and Western Reserve University parties visited a number of parks, the latter group numbering more than 60. The Princeton geology party under Doctor Field again visited several national parks. The University of Montana summer-session party spent three days in Glacier National Park under the leadership of Dr. Charles H. Clapp. The Universities of North Carolina and Missouri sent parties into the national parks, as did a number of teacher colleges. In Hawaii National Park a summer field course was initiated under the direction of Prof. Theo. C. Zschokke, extension forester, University of Hawaii.

Yosemite School of Field Natural History

From more than 80 applicants, 20 students were chosen—14 men and 6 women—for the seventh session of the Yosemite School of Field Natural History. The school is taking on more and more a national aspect. The 1931 class came from 11 different States, 9 hailing from east of the Rockies. Greater emphasis is being placed on this school as a training ground for those interested in National Park Service work. Consequently time is devoted to the ideals, policies, and administration of national parks. Dr. Ralph W. Chaney, paleontologist, and Prof. E. O. Essig, entomologist, from the University of California, helped in the instruction work.

Junior Nature School

The junior nature school, started in 1930 in Yosemite as a means of giving special instruction to children, was continued in 1931. Several parents stated they had settled down in the park for the summer because of the opportunity afforded their children. The results attained indicate that nothing is of more interest to children than the study of living things.

The numerous troops of Boy Scouts and Girl Scouts which visit the parks might well be considered special groups gaining knowledge of nature and nature's laws. These groups make continuous use of the naturalist service, both for leaders of field trips and for campfire talks. From the museum displays they gain much information found valuable in field studies.
FIELD HEADQUARTERS

Quarters furnished by the University of California have been made more adequate. More office room, a photographic dark room, and more storage space have been provided. The staff, in addition to routine, has concerned itself largely with plans and specifications for museum displays and in their actual installation. Senior Naturalist Hall spent several days in the Washington office and visited a number of eastern museums, where he secured fine advice and cooperation. A group of Eagle Scouts under his supervision aided in the development of a number of important displays in various parks. Installation of exhibits in Fishing Bridge Museum in Yellowstone was under the charge of Field Naturalist Carl P. Russell and was partly completed in the summer of 1931.

LIBRARIES

Small reference libraries are to be found in most of the major parks. In only a few instances, however, has it been possible to supply a public reading room. In Yosemite and Mesa Verde very attractive libraries are available in the museum buildings throughout the year. Yellowstone has developed a fine technical reference library much used by the staff, but thus far not open to the public. With the increase in use of the park educational facilities by field classes from colleges, universities, and high schools, it is becoming essential that complete reference libraries be available in all major parks. A committee of the American Library Association, headed by C. E. Graves, has made a survey of needs in the various parks and is planning important developments in this field.

NATURE TRAILS

The nature trail, carefully selected and marked, is proving an efficient method of helping visitors to get acquainted with interesting geologic and biologic features. There are many who prefer studying things quietly by themselves, and labeled rocks, trees, and plants make this possible.

In Yosemite National Park short trails have been built and labels placed to indicate the best locality in which glacial polish and strie may be seen. In Grand Canyon National Park rock formations, fossil footprints, and other important exhibits in place along the trail sides have been marked by enameled metal signs.

LIVE ANIMAL DISPLAYS

One of the prime features of the park continues to be the display of wild life. Wild bears to be seen at the bear-feeding platforms draw thousands of people. Tame elk, antelope, deer, and mountain sheep keep the amateur photographer busy. Wherever a close view of animals is possible there the park visitors foregather.

Two mountain lions and a paddock with elk still attract great numbers of people in Yosemite. Yellowstone's display of buffalo in a corral at Mammoth was much improved this past year by exhibiting both old and young animals. Eventually it is planned to have better quarters for this display. Exhibits of live reptiles were available for study in several of the parks.
THE FISHING BRIDGE MUSEUM, AUGUST 21, 1931

View from the south. Ranger-Naturalist's residence on extreme right.

ENTRANCE TO THE ROCKY MOUNTAIN MUSEUM

Administration building (background) contains laboratory and photographic dark room.
DISPLAY OF PUBLICATIONS IN SPANISH INDIAN CABINET IN MESA VERDE NATIONAL PARK MUSEUM PRODUCED INCREASED SALES

DETAILS OF INTERIOR OF MUSEUM AT ROCKY MOUNTAIN NATIONAL PARK
WILD FLOWER DISPLAYS

Experiment has shown that it is possible to exhibit wild flowers growing normally in a botanic garden and there is a tendency to develop this sort of display rather than the usual cut-flower show of wild flowers. Several successful gardens have been started. Another year will see a very extensive botanic garden of this type, the gift of Miss Marjorie Montgomery Ward, developed behind the Yosemite Museum.

SCIENTIFIC RESEARCH

Even with the continual help of other Government bureaus in attempting the solution of acute problems involving scientific advice, the problems have become so numerous that the National Park Service has found it necessary to undertake the solution of some of them itself. The intention is not to duplicate scientific work done elsewhere but to gather the scientific information necessary to the development of the museum, educational, and game administration programs of the national parks.

ANIMAL PROTECTION STUDIES

Joseph Dixon, field naturalist, George Wright and Ben Thompson, park naturalist aids, working under funds partly provided by Mr. Wright, have continued to gather data on the major animal problems of each park, to solve problems needing immediate attention, and to help in formulating general wild life policies. Special studies have been made of damage by deer, by bears, by porcupines. Because the trumpeter swan has been near extermination, the finding of several nesting pairs in Yellowstone led to careful studies of the means to be taken to give them better protection. District rangers are required to report all swans seen and local rangers regularly patrol nesting grounds so as to give the most careful protection to breeding birds. The Park Service feels that in giving special protection to the trumpeter swan it is fulfilling one of its major duties—that of helping to preserve for future generations the wild life of the Nation. The wild life survey has gathered data on 150 species of birds and 110 species of mammals, and at the same time has obtained 1,445 photographs which will become the basis for a progress report and for the contemplated wild life division needed to handle adequately the many problems which arise in the field. A full report of the wild life survey appears on page 148.

The cooperative elk survey supported by the Biological Survey, Forest Service, Montana Fish and Game Commission, and the National Park Service, has been continued. William Rush, in charge of the investigation, has worked out migration routes, life history, and forage requirements of the Yellowstone elk. His well-illustrated reports have been most helpful in fixing management policy. This work is proving so valuable to the Park Service that plans are being made to continue it. The Park Service continues to benefit by the work of Dr. O. J. Murie, of the Bureau of Biological Survey, who has continued studies of elk in Jackson Hole.
With the hope of learning more about earthquakes, experiments with artificial earth tremors were carried on in Yosemite National Park by a group of scientists working under the joint auspices of the Carnegie Institution of Washington and the California Institute of Technology. In one instance at the inner end of the new tunnel on the Wawona Road, several hundred feet underground, charges of several hundred pounds of dynamite were exploded and the vibrations set up registered on seismometers up to distances of several miles. Through these experiments data were gathered as to the velocity of earthquake waves in various kinds of granite, as to the effect of a vertical walled canyon on earthquake waves when they traveled at right angles, and as to the echo in the rock wave when reflected by granite.

On September 5 a special committee met in Santa Fe to formulate plans for an appropriate development program of the notable archeological resources of the recently created Canyon de Chelly National Monument. Taking part in the conference were Dr. Clark Wissler, curator-in-chief of the Division of Anthropology of the American Museum of Natural History; Dr. A. V. Kidder, chairman of the Division of Historical Research of the Carnegie Institution; Earl H. Morris, of the Carnegie Institution; Neil Judd, curator of archeology of the United States National Museum; and Consulting Archeologist Nusbaum. Unfortunately Superintendent Pinkley was taken ill on route to the conference and could not attend.

The plans, suggestions, and recommendations of this advisory committee, based on intimate scientific knowledge accumulated over an extended period of years, will form the basis of our future development plans for this monument.

Dr. W. R. Atwood, of our staff, undertook geological research in Glacier and Crater Lake National Parks during the season of 1931. In the latter park he secured evidence of three glacial stages separated by volcanic deposition. The direction of glacial striae were platted in an endeavor to picture past conditions and explain present-day ones.

Expert advice on entomological problems has been furnished by the Bureau of Entomology; on plant diseases and on forage for wild animals by the Bureau of Plant Industry; on animal life by the Bureau of Biological Survey.

Scientific studies by outside agencies and individuals have been many. Archeological research was continued in several of the southwest monuments. Dr. Herman S. Pepoon studied the flora of Great Smoky Mountains; Dr. Ira Edwards, of the Milwaukee Museum, the fossil trees of Yellowstone; Miss Elisabeth E. Morse, the fungi of Mount Rainier; Mr. and Mrs. John L. Sperry, the insect life of Rocky Mountain; Dr. A. E. Douglass, of the University of Arizona, the age of giant sequoias in Sequoia National Park; Dr. W. A. Setchell, of the University of California, the flora of Mount McKinley, where he collected 21 varieties of willow; and Dr. F. M. Fryxell, the geology of Grand Teton National Park. The National Park Service encourages such use of the parks as from these researches come concrete and dependable knowledge of their scientific features.
VISUAL EDUCATION

The demand for visual educational material has continued to grow and effort has been made to increase the material available for loan. Colored lantern slides now available for free distribution number 2,200, of which number 975 have been added during the year. Special coloring by an artist has produced many artistic slides. The park photographer has made many lantern slides from negatives. Seventeen reels of 32-millimeter film and 14 reels of 16-millimeter film are available for loan. Most of these reels have been donated to the service. Sound pictures are being requested by schools, clubs, and organizations desiring to feature the national parks in their programs. It is hoped that funds may soon be available for the production and distribution of such distinctly educational films. Universities, colleges, high schools, clubs, and various organizations throughout the country make constant use of this loan material.

With the transfer of the official park photographer, George Grant, from field headquarters to the Washington office, the photographic department is certain to prove far more valuable to the service and to the public. Mr. Grant has secured several thousand excellent negatives of the parks and is prepared to contribute much to the visual educational program. The service is now in possession of some 8,000 photographs, part of them catalogued and mounted.

Of great help in developing the visual educational work has been the $5,000 donated by the public-utility operators, to be used in purchasing necessary equipment and supplies and for defraying the salary expense for a clerk to assist in the upkeep of this material. The service has arranged to continue in 1932 the work which the operators made possible during the past year.

Through the generosity of Dr. Frank R. Oastler, the service has obtained numerous excellent motion pictures and colored slides of wild animals in the parks. Doctor Oastler has visited most of the parks, and with his ever-active camera has secured many unusual outdoor pictures.

ANIMAL CONDITIONS

Censuses of wild game are taken annually in each park. Figures indicate that animals are on the increase. (See table on p. 160.)

The herd of buffalo in Yellowstone continues to increase so that difficulty is found in disposing of the surplus animals to avoid over-grazing. Both the northern and southern herds of elk in this park wintered well and are increasing. The hay crop netted approximately 200 tons less than the preceding year which may handicap winter feeding. The number of antelope in Yellowstone has more than doubled in the last 10 years according to counts made, censuses for the last 2 years having shown a total of nearly 650 animals.

The situation relative to moose is most gratifying. These animals are seen more and more frequently along the roads in Yellowstone, not only cows and calves but also the bulls. Moose are particularly abundant in Grand Teton National Park and may be seen from roads and trails. At some of the feeding stations in Yellowstone as
many as 20 grizzly bears may be seen at one time. Black bears continue to be an annoyance to campers at times, but steps have been taken to remedy this. There has been apparently an increase of both kinds of bears.

Deer are enumerated in thousands in almost all of the larger parks. A tame herd has been established in Grand Canyon National Park through transplanting of fawns from the Kaibab Plateau, 15 having been added the past year. From a herd of 60 or more there was a fawn crop of about 16. Were it not for a lack of water the herd could be greatly increased. The small herd of antelope established in Grand Canyon National Park through the generosity of Dr. E. E. Brownell now numbers 19, but its growth has been disappointing and it may be the Tonto Plateau will prove unsuitable.

The mule deer of the Kaibab Plateau, which adjoins Grand Canyon National Park on the north, continue to present a problem. At the request of the Forest Service, a committee of nine men studied present deer conditions on the Kaibab. Mr. Joseph Dixon represented the National Park Service on the committee, and other Park Service men accompanied the party. The investigation covered a period of eight days, June 8 to 15. According to the committee's report, the area is still overstocked and much of the winter range has not recovered from overgrazing by deer. Recommendations included "urgent need for the reducing of the present number of deer," the elimination of stock in excess of permits, continued suppression of predatory animal killing, and "more coordination and cooperation among Federal departments concerned with the solution of biological and economic problems as affecting the management of Federal land and the plant and animal life produced thereon."

The variance in administrative policy within Grand Canyon National Park and the adjoining national forest has provided a difficult problem not yet solved to the satisfaction of those interested in preserving wild life as a tourist attraction. Park Service officials regret that the committee did not have more time to study that portion of the park adjoining the Kaibab Forest and determine definitely whether what appears to be an overgrazed condition of park lands is due to cattle which the Park Service is powerless to keep out of the park, owing to lack of fences, or whether this condition has been caused by the deer.

The Commission on the Conservation of Jackson Hole Elk, first organized in 1927 under the chairmanship of the late Charles Sheldon, held its last meeting in New York on December 3, 1930. Chairman Seth Gordon submitted his resignation and was succeeded by Mr. O. H. Van Norden, Camp Fire Club representative on the commission. The commission reiterated its support of the so-called Winter bill providing for the acquisition of additional hay ranches and winter feeding lands in the Flat Creek watershed of the Jackson Hole. A thorough discussion of the present status of the Jackson Hole elk herd, the scientific work that has been accomplished by the Biological Survey in connection with the management of the elk, and the relationship of the commission's land project to the Rockefeller purchases and Grand Teton Park extension, took place in the session that lasted the entire day. The Commission, which is composed of a.
representative from each of the conservation bureaus of the Government as well as members from several outside conservation societies and the State of Wyoming, was well represented at the New York meeting.

The reduction of the numbers of deer in Yosemite National Park by means of transportation to other portions of the park was successful in that less damage to vegetation is to be noted and in that a section of the park where deer were scarce has been repopulated. Fewer bears and cubs were seen and less trouble was experienced. It was necessary to “deport” from one part of the park to another only 14 bears this year as against 48 last year. The experiment of using a few selected dogs contributed measurably to a restraint of depredations by bears.

In Glacier National Park deer and elk wintered well and the fawn crop was large. Feeding was not necessary to keep the elk inside the park, nor were any elk killed by Indians. The count of moose in this park showed 142. Seventy head of mountain sheep were fed during the winter at Many Glacier. Mountain goats seen numbered 439. All in all, wild-life conditions in Glacier are favorable.

In Mount Rainier National Park a pleasing increase in the number of mountain goats has been noted. A band in Van Trump Park that numbered 30 head three years ago now contains 60 head, and like increases are reported for other portions of the park.

Mountain sheep are most numerous in Mount McKinley National Park. Airplane inspection and horseback patrol has resulted in an estimate of between 12,000 and 15,000 animals. Caribou vary in number from a few hundred in winter months to 25,000 during the migratory season. Moose and grizzly bears are thriving and are seen daily along the trails. Foxes, too, are common.

At Crater Lake National Park a colony of beavers was discovered just outside the park boundary, giving the hope that this park may also have an exhibit of these interesting animals.

In Zion National Park deer are gradually appearing on the canyon floor in large numbers. Mountain sheep are known to be on the canyon walls, and on the rim, and signs indicate probable increase in numbers.

In the Great Smoky Mountains National Park deer are exceedingly rare, leading to the belief that restocking will be necessary. It is thought that wild turkeys and ruffed grouse still persist in sufficient numbers to act as breeding stock.

In Hawaii National Park it has been found necessary to reduce the unowned domestic goats which have become so numerous that they are destructive to shrubs and plants. Drives held through the cooperation of the Territorial Board of Forestry netted 2,000 during April and 3,000 in May within the park and adjacent territory to the east. In addition, 736 goats, 28 pigs, and 57 mongooses were destroyed by rangers in the attempt to rid the park of exotic animals and bring back natural conditions.

Rearrangement of the entrance trail to Carlsbad Caverns National Park has provided excellent seats for visitors who wish to hear the lecture and see the evening flight of bats which issue nightly during the summer months. Every one seeing the flight estimates the num-
ber of individuals in the millions. Whether this is correct or not, this display of animal life is one of the most notable ones to be seen in any park.

At the new Yellowstone Lake Fish Hatchery some five aquaria display various local fishes, affording an opportunity for close study of marks for identification. An attendant gives an educational lecture and shows people about the hatchery.

PRESERVATION OF PARK LANDSCAPE

With the increasing use of parks by the public an ever-mounting responsibility is placed upon those directing the development of the national parks. To protect irreplaceable landscape and primitive forests from damage through ill-advised improvements and man-made construction, and at the same time provide adequate tourist and administrative facilities, is the function of the Landscape Architectural Division.

An increase of personnel was granted during the year to meet the enlarged program of road work and to expedite the completion of 6-year plans. There are now 20 architects and landscape architects on the staff.

The Landscape Architectural Division continued to supervise all work affecting the park landscape, such as location of roads and type and location of bridges, buildings, and other structures. This work can not be accomplished by a casual inspection, and one of the needs of the near future is a landscape architect for each park throughout the entire construction season.

The advantages of landscape-planned roads are now apparent to all. Roads, both in alignment and section, now more nearly harmonize with the topography than in the days when they were strictly engineer planned. Besides improving the appearance, the rounding and flattening of slopes treatment has lowered the cost of road maintenance. The cooperation of the road engineers has hastened the results of these policies and of other points accomplished through the insertion of our special-provision clauses in the specifications for various road projects. A variety of buildings, bridges, gateways, and other structures were constructed during the year, each carefully planned for its particular site. The standard of buildings, particularly residences, was raised to a better average than ever before.

Although the park operators undertook few new projects, it was apparent this year that they are considering more carefully the matter of a plan showing future expansion before beginning any actual construction.

The landscape division has in course of preparation a 6-year development plan for each park, which in addition to its major purpose of supplying a definite and orderly basis on which to proceed, will also do much toward the stabilization of employment in the parks. The landscape division of necessity probably looks farther into the future in laying out its plans for work than any other branch of the National Park Service.
PROTECTION OF PARK FORESTS

Measures to protect park forests were necessarily intensified throughout the park and monument system because of the drought conditions which prevailed for two successive seasons and of which the cumulative effect was felt during the past season.

Fortunately the appropriations for this work for the present fiscal year, which began last July 1, were larger, there being a total available of $170,000, as against $96,850 for last year. In addition to these amounts there was a fund each year of $50,000 for fire suppression and reconstruction because of fire or flood destruction or other unforeseen emergencies.

THE FIRE SITUATION

Forest fires were the chief forest-protection concern of the summer, since the succession of one dry summer after another, with the intervening winter one of subnormal precipitation, had greatly increased the fire hazard. Despite these conditions and the fact that terrific fires raged in the general vicinity of the parks, fires within their boundaries were held down to a minimum. This was due to the constant vigilance and untiring efforts of the enlarged personnel and increased fire-prevention methods and equipment made possible only through the increased appropriations of the past few years.

The worst fire situation was in Yellowstone National Park, where the Heart Lake fire burned an area of approximately 18,000 acres, and was fought by 700 men at one time. It was caused by lightning. Most of the other fires were small and were caused by visitors leaving camp fires still smoldering or throwing cigarettes and matches out of car windows before they were completely extinguished.

Many parks sent men out to assist in controlling fires outside their boundaries, especially on national forests, and local Forest Service people and State protection forces rendered valuable assistance by supplying both men and equipment in times of park need. This cooperation even took on an international aspect, when the superintendent of Glacier National Park sent men to assist in suppressing a fire in Canada’s adjoining Waterton Lakes National Park.

To this spirit of cooperation, to the foresight of the Bureau of the Budget and Congress in providing increased appropriations, and especially to the determined efforts of the men actually on the fire line, at times in grave personal danger, is due the fact that our fire record this year is an unusually good one. Had the same conditions prevailed a few years ago, before men and equipment were available, I firmly believe that untold fire damage would have occurred to the park forests.

INSECT AND TREE-DISEASE CONTROL

The intensities and trends of insect infestations are endangering the preservation of important scenic values in some of the national parks. Following previous subnormal precipitation drought conditions prevailed in the summer of 1930. Snowfall last winter was abnormally light and a deficiency of moisture again prevailed the past summer. Climatic conditions during the past several years there-
fore have been favorable for multiplication of insects, especially the bark beetle, which attack the forests.

Effective treatment is required on the basis of area-type maps which entomologists can supply only by having adequate funds to conquer the pests which have advanced to an epidemic stage.

The increase in the appropriation for insect and tree-disease control made possible some very essential control work in Yellowstone, Mount Rainier, Crater Lake, Yosemite, General Grant, and Sequoia National Parks, and maintenance follow-up work in Glacier National Park on areas treated last year. This work was done under the supervision of the Bureau of Entomology, except in the case of blister-rust infestation, which was handled in cooperation with the office of blister rust control.

In Glacier National Park insect infestations attacking the western white pine, lodgepole pine, and Douglas fir, have reached an epidemic stage. Depredations have assumed such alarming proportions that concentrated action is imperative. There are three bark-beetle epidemic areas containing 49,915 trees on which control measures have not been possible due to lack of funds. Much of the rapid increase in insect infestations appears attributable to the large forest fires which occurred in 1926 and 1929. White pine blister-rust is also spreading rapidly toward Glacier National Park from Canada.

In Yellowstone National Park conditions prevail which are critical, as evidenced by preliminary airplane and ground examinations. Although the full extent of depredations can not be definitely determined until after the fall surveys have been completed, it is apparent that a minimum of $50,000, exclusive of cost for surveys and type mapping, is necessary for bark beetle control operations.

PUBLIC RELATIONS AND PUBLICATIONS

Contact with the press was maintained through the division of public relations of the Washington office on matters of general interest and by the individual parks on matters of more local interest. This was done by the release of prepared statements to the press in many cases and by individual contacts in others.

Information regarding the parks and monuments also was disseminated through the preparation of specially-requested magazine and newspaper articles, well illustrated, and by the giving of radio talks. Not only did Park Service officials, both in Washington and the field, give special talks over national and local broadcasting lines, but several times advertising companies giving regularly scheduled programs used national park and monument themes as their main topic. It is hoped that this latter method of bringing the national parks and monuments to the attention of the public may show increased use during the year just starting.

There has been a noticeable increase in the demand for literature regarding the national parks and monuments. Newspapers and periodicals have carried unsolicited notices regarding our various publications which have greatly increased the demand for these booklets, as have the notices appearing in School Life, the official organ of the Office of Education of this department.
THE FOREST FIRES ON THE SOUTHEAST SHORE OF HEART LAKE, YELLOWSTONE NATIONAL PARK

PACK HORSES AT BASE CAMP, SNAKE RIVER, LADEN WITH SUPPLIES FOR FIGHTING HEART LAKE FIRE
FIRE EQUIPMENT SHED AND FIRE TRUCK, ROCKY MOUNTAIN NATIONAL PARK

THE SAME FIRE TRUCK, WITH DOORS OPEN READY FOR USE
The initial publication of the new Branch of Research and Education, Educational Leaflet No. 1, entitled "How Yavapai Station can help you to understand and enjoy the Grand Canyon," was published in August and sent to the Grand Canyon National Park for distribution. Owing to lack of funds on the part of the Park Service, this leaflet was prepared originally by the Grand Canyon Committee of the National Academy of Sciences and the Carnegie Institution of Washington as an aid to visitors to this unique station. Other leaflets of a similar nature are planned as funds become available.

**BILINGUAL PARK BOOKLET FOR PARIS EXPOSITION**

At this point I want to acknowledge the cooperation of the various railroads and steamship lines serving the western national parks, either directly or indirectly, which made possible the publication of the bilingual booklet prepared for distribution at the International and Colonial Overseas Exposition now being held at Paris, France. Through the Transcontinental Passenger Association these carriers authorized the preparation and printing of 100,000 copies of the booklet at a total cost not exceeding $10,000. Preparation of the copy and all details of the printing were handled by the service which approved all bills for payment direct by the association. In addition, plates for the illustrations, including 21 full-page color plates and 4 full-page halftones, were furnished by the railroads.

**SCIENTIFIC PUBLICATIONS**

There is need for the revision of a number of the scientific publications on the national parks, many of which are out of print and should be brought up to date before reprinting, to keep pace with the fast-moving discoveries in the world of science. Several new scientific publications on the national parks are also vitally needed. While these are handled as sale publications through the Office of the Superintendent of Documents, the National Park Service has to bear the initial cost of plating and printing. The purchaser merely pays for the actual cost of printing his own copy after the finished plates are finally approved, so that the price is nominal on all Government sale publications.

**NATIONAL PARKS PORTFOLIO REVISED**

The National Parks Portfolio, a profusely illustrated, cloth-bound volume on the national parks and monuments which sells for $1, was increasingly popular. It was revised during the year to include material on the three national parks and three national monuments established since the printing of the fifth edition. First delivery of the sixth edition was made on August 1. The Superintendent of Documents reports that by September 1 the 10,000 copies which he ordered for sale were all disposed of, and at the present time another edition of 10,000 copies is on the presses. Here again the National Park Service stands all cost of preparation and plating, so that the purchaser gets a very beautiful book for a remarkably low price.
LARGER SUPPLIES OF FREE PAMPHLETS NEEDED

In 1931 the Superintendent of Documents terminated the arrangement which had been in force for several years whereby a supply of our circulars of general information was ordered by him from the Public Printer for sale in lots of 100 or more to motoring organizations, travel clubs, and other organizations desiring to secure more than the few copies the service could spare them. It was found by the Superintendent of Documents that the expense of maintaining this sale supply, with the uncertain demand, did not warrant continuation of the practice.

Under the rules of the Joint Committee of Congress on Printing and Binding this service is not permitted to furnish to any individual or organization more than 50 copies of any one free circular without special authorization. While it might be possible to obtain this special authority, because of the very real need these organizations have for the circulars, the extremely limited supplies of our publications which it is possible to print with present funds do not permit us to give even that limit in most cases. As it is, we are unable to meet all the individual demands upon us for free park literature.

It is most desirable that our printing funds should be increased to such proportions that we could print sufficient park information circulars annually not only to meet all individual needs but also, subject to the approval of the joint committee, to furnish lots of several hundred copies to motoring and travel clubs in the vicinity of the parks, which each year get many requests for this material from the visiting public. In this connection officers of the National Park Service have noted at the desks of many hotels in the West supplies of free circulars descriptive of lands under the jurisdiction of other Government bureaus. We only wish authority and funds to supply the booklets to organizations in direct touch with travel, who would use them to the best advantage.

This past year, when it was found that sufficient supplies of circulars could neither be bought nor secured from this office, many automobile organizations took the matter up with the American Automobile Association, which in turn got in touch with the service to see what could be done in the matter. It was thereupon decided that the association would circularize its member clubs, advising them of the conditions and suggesting that all club requests come through it. This was done, and the association, upon being informed of the number of circulars available for such use, advised us of the distribution to be made to each club, based upon their location and travel needs, and even cooperated by typing the labels on which the address and quantity of booklets desired were indicated. These labels were then sent to this office for checking and transmittal to the Superintendent of Documents. This cooperation was of great assistance to the service and eliminated a great deal of detail work.

BOOKS AND OTHER NON-GOVERNMENT PUBLICATIONS

The national-park bibliography is being constantly enlarged. During the past year, as already mentioned, the Portfolio came from the Government Printing Office in its sixth edition. It is a beautiful book and right up to date. It was edited by Miss Isabelle F. Story, the editor of the service.
"Another Government publication of tremendous importance to national-park visitors as well as to scientists, is the “Geologic History of the Yosemite Valley,” by Dr. François E. Matthes of the United States Geological Survey. This is United States Geological Survey Professional Paper 160, which can be secured from the Superintendent of Documents, Government Printing Office, at $1.10.

In the field of natural history is a book by Dorr G. Yeager, one of our associate naturalists, entitled “Our Wilderness Neighbors,” which deals with his observations of wild life in Yellowstone National Park. This book is published by A. C. McClurg & Co., of Chicago.

Another naturalist, Dr. Fritiof M. Fryxell, associated with the National Park Service in the Grand Teton National Park during the summer months, published late in 1930 “Glacial Features of Jackson Hole, Wyoming.” This book comes from the Augustana Book Concern, Rock Island, Ill.

At this point mention should also be made of Otto Degener’s “Ferns and Flowering Plants of Hawaii National Park,” very attractively illustrated and containing also descriptions of ancient Hawaiian customs and a brief account of the geologic history of the islands. The publisher is the Honolulu Star Bulletin (Ltd.), Honolulu.

“Rainbow Canyons” is a new volume on Zion and Bryce Canyon National Parks and the southern Utah country, by Supt. E. T. Scoyen, of Glacier Park (formerly at Zion), and Frank J. Taylor, of San Francisco. The book is printed by the Stanford University Press.

Two more new books from the Stanford Press are by Dama Margaret (Mrs. “White Mountain”) Smith, of the Petrified Forest Monument. One is a lively account of national-park activities entitled “I Married a Ranger,” while the other is a very entertaining, yet serious, portrayal of the writer’s observations of Indians in the Grand Canyon country, called “Hopi Girl.”

We are glad to mention again at this point the book “Three Scout Naturalists in the National Parks,” described in the section of this report bearing on Boy Scout activities.


In the realm of poetry and art we are especially pleased to note the appearance of two exquisite volumes, one by Elinor Nell Murray and the other by Lou Ella Archer. “Memories of Sequoia,” by Miss Murray, is a beautifully illustrated little book of poems. It is published by the Times Mirror Press of Los Angeles. The author’s own description, “A nature book in verse,” is as fine a short statement of this attractive volume as can be made. Miss Archer’s “Canyon Shadows” is an exquisite volume of art and verse bearing on Grand Canyon, Zion, and Bryce Canyon National Parks and several national monuments. The small paintings and drawings that have been reproduced are by Lillian Wilhelm Smith. A copy of this book may be obtained through Miss Archer, Phoenix, Ariz.
In Mount Rainier National Park several enterprising young editors and business men published "Rainier National Park News," a newspaper which appeared weekly during the season, and which contained not only current news of the park but also many articles on history, natural features, and park policies. It is hoped that the venture of these industrious men was successful and will be continued.

**PARK ROAD DEVELOPMENT**

Excellent progress was made during the year in bringing the highway systems within the national parks to a standard commensurate with the importance of these areas as focal points of concentrated travel and with conditions on the main approach roads.

The Bureau of Public Roads of the Department of Agriculture continued to cooperate in major road construction in the national parks and national monuments, except in Mount McKinley National Park, Alaska, where the road work was performed, as in past years, by the Alaska Road Commission under a cooperative arrangement with the National Park Service.

The 1931 fiscal year cash appropriations for road and trail work amounted to $7,078,800, with additional authority granted to enter into advance contractual obligations to the extent of $2,500,000. The increase in appropriations was due to the desire of the Federal Government to aid unemployment.

That the various classes of work in the administration of the national parks and monuments offer excellent means for effectively relieving unemployment to the extent funds are made available, especially for construction of roads and trails, is shown by the records of per diem employment during the 1931 calendar year. An analysis reveals the following numbers of per diem employees for the 1931 calendar year: January, 317; February, 334; March, 597; April, 1,527; May, 3,107; June, 4,666; July, 5,300; August, 4,966; September, 4,504; October, 3,251; November, 1,989; December, 823; the average for each of the 12 months amounting to 2,615. The figures through September are actual, while those for the last three months are close estimates.

Excluding funds for emergency construction appropriated in 1931, the 1932 roads and trails appropriation is increased to $7,500,000 cash and an additional $2,850,000 authorization for entering into advance contractual obligations, as compared with $5,000,000 and $2,500,000, respectively, for 1931.

Special legislation authorized the allocation of not to exceed $1,500,000 of the national park and monument road and trail funds for each of the fiscal years 1932 and 1933 for construction, reconstruction, and improvement of national park and monument approach roads which cross lands wholly or to the extent of 90 per cent owned by the United States. As the primary value of these roads is to carry national-park travel, and as they cross lands almost wholly owned by the United States, the cost of construction is properly being borne 100 per cent by the Federal Government. The expedition of the construction of these approach roads will result in securing, in the
shortest possible time, the maximum usefulness of the road systems being constructed in the parks.

Very favorable operating conditions obtained throughout the 1931 working season. Climatic conditions were excellent; productivity was increased through the availability of high-class workmen; and it was possible to make unusually good contract placements under the competitive conditions which prevailed.

To insure the economical and effectual carrying out of highway development in the next few years, programs of future construction projects have been carefully prepared and are constantly being perfected. Advance surveys are undertaken on a schedule devised to insure the most advantageous results.

Indian labor, both skilled and unskilled, was used wherever practicable in connection with road construction. The use of this class of labor is constantly increasing, in accordance with the expressed policy of the National Park Service and with the experience of local park and highway officials who find the near-by Indian reservations offer an excellent potential source of good material.

An interesting highway development of the past year was the designation of the Eastern National Park-to-Park Highway, to connect the Great Smoky Mountains National Park, the Shenandoah and Mammoth Cave projects, and the Colonial and George Washington Birthplace National Monuments. This highway was outlined in the office of Representative Maurice H. Thatcher, of Kentucky, on April 4, 1931, at a meeting of official representatives of Kentucky, West Virginia, Virginia, Tennessee, and North Carolina. The Eastern Park-to-Park Highway Association was formed at this time with Mr. Thatcher as president.

Those promoting the highway have expressed the hope that it may be extended northward to include the Acadia National Park and the
Isle Royale project, and southward to take in the Everglades if, and when, a park is established in that region; and that eventually it will join with the Western National Park-to-Park Highway.

**APPROPRIATIONS AND REVENUES**

The appropriations for the National Park Service for the fiscal year 1931 totalled $12,113,435. Of this amount $35,500 was authorized in the second deficiency act of March 4, 1931. An item of $1,500,000 was included for construction, reconstruction, and improvement of roads and trails provided by the emergency public works act of December 20, 1930, together with $578,800 additional authorized by the President, for increasing employment. In addition to the total appropriated, authorization was granted to enter into contractual obligations for road work up to $2,500,000. Cash donations to the national parks for the fiscal year ended June 30, 1931, amounted to $65,157.12. These funds were deposited in the United States Treasury and expended under the same fiscal regulations which govern the expenditure of Federal funds.

For the fiscal year 1932 there was appropriated $12,754,250, of which amount $635,000 was authorized in the first deficiency act of February 6, 1931, and $2,621,000 in the second deficiency act of March 4, 1931. Authority was also granted to enter into contractual obligations on road work up to $2,850,000.

Despite the downward revision of automobile-entrance fees effective during the 1926 season, resulting in a decrease of revenues to $703,849.60 as compared with $826,454.17 received in 1925, and the adverse economic conditions which prevailed last season, the total income derived from the operation of the national parks this past year amounted to $940,364.79 as compared with $1,015,740.56 a year ago when, for the first time, revenues reached the million-dollar mark.

**DONATIONS**

The many friends of the national park and monument system have been as liberal with gifts of lands, money, museum collections, and other valuable educational material as in past years. For their generosity and its stimulating effect on the entire Park Service staff, grateful appreciation is here expressed.

Cash donations amounting to $65,157.12 have been made to the park and monument work. Gifts of private lands totaling 4,581.04 acres are also valuable contributions from public-spirited citizens and will assist materially in the important work of properly rounding out park and monument boundaries.

The gifts of money are available for a great variety of important park work which is often taken for granted, with little thought of the source of the funds with which it is accomplished. Such work as snow removal, road construction, museum building, mosquito control, trail construction, hospitalization, community-building construction, and purchase of visual educational material is often furthered, and some projects made entirely possible, through funds donated by
friends of the national park and monument system. Their cooperation is a source of inspiration to the hundreds of men and women engaged in national park and monument work.

SANITATION AND MEDICAL SERVICE

As hotel, lodge, and public camp facilities are extended to meet the demands for service occasioned by increased travel, the need for sanitary facilities increases in an even greater ratio. Meeting this need is one of the most important duties of the National Park Service, and to handle it adequately the cooperation of the Public Health Service is invoked. That office for a number of years has detailed one of its most competent sanitary engineers to national park work, and the same arrangement was continued during the past year. The most important developments in park sanitation work are outlined in his report, which appears in Appendix D.

They cover such matters as the installation of sewage plants and sewage-treatment systems, the laying out of sanitation systems for new public automobile campgrounds and new utility developments, examination of water supplies, analyses of water and milk, inspection of food, mosquito control, and related projects.

In addition to the cooperation above mentioned, the Public Health Service details one of its medical officers to serve as superintendent of the Hot Springs National Park, and also operates a free clinic in connection with the Government free bathhouse. Senior Surgeon Hugh de Valin, who served as superintendent last year, was assigned to new duties by the Public Health Service and Medical Director George L. Collins was detailed to Hot Springs.

Hospital service was available in Yellowstone, Grand Canyon, Yosemite, Crater Lake, Sequoia, and Mesa Verde National Parks, and the services of physicians and trained nurses were available in all the major parks during the season.

PUBLIC-UTILITY SERVICE

In the 1930 annual report mention is made of the conference of operators of park utilities, held in Washington in December, 1929, at the call of the Secretary of the Interior. At that time department officials stressed the importance of the operators forming a permanent organization to work together both for their mutual benefit and in the interest of the visiting public. Before the close of the conference a definite organization was agreed upon, and at conferences held in the West during the year the details of organization were perfected.

Last December the operators again assembled in Washington for their first conference as a permanent organization. The proceedings of the conference dealt primarily with the consideration of reports on questions which had been raised the previous year and with discussions of policy matters presented by the operators for clarification. Chief among the latter were the department’s policy for the administration of the parks and the public utilities, the relations of the operators with the Government and with each other, and definitions of the rights of operators under their franchises. The results
of the conference were helpful to all concerned and should be of lasting benefit.

The matter of certain overlapping of privileges among operators in Yellowstone National Park, which had been under consideration by Government officials for some time, was satisfactorily adjusted through mutual concessions by the operators concerned. The action taken by these operators eliminated undesirable duplication of service and clearly defined the scope of each operation. This was a fine piece of cooperation.

The 5-year programs of improvement and betterments submitted by the operators early in 1930 were again abated during the current year because business in the parks was considerably below normal. The heavy travel to the parks was due to the increasing number of tourists in private cars who patronized the housekeeping camps or who used personal camping equipment. Under these conditions the volume of business handled by the operators reached the lowest mark in some years. Economies in management and operation offset this discouraging condition to some extent, but little or no profits were earned and in some cases actual losses were sustained.

Despite the unfavorable financial situation, however, some notable improvements were carried through to completion during the year.

The new wing to the Canyon Hotel in Yellowstone National Park was completed. It contains 100 guest rooms, each with bath, and is a distinct addition to the facilities available to the public at this important center.

In Mount Rainier National Park the new lodge and housekeeping development undertaken last year at Paradise Valley was completed and placed in operation early this summer. Similar accommodations were opened to the public at Sunrise Ridge. The plans for each of these developments provide a central lodge with 35 bedrooms, a cafeteria, and other necessary service units. The Paradise Valley plan was executed in its entirety; the Sunrise Ridge lodge lacks the wings containing lobby and bedrooms. There are 275 housekeeping cabins in the development at Paradise Valley and 200 at Sunrise Ridge.

A housekeeping development was completed and opened to the public by the Utah Parks Co. on the North Rim of Grand Canyon National Park. This development completed a well-rounded range of facilities available for accommodation to the public in this area and will be much appreciated by private car tourists. The installation of housekeeping accommodations on the North Rim has emphasized the need for similar developments in Zion and Bryce Canyon National Parks and it is expected that these will be provided in the near future.

Since July 1, 1930, four major 20-year concession contracts, one covering the operation of a general store and three for bathhouses and hot-water privileges, were negotiated and completed; 75 miscellaneous permits were issued or renewed for various activities and uses in the national parks and monuments.

**HOUSEKEEPING CAMPS**

There is a steadily increasing demand for cheap housing facilities in the national parks, preferably in or near the camp grounds. Where
HOUSEKEEPING CABIN DEVELOPMENT IN MOUNT RAINIER NATIONAL PARK

Newly-opened Sunrise Area

NEW WHITE RIVER ROAD TO SUNRISE WINDING THROUGH FORESTS OF ALPINE FIR AND MOUNTAIN HEMLOCK
HAMILTON'S STORE, OLD FAITHFUL AUTO CAMP, YELLOWSTONE NATIONAL PARK

INTERIOR OF HAMILTON'S STORE, OLD FAITHFUL AUTO CAMP
this demand has not been met in a park, or has been met in part only, gateway towns adjacent to the park boundary line have installed these facilities. These outside interests are, of course, directly competitive with our park operators. The unfortunate part of this competition is that the owners of the outside camps, in their zeal to secure and hold business, have a tendency to unfairly criticize park facilities, charging that park rates are high, that accommodations are scarce, that bears are troublesome, that regulations are onerous. There seems to be no way to combat this propaganda.

There is no legitimate argument that can be made against rates for any park service. We keep rates to the lowest possible level consistent with a fair return to the operator. Charges about dust, troublesome animals, and regulations are without any foundation whatever, except that bears are seen about park camp grounds whereas they are shot on sight outside of the parks. Bear depredations are really very rare. Stories of property damage as a rule grow out of confusion with accounts of bear bites, and these in turn are in most cases the outgrowth of feeding from the hand, a practice which the Park Service endeavors by every means open to it to prevent. Curiously, visitors even when bitten by bears are more inclined to accept slight injury as a souvenir and happily display it than to complain about the offending bear. Nevertheless, bear-bite stories have assisted outside camp enterprises in developing business.

Negotiations are well under way for a contract with the Western Pacific Railroad Co. to provide lodge and housekeeping accommodation and transportation facilities in Lassen Volcanic National Park. The completion of this contract will bring a new public utility operator into the national parks. The tentative plans of the Western Pacific Railroad Co. call for an initial expenditure of approximately $275,000 in providing facilities for accommodation of the public.

Plans for the expansion of facilities in Mesa Verde National Park are being held in abeyance pending the outcome of our plans to develop an adequate source of water supply. Once assured of an ample supply of water, the Mesa Verde Park Co. is prepared to install new and much needed improvements. A new lodge with central structure and cabin units, all to conform to the pueblo architecture, are on this development program.

AIR SERVICE IN THE NATIONAL PARKS

In 1928 the Scenic Airways (Inc.) established a service by plane between the north and south rims of the Grand Canyon. At that time the trips were made over the canyon from an airport located in the Tusayan National Forest, approximately 18 miles south of the park headquarters. The company operated approximately two years and carried about 7,200 passengers without any accidents. In 1929 the company sold its interests and the Grand Canyon service was temporarily abandoned. In 1930 regular service was offered by another group of operators, who used the airport south of the park and on the north rim landed their planes in VT Park in the Kaibab Forest. Now, the Grand Canyon Lines (Inc.) of Arizona has acquired the interests of the Scenic Airways (Inc.) and is again operating the regular service over the Grand Canyon. We expect to cooperate in making it possible for the company officials to contact the public and
develop interest in their business. A thousand visitors took ad-
vantage of this service last summer.

In Mount McKinley Park, Alaska, the operator who has the fran-
chise covering the operation of hotel, lodge, and transportation serv-
ice is also authorized to arrange for airplane service over the park.
The operator's arrangements have been made with Alaska Airways
(Inc.), a very efficient concern which maintains a fleet of airplanes
manned by a group of pilots who have splendid records. The planes
are based at Fairbanks, but in an hour can reach the landing field on
the Savage River in the park. Many tourists avail themselves of
this special type of service. I had the opportunity of making two
airplane flights over Mount McKinley Park while there during the
summer. I can not imagine a finer trip by airplane anywhere in the
world than over Mount McKinley Park.

While I still see little if anything to be gained by authorizing
airplane service in most of the national parks of the country, I realize
fully that in the case of Mount McKinley and Grand Canyon Parks,
and perhaps several others, the views from the air are so extraordi-
nary as to make it highly desirable to authorize adequate airplane
service for the traveling public. Each request to establish such serv-
ice will be judged on its merits. It is quite certain that from time
to time in the future extensions of the national park air service are
bound to be necessary and will be authorized.

WINTER USE OF THE PARKS AND MONUMENTS

The growing interest of the public in winter use of the national
parks is an important angle of park work, which, with the increase
of road improvements, must of necessity assume an important place
in future plans for park development. Good roads are, of course,
the essential basis of all such plans. Once they are assured, the
possibilities of winter use of the parks appear to be limitless.

Eleven of the national parks are now operated on an all-year
schedule. Mount Rainier is open for winter sports, Zion and Bryce
are open to motorists carrying their own equipment, and, where
roads permit, many of the others are entered by thousands during
the winter season. Improved snow-removal machinery has made
cravel to Crater Lake possible earlier in the spring and later in the
fall than ever before. Winter sports events are also held there.
With the exception of those in extremely cold areas, the national
monuments have impressive winter visiting lists. This is especially
tue of the 18 monuments in the Southwest, some of which experience
their heaviest travel during the winter months.

In spite of light snows during the winter of 1930–31, Yosemite
National Park kept abreast of its 1929–30 winter-travel record which
broke all previous records and was due chiefly to better roads and
increased interest in winter sports. With winter sports at their
height, the month of January, 1931, showed an increase in travel
over January 1930, of 37 per cent. On Washington's Birthday, 4,462
people entered the park, the largest number ever recorded for a
single day during the winter season. In connection with the tre-
mendous popularity of winter sports in Yosemite, it is interesting
to note that during a 3-month period 23,000 persons applied to park authorities for ash-can covers to use for "ash-can sliding."

Important among the winter-sports events held in Yosemite this year were the second annual Pacific coast intercollegiate winter games for the President Hoover cup and the first annual San Joaquin Valley-Sierra winter-sports carnival. Ski tours into the heart of the skiing country, with comfortable camp-style accommodations, were again offered during the 1930–31 season.

Winter travel to General Grant Park more than doubled during the past year. Sequoia Park, where winter sports are becoming increasingly popular, records an increase over the corresponding period for 1929–30. Sequoia and General Grant Parks are the most accessible places in California where visitors can see Sequoia gigantea during the winter season, and improved roads will undoubtedly bring about a great increase in winter travel to the park for this reason alone. Little Giant Forest winter camp, with accommodations for 80, was filled to capacity on several occasions, and cars from 40 States other than California were noted during the month of March.

A large number of the estimated crowd of 4,000 attending the fifth annual Crater Lake ski race and snow carnival held at Fort Klamath made the trip from Fort Klamath to the park on skis. Because of improved snow-removal machinery, roads to the rim of the lake were open this year by April 1. The trip was exceedingly interesting to visitors at that time because the road passed through snow banks from 6 to 18 feet high.

The winter use of Mount Rainier National Park increased greatly during the past season. For the month of February, travel to the park increased 38 per cent. Sunrise, the newly developed scenic area in the White River District, offers an ideal location for winter sports. If proper equipment can be provided to keep the road to this area open, Sunrise has extremely interesting possibilities as a great winter-sports area.

Thousands of travelers continue to visit the Grand Canyon during the winter months. During the past February nearly 800 persons attended the geologic lectures, and cars from every State in the Union, the District of Columbia, and Canada entered the park. From October 1, 1930, to March 31, 1931, approximately 65,000 people were registered at park headquarters at Hot Springs.

A ski meet, sponsored by the reorganized Rocky Mountain Ski Club and attended by about 800 people, was held in Rocky Mountain National Park on March 15. Hidden Valley, on the new Trail Ridge Road, with an elevation of approximately 9,500 feet, is considered an excellent location for a ski hill and toboggan slide, and it is hoped that developments along this line may be made in the near future.

The Zion-Mount Carmel Highway has resulted in increased winter travel to Bryce and Zion National Parks. While figures for visitors to Bryce during the winter season are not available, the winter travel to Zion National Park increased 50 per cent over that for the corresponding period of 1929–30.

Approximately 35,000 more people visited Hawaii National Park during the period from October 1, 1930, to March 31, 1931, than for
the same period in 1929–30. This tremendous increase in visitors was undoubtedly attributable to the volcanic activity during November and December.

Improved roads appear to be the reason for increased winter travel to Wind Cave National Park. The winter schedule of one afternoon trip has been changed to trips at any time between 8 a.m. and 4 p.m. in order to accommodate people traveling through the Black Hills who wish to go through the cave. Approximately 75 cars a day pass through the park.

Winter travel to Platt National Park increased 27 per cent during the past season.

Carlsbad Caverns and Acadia National Parks are also open during the winter.

**BOY SCOUT ACTIVITIES**

We are always pleased when we hear of parties of young folks making use of park facilities for recreation and education. Boy and Girl Scout parties are among our most welcome visitors in nearly all the parks and in many of the monuments. Space does not permit any full account of young America in the park system, but a few notable events should be recorded. The Great Falls (Mont.) Council of Boy Scouts again sponsored a scout trail-building expedition in Glacier Park during the past summer. Eagle Scouts, 66 in number, from 21 States, in charge of commissioner, North Central Montana Council, E. G. Maclay, constructed 4,000 feet of trail in the Bowman Lake country. This work has been a regular part of our program for many years, and some of our most interesting and beautiful trails have been constructed in part by the Eagle Scouts, the Park Service furnishing to them only materials and equipment, a cook, foreman, and powdermen. The boys are not permitted to touch explosives. They serve without pay but we provide transportation, food, and shelter.

During each of the past three years Senior Naturalist Ansel F. Hall, of the National Park Service, has aided in organizing special groups of boy scouts called scout naturalists, who have visited many national parks and monuments, and have alternated sightseeing with research and exploration, definitely contributing important service in building up our museum collections and otherwise enlarging our educational exhibits.

In July, 1931, the experiences of the 1929 party appeared in a book entitled “Three Scout Naturalists in the National Parks,” published by Brewer, Warren & Putnam (Inc.), and which is available at $1.75. This is a highly interesting and entertaining volume, which is attractive alike to children and adults.

The scout naturalist party this year was made up of 11 scouts of Eagle grade who visited four national parks. Their major work was in Yellowstone National Park, where under supervision of scientists they excavated 11 petrified trees in the Tower Falls region. These have become scientific and educational exhibits in place, as the petrified trunks are standing just where they grew before they were overwhelmed by mud and ashes from a prehistoric Yellowstone volcano.
In Sequoia National Park troops of boy scouts encamped near Giant Forest furnished patrols on the Fourth of July and week ends to assist the ranger organization in traffic control and in dispensing information to visitors. These embryonic rangers from the standpoints of personality, spirit, and efficiency proved to be invaluable to our organization.

**STATE PARK PROGRESS**

State parks, closely allied to the national parks in purpose and character, continue to show a steady growth, which has been marked during the past year by several developments of exceptional interest. None, perhaps, was of wider public interest than the final acquisition by the State of Kentucky of the Cumberland Falls area. The battle for the preservation of this fine area free from any power development was carried on for six years by an aggressive group of Kentuckians and by a number of National, State, and local organizations outside the State under the leadership of the National Conference on State Parks. The falls with its surroundings was purchased last spring with $230,000 given for the purpose by the late Hon. T. Cole-

man du Pont and $170,000 additional furnished by Mrs. du Pont and other members of the family.

Acquisition early this summer of some 10,000 acres of virgin redwood forest in the famous Bull Creek-Dyerville tract by purchase with funds provided by the Save-the-Redwoods League and the State of California assured the preservation of what many consider to be the finest stand of redwoods in existence. The Bull Creek Grove dedication took place on Sunday, September 13, 1931. The Calaveras Grove Association also raised the $137,500 needed to match an equal contribution by the State for the purchase of the North Calaveras Grove of Sequoia gigantea, and other acquisitions of noteworthy State park areas in California have been made during the year.

Another interesting State park development was the enlargement of the Adirondack State Park, established in 1883, to include Lake George and part of Lake Champlain. Its area is now approximately 4,500,000 acres, including, of course, large tracts of privately owned lands.

Oregon, Wisconsin, Michigan, Iowa, Kansas, Ohio, Connecticut, Alabama, Georgia, and Illinois have all made great or small additions to their park systems.

The National Conference on State Parks, in which the National Park Service has always had a special interest because of the fact that it was established by former Director Stephen T. Mather, continues to enlarge its usefulness in its chosen field. Its 1931 conference was held at St. Louis May 27 and 28. It was attended by several National Park Service men, including myself. After the conference many of the delegates took a 3-day tour of Missouri’s State parks in the Ozarks. It is rapidly gaining recognition not only for its influence in promoting the establishment of properly selected parks, but also as a consultant on methods of administration, development, and use. One of the most interesting and useful park
volumes of recent years is "A State Park Anthology," edited by its executive secretary and published less than a year ago by the conference.

THE YEAR IN THE NATIONAL PARKS AND MONUMENTS

In order to conform to the President's policy of economy in Government expenditures wherever possible without resultant unemployment this report has been shortened by the elimination of the reports of the individual park and monument superintendents and custodians, which formerly appeared in the appendices, and instead a brief résumé of the outstanding achievements of the year in each park and monument is given below.

The reports of the several field divisions carrying on specialized work throughout the park and monument system are printed in Appendix D, and for this reason the engineering, landscape architecture, sanitation work, fish culture, and wild-animal conditions are treated but lightly below.

ACADIA NATIONAL PARK

Under the organic act establishing this park authority was given by Congress for its enlargement from time to time as donations of land or money might make this practicable. This park, it should be emphasized, has been created solely from land donated by public-spirited citizens, mostly residents of the locality, or acquired from monies donated for that purpose. Among these donors has been Mr. John D. Rockefeller, jr., who continued to show his interest during the year by presenting for addition to Acadia National Park a gift of land which includes the major portion of the town of Bar Harbor's frontage on the open sea and the southernmost extension of the Champlain Mountain Ridge. This entire mountain ridge is now within the park.

Some other lands, mostly east of Somes Sound, were donated to the Government during the year, primarily by the Hancock County Trustees of Public Reservations, and title to still other lands that have been offered will be studied during the year with a view to acceptance by the United States.

Plans to further extend the usefulness of the Acadia National Park to the public were rendered inoperative, temporarily at least, last year when Mr. John D. Rockefeller, jr., requested permission to withdraw his preceding offer to construct a magnificent extension of the park's present motor road, estimated to cost some $4,000,000, because of the opposition to the project by a small group of local summer residents. The extension was planned to follow for miles the rocky ocean front of Mount Desert Island, thus making the beautiful coast accessible to the general public. Only 3½ miles of this, however, were to be on park land, the remainder being over land that Mr. Rockefeller had acquired, but which would become available for driving purposes by the general public if the plan went through. At the request of the Secretary of the Interior Mr. Rockefeller agreed not to withdraw his offer at that time, but to let it lie
for a time in the hope that those opposing the project might gain a better understanding of it, and the obstacles in the way of the road building be overcome.

One of the obstacles in the direct location of the road is the present naval radio station at Otter Cliffs. Negotiations are under way with the Navy Department looking forward to the concurrence of that department in its removal and relocation on Schoodic Point without cost to that department. A study made of the availability of the new location on Schoodic Head appeared to indicate most favorable conditions for such transfer, which, when effected, will make available to the public for park purposes what is considered the most beautiful point on the whole island of Mount Desert. Mr. Rockefeller has also donated considerable acreage on this point adjoining the radio station for the purpose of turning this beautiful point into public property as soon as possible.

It is interesting to note that not only are most of the residents of Mount Desert Island in favor of a road extension, but that the State generally has taken a great interest in it, both houses of the legislature unanimously adopting resolutions in favor of the prosecution of the road.

I sincerely hope that nothing will interfere with the completion of this magnificent road project so splendidly conceived by Mr. Rockefeller in the interest of the park and the public, for he has contributed to the enlargement of this park and its facilities with a vision that time will prove to be one of the most outstanding examples of conservation in the entire country.

The town of Bar Harbor, at its annual meeting in March, took action to relinquish to the Government the Ocean Road, which runs through the park and which it has regarded for the last 40 years as one of its greatest scenic assets.

PARK TRAVEL

Again travel reached a new high, increasing from 154,734 in 1930 to 162,238 in 1931. Many times during the year the camp ground at the foot of Champlain Mountain was filled to capacity. The grounds were extended and a community building installed. To keep up with the growing travel it is planned to develop another camp ground on the Seawall tract, which was transferred from the Navy Department to the park several years ago.

ROAD DEVELOPMENTS

The new road to the summit of Cadillac Mountain, the highest point along the eastern coast of the United States, was brought almost to completion. It is hoped to open it formally early next summer.

A survey was made for the proposed road on the Schoodic Peninsula, that portion of the park on the mainland and jutting out into the open sea beyond all other mainland points on the coast. Special attention was paid to the location of the road from the landscape point of view.
A concrete highway, kept open throughout the year, connects Bar Harbor with Ellsworth, 20 miles away and on the main rail line to Canada. Bus service over this road was put into effect last summer.

**SCIENTIFIC RESEARCHES**

Acadia National Park is rapidly becoming a conspicuous center for biological research and the study of native tree diseases. The Federal Government has been engaged in a pine blister rust work, and State authorities have been making a study of the diseases attacking the birch trees. The Mount Desert Island Biological Laboratory has cooperated in this work.

**BRYCE CANYON NATIONAL PARK**

Bryce Canyon finished its third year of operation as a national park with much accomplished toward opening up its scenic areas and making them more accessible to the increasing number of tourists attracted there. The park boundary was extended to the south by taking in 3,400 acres of the Powell National Forest and 2,960 acres of public domain. The bill further adjusted the park boundaries by transferring 1,280 acres from the park to the Powell National Forest. The area added is a logical part of the park topographically and contains magnificent scenery. It is hoped that within another year or two this area will be made accessible to travelers by an approach road from the southwest connecting with the rim road from the north which was constructed in part last summer.

Visitors to the park during the travel season ended September 30, numbered 41,572. During the year people in cars used their own camping equipment in the park’s one public campground. Housekeeping cabins have not as yet been constructed in the area.

Bryce Canyon continued to be administered by the same organization as Zion National Park, although it carries its own separate appropriations.

**ROADS AND TRAILS**

Construction was started on the rim road project early in the summer and by the end of September was about 50 per cent completed. This road is being constructed under the emergency program of Congress and has been a vital factor in reducing unemployment in this section of southwestern Utah.

The trail system leading into and through the canyon was extended, as was the trail leading along the rim from Sunset Point to Bryce Point. A short bridle path was also built from Bryce Lodge to Sunset Point, to prevent indiscriminate riding, with resultant detriment to the landscape, between the hotel and the rim.

**WILD-LIFE SURVEY**

A survey of wild life made last summer showed that there were 200 deer and 25 cougars in the park. The Bureau of Biological Survey is planning a drive to exterminate some of the cougars in the vicinity of the park late in the fall, and this should help materially in increasing the deer herd.
Sign Directing Visitors to Winter Camp, Yosemite National Park

The New Raker Memorial Gateway at Lassen Volcanic National Park
A CORNER OF THE FISHING BRIDGE GEOLOGY ROOM, YELLOWSTONE NATIONAL PARK

THE BIRD ROOM, FISHING BRIDGE MUSEUM. LOOKING EAST THROUGH THE GEOLOGY ROOM AND READING ROOM
Mapping of the park was continued by the Geological Survey but field work was not completed by the close of the season. It is interesting to note that prior to the beginning of this work no primary bench-mark levels existed in this section of Utah. Part of the field work has been done by topographic engineers on the ground, and part by airplane photography.

CARLSBAD CAVERNS NATIONAL PARK

The outstanding developments in Carlsbad Caverns during the past year were the construction of a 750-foot elevator shaft, with installation of one passenger elevator and the revision of the underground trails to eliminate most of the stairways. The elevator shaft is sufficiently large to permit the use of an additional elevator when funds for installing it are available. It is planned to use the elevator primarily as an exit and means of handling supplies.

The improvement in underground trails has added much to the enjoyment of visitors and has met with widespread approval. The elimination of the long stairways in particular has added greatly to the comfort of the trip.

There was a slight decrease in travel to the caverns, with 81,275 visitors as against 90,104 in 1930. The greatest travel occurred on July 4, when 1,402 people took the 6-hour trip through the caverns. It was necessary to send the visitors through in two or three groups on the days of heaviest travel. Such travel naturally occurs during the summer months, although the caverns are open throughout the year with a constant temperature of about 56° F. With this equable cave climate the temperature on the surface varied from zero to 108° F. during the past year.

APPROACH HIGHWAYS

Probably 97 per cent of the Carlsbad visitors arrive in privately owned cars, and for this reason good approach roads are vital to the fullest use of the park. Realizing this, the highway commissions of New Mexico and Texas have done excellent work in improving roads, and have kept all the near-by highways open to traffic throughout the year. The State highway north of Carlsbad is in excellent condition and rapid progress is being made on the new State highway between Carlsbad and the park which provides a shorter and more direct route. Highways to the south and east are also being improved.

The shorter route between El Paso and the Caverns was dedicated on January 18 by a motorcade from El Paso, headed by Paul Shoup, president of the Southern Pacific Railroad system. At the present time nearly one-third of the travel is over this route.

"BAT" LECTURES

The bat flight continued to attract public interest to a large degree, and last season lectures concerning these little mammals were given by ranger naturalists during the flight. It is estimated that 3,000,000 bats live in the eastern portion of the caverns in the chamber known as Bat Cave. However, these animals never enter the sections accessible to park visitors.
ACCOMMODATIONS

No hotel, lodge, or camp-ground facilities are available on the small surface area of the park, and none are needed since accommodations of various types are available within a few miles of the park.

PROPOSED EXTENSION

It was found impracticable, during the year just ended, to make a study of the land withdrawn under congressional authority for possible addition to the park. Present plans, however, call for a careful investigation of the entire area during the fall, in order that conclusions may be reached on which to base departmental recommendation for a presidential proclamation enlarging the monument. Since the caverns extend for many miles underground, the surface boundaries of the park should be extended beyond their present area of approximately 1 square mile.

CRATER LAKE NATIONAL PARK

Great interest has been displayed in the newly completed Sinnott Memorial Observation Station located on the rim of Crater Lake. An interesting feature of this construction is the fact that it cost less than the fund of $10,000 provided for it by Congress. The memorial, erected in honor of the late Representative Nicholas J. Sinnott, of Oregon, who served for many years as chairman of the House Public Lands Committee, was dedicated by members of the present Public Lands Committee and the House Appropriations Committee during July. It is described in detail on pages 17 and 18, under the section on education and research developments.

In spite of some impediments to travel because of approach highway reconstruction, the number of visitors again showed an increase, reaching a total of 170,284. Contrary to the experience in most of the national parks, there was a slight decrease in the number of persons using the camp grounds.

Last winter’s subnormal snowfall and the highly efficient snow-removal equipment combined to make the park available to travel earlier than ever before. Visitors were permitted to drive to the rim of the crater on April 1, almost two months earlier than in previous years. Through the use of the rotary snowplow it was possible to keep open throughout the winter the west and south entrance roads, thus facilitating the new road construction.

In order that visitors may enjoy to the full the wonderful vistas of Crater Lake and the opposite walls to be had from the rim, the old Rim Road has been resurveyed and last year the first section, from a point near Crater Lake Lodge to Diamond Lake Junction was put under contract. This portion of the road, about one-third the total distance, follows the lake rim rather closely, departing from it for some distance only where The Watchman and Glacier Peak are encountered. Plans have been made for contracting the second third of the road next summer. The new road is on practically a new location, although in a few places it coincides with the old one.

During construction of the new highway the old road is being oiled and kept in condition for travel.
LANDSCAPE DEVELOPMENTS

Excellent results were achieved in planting and sodding the dusty, barren areas along the rim promenade. This reclamation work has greatly improved the appearance of the rim area through restoring its natural appearance. Roadside clean-up was also carried on with excellent results.

FISHING

Crater Lake afforded exceptionally good fishing during the season. Indeed, it far surpassed any location in the vicinity, even the noted fishing resorts at Diamond Lake and Lake of the Woods. Over 96,000 rainbow and silversides trout were planted last year, through the cooperation of the State Fish Hatchery at Butte Falls, and 200,000 fingerlings have been requested for planting this fall.

ACCOMMODATIONS

Despite a slight increase in the number of housekeeping cabins in the park, there was found to be an insufficient number of this type accommodation to meet the public demand. The housekeeping layout should be expanded as soon as possible, but it is impracticable to urge the public-utility operators to make the necessary expenditure at this time, since its revenues showed a considerable decrease during the past year.

GENERAL GRANT NATIONAL PARK

Continued improvement in general conditions and operation methods characterized General Grant Park during the year just ended.

Work upon the Generals Highway through the park is now under full headway, and good progress is being made. Oiling and widening of county approach roads have contributed to the comfort and safety of visitors. Within the park, limited funds provided for road betterments have permitted needed improvements, chiefly widening and light oiling of the heavily traveled Rocking Rock Road.

The opening of old roads and trails, long neglected and overgrown with brush, chiefly as a fire-protection measure, was continued. All of the 13 miles of old trails are now open to travel.

The public responded to these improvements by visiting the park in increasing numbers. The total amounted to 51,995, a gain of nearly 20 per cent over the preceding year, and this despite several adverse conditions. Cold, rainy weather in June acted as a deterrent to park travel during that month, and two serious forest fires near the park over the Fourth of July holidays also adversely affected travel, especially camping, at a time that heavy travel ordinarily occurs. Out of season travel last winter was nearly 60 per cent greater than a year ago.

The sixth annual celebration of the Nation's Christmas tree was held at noon on Christmas Day at the foot of the General Grant Tree, and brought an attendance of approximately 400 people. Road-maintenance equipment now available in the park will in the future assure easy access to visitors to this annual ceremony.
Outstanding achievements of the past season in Glacier Park are the completion of the trail tunnel through Ptarmigan Wall and the trail to Waterton Lakes, the letting of contracts for the completion of grading on the east side section of the Transmountain Highway, which crosses the Continental Divide over Logan Pass, and marked progress in the elimination of privately owned land.

The letting of the final contracts for grading of the Going-to-the-Sun portion of the Transmountain Highway will result in the early completion of one of the outstanding mountain roads in America. Although Glacier will always remain a trail park, the construction of this one highway to its inner wonders is meeting an obligation to the great mass of people who because of age, physical condition, or other reason would never have an opportunity to enjoy, close at hand, this marvelous mountain park.

Early in the present calendar year Supt. J. Ross Eakin was transferred to the superintendency of the new Great Smoky Mountains National Park and E. T. Scoyen, then superintendent of Zion and Bryce Canyon Parks, assumed the superintendency of Glacier.

Although the season showed a decrease in travel from 1930—especially rail visitors—and was rather discouraging to park operators, there were many bright spots in the picture. Significant has been the extensive highway development by the State of Montana, which will result in a large increase in tourist travel through this State in the next few years, and this increase will, no doubt, be reflected in future travel figures of this park. Nothing can be considered of more importance to the future of the park than the aggressive highway policy of this State.

**TRAVEL**

The number of visitors entering Glacier National Park by all modes of travel during the travel season was 63,497, a decrease of 13.6 per cent from the number visiting the park during the 1930 season. There was a decrease of 28 per cent in rail travel and of 12.5 per cent in motor travel from the 1930 figures.

Camp-ground attendance as a whole has increased 25.7 per cent over the previous season. The Two Medicine camp ground seemed to be a favorite, due to the fact that it is located on a beautiful lake and has very good camping facilities. With the opening of the new camp ground area at Many Glacier with its new sewer and water system, this camp ground will be one of the most popular in the park. Camp-ground attendance on the west side of the park approximately doubled during the 1931 season.

**PROTECTION**

Throughout the latter part of the summer, forest fires raged in western Montana and northern Idaho. The season was started with the best fire organization in the history of the park, and closed with a loss of only 188 ½ acres of park timber. The largest fire occurred early in the spring before fires were even expected.

Satisfaction over the fortunate fire record is decreased a great deal when the damage done by bark beetles is considered. It is more
than a probability that the entire stand of white pine and Douglas fir on the west side of the park will be destroyed in the next few years. The problem of the bark beetle alone has developed to an extent where nothing can be done to stop its spread, and, even if this were possible, complications have been discovered which lead one to believe that the beetles are merely one cause of this tree destruction. Fortunately the timber stand consists only in part of these tree species, and, therefore, complete denudation is not in prospect.

**TRAIL IMPROVEMENTS**

An oiling program was started which includes oiling the most important trails for dust laying. Corrugated iron culvert pipe is being installed in place of small wooden bridges on the trails. It is cheaper and has much longer life.

The Ptarmigan Wall trail, with tunnel, was completed during the summer of 1931 and is now the means of travel for the tourist en route between Many Glacier and Waterton Lakes. This trail winds along the vertical face of the Ptarmigan Wall. The outer edge of the trail is sealed in by a parapet wall, thus removing the mental hazard sometimes experienced by the more timid visitor. The completed tunnel is a solid piece of construction with a 3-foot tread in the center. It is 6 feet wide, 9 feet high, and 183 feet long.

The approaches to the two saddle-horse over-passes over the main highway by the Many Glacier Hotel, the approaches to the equestrian depot, the Bar-X6 trail from the hotel to the stables, the revised section of the Cracker Lake Trail around the southerly side of Mud Lake, and the stone masonry steps to the automobile parking area were completed during the year. Approximately 60 miles of fire ways trails have been constructed during the year. This mileage includes 10 different trails ranging in length from 1 to 8 miles and all located on the west side of the park.

**ROADSIDE CLEAN-UP**

Roadside clean-up between park headquarters and Lake McDonald Hotel was continued during the fall of 1930 and the spring of 1931. This work included clearing a strip 150 feet wide on each side of the highway through the 1929 burn. Dead and down timber was cleared from along the roadsides between the foot of Lake McDonald and Avalanche Creek.

**EDUCATIONAL ACTIVITIES**

The naturalist service was characterized by satisfactory and efficient work in connection with lectures and guided trips afield, by further extension of service to automobile camps, and by increase of service in the "high country."

Cut-flower and other exhibits were maintained at Many Glacier, Going-to-the-Sun, St. Mary, Two Medicine, and Lake McDonald. Self-guiding trails were maintained around Swiftcurrent Lake, from Lake McDonald Hotel, and John's and Fish Lakes, and from Avalanche Camp to Avalanche Lake.
ANIMAL CONDITIONS

An exceptionally mild winter with snowfall far below normal cut down winter feeding and game loss. Deer wintered exceptionally well, although a small amount of feeding was necessary. Only about 600 deer were fed last winter. The fawn crop this year will run very high, being estimated at 80 per cent.

Elk wintered exceptionally well on both sides of the park. None was killed by Indians and the few that were lost died of old age. Feeding was not necessary to keep them within the park boundaries as they were able to secure forage in the valleys well within the park. The calf crop is estimated at 70 per cent.

Mountain sheep fared equally well. Seventy were fed at the Many Glacier feed yard. The winter was favorable for a good lamb crop and the increase is estimated at 35 per cent.

From reports of rangers who are finding moose and moose signs in parts of the park not frequented by this animal in the past, it is evident that it now is on the increase.

Although there is no definite information as to the number and increase of Rocky Mountain goats, they are becoming numerous enough to be encountered frequently on the trails by tourists going into the interior of the park and over the passes.

The Bureau of Fisheries made an initial plant of black-spotted trout and landlocked salmon in the Upper St. Marys Lake. This is a large lake and does not, at the present time, provide very good fishing. Plantings of native cut-throat and eastern brook trout were made in all of the larger lakes of the park and in some of the smaller lakes and streams.

ELIMINATION OF PRIVATELY OWNED LAND

The acquisition by the Government of privately owned lands at the foot of Lake McDonald received a decided check this summer. One lakeshore lot was purchased from the Glacier Park Transport Co. Four small deals that were hanging over from last year were closed. The purchase of 160 acres situated midway between park headquarters and the foot of the lake was consummated. However, prices on other properties in this area were too high to even warrant consideration. It is considered inadvisable to purchase any further properties from local residents at the foot of Lake McDonald.

Approximately 1,200 acres of timbered land in the Nyack district of the park were purchased from the Somers Lumber Co., of Somers, Mont., with matched funds, the Great Northern Railway Co. donating half the purchase price.

SERVICE OF PUBLIC UTILITIES

The park operators have rendered a high grade of service the entire season. It is hardly probable, however, that any of them will find revenues in excess of expenses this year and in view of this discouragement very little effort at expansion has been attempted.

GRAND CANYON NATIONAL PARK

The Grand Canyon, one of the most accessible of the all-year parks, enjoyed favorable weather both during the winter and sum-
mer months. Every standard highway to and within the south rim area of the park was kept open and in excellent condition. Responding to these conditions, there was a small consistent gain in automobile travel for nearly every month. Rail travel fell off, however, causing a decrease in the annual total travel to 156,964, a loss of nearly 15 per cent.

PARK EXPERIENCES ITS GREATEST CONSTRUCTION PERIOD

The biggest building construction program in the history of the Grand Canyon was executed last year. A much-needed hospital building was completed and the most important equipment installed. The second floor of the community building, which had to be left unfinished at the time of construction because of lack of funds, was completed and turned into clubrooms with a fund of $1,200 donated by the local post of the American Legion, its auxiliary, and the Parent-Teachers Association. A wayside museum of archeology was established. A new residence for the superintendent and several cottages and cabins for employees were built. An electric street-lighting system at headquarters on the south rim and an electric system on the north rim were provided.

Road work kept pace with other construction. Two important south rim projects were the completion of the south approach highway on a standard basis with a good travel surface all the way to Grand Canyon, and oil process surfacing of the road from Grandview-Desert View and the spurs to Yavapai Point, Yaki Point, Moran Point, and Grandview Point. On the north rim work is in progress on the Bright Angel-Point Imperial-Cape Royal Drive. The project progressed well until midsummer, when it was found that the quarry material was not holding up in quality. It was therefore necessary to shut down completely pending investigation and resultant selection of a new quarry site. This caused the loss of more than a month's time. It is still hoped that the work may be completed this fall if weather conditions continue favorable.

Reconstruction of the Bright Angel Trail was continued and by the close of the travel year all but a half-mile section and the section from the foot of the Redwall to Indian Gardens had been completed. Standards for this reconstruction are of the same high type as those adopted for the Kaibab Trail. Several footpaths on the north rim were oil surfaced.

Camp grounds were further developed by limited extensions at Grand Canyon village on the south rim and at Bright Angel Point on the north rim and by installation of additional tables and fireplaces. New camp grounds were also established at Cape Royal and Point Sublime, and a picnic ground at Shoshone Point.

Twenty-two standard metal enameled warning, direction, and guide signs were installed along roads, trails, and paths, and in camp grounds. In addition the Arizona Automobile Association furnished standard Arizona Highway Department type signs for the complete signing of the Grand Canyon-National Old Trails—the south approach highway.

All these activities helped to relieve the local unemployment situation. During the summer months an average of 300 men was em-
ployed on park maintenance and construction projects, including contract work. Considering both park and park-operator activities, Grand Canyon National Park gave employment to not less than 500 persons during the summer months.

**APPROACH ROADS**

There has been a very gratifying continuation of road work by State and other agencies, in the region immediately adjacent to the park. A half-million-dollar contract was let for construction of the Cameron to Cedar Ridge section of Highway 89. One of the most important pieces of road work accomplished in the Grand Canyon region was the reconstruction of that section of Highway 89 from House Rock Valley to the top of House Rock Hill, as it eliminates a grade which in places ran to 26 per cent and was so rough that altogether it represented a very well-known barrier to travel between the north and south rims of the canyon. Work now is well under way on reconstruction of the 8.4-mile stretch between the top of House Rock Hill and Jacob’s Lake junction of Highway 89 and the north approach.

The uncompleted portion of the north approach road within the Kaibab National Forest, lying in the vicinity of Jacob’s Lake, remained at the beginning of the 1931 season. The contract for this reconstruction was let late in the fall of 1930 and the work will be completed this season. Between Fredonia and the Utah State line, a distance of a little more than 4 miles, a new road has been constructed.

**LANDSCAPE AND RESTORATION WORK**

It is a matter of gratification to report that practically all residence shacks on park property were razed during the summer, thus removing an unsightly condition.

In order partially to restore overgrazed areas in the south rim portion of the park and in the adjacent Tusayan National Forest, the grazing period was reduced one month and efforts were made to limit grazing permits. It is especially important, both for proper administration and for unhampered growth of wild flowers and other plants, that a larger area surrounding park headquarters be excluded absolutely from grazing. At present it is not possible to keep cattle out of the village, primarily because of inadequate cattle guards and lack of a suitable drift fence.

**POPULARITY OF CAMP-FIRE LECTURE**

The popularity of the camp-fire lecture ground in the Grand Canyon camp ground has increased beyond its capacity, and plans have been prepared for rearrangement to provide more seating capacity, and for erection of a lecturer’s stand. A camp-fire lecture ground at the north rim camp ground was prepared at the beginning of the season. Hundreds of native plants were transplanted in the gardens at Yavapai Point, and the results of much effort are beginning to show here.
THE OBSIDIAN CLIFF TRAILSIDE EXHIBIT, YELLOWSTONE NATIONAL PARK

THREE-LINE TRAFFIC WAY AT NEW WHITE RIVER ENTRANCE CHECKING STATION, MOUNT RAINIER NATIONAL PARK
OLD THARP CABIN, BUILT IN A SEQUOIA LOG IN SEQUOIA NATIONAL PARK, HAS BEEN RESTORED AND IS NOW USED AS A TRAILSIDE MUSEUM

THE GALEN CLARK BRANCH MUSEUM IN MARIPOSA GROVE, YOSEMITE NATIONAL PARK, A RESTORATION OF THE OLD CLARK CABIN
WILD LIFE IN THE PARK

Reference already has been made to the Kaibab deer investigation. The 15 hand-raised fawns brought from the Kaibab to the south rim last year have done well. The fawn crop this year numbered about 17 so there is now a herd of approximately 60 at the south rim. This is a sufficiently large band to sustain itself satisfactorily by reproduction and lack of watering places will not permit any more importations from the Kaibab for the time being.

The antelope band at Indian Gardens now numbers 19, a slight increase over last year. The growth of the herd has been somewhat disappointing and it may be that the Tonto Plateau will prove unsuitable as a range for this animal.

It has been decided to discontinue all predatory-animal control measures until such time as a change in wild life conditions within the park warrants a different policy. There are many wild horses in the western portion of the north rim and effort will be directed in the future toward ridding this territory of these animals which are encroaching on range belonging to and needed by native wild life.

DESERT VIEW REST ROOM

In line with the usual Fred Harvey policy of providing suitable rest rooms at the termini of scheduled auto trips on the south rim, a temporary but delightful rest room was provided at Desert View, where all visitors, whether patrons of the Harvey Co. or not, were welcome. Located on the rim, its walls were largely plate-glass windows, each framed with molding, so that from inside it gave the visitors the impression of looking at framed pictures of the canyon, a very delightful effect. This temporary rest room is to be replaced during the coming winter by a permanent structure, the motif of which has been taken from one of the ancient kivas or ceremonial rooms and observation towers of the prehistoric dwellings of the Southwest.

AIRPLANE SERVICE

Airplane service was established by the Grand Canyon Air Lines, Inc., an Arizona corporation which took over the holdings of the Scenic Airways in the Red Butte airport. Regular scheduled scenic trips included a 45-minute flight from the airport along the canyon rim to the Little Colorado gorge and return, and across the canyon to the landing field in VT Ranch and return. The company handled a good volume of business. It uses excellent equipment and operates efficiently and carefully. In addition to regular schedules, many special trips were made over the Painted Desert country and elsewhere. Consideration is now being given to a proposition to bring the company's operation under park control by issuance of a concession contract.

GRAND TETON NATIONAL PARK

Grand Teton National Park is one of the most precious possessions of the Nation. Those of us who have had opportunities through the years to see its mountains in winter and spring when covered with
snow, to enjoy its lakes, forests, and streams as well as mountain scenery in summer, and its brilliant garb of frost-touched aspen in the autumn, still with a background of granite peaks and glaciers, have long realized that it is a region exceptionally favored by nature. Now it is fast becoming known to all our people, and it brings great happiness to National Park Service men to hear and read the comments that are made on the beauty of the park by visitors who are just discovering it.

It is a new park, established in 1929, but as yet unfinished. Its limited area inhibits adequate planning for the future. An extension to include Jackson, Emma Matilda, and Two Ocean Lakes, and the upper part of the Jackson Hole from the Gros Ventre River to the Buffalo Fork is inevitable.

In 1927 Mr. John D. Rockefeller, jr., through his Snake River Land Co., organized solely to buy lands in the Jackson Hole north of Jackson and hold it until conveyed to the Federal Government, began the acquisition of homesteads and other private holdings which he intends to turn over to the Nation for preservation. In excess of 30,000 acres have been acquired to date at a cost of over $1,000,000. The project is incomplete, but has progressed far enough to bring very satisfactory results. It was first launched in 1922 by a group of Jackson Hole citizens who contended that the Grand Teton Park plans were inadequate and that any proposed park not including the valley lands that were the foreground of the mountains and the winter habitat of the larger mammals of the region would not be satisfactory to the people of the valley nor to the Park Service. The contention of the Jackson Hole group was recognized as sound, but there was no fund in sight from which the privately owned lands, mostly ranches, could be purchased.

Years passed and the new road approaching the Tetons brought hot-dog stands, gasoline stations, camps, fences, a rodeo area, telephone lines, and even a modern city billboard with latticework about its edges. The foreground of the Tetons and the approaches to the magnificent range were all but ruined. Mr. Rockefeller, visiting the region, appreciated its sublimity, and from experience envisaged the future impairment of its extraordinary esthetic values. He decided to supply the funds to do the ideal thing—clear out the private holdings on a basis that would not only be fair but liberal, then turn over the lands to the Government for perpetual preservation as a park. Two ends were to be achieved. First, the preservation of the landscape of this exceptionally beautiful region; second, aid to the conservation of wild life, especially elk, through removal of fences and furnishing of more ranch lands for hay production necessary in winter feeding.

AN IDEAL NEARLY ATTAINED

The ideal is now largely attained so far as Mr. Rockefeller can accomplish his noble purpose. Hundreds of buildings have been razed, scores of miles of fences no longer mar the Teton approaches, the landscape is quite clear of obtrusive structures. Transfer to the Government is the next step. Opposition of various types has delayed this action. Wyoming sentiment, through misrepresentation of the donor’s aims and ideals, and equally unfair misstatements of
national park policy, has been swayed rather against the plan, de­
spite the fact that the Jackson Hole people themselves, the very
 citrus most affected by the plan, favor its early consummation.

As this is written, the atmosphere is clearing, and the prospects
for early action in Congress seem bright. If and when the plan is
carried through, Grand Teton Park will embrace nearly all the
valley lands north of Jackson and east to the national forest line as
well as a strip including Jackson Lake running north nearly to
Yellowstone, perhaps to that park, and west to the Teton divide.
The park will have the duty of preserving the landscape of the region
and providing adequate recreational facilities, including a splendid
trail system, while the Biological Survey, probably with the coopera­
tion of the State, will maintain exhibition herds of native wild life
and will continue the care of the elk and other animals in winter.

JACKSON LAKE SHORES TO BE CLEANED UP

During the past year perhaps the greatest achievement of the
service in the Grand Teton Park region has not taken place in the
park. It is the clearing of the Jackson Lake reservoir and shores
of the original lake of dead timber which was flooded when the dam
was built. Congress in the 1932 appropriation bill provided $100,000
for this work, $50,000 made available to Grand Teton Park and
$50,000 to the Reclamation Service, Minidoka project. The two
bureaus have pooled their funds, and let a contract for the work.
Supervision of the contractor is handled by the reclamation engi­
neer, while our landscape architect advises on all questions of
esthetics. This is about the biggest landscape project of its kind
that has been undertaken, and it would be difficult to find one more
important.

ROAD AND TRAIL CONSTRUCTION

While this work was under way splendid progress was made in
the park in the reconstruction of the road along the shores of Jenny,
Beaver Dick, and Leigh Lakes. The roadsides were cleaned of
brush, stumps, and down timber and vistas were cut to afford excep­
tional views of the lakes and mountains. This drive along the lakes
was also oil-processed late in July through cooperation extended by
Yellowstone National Park which supplied the necessary equipment
and experienced men.

Quite as interesting as the fine road work is the achievement in
trail construction. Our trail program in Grand Teton Park in­
cludes a system of trails connecting the lakes and other features at
the base of the Tetons, a trail up the slopes of the Grand Teton to
its most accessible glacier, and a series of trails through the glacier-
cut canyons to the backbone of the range which when completed will
form a series of loops beginning with the Death Canyon on the south
and ending with one of the canyons in the northern part of the park.
At the present time the Teton Glacier Trail is completed to Amphi­
theatre Lake. The Indian Paint Brush Canyon Trail is complete
to within 2 miles of the head of the canyon. The Glacier Canyon
Trail extends 2 miles up the gorge via Hidden Falls, and Death
Canyon Trail extends back in the mountains 6 miles, approximately
half the distance from Taggart Lake to the head of the gorge. It is expected that next year Glacier and Death Canyons will be connected with a portion of the Skyline Trail which is the summit route tying in all of the proposed canyon feeder trails.

This trail system is a part of the program of the National Park Service to encourage the use of the Teton Mountains by hikers and lovers of horseback riding. In fact it is the hope of all Park Service officers that the Grand Teton Park will always be attractive to the mountain climber, the pack outfit, the dude ranch guest, and all other vacationists who enjoy life in a wild, beautiful alpine region, kept as primitive as possible.

**ADMINISTRATIVE DEVELOPMENTS**

It is hoped that all buildings will be of the trapper cabin architecture, a type of design early adopted by our landscape architects in ranger-station construction. This means logs and rocks will be the principal materials of construction. We have not been able to finally locate the headquarters of the park for the reason that the boundaries have not yet been settled. There are several suitable locations for headquarters, any one of which would be entirely satisfactory.

Camp grounds have been extended at Jenny Lake. Water and sewer systems extension, begun a year ago, was completed before June 15. The camp grounds are now sufficiently large to accommodate comfortably about 300 people. Of course there are many other smaller areas which are available for parties wishing more isolation than is usually afforded by the developed camp ground.

**WILD LIFE**

Special attention has been given to fish planting, in cooperation with the United States Bureau of Fisheries. It is hoped next year to begin the construction of a hatchery and rearing ponds that will supply young trout to all of the waters of the park and adjacent territory.

This has been an exceptionally satisfactory year from the standpoint of the wild life of the park. There was little snow in the Jackson Hole country last winter, and all species of mammals were able to care for themselves on the natural range. There was no feeding of elk by the Biological Survey, which bureau has supervision of the winter care of the wild life in this region. Moose are apparently increasing in numbers in the park, and sheep and bear are reappearing in the Tetons. Both elk and deer, of course, are easily seen, not so much in the park as along the borders but within the area of the proposed enlargement. Several pairs of the trumpeter swan were reported during the season on Jackson Lake.

**ASCENTS OF HIGH PEAKS**

The Grand Teton was climbed during the 1931 season by 57 people, 5 climbed Mount Owen, and 30 or 40 ascents of lesser peaks were accomplished by enthusiastic mountaineers. Especially notable were ascents of Grand Teton, Mount Owen, and Mount Wister along new routes, all considerably more difficult than the earlier and more established courses.
PHOTOGRAPHIC SHOP

The most important thing to note about the business of the public utility operators in the Grand Teton is the fact that Mr. H. R. Crandall, official photographer, moved his picture shop to the Jenny Lake camp ground. Mr. Crandall's photographs of the Tetons and Jackson Hole have attracted wide attention.

SUPPORT OF JACKSON HOLE PEOPLE

The National Park Service is especially grateful for the support we have had from the people of Jackson Hole, particularly the business men of the town of Jackson. The money that is being expended in the park and the employment of nearly all the available men in the valley, combined with State and Federal aid road work, have brought about very satisfactory economic conditions.

GREAT SMOKY MOUNTAINS NATIONAL PARK

Although development of the area within the Great Smoky Mountains National Park may not be undertaken until a minimum area of 427,000 acres within the prescribed boundaries has been tendered to and accepted by the Government for park purposes, the National Park Service was charged with the administration and protection of a minimum of 150,000 acres when that amount had been accepted by the Government. Title to deeds covering 158,676.5 acres was turned over to the United States in February, 1930, by the Governors of North Carolina and Tennessee, and accordingly a small administrative staff has been installed for the administration and protection of the area. J. Ross Eakin, who has served as superintendent both of Grand Canyon and Glacier National Parks, was transferred to the Great Smoky Mountains Park because of his intimate knowledge of conditions in that region and his proven ability to organize.

STATUS OF LANDS

Informal advices indicate that an additional area of approximately 170,000 acres will be conveyed to the United States before the end of the year. This acreage will include the approximately 95,000-acre tract of what is conceded to be the most beautiful virgin area of the proposed park, which was acquired by compromise between the Champion Fibre Co. and the Park Commissions of North Carolina and Tennessee at a cost of $3,000,000 after condemnation proceedings had been instituted by the State of Tennessee for the acquisition of the Champion holdings on the Tennessee side of the park. Great credit is due these three agencies for reaching such a compromise in an amicable manner, so that this luxuriant primitive wilderness could be saved for posterity. The Park Commissions of North Carolina and Tennessee have been conducting an unusually difficult and complicated park acquisition program in a highly creditable manner.

The park is being established one-half by the peoples and States of North Carolina and Tennessee and one-half in memory of Laura
Spelman Rockefeller. Assuredly no finer memorial, enduring to the end of time, could have been selected than the conservation of one of the most glorious wilderness sections of the East.

Unfortunately, when the State of Tennessee enacted legislation granting its park commission authority to acquire lands by condemnation within the park area, a small section in the Elkmont and Cherokee Orchard regions was specially excepted in that act from such acquisition. These areas are vitally needed to protect the approaches and complete the park on the Tennessee side, and while the vast majority of the acreage in these sections has been acquired by purchase, there are some sections that must be acquired by condemnation, and additional legislation is needed and is being sought by the Tennessee Park Commission to effect this. This section is so vital from a park standpoint that, in my opinion, the park can not be accepted as completed until this land has been acquired. I am hoping, therefore, that Tennessee will grant the necessary legislative relief.

**ROAD CONSTRUCTION**

The State of Tennessee’s consistent interest in the park project has been shown in many ways, but in none more effectively than in the planning of construction of roads to and within the park area. A plan for a large boulevard from Knoxville to Gatlinburg has been projected, and in this the Park Service is very much interested. Similarly approaches on the North Carolina side from Asheville to the park have been planned.

The service, through its responsible officers, has rendered all possible assistance to the North Carolina and Tennessee Park Commissions whenever requested.

The States of North Carolina and Tennessee have no funds which may be used to protect the lands acquired for the Great Smoky Mountains National Park, but not yet deeded to the Federal Government. The small protective force of four rangers is therefore faced with the difficult task of protecting, or attempting to protect, an area of over 327,000 acres.

**FOREST PROTECTION**

Protection work in the forests is devoted primarily to forest-fire prevention and suppression. The fire situation in this area is quite different from that of the Western parks, where the summer is the time of greatest hazard. In the Great Smokies there is relatively little danger of forest fires during the travel season, the greatest hazards normally occurring from February 15 to May 15 and from September 15 to November 15, a total period of five months. So far this calendar year the most hazardous period was the last week of January.

Excellent progress has been made in the cutting out of 214 miles of fire trails at a cost of $35 per mile. The locations chosen have been those to be used later for permanent construction, but only crude trails, passable for pack horses, have been brushed out. When the development of the park is authorized, upon acquisition of the necessary lands, these trails will be rebuilt on modern park standards.
Owing to the great rainfall and the dense forests, insuring a gradual run-off, the park area has 600 miles of fine trout streams. Inaccessible waters now provide unusually good trout fishing, but accessible waters have been fished out. To remedy this latter condition an intensive restocking program has been planned. During the year 128,000 rainbow trout and 37,850 brook trout were planted in the streams of the park.

**HAWAII NATIONAL PARK**

Lava returned to Halemaumau, the firepit of the Kilauea Volcano in the Hawaii Park on November 19. The activity lasted for three weeks, and during that time 25,000 visitors came to view the gorgeous spectacle. Starting first with two fountains bursting through the lava of the pit floor, it was not long before the entire floor was rising and the lava bursting into huge blocks which were thrown high into the air. At times during the flow the great blocks were thrown upward 200 feet.

Further volcanic activity in the Hawaii National Park, either in Kilauea or its towering neighbor Mauna Loa, is predicted by Dr. T. A. Jaggar, volcanologist of the Geological Survey stationed in the park. This forecast is based upon the Japanese earthquakes and volcanic disturbances of the past six months, as the park volcanoes and the Japanese features involved are on the same volcanic rift.

The work of the Volcano Observatory, under Doctor Jaggar, was most interesting to the park. It included the operation of five seismographs about Kilauea Volcano, one in Kona and one in Hilo, operation of weather gauges, and tilt study.

Kilauea's activity and the number of spectators it drew caused a sharp increase of travel, breaking all park records at a time when steamship travel to the islands showed a marked falling off. In all, 124,982 people entered the park.

**NATURALIST ACTIVITIES INAUGURATED**

A permanent park naturalist was appointed, as well as a seasonal ranger-naturalist, to explain the park to visitors and to conduct them on trips along the trails.

An interesting activity was the nature-study class from the University of Hawaii. Composed of teachers from various schools on the islands and students from the university, it made its headquarters at the Kilauea summer camp. Many phases of natural history were studied. The park staff assisted the teaching staff.

**NEED FOR BETTERMENT OF ACCOMMODATIONS**

I regret to state that hotel accommodations in the Hawaii National Park as yet are inferior to those established in mainland parks. The lack of hot water, baths, heat, and sufficient electric light in the rooms, coupled with the high rates, has been the cause of numerous complaints. Service officials are urging the utility operators to undertake the amelioration of these conditions at once.
The main feature of this park being the hot springs and the therapeutic use of its waters, it is gratifying to note that interest in the use of the waters has kept pace with the advances in medical science. This applies particularly to the wide field of various forms of arthritis to which much scientific attention has been recently devoted. Increasing interest in the subaquatic thermal manipulative treatment of various paralyses such as those following anterior poliomyelitis has indicated a future use of the hot springs waters which may prove practical with the increased supply of these waters. This increased supply has been affected by the installation during the past year of a central collecting, pumping, and impounding system.

Medical Director George L. Collins was detailed to Hot Springs by the United States Public Health Service to succeed last year's superintendent, Senior Surg. Hugh de Valin, who was assigned to new duties.

The high professional standing of the National Park Service in architecture and landscaping was recognized by Congress in the act approved June 18, 1930, which provided that in the reconstruction of the Army and Navy Hospital at Hot Springs the exterior design should be approved by the service. This approval has recently been given and it is expected that the construction of the hospital will be rushed to completion. It will become undoubtedly the outstanding structure in Hot Springs.

Approximately 63 acres of land were donated to the Government by Col. John W. Fordyce. On this tract is located an old Indian quarry which is believed to be of considerable value from a standpoint of archeology and ethnology.

Hot Springs National Park still presents to its visitors an unusual variety of accommodations ranging from de luxe modern resort hotels to boarding houses with the most reasonable rates. The recreational advantages are of the highest types. Recent additions have been made to the park system of foot and horse trails, the Country Club has added another 18-hole golf course with grass greened to its existing 36 holes, and additional tennis courts have been provided by the city of Hot Springs.

It is estimated that about 163,394 persons entered the park last year.

WATER SYSTEM IMPROVED

The installation of the central collecting, pumping, and impounding system, a unique engineering achievement, now practically finished, not only adds greatly to the amount of hot water available, but by an ingenious system of pipe insulation assures a remarkable retention of heat by water impounded in and delivered from two subterranean reservoirs of an aggregate capacity of 500,000 gallons located on Hot Springs Mountain. The work was done under contract with the Wickes Engineering & Construction Co. of Des Moines, Iowa, under the supervision of an assistant engineer detailed from our San Francisco office.

Numerous repairs and improvements were made to the buildings in the park, and the roads and trails kept in good condition. The
OVERPASS LEADING TO DORMITORY QUARTERS, MANY GLACIER HOTEL, GLACIER NATIONAL PARK

ON DEATH CANYON TRAIL IN GRAND TETON NATIONAL PARK
THE SILVER SWORD PLANT WHICH GROWS IN THE HALEAKALA CRATER OF HAWAII NATIONAL PARK

On left: Plant in full bloom.  On right: Blooms covered with cheesecloth for protection against tyrpetid fly which destroys seeds.

REARRANGEMENT OF PARKING DRIVEWAY AND ATTRACTIVE NEW LAWN AT ZION LODGE, ZION NATIONAL PARK
paving of Reserve Avenue adjacent to the park was completed, thus eliminating a dust nuisance, and the water and electric lines repaired where necessary.

All lawns were placed in good condition and winter grass successfully planted. The slopes on Hot Springs Mountain were landscaped according to plans worked out by the landscape architectural division.

The bathhouses received the customary regular careful inspections. Bacteriological examination of water supplied for bathing purposes was made, and at no time was contamination noted. Bathhouse employees coming in personal contact with persons taking the baths were given physical examinations prior to entrance on duty and subsequently on the first of each month.

Weeds liable to cause respiratory diseases or to favor mosquito propagation were cleared from the park, and all pools of standing water carefully drained or treated with oil.

Park authorities assisted the city of Hot Springs in physical examinations, typhoid and smallpox vaccinations, and Wassermann tests of all persons handling foodstuffs in the city. Cooperation was also given in the examination of various specimens submitted to the laboratory and on matters of rural sanitation.

**LASSEN VOLCANIC NATIONAL PARK**

One of the major events of Lassen's history transpired during the year 1931 when the park and the new Lassen Peak Loop Highway were formally dedicated by the Secretary of the Interior. Governor James Rolph, jr., of California, also participated in the dedication ceremonies, which were held at Kings Creek Meadows July 24, 25, and 26.

A memorial gateway to the late Judge John E. Raker was erected at the southwest entrance to the park by park forces with funds provided by the California State Chamber of Commerce. The memorial was dedicated by the Hon. Harry L. Englebright, Judge Raker’s successor in Congress.

An enormous increase in travel was recorded during the year. The dedication ceremonies, the early disappearance of snow, and the opening of the new Loop Highway were contributing factors. Park visitors totaled 56,833 this year as compared with 31,755 in 1930, an increase of 79 per cent.

The major item of construction was the completion of the surfacing of the new Loop Highway and the oil processing of this unit for its entire length of 29.77 miles. The completion of the Lassen Peak Trail was the major item of the trail program for the season. At headquarters sewer and water systems were installed and a checking station, employee's cottage, equipment shed, and horse barn were erected.

A tract of 280 acres, including Manzanita and Reflection Lakes, was purchased during the year. One-half of the appraised valuation of the land was donated by the Pacific Gas & Electric Co.

The continued planting of fish in the park waters has resulted in this area becoming a fisherman's paradise. Deer are becoming increasingly plentiful, and large numbers of bears and other animals are seen.
With the appointment of an assistant park naturalist the first step forward in an educational program for Lassen was made. Although the museum, presented by B. F. Loomis, of Anderson, Calif., in 1929, has been under park supervision for approximately two years, no material development had taken place. The park naturalist, therefore, had a virgin field in which to work.

The number of rangers proved insufficient to handle the crowds which visited the park this season, and during the dedication ceremonies rangers were detailed from Yosemite and Crater Lake National Parks to assist the protection force.

MESA VERDE NATIONAL PARK

Jesse L. Nusbaum, superintendent of Mesa Verde National Park and archeologist for the Department of the Interior, resigned on March 16, 1931, to accept permanent appointment as director of the new Laboratory of Anthropology at Santa Fe, N. Mex., established for the specific purpose of collecting and studying all data pertaining to the American Indian. The Department of the Interior is fortunate in that it was able to retain Mr. Nusbaum's services as consulting archeologist.

C. Marshall Finnan, acting superintendent of the park for a year and previous to that chief ranger, was appointed to the superintendency upon Mr. Nusbaum's resignation. During his year as acting superintendent, Mr. Finnan proved himself splendidly equipped for the work.

Public interest in southwestern archeology has grown rapidly during the past decade. Mesa Verde, as a significant contributor to the story of prehistoric man in the Southwest, has received constantly increasing attention, resulting in 18,003 visitors to the park last year, the greatest travel it has yet experienced.

THE LABORATORY OF ANTHROPOLOGY

Santa Fe's Laboratory of Anthropology is the direct result of this public interest in prehistoric man and his homes and mode of life. On September 1 this new institution was formally opened, in the presence of a number of the ranking archeologists and anthropologists of the Nation. The one building now completed is but the first unit of the vast laboratory which it is believed will develop as time goes on. It faithfully carries out in every detail the Spanish mission style. Already fascinating prehistoric Indian exhibits are on display.

CONGRESSIONAL AID TO THE PARK

Through the interest of Congress in the Mesa Verde National Park, two important administrative moves were made. One of these granted to the President authority to add to the park a strip of land including an approach highway 1 mile in length and right of way on each side sufficient to protect the scenic beauty of the approach. This short road, built and improved at county expense, connects the park with the main approach highway. The other prohibited the issuance of any permits hereafter allowing prospecting, mining, or other utilization of the mineral resources of the park.
Climatic conditions were ideal for all construction purposes. Throughout the winter the deep test water well was drilled, with a minimum of inconvenience and delay through storms. The depth to which the well will have to go to produce water makes the project unique and without precedent in the National Park Service. So far two water-bearing sands were penetrated. The first, in the upper formation at a depth of 800 feet, produced a flow of 13,500 gallons a day. The second, in the Dakota formation at a depth of approximately 3,000 feet, produced an almost negligible amount. Since the combined output of these two flows would not be sufficient to meet present water requirements of the park, it is necessary to carry the well deeper to the main water-bearing sands known as the Navajo formation. It is urgently hoped that sufficient funds to continue drilling may be provided. Unless more water can be made available in the park, it will be impracticable to carry out plans for the erection of a modern hotel or lodge with private baths and similar facilities.

**ROAD AND TRAIL DEVELOPMENTS**

The improvement of the year that has drawn the most favorable comment from park visitors is the newly-completed short scenic road leading from the main entrance highway to the highest point in the park known as Park Point. From the terminus of the road a panorama of unsurpassed grandeur is revealed, extending into the four States of Utah, New Mexico, Arizona, and Colorado.

Work on the entrance road itself was completed to the point of surfacing. Graveling is now in progress and will be finished about November 1. It has been found, however, that in Mesa Verde National Park, with its long months of drought and severe windstorms, usually followed by periods of excessive precipitation, the roads must be well treated. For this reason the gravel used this year was a course of large, crushed material intended only for a base, and this foundation will be treated with oil next year.

Of especial interest to visitors was the reconstruction of trails leading to several of the ruins. Spring House, perhaps the most visited of any of the ruins not in the vicinity of park headquarters, formerly was reached by an old trail with grades as steep as 47 per cent and of insufficient width for horses to pass. This was rebuilt to a 4-foot width during the past year, and all grades reduced to a maximum of 15 per cent. The foot trail to Balcony House, one of the most important of the ruins, was greatly improved. Reconstruction of the road between this ruin and Cliff Palace was also undertaken, and several other stretches of old roads leading to important ruins were under reconstruction.

**NAVAJO LABOR**

Both the National Park Service and the Navajo Indians of the vicinity have benefited from the plan adopted 10 years ago of employing Navajo Indians for common labor. As a result of using Indian labor this past summer, and the foresight of the Indians in saving carefully, about 60 Navajo families are now assured of
sufficient funds to carry them through the winter. Special attention was paid last season to encouraging and assisting the Indians in learning one of the skilled trades. Several hundred cubic yards of masonry head walls and retaining walls on new roads were built entirely by Navajo skilled labor, and they showed a fine understanding of this work. The finished product compares favorably with similar construction along the main highway by skilled white masons.

**REPAIR OF SUN TEMPLE**

The outstanding archeological accomplishment was at Sun Temple, the great prehistoric ruin on the surface of the mesa. In addition to recAPPING the walls of the entire structure, concave drainage to protect the walls was installed. Maintenance and minor repair of some of the other ruins also was accomplished.

**MOUNT MCKINLEY NATIONAL PARK**

In July, I had the good fortune to accompany the congressional party to Alaska and Mount McKinley National Park. This was my first visit to the far North, and despite extensive advance reading I was totally unprepared for the vast areas of beautiful and intensely interesting country to be found there.

Alaska offers a number of intriguing trips, but no tour of the Territory would be complete without a journey one way over the Alaska Railway and into McKinley National Park, the second largest in our system.

**MOUNTAIN SHEEP AND OTHER WILD LIFE**

In addition to towering Mount McKinley, the highest mountain on the North American Continent, the park contains a magnificent display of wild life under perfectly natural conditions—the finest that I know of any place. The White (Dall) mountain sheep, moose, grizzly and black bear, and caribou are the large mammals easily seen by all visitors. The protection afforded the wild life in recent years, of course, is responsible for the increase in the moose and bear, and for the maintenance of the fine herds of sheep. There are some predatory animals such as wolves and foxes, but the National Park Service men are watching this situation carefully, and control measures will be taken as necessary to protect the sheep and other fine animals.

I reread Charles Sheldon’s book, “The Wilderness of Denali,” and immediately thereafter took trips by air which enabled me to determine approximately the situation of the sheep. I am of the opinion that the sheep population of the park is probably as large as it was in 1906 to 1908, when Mr. Sheldon was there making his careful observations. From every standpoint, I thought the present condition of the wild life excellent. There can be no doubt about the advisability of extending the boundaries of the park somewhat in order to afford better protection to moose, especially in the Wonder Lake region and along the boundary in those sections of the park bordering the headwaters of the Kantishna and the Kuskokwim.
It is desirable also to make an extension of the park in this section in order to make the Wonder Lake available to park visitors and to justify the extension of the auto trail to that region. It is likely that ultimately tourist facilities may be necessary on Wonder Lake.

NEW ROADS AND BRIDGES

The road work in the park is progressing satisfactorily under the Alaska Road Commission. The new Polychrome Pass section was opened late in August, and is one of the great sections of national-park highway. Built to all modern standards, except in width, this stretch of road affords a spectacular outlook over Polychrome Pass, the Alaska Range, and the branches of the Toklat River. A very attractive log bridge over the East Fork, designed by our landscape architectural division, is a notable addition to the structures of the park. The new road is opened up to the Stony Creek region and with a new bridge over the main Toklat just authorized, it will be possible next year for visitors to reach a point over 60 miles west of the railroad.

SERVICE TO THE PUBLIC

Good service was rendered by the Mount McKinley Tourist & Transportation Co. Its accommodations are of the pioneer type but are comfortable and every visitor seems to thoroughly enjoy them. During my visit to the park, I gave such study as I could, in my limited time, to sites for a new lodge to be built near the base of Mount McKinley. There are several sites available, all having good water and excellent views of the great mountain. It will be two or three years before a new site can be occupied.

Air service by Alaskan Airways (Inc.) was continued this year. This park is peculiarly adapted to air service. Its river bars afford fine, safe, landing fields, and the Alaska Range, Mount McKinley itself, and the many branch ranges in the park, all replete with glaciers and snow fields, give the airplane traveler panoramas of Alpine grandeur which can not be surpassed. Two airplane trips over the park convince me that the Alaskan Airways service is quite as important to that region as any facility we have.

OVER MOUNT McKINLEY BY AIRPLANE

It is important to note here that on August 29, 1931, Pilots Joe Crossen and Ed Young, of Alaskan Airways, each with a sound motion-picture operator, flew over Mount McKinley's summit. Traveling at an altitude nearly 21,000 feet over America's wildest and most inaccessible terrain, these intrepid men in two airplanes have made it possible for us in Washington in early October to see pictures of a peak that was extremely difficult for the few climbers who have attempted to scale its ice-clad sides.

PARK HEADQUARTERS

Our headquarters deserve mention because here are two very interesting features which all visitors enjoy. Our thirty-odd sledge dogs, their kennels, and kitchen plant for preparing their food, give a new note in park management. So much for one of the features.
The other is our new log houses in the headquarters area. They are not only of very interesting design but are built with the utmost care by the superintendent and his men, who are experts in the use of coping and other log-working tools.

If more than allotted space has been occupied by this enthusiastic statement regarding Alaska and Mount McKinley Park, perhaps two facts may be offered by way of justification. First, previous reports have not given adequate attention to our farthest north park and, second, I am especially fond of a wilderness country and pioneer people and back of the Alaska Range, in the park, and in the Yukon Valley I found the combination I have always liked and I hope the time is not far distant when I can go back again.

**MOUNT RAINIER NATIONAL PARK**

Sunrise, a beautiful scenic area in the White River District of Mount Rainier National Park, was formally opened to the public on July 15. The popularity of this area was apparent almost immediately and all daily, weekly, and monthly travel records for the park were broken. The new White River Highway to the Sunrise area brings out the best scenic features of the district through which it passes. The bridge work and masonry guard rails along the highway are made of natural rock, harmonizing perfectly with the landscape. At Sunrise Point, and at several other advantageous places, observation parking space has been provided to enable visitors to enjoy magnificent views of Mount Rainier and other mighty peaks.

Accommodations in the new area consist of European-plan lodge facilities and 200 modern housekeeping cabins located in a beautiful site which overlooks White River and Emmons Glacier.

Altogether, 293,562 people visited Mount Rainier this year as compared with 265,620 for the last year, or an increase of 27,942.

**AREA OF PARK INCREASED**

An area of approximately 34,000 acres was added to the south and east portions of Mount Rainier. In addition to enriching the natural scenic features of the park and greatly increasing its educational features, this boundary change simplifies administration, protection, and development of the park by affording a natural boundary on the east, based on topographic conditions. Chinook Pass, thus made the new east gateway, is an unusually spectacular entrance.

**ROADS AND TRAILS**

Chief among road construction projects were the added units of the West Side Highway and the beginning of work on the East Side Highway.

During the study and planning of park roads, it has been the policy to provide parking spaces at or near some of the outstanding scenic points to encourage motorists to stop and view the scenery along the highway. The first of these park views, Ricksecker Point, is located on the Nisqually Road leading to Paradise Valley. Tahoma Vista, on the first leg of the West Side Highway and Sunrise Point, at the end of Sunrise Ridge where the White River Road turns
upon itself to head toward “The Mountain,” are two other such points. Each of these outlooks, developed at some little extra expense, is built with stone guard walls to protect the motorists. A pause on any day at any one of these scenic spots during the travel season will convince the observer of the tremendous popularity of such facilities for viewing the natural wonders of the park.

Counts made on busy days indicate that fully 80 per cent of incoming vehicles stop at such places from a few minutes to an hour or more. Such popularity more than justifies the continuance of the policy of developing prominent outlook points along all park highways. An interesting fact in this connection is that every visitor, regardless of physical condition or time at his disposal, is provided with at least one opportunity to enjoy the scenery of the park to the fullest extent possible.

The Skyline Trail now avoids the ice altogether and the climb to Camp Muir is largely made over barren rock because of the rapid melting of the winter’s snow. New ice caves were opened up in Paradise Glacier, the old ones having been destroyed by melting. There were no decided changes in ice conditions at the summit. The most popular route for summit climbers was, as usual, the one from Paradise.

**HIGH FIRE HAZARD**

Although acute fire hazard conditions existed throughout the 1931 summer season no fires have occurred in the park. The three park lookout stations have reported 26 fires, all outside the park boundary. Following the windstorm of April 22-23 the humidity dropped to eight and remained dangerously low for several weeks. Heavy rainfall during June greatly relieved the danger of fire and its effect was noticeable during the rest of the summer.

A fire one-half mile from the park boundary in a blowdown area was reported, and when placed under control, largely through the use of Park Service men and equipment, covered 20 acres. It is claimed that the fire, which for a time threatened park forests, was started from a snag which held fire during last year’s Sunset Park fire. The fire escaped from right-of-way clearing operations.

**FISH CULTURE ACTIVITIES**

Negotiations for a fish hatchery in the park were entered into with the United States Bureau of Fisheries, but no definite site for a hatchery was selected.

Fish spawned only in the larger lakes, which were closed to fishing during the spawning season. While fishing is not yet as good as it can be with further development, many fine catches were made during the season just past.

**EDUCATIONAL DEPARTMENT**

The fiscal year 1930-31 was marked by continued progress of the educational department. The greatest improvement was the appropriation of sufficient funds to permit the remodeling of the museum at Longmire. Many exhibits and other museum materials were loaned to the museum by the State Museum at the University of Washington.
GLACIER RECESSION

Glacier recession reached the highest point in history during the past year, the Nisqually receding 118 feet and wasting greatly at the top. Great recession and similar wastage was also noticed in the other glaciers.

PUBLIC UTILITIES

While business has fallen off because of the general business depression, the Rainier National Park Co. has gone ahead with its development program. A complete new lodge containing 40 rooms, cafeteria, supply store, and other services, and 275 one, two and three room housekeeping cabins were constructed at Paradise Valley during the fall of 1930 and placed in operation June 20, 1931. Paradise Inn was redecorated and refurnished, adding greatly to the attractiveness of the building and the comfort of guests. The new Paradise Lodge and housekeeping cabins replaced the old tent camp and proved instantly popular with visitors. The 200 housekeeping cabins and kitchen and cafeteria wing of the new lodge at Sunrise, which were started last fall and opened to the public July 15, also attracted favorable comment.

Another improvement inaugurated during the year was in the transportation service. A contract entered into with the North Coast Transportation Co., a company operating extensive bus lines throughout the Pacific Coast States, provides that the North Coast Co. will haul all passengers from Seattle, Tacoma, and Portland to Longmire in their 32-passenger, inclosed-type busses. At Longmire the visitors transfer to the park-type open stages carrying 14 passengers. This arrangement provides comfortable, inclosed-bus service over the less scenic State highways but a better opportunity to enjoy the forest and mountain scenery along the park roads.

Patronage of the winter-sports facilities at Longmire showed a slight increase last winter, although snow and climatic conditions were below normal. Increased interest in winter sports and a lack of snow at Longmire caused more people to use the winter trail to Paradise Valley than ever before.

PLATT NATIONAL PARK

While the general economic depression throughout the country has not decreased the number of visitors to the park, the stay of the average visitor was very short in comparison with former years. There were 325,000 visitors in 1931 as compared to 178,188 visitors during the 1930 travel year, but much of this travel, which is estimated, originated in the locality. The number of campers in the park increased from 64,057 in 1930 to 68,140 in 1931.

The most important improvement during the year was the installation, at a place remote from the town and the park, of a 4-hopper Inhoff sewage disposal plant and sprinkler filter. The cost was $45,000 and was borne jointly by the State of Oklahoma, the city of Sulphur, and the park service.

The springs have been inspected regularly for surface seepage and the containers sterilized. Specimens of the waters from the principal springs have been submitted to the Oklahoma Public Health
Snowplow kept Crater Lake Park roads open for first time in winter, greatly facilitating construction work.

Dragging to eliminate rough spots on the Wawona Road, Yosemite National Park.
TRACTOR BRINGING SUPPLIES NEEDED IN DRILLING DEEP TEST WELL, MESA VERDE NATIONAL PARK

MUCK TRAIN AT THE EAST PORTAL OF THE WAWONA TUNNEL, YOSEMITE NATIONAL PARK
Service for bacteriological analysis and in no instance has an unfavorable report been received. Few instances of insanitary camps have been reported. This is remarkable when it is remembered that the park is located on two State highways, is in the vicinity of the largest oil fields in the world, and receives large numbers of nomadic visitors.

ROCKY MOUNTAIN NATIONAL PARK

For the past two seasons Rocky Mountain National Park has called me first as I have gone West on my annual inspection tour. This time it also called the Secretary of the Interior. Its problems were not pressing. Its organization has been functioning smoothly. Steady progress has been made in all lines of activity. It comes first on an itinerary because it is so easily accessible from the East and Middle West by train or by automobile. So we Washington officers find ourselves reaching Rocky Mountain early in the season and after a trip of only about 48 hours by rail from the Atlantic seaboard.

It is quite startling to pause at the Rocky Mountain Park entrance after a delightful ride from Denver in the afternoon and recall that it has been only two days since our train left the Union Station at Washington.

It is easy to imagine the feelings of a Middle Westerner who for the first time arrives in the park region fanned by the cool breezes from the Great Divide, and suddenly remembers that it was only yesterday that he left Chicago, or only last night that he boarded his train at Omaha or Kansas City.

Travel at Rocky Mountain Park this year increased 3.18 per cent over last year. Of the bigger parks in the intermountain region, this showing of increased travel was the best by a considerable margin. There was a decrease in train travel, but motorists came in great numbers and remained rather longer than usual. Our public camp grounds were better patronized than ever, but hotel and pay camp patronage was probably better than was expected.

There can be no doubt about Rocky Mountain Park's future as a vacation land. Its proximity to the Great Plains States and, for that matter, to the center of population, its magnificent scenery, its invigorating air, its wide variety of accommodations, all combine to make it a most attractive region in which to spend one's entire summer holiday.

TRAIL SYSTEM BEING EXTENDED

The favorite vacation sport in Rocky Mountain Park is horseback riding, and it is the present program of the National Park Service to extend the trail system as rapidly as possible. New trails are being built back to lakes and glaciers and high places in the mountains, and in the valleys the trail systems are being tied together so that horses may always be kept from the highways. There are probably 1,500 head of horses being used in Rocky Mountain Park and in the Estes Park section.

A letter signed by the principal saddle-horse operators recently came to the superintendent expressing appreciation of the trail work
already accomplished, and this letter undoubtedly reflects the pleasure and satisfaction of the thousands of saddle-horse users who traversed the new bridle paths.

There are 200 miles of trails in the park. New trails built this year include 1.7 miles up Glacier Creek to the Storm Pass Trail, 5.9 miles of the Fall River Trail connecting with 1 mile built by the Estes Park Chamber of Commerce, Nymph Lake Trail extension one-half mile to Dream Lake, and a beginning of the trail between Bear Lake and the Pool via Fern and Odessa Lakes. The Gem Lake Trail was reconstructed in part, and likewise part of the Twin Sisters Trail was reconstructed. On the west side of the park 1.8 miles of trail were built between North Inlet Trail and Lake Nakoni. This is part of the North and East Inlet loop. Also, a mile of new trail built this year nearly connected Lone Pine Lake and Lake Verna. Trail work is being concentrated in the Estes Park, Grand Lake, and Bear Lake regions, from which the bulk of the travel originates.

**PROGRESS IN ROAD BUILDING**

The new Trail Ridge Road over the Continental Divide is taking shape rapidly. The east-side section, 17.2 miles in length, between the Highdrive and Fall River Pass, is practically completed and will be put in service next summer, at the same time being surfaced with crushed rock and oiled. This is the section of the new transmountain road that makes this highway one of the greatest roads of the world. It climbs to a height of over 12,200 feet and along Trail Ridge on the very summit of the Rockies takes its course for a distance of 12 miles at an altitude in excess of 12,000 feet. The panoramas of peaks, forests, and glacier-carved canyons to be observed from Trail Ridge are unbelievably spectacular.

The west-side section of this highway, 10 miles in length, destined to be known the world over, is also under construction and will be finished a year hence. Its western terminus is at the Colorado River. The present Fall River Road will be maintained for down traffic only from Fall River Pass to Estes Park, affording an interesting loop trip of value to vacationists sojourning on the east side of the park.

**LANDSCAPING ACTIVITIES**

Much effective landscaping and roadside clean-up was accomplished during the year, particularly on the Bear Lake Road, our best improved highway at the present time.

As a landscape protection to the new Trail Ridge Road, the Horseshoe Inn property was purchased, and will probably be cleared of its buildings and fences before next season. Further land purchases were made along the new highway, and others necessary to protect landscape and afford winter range for wild life are in contemplation.

**THE WILD LIFE**

The wild life in the park has been thriving, except that the mountain sheep do not appear to be increasing, and at times do not look as healthy as we would like to see them. The elk need more winter range. This fine elk herd faced decimation, if not annihilation, this
fall when Larimer County declared an open season on elk for several
days in November. On request of the park officials, supported loy­
ally by the Estes Park people, the county authorities rescinded their
earlier action.

NEW INFORMATION OFFICE AND MUSEUM

Our new information office and museum, described elsewhere in the
report, is nearing completion as this is written. It is a splendid ad­
dition to our facilities in the park.

A GREAT TOURIST RESORT

With its new trails leading to all the high places and the lovely
hidden valleys of the Rockies, with its new road unsurpassed in
grandeur of its far-flung vistas, with its wild life so attractive to
park visitors, with its extraordinary facilities for accommodating
travelers for a night or for a season, with its friendly Estes Park
and Grand Lake citizens supporting the National Park Service,
Rocky Mountain Park, it seems to us, is just attaining its destiny
as one of the greatest of all tourist resorts.

SEQUOIA NATIONAL PARK

Trail construction is one of the most interesting as well as one of
the most important activities in Sequoia. Not only do many visitors
reaching the park by automobile and horse take to the trails after
their arrival, but our records show that about 4 per cent of them
actually enter the park by trail. Work was continued on the High
Sierra Trail, which now covers a distance of 17 miles from its be­
ginning at Crescent Meadow. That part of the trail approaching
the Hamilton Lake area was heavy construction, and for that reason
the mileage covered was not as great as when the work was in less
difficult country. Another interesting trail, especially from an ad­
ministrative and fire-prevention point of view, was that from Para­
dise Creek to Atwell. It crosses an area of extreme fire hazard and
enables quick access to fires in regions which could be reached
formerly only after a journey of several hours or a day.

Work was also extended on the John Muir Trail through the park
to Forester Pass, where connection was made with trail construction
carried on by the Forest Service. A small amount of work will be
necessary in 1932 to conclude this project. The John Muir Trail,
when completed, will connect Sequoia and Yosemite National Parks,
passing through spectacular mountain country.

Popular Moro Rock was made more accessible to visitors by the
reconstruction of the Moro Rock stairway. About 75 per cent of this
work was completed during the 1931 season.

Notable progress also has been made on road construction, a new
contract being let for grading an additional 2.7 miles of the Generals
Highway connecting Sequoia and General Grant National Parks to
Halsteacl Meadow. Three bridges at Lodgepole, Clover, and Silli­
man Creeks were constructed under contract. Under the approach­
road authority, grading of 6.7 miles of the Generals Highway start­
ing from the north boundary of Sequoia National Park, running
northwesterly to General Grant Park, were placed under contract
this year, as well as 2.38 miles of the Generals Highway within General Grant National Park. The completion of the Generals Highway will afford an interpark trip through unsurpassed mountain scenery. Continued improvements under Park Service force account supervision have been accomplished on the Moro Rock-Soldier Loop Road, subsidiary camp roads, and the old Colony Mill Road. Oiling of the Generals Highway from Ash Mountain to Lodgepole, and of footpaths in Giant Forest has done much to eliminate the dust nuisance. Of interest was the general study of conditions and possible locations for that portion of the High Sierra Highway extending in a general southeasterly direction from Giant Forest to the boundary line and thence to Isabella.

YEAR-ROUND TRAVEL INCREASES

Again the park made a new travel record, with 143,573 visitors. The Fourth of July, the heaviest travel day in its history, saw 4,938 visitors and 1,382 automobiles in the park. Winter travel showed a corresponding increase, and it was not uncommon for several hundred people to enter the park in one day during the off-season months.

EDUCATIONAL ACTIVITIES

The year has been one of real development in educational work. Two temporary ranger naturalists were employed for the first time. The development, however, does not indicate an increase over past years in educational activity, as formerly a woman museum attendant was supported through private subscription and a ranger was loaned as an aid to the park naturalist. It does indicate, however, that this division is no longer entirely dependent upon other help for the success of its work. Because of limited personnel, educational work is confined almost entirely to the Giant Forest area. Naturalist service should by all means be made available at Lodgepole and other areas. Through the interest of Ira Clayton, an “old timer” who lived with Hale Tharp, a feature of historical significance was improved by the restoration of Tharp Log, where the first white man to enter Giant Forest made his home in a fallen hollow sequoia tree.

The museum at Giant Forest unfortunately has long since reached the limit of its capacity and its unsafe construction discourages the addition of exhibits.

FOREST AND MEADOW PROTECTION

In order that the latest methods and practices in forestry might be put into effect, the acting park forester visited the forest insect laboratory, the nursery of the California Forest Experiment Station, and several city nurseries during the year.

Control work was also conducted on the false hellebore which was rapidly taking possession of the Giant Forest meadows and giving them a very unsightly appearance.

The Ash Mountain Nursery supplied planting stock for reforesting trampled areas in the Giant Forest, planting in the administrative area, and furnishing sequoia seedlings to selected institutions and organizations. The seeds of many native plants were gathered to increase the variety of planting stock.
A forest-insect exhibit was prepared for illustrating to the Appropriations Committee, on the occasion of its visit, the seriousness of the insect conditions and the necessity for control.

A complete survey was made of forest-insect conditions in the western part of the park. As a result of conditions observed, bark-beetle control work was inaugurated in three areas. This important protection measure will be extended each year as funds become available, for the beauty of Sequoia Park especially depends upon the preservation of its forests.

WIND CAVE NATIONAL PARK

The most important event of the 1931 season at Wind Cave was the installation of an electric system providing adequate service circuits and a most satisfactory electric lighting of the cave trails and the important and interesting formations. The lights were first flashed inside the cave on July 1, and their continued use since that time has made possible a greater appreciation of the beauties and wonders of the cave by the visitors as well as assisting materially in the administration of the park and the protection of the formations.

While the 1931 season shows a decrease in travel, the year has been marked by real progress in the development of the park. Both park headquarters and the cave are situated on a heavily traveled highway, making impracticable the maintenance of entrance gateways and an accurate count of automobiles and persons entering the park. However, 18,716 persons actually made the cave trip this year, while 23,639 made it last year. This decrease, which is attributed to general economic conditions, is said to be less proportionately than the decrease in travel reported by other tourist centers in the Black Hills.

On March 15, 1931, Supt. Anton J. Snyder was transferred to Carlsbad Caverns National Park, and Edward D. Freeland was transferred from Carlsbad to Wind Cave National Park as superintendent.

An act of Congress approved March 4, 1931, extended the park boundaries on the north, to take in the beautiful wooded Beaver Creek Canyon and a half section of partially timbered land on the northwest corner of the park.

On June 16, Robert and Fanny McAdams, owners of land adjacent to the park, signed an agreement to sell to the Government two fine springs of water and 101 acres of land to protect the springs and to provide a right of way for the pipe line. The National Park Service is indebted to the United States Senator Peter Norbeck and to Superintendent Robertson of the Custer State Park for their interest and cooperation in the negotiations for this purchase.

The past winter was the mildest recorded in many years. The coldest temperature, lasting only three days, was 6° below zero. The past summer, likewise, has been unusual in that the heat has been extreme with high humidity and very little rainfall.

Construction projects completed during the year included, in addition to the electric system heretofore mentioned, a complete water and sewer system.

H. H. Hoyt, gamekeeper for the United States Biological Survey, reports a good increase in the buffalo herd this year; also a moderate increase in the elk and antelope herds.
The public-utility operator, Mr. C. C. Gideon, opened for business on June 1, operating a lunch counter, soda fountain, and service station. Meals were served at all hours and at reasonable rates. The service rendered by Mr. Gideon's organization is courteous and a credit to the park.

YELLOWSTONE NATIONAL PARK

The annual reports of the National Park Service have often begun the story of the Yellowstone season by pointing out that every year in that park brings some outstanding event, that no season is or can be routine and commonplace for the reason that Nature, which there manifests itself in such varied forms, can be depended upon to startle park officials and visitors with one or more surprises.

The season just closed was no exception. While travel was slightly less than that reported for 1930, the decrease being in visitors coming by rail, while the weather was warm and there was practically no precipitation, while fires in distant sections of the park during part of the summer threw a pall of smoke over the entire area, Nature, as usual, wrought interesting changes in thermal basins and arranged for an exhibit of wild life which was rather better than is usually seen.

The most spectacular event in the geyser basins was the eruption of the Splendid Geyser, which erupted on July 28 for the first time since 1892. The height of the eruption was from 100 to 150 feet and lasted for five minutes. This very unusual eruption of the geyser best known to people who are now grandparents had very interesting influences on the Daisy Geyser and several near-by pools of hot water. In the Norris Geyser Basin there was increased power in the eruptions of the Ledge Geyser. In the Old Faithful region, in addition to the display by the Splendid, the Whistle Geyser, long inactive, very effectively demonstrated that it was still alive.

THE WILD ANIMALS

The condition of the wild life in the park has been discussed in another section of this report. As a matter of fact, many of the most important activities of the Yellowstone are of such general interest taken in connection with the activities of the National Park Service as a whole that they have been discussed in sections broadly descriptive of the park system. It may be said here, however, that the fine weather and long dry summer provided ideal conditions for wild life growth and protection, but there is a dark side to the picture which we face as winter approaches. The lack of precipitation made it impossible to harvest the usual crop of hay, and there will be a shortage of winter forage, particularly for buffalo, if we are unable to dispose of a large part of the surplus animals of the herd.

Some years ago it was decided that the buffalo herd should be maintained at approximately 1,000 head and acting under authority granted by Congress we have been disposing of a large part of the surplus each year, either by gift of animals to zoological parks and private estates for exhibition purposes, or by sale to enterprises dealing in buffalo meat and hides. This year nearly 250 calves appeared in the herd bringing its total number to more than 1,300.
Up to this writing it has been impossible to arrange to dispose of the surplus through any of the various courses heretofore open to us.

In connection with the discussion of the Yellowstone buffalo herd, mention should be made of the fact that Burton C. Lacombe, chief buffalo keeper for many years, reached the retirement age, but it was possible to retain him in active service by assigning him as custodian of the Craters of the Moon National Monument in Idaho.

The bears in the park are apparently increasing. It is difficult to place an estimate on the number of grizzly and black bears that inhabit this great reservation. While many of these interesting animals are seen along the road there is no reason to believe that they are likely to increase beyond reasonable numbers. This is particularly true in the case of the grizzly bear which in the United States, exclusive of Alaska, really is a rather rare species. The black bears have become troublesome at times, but it has always been the practice of the National Park Service to dispose of members of the black bear family when they show signs of making unprovoked attacks on park visitors or their property. This subject is discussed elsewhere in the report. A fine new bear feeding field was opened to the public on Otter Creek just south of Canyon Junction. Great gatherings of visitors are to be found each night at the various feeding grounds in the park, particularly at Old Faithful where under the auspices of the educational division a very interesting talk is given by a ranger naturalist.

MANY STREAMS RESTOCKED

There has been the closest cooperation between the Bureau of Fisheries and the National Park Service in the restocking of park waters. At the lake hatchery 17,500,000 eggs were harvested of which 6,000,000 were hatched in the park and distributed to its streams and lakes. Eggs collected in the Yellowstone, of course, are of the native cutthroat trout, but this year for the first time eggs of the grayling were taken at Grebe Lake.

EXCELLENT PROGRESS IN ROAD BUILDING

Fine progress was made in the improvement of roads of the park. The system includes 310 miles within the park boundary. Approximately 60 miles of the east and south approaches to the system were given oil treatment to suppress dust. Clean-up of roadsides was conducted as a maintenance project, over 135 miles being cared for this year. Twenty miles of the West Gallatin road were surfaced with crushed rock, and an armor coat of asphalt-treated material was placed on 10 miles of the road between West Yellowstone and Madison Junction. Many sections of the main highways were reprocessed under the so-called oil-mix method.

New road projects under construction included the surfacing of the new highway between Obsidian Cliff and the Firehole Cascades, 24 miles in length. The 17-mile stretch of the Cody road between the east entrance and Lake Butte was also completed to the same standards. These roads can be said to be completed until such time as heavier paving is needed.
The new road to Artist Point, 1.6 miles, was graded and surfaced with crushed rock. Another fine project completed was the grading of the new road between Grand View Point on the Canyon of the Yellowstone and Tower Falls. This is the section known as the Dunraven Pass road.

New contracts let this year include another section of the Grand Loop from Tower Falls through Camp Roosevelt and on to Blacktail Deer Creek, only about 7 miles from park headquarters; also the section from Mammoth Hot Springs to Obsidian Cliff exclusive of a small section in the Golden Gate.

The road construction policy for Yellowstone Park contemplates the rebuilding on modern standards of the Grand Loop Highway connecting all the main points of interest and of the six approaches to that highway before any new projects are undertaken.

Another policy contemplates keeping as much of Yellowstone Park as possible in primitive condition and we are always glad to emphasize the fact that more than half of this great area is a wilderness unspoiled by roads, in many cases untouched even by man-made trails, the paths of animals having been cut out to provide routes for patrolling rangers.

SANITARY IMPROVEMENTS

In a park as large as this one important sanitation problems are always requiring solution. Great strides have been taken in installation of sewer and water systems in all parts of the park. In fact, all of the points of tourist concentration are protected by sewage disposal facilities except headquarters, and in the current appropriation act funds are included to begin the construction of the Mammoth Hot Springs sewage plant. Altogether there are 16 water systems, 20 sewer systems, and 5 incinerators in the Yellowstone, not counting primitive facilities at minor camp grounds.

THE PUBLIC UTILITY OPERATORS

Mention of the service of the Yellowstone operators has been made elsewhere. Excellent accommodations were provided as usual. The new Canyon Hotel wings mentioned in last year's report were completed and partially furnished during the past summer.

Stores in the national parks are somewhat incidental enterprises, but in Yellowstone there are several chains of photographic, curio, and general supply stores that are unique. The Haynes Picture Shops are the largest retail photographic enterprises that we know of. They are housed in relatively new buildings. The Whittaker and Pryor groups of stores are notable both for size and stocks of goods. The Hamilton chain, however, ranks among the unique features of the park system. The new Hamilton Stores at Old Faithful and Fishing Bridge are tremendous structures built of concrete and steel and equipped with every modern merchandising facility. They are likely to be, for years to come, the largest enterprises of their kind. The courage of the owner and his financial backers commands admiration. There can be no doubt of his faith in the future of Yellowstone Park.
LE-ME, YOSEMITE INDIAN, DEMONSTRATING INDIAN SIGNS AND DANCES
OUTSIDE YOSEMITE NATIONAL PARK MUSEUM

UNIVERSITY OF CALIFORNIA FIELD CLASS IN YOSEMITE NATIONAL PARK
WEATHERPROOF PICTORIAL FINDER AT VALLEY VIEW, YOSEMITE NATIONAL PARK

Visitors orient themselves by noting labeled feature on the picture.

A NATURALIST AT GLACIER POINT EXPLAINING THE GEOLOGIC STORY OF THE YOSEMITE VALLEY
The forests of the park have been giving us much concern. There is a very serious insect epidemic in the southwestern part of the park which, if not controlled, may destroy all of the lodgepole forests, and when it is realized that over three-fourths of the area of the Yellowstone is covered with this species of conifer the potentialities of this insect infestation are startling indeed.

The lack of precipitation during last winter and the dry summer made conditions in the forest just right for bad fires and for the first time since 1919 there were serious fires to combat. There were 113 fires in all, which burned a total of 20,605 acres. The largest fire was in the Heart Lake district where 18,756 acres of timber were destroyed by fire caused by lightning which, due to high winds, spread rapidly and widely over the big area. A fire late in September burned approximately 1,000 acres on Chipmunk Creek and another in the Gallatin country swept 400 acres earlier in the month.

**NO PARK BOUNDARY CHANGES**

There have been no boundary changes in Yellowstone during the past year. In another part of this report there is a discussion of the final recommendations of the Yellowstone Park Boundary Commission which made a study of the extension proposals in 1929.

**GENERAL CONDITIONS NEVER BETTER**

I have been closely associated with the administration and protection of Yellowstone Park for 16 years and despite the dry season and interruption of normal activities by forest fires and other emergencies, upon an inspection of the park, from September 16 to 21, I was glad to be able to say to the superintendent that I had never seen the roads in better condition or the park in general in better trim than it is at the present time, nor can I recall that it ever had a more enthusiastic and capable group of employees than the permanent organization now in charge of its destinies.

**YOSEMITE NATIONAL PARK**

In common with all of California, Yosemite suffered seriously from subnormal precipitation. Snowfall was light and recession early. The results were a long summer season, a diminution of water supplies, in some instances to zero, extreme fire hazards in our great forest, and certain effects upon flora and fauna. The discomforts of this extreme dryness to park visitors were mitigated, however, by progress made during the last five years in dust-proofing roads, parking areas, and bridle paths.

For the fifth successive season travel remained stabilized at about 460,000 visitors. Holiday periods brought the usual peak loads. Last May 30 saw the heaviest travel day in park history, 11,986 people entering the park on that date. Though 18,512 people were in the valley on July 4, no sense of overcrowding was experienced. A greatly improved physical layout and a much better understanding of problems by the ranger personnel obviated practically all semblance of congestion.
Yosemite set a new record for winter travel when 1,180 cars with 4,462 people entered the valley in one day last February. Railroad and stage travel is still on the decrease, with private cars showing a gain.

An increase of 11 per cent in the number of campers in Yosemite is accounted for by the improvements in the camps and by the fact that the business depression undoubtedly caused many visitors to bring their own camping equipment. The average stay was close to seven days. The six campgrounds in operation on the valley floor were well filled most of the summer. The total number of campers for 1931 is estimated at 132,000, compared with 117,600 in 1930.

HETCH HETCHY AGREEMENT

In December, 1930, the Hetch Hetchy problem came before the Department and Service for readjustment in the light of conditions that have materially changed since 1913 when the so-called Raker Act was passed giving the city and county of San Francisco rights to store water in the Hetch Hetchy Valley and at Lake Eleanor in Yosemite National Park.

The city had found it necessary to dispose of power generated at its Moccasin Creek plants (outside Yosemite Park) with Hetch Hetchy water, because it had not been able to acquire a distributing system of its own. The power was being delivered to the Pacific Gas & Electric Co., under an agency agreement which had never received the approval of the Department. In August, 1930, the voters of San Francisco refused to approve a bond issue to buy the distributing systems of the power companies now serving the city. This made it necessary for the city to continue its disposition to the Pacific Gas & Electric Co. Meantime, the city had failed to diligently carry out the provisions of the Raker Act in respect to building roads and trails in Yosemite Park, which requirements were a part of the consideration for the Hetch Hetchy grant.

The Secretary of the Interior, on recommendations of the late Director Mather and Superintendent Lewis, had ordered the city to improve and surface the road to the Hetch Hetchy Dam, to build a new road from Canyon Ranch to Harden Lake along the south rim of the Tuolumne Canyon, to build a new road from the dam to Lake Eleanor, and to construct a trail along the north wall of the Hetch Hetchy gorge to Rancheria Mountain thence to Lake Vernon and Tiltit Valley. The total cost of these improvements and new works in 1928 was about $1,630,000. The city officials opposed the Lake Eleanor road because, they contended, it was unnecessary, and also would bring about interference with their water supply there. Furthermore they felt that the Harden Lake road was too costly as planned by the Bureau of Public Roads and the Park Service. The city's representatives asked for permission to continue the sale of Hetch Hetchy power, and some revision of the road requirements, and promised to expedite construction if their proposals could be met.

After extended conferences, participated in by the Secretary, the Assistant Secretary, the Solicitor, the Director of the Park Service, and several California Members of Congress, a satisfactory arrange-
ment was made whereby the city agreed to build the roads and trails set forth in a new program to cost $1,500,000, expenditures to be made at the rate of $250,000 per year for six years. The 1931 program was to complete the road to the dam and surface and parapet it; also to finish the trails as previously required. In 1932, 1933, and 1934 the Harden Lake Road is to be built at a cost of $750,000. In 1935 and 1936 the road from Crane Flat to Mather Station, through the wonderful forest acquired in 1930 with the aid of Mr. John D. Rockefeller, jr., will be built at a cost of $500,000. This Crane Flat-Mather Road will be in lieu of the previously required Lake Eleanor Highway.

During the past year San Francisco has fully complied with this new understanding.

**MAJOR ROAD CONSTRUCTION**

Road construction in this park was concentrated largely on the new Wawona Road, the grading of which, except for the tunnel section through Turtleback Dome, was completed. Through the use of the California oil-mix method a dust-proof surface was laid and the new road made usable by the traveling public all the way to the Mariposa Grove with the exception of the tunnel section. Out of a total length of 4,230 feet, 2,455 feet of the tunnel had been constructed by the end of August, and the project is far ahead of contract requirements.

The construction of this road, particularly the tunnel portion, has received widespread commendation, as it has avoided making a tremendous scar on the south wall of Yosemite Valley.

**SANITATION AND WATER SUPPLY**

Last year I reported that the outstanding sanitary achievement of the year in the national-park system was the beginning of construction of an adequate sewage-disposal plant in Yosemite National Park. This year I am glad to report the completion and satisfactory testing of this plant. It can treat approximately 1,000,000 gallons of sewage a day, with a slight excess for a few days during the rush season.

The completion of the new water system at the Mariposa Grove was a matter of importance to a large number of park visitors, as it relieves one of the most critical water situations in Yosemite National Park. Under the new system a fine supply of water is brought through a 2.65-mile main from springs on the slope of Mount Raymond, outside the park.

For the first time in the history of the park, equipment was available continuously last summer for the clean-up of mountain roads, and gratifying results were obtained.

It is interesting to note that the incinerator at the garbage-disposal plant made a new record, the cost per can being $0.006 less than the extremely low cost of $0.151 per can last year.

I have stressed this part of our work more in Yosemite than in the other national parks, because in Yosemite Valley alone, during the peak season, conditions are comparable to those obtaining in a fair-sized city. At some periods during the height of the season
the overnight population of the valley is 25,000. With this number of people to accommodate, the service believes it can not stress too strongly the importance of modern, adequate sanitary arrangements of all types.

**USE OF NATURALIST FACILITIES**

The increasing tendency of park visitors to look deeper into the facts of nature was emphasized during the 1931 travel season, when the educational staff served 290,000 visitors. The Yosemite museum continued to serve as the focal point of the educational activities, but the new museum at Mariposa Grove also was the gathering place for many thousands.

A start was made in cataloguing the more than 3,000 books accumulated in the nature library in the Yosemite museum. About 500 volumes were catalogued and indexed by an expert librarian from the Oakland Public Library. Plans contemplate the completion of this work next year.

**LANDSCAPING**

The encroachment of forests into the El Capitan Meadow and a few other areas was partially corrected by cutting out pine and oak trees under 6 inches in diameter. Many denuded areas on the valley floor, which had needed treatment for years, were restored by plowing, harrowing, fertilizing, and the planting of native grass and flower seeds. Areas from which several houses were removed were treated similarly. A general program along these lines is continuously under way in all areas. Visitors to the park in the future will reap full benefit from this restoration.

**SIGNING OF ROADS AND TRAILS**

Progress was made in signing the roads and trails according to a comprehensive program for sign installation. In making this broad plan, assistance was rendered by the California State Automobile Association, affiliated with the American Automobile Association. Well-designed, illuminated signs also were made for important buildings such as the administration building, museum, and hospital, and for the camp grounds. It is particularly interesting that the attractive signs used in the latter instances were made in the park shops out of scrap material through the medium of an acetylene torch.

**PARK OPERATORS**

The Yosemite Park & Curry Co. naturally felt the effects of the world-wide depression and suffered at least equally from the effects of the excessive drought upon California. The winter-sports season fell short of expectations due to light snowfall and mild temperatures, which made even skating impossible at times. Owing to these factors, the company undertook no expansions and no notable improvements.

Due to the rigid curtailment of expansion, operating, and maintenance expenses, I am glad to report that the company is in a strong financial position. It is greatly encouraged by the showing of the past year in the face of so many obstacles.
Many gifts were presented to the park, and especially to the museum, by friends of the park. Outstanding among these were a highly appropriate entrance marker erected at the El Portal boundary with funds donated by Mr. James H. Schwabacher, of San Francisco, in memory of his father-in-law, Samuel Dinkelspiel, who for many years was devoted to the interests of Yosemite.

Miss Marjorie Montgomery Ward, of Chicago, authorized the expenditure of $4,000 in bringing the area at the rear of the museum into natural beauty and an enlarged usefulness as a living exhibit of native wild flowers, etc. There were numerous other contributions to the park.

ZION NATIONAL PARK

Reference already has been made to the purchase of a square mile of privately owned land at the mouth of Zion Canyon, at the park entrance. This purchase is most important from an administrative and a landscape point of view, as it affords an ideal site for the construction of a needed new camp ground.

Supt. E. T. Scoyen was transferred to Glacier National Park last January 16, and the vacancy thus created was filled by the transfer of Supt. Thomas J. Allen, jr., of Hawaii National Park, to Zion.

The absence of snow and the mild temperatures which prevailed during the winter and early spring resulted in a heavy increase in travel for that period. By the end of March the increase amounted to 50 per cent over the same period a year ago. Since then, however, owing to extreme heat and drought conditions, there has been a steady falling off in travel. Despite this fact, the total travel was 59,186, an increase of 7 per cent over the 1930 travel year.

ROADS

The main road up the floor of the canyon was rebuilt along modern standards from the checking station to the Temple of Sinawava. Work on this project began on April 12 and at the end of September was 75 per cent completed. River protection work was an important feature in connection with the reconstruction of the canyon road. Two additional rock dykes were built in the vicinity of Zion Lodge. The protection which these and previously built dykes afford has enabled construction of the new road past the lodge on a new alignment, allowing it to follow the river to a point near the public camp ground, and thus making available for parking and construction purposes a large area which was formerly a part of the river channel. Masonry walls for a distance of 850 feet provide additional protection from the river. Particular attention was given to landscape requirements on this project. The reconstruction of this road was a project under the emergency employment program of Congress and has helped materially in relieving the unemployment conditions in this part of the State.

The Zion-Mount Carmel Tunnel Highway is the favorite route of motorists entering the park. In the first year of its operation this scenic route has developed into the principal cross-State highway of southern Utah.
INSECT INFESTATION CONTROL

Probably the worst insect infestation in many years occurred this spring when the park was literally overrun with caterpillars. Here­tofore their activities were practically confined to the ash tree, but this year they attacked the cottonwoods as well, and since this is the major deciduous tree of the park, it became necessary to resort to control measures on a rather large scale. A liberal treatment of lead-arsenate spray was used and proved very successful, but it is quite apparent that it should be repeated each year to keep these insects in check.

UTILITIES

The grounds in front of Zion Lodge were greatly improved by the removal of the old rock seats and fireplaces and by planting of an attractive lawn. Other changes involving the grounds and park­ing area will be made as soon as the old road is obliterated this fall.

In spite of a very poor year financially, the Utah Parks Co. ren­dered excellent service to all its patrons throughout the tourist sea­son, and in no way lowered its standards of caring for guests from those established in previous years.

There was a strong demand for accommodations of the housekeep­ing type, however, and it is hoped that the operators soon will install such a development on lands recently purchased by the service which are especially suited to this purpose.

NATIONAL MONUMENTS

COLONIAL

The sesquicentennial celebration of the surrender of the British forces at Yorktown, Va., on October 19, 1781, has created nation­wide interest in the only two national monuments in the East which are under the administration of the National Park Service. These are the Colonial National Monument, which includes historic fea­tures of Yorktown, Williamsburg, and Jamestown, and the George Washington Birthplace National Monument at Wakefield.

Since the establishment of the Colonial Monument on December 30, 1930, the Park Service has cooperated in every way possible with the United States Yorktown Sesquicentennial Commission and other agencies in its plans for the Yorktown celebration. An administra­tive organization, in charge of Engineer O. G. Taylor, was assembled and development work pushed in every way possible. With funds from the $500,000 congressional appropriation made for the monu­ment in March, 1931, approximately 2,000 acres of land were pur­chased in the Yorktown Battlefield area and on the road right of way between Yorktown and Williamsburg. The Yorktown Inn, built in 1725, and the Moore House, where the terms of surrender were drawn up, were also purchased. Approximately $550,000 from emergency relief funds were available for road construction in the spring and the Bureau of Public Roads began surveys and plans immediately. Contracts were awarded for the grading of approxi­mately 9 miles of parkway between Yorktown and Williamsburg.

A deep-well water system providing approximately 100 gallons per minute was constructed. To supplement this supply for the
period of the Yorktown Sesquicentennial Celebration, a pump and motor was installed on another well near the York River. A water-distributing system approximately 3 miles in length and a number of fire hydrants were installed to protect the historic buildings at Yorktown. Six comfort stations with suitable disposal plants were constructed.

William G. Robinson, jr., was appointed superintendent of the monument.

**WAKEFIELD**

The National Park Service was authorized by Congress in 1930 to cooperate with the Wakefield National Memorial Association in the restoration of the long-neglected birthplace of George Washington at Wakefield, Va. Under the direction of Engineer Taylor, the development program for this monument has gone forward rapidly, and in June of this year the house and kitchen, which represent two of the most interesting features of the rehabilitation program, were completed. A water supply and sanitation system were also installed. Plans for extensive landscape work to complete the picture of a colonial homestead are now being carried out.

A hostess was installed in the house by the Wakefield Association. A count of visitors was made during August for the first time, and showed a total of 4,437.

The acreage of the monument is at the present writing approximately 307 acres, but land sufficient to make the total acreage approximately 400 acres has been deeded to the Government by the association and will be formally added to the monument in the near future.

The family vault at the ancient graveyard has been reconstructed. A wall of brick made by hand on the place will be built around the graveyard in the near future. The Wakefield rehabilitation program, like the Colonial program, has been facilitated in every way possible to aid in the 1932 national celebration on the two-hundredth anniversary of the birth of George Washington.

**DEVILS TOWER**

Made accessible the year round by a new bridge built a few years ago and now under administration of a full-time custodian, this important monument is becoming a favorite place to tarry awhile as travelers move back and forth across the country. Roads and trails have been improved this year, and a cabin has been constructed for the officer in charge. The camp grounds have been extended, and sanitation control has been brought into line with national park policies. Many commendations of our personnel at the monument and the service extended there to the public have been received.

During the winter a campaign of education will be conducted with a view to attracting more visitors to Devils Tower next summer.

**SCOTTS BLUFF**

I visited this interesting historical monument in June. It includes a series of bald, striking buttes which rise high above the Platte River and which are covered with native trees, brush, and flowers. The buttes were landmarks in the early days, and the Oregon Trail
took its course through a pass between two of the outstanding mountains.

There is need for a road to the summit of one of these historic buttes, but neither the National Park Service nor the local communities want a road built if the construction of it will cause irreparable injury to the bluffs which give the monument such prominence in the North Platte Valley. Surveys by the Bureau of Public Roads and careful investigations by our landscape architects are now in progress. The pride of Scotts Bluff, Gering, and other Nebraska cities in their beautiful, historic monument, as well as the policies of the National Park Service, are sufficient guaranties of the safety of this important feature of the Old Oregon Trail.

**COLORADO MONUMENT**

Another area especially considered during the year was the Colorado National Monument near Grand Junction, Colo. Already developed locally as a game preserve and partly accessible by trails constructed with funds privately subscribed, it deserves wider recognition as a worthwhile member of the national-monument system because of its scientific interest and its scenic quality. It should have a few miles of road, and such a highway possibility I was able to study in June, 1931. The road is feasible and should be on our program for construction as soon as it can be adequately planned. This monument will be a feature of our special travel program that will afford travelers a chance to see the Colorado at its head in Rocky Mountain Park, then in going westward observe irrigation from the river at Grand Junction, the Dinosaur exhibits near the Green River tributary, next Bryce Canyon, and Zion and the Grand Canyon Parks, and finally the Hoover Dam at Black Canyon.

**BOUNDARIES OF KATMAI EXTENDED**

By presidential proclamation 1,609,600 acres were added to Katmai National Monument on April 24, 1931. The total area of the monument is now approximately 2,697,590 acres, and was enlarged to protect the brown bear, moose, and other wild animals of the region, as well as preserve an area of historical and scientific interest.

**MUIR WOODS**

A good trail maintenance and improvement program was carried on in Muir Woods during the year. A large foot log across Redwood Creek in the upper end of the woods and the brushing out of a new trail on the west side of the creek opened up an undeveloped area. An abandoned trail paralleling the creek on the west side was entirely rebuilt and labeled as a nature trail.

The main monument thoroughfare was connected with the abandoned Muir Woods railroad grade so that fire equipment and work trucks could enter and leave by this route in emergencies.

A free road to Muir Woods is badly needed and the Mill Valley Chamber of Commerce is sponsoring an active program for public ownership of the present toll road.
In an effort to achieve natural boundaries for Pinnacles National Monument, the county of San Benito, Calif., has purchased and transferred to the United States approximately 1,926 acres of land. Another tract of 160 acres is being condemned by the county. This, with about 2,000 acres of public domain which has been withdrawn from entry, will round out the natural boundaries of the monument.

Some of the finest scenery of the monument has been made accessible by the construction of a trail more than 2 miles long from the lodge to the easterly high peaks and stairs have been built into heretofore inaccessible caverns.

The following are some monument-construction activities now under way: At Aztec Ruins, a custodian’s residence, comfort station and sewer system, implement shop; at Casa Grande, an administration building, residences for the superintendent and the custodian, a tool shop; at Gran Quivira, a residence for the custodian; at Petrified Forest, an administration building, custodian’s residence, two ranger residences and a tool shop; at Tumacacori, ranger’s residence, tool shop, and sewer system. Funds have been allotted for the building of a shelter over the Casa Grande Ruins. A fence will soon be built along two sides of the monument; irrigation canals protect the other two sides.

The Bureau of Public Roads has under construction a 16-mile road through the Petrified Forest and a bridge across the Rio Puerco. This is the most important improvement project ever initiated in the Petrified Forest National Monument, as it will insure travelers using U. S. Highway 66 crossing the Rio Puerco at all times of the year.
Up to the present time, at certain periods during the year, high water in the Rio Puerco cuts off the Petrified Forest National Monument from motorists traveling north of the monument. The new road and bridge will also permit westbound train visitors to leave Santa Fe trains at Adamana, motoring through the monument to Winslow and those eastbound to leave Winslow picking up the train at Adamana. Over 8,000 train travelers took advantage of this service but had to make the long automobile trip from Winslow to Petrified Forest and return.

The road leading to the top of Capulin Mountain was put into good shape early in the season. Considerable repairs were also made on the road at Gran Quivira and the trails at Natural Bridges. Important repairs were made on the old fort at Pipe Spring.

**WATER SUPPLY**

A good water supply has been obtained for Casa Grande by drilling a 6-inch well, 186 feet deep. A well, 75 feet deep, was also drilled at Aztec Ruins. Some improvements were made in the water distribution at Petrified Forest, but water for the headquarters area is still being hauled about 16 miles.

**CAMP GROUNDS AND SANITATION**

Camp grounds are maintained, usually in the vicinity of headquarters, at many of the monuments. Modern installations have greatly improved the sanitary conditions of the camp grounds, and, as funds permit, we expect to improve sanitary facilities further. The demand for camp-ground accommodations increases steadily.

**EDUCATION**

Petrified Forest, Aztec Ruins, Casa Grande, Chaco Canyon, Gran Quivira, and Montezuma Castle now have museum collections, at present housed in more or less makeshift structures. The building program for Casa Grande and Petrified Forest will remedy this condition, but the other monuments will have to be provided with museum space in the near future. An interesting collection which has been started at Tumacacori can not be displayed at all on account of lack of space.

Although the educational use of the Southwestern Monuments has always been stressed, the addition of a naturalist to the staff has made possible the expansion of this work. Enlargement of old features is planned as well as the addition of many new ones. At present the custodians furnish guide service, and there is a great need for ranger naturalists. Where space is available artifacts are displayed.

During the year many of the monuments were visited by student classes of archeology and geology from various institutions of learning. The monuments are fine places for practical field study and this type of visitor appears to be increasing in numbers each year.

The Van Bergen-Los Angeles Museum Field Expedition, under the supervision of Irwin Hayden, continued the excavation work started last year at Casa Grande and at adjacent sites. As soon as the administration building is ready to receive it, a part of the in-
Interesting representative collection which has been assembled will be given to the monument. The expedition has also presented the monument with a good model of Compound "A" at Casa Grande, representing the village as it appeared at the time of occupation.

The American School of Research conducted some excavation work at Chettro Ketl, in the Chaco Canyon.

**MONUMENT TRAVEL**

A total of 392,011 people visited the national monuments during the 1930–31 travel year. This represents a 17 per cent decrease from the total of 472,095 visitors recorded for the previous year. An extremely hot summer and bad road conditions in the Southwest, where a large number of the national monuments are located, are believed to have contributed equally with economic conditions to this decrease. Had it been possible to obtain an accurate count of the travel to the new Colonial National Monument in Virginia, the 17 per cent decrease would have undoubtedly been greatly reduced if not entirely wiped out.

**NECROLOGY**

It is my sad duty to report herein the death of several pioneers in national-park work. Col. George W. Stewart, of Visalia, Calif., died in San Francisco on September 7, 1931. Known as "the father of Sequoia National Park," it was largely through his personal efforts that this park was established in 1890, and he was always a staunch friend and defender of the park and of the National Park Service.

Word came from Hawaii of the death of Lorrin A. Thurston on May 11. Not only was Mr. Thurston primarily responsible for the establishment of Hawaii National Park, but he was a leader in Hawaiian affairs for more than half a century, as lawyer, statesman, and publisher. His outstanding achievements were the reformation of the Hawaiian Constitution in 1887, participation in the annexation movement, and, after the establishment of the Territorial form of government, the drafting of laws for bettering conditions.

Horace Kephart, Southern author closely associated with the Great Smoky Mountains National Park project, was killed in an automobile accident early in April.

Mrs. Harry L. Rust, sr., president of the Wakefield National Memorial Association, died June 25, adding one more name to the roster of those who have devoted their lives to the preservation and protection of America's historic and scenic areas. Her enthusiastic and persistent work in behalf of the preservation of Wakefield resulted in the establishment of the George Washington Birthplace National Monument and the rehabilitation of the old homestead and surrounding grounds.

Hamp Williams, appointed by Secretary Wilbur as chairman of the Hot Springs Planning Commission, which considered and advised the Service on Hot Springs National Park developments, died on May 16.

A distinct loss was suffered in the ranks of the national park public utility operators, and by the National Park Service, through the death of Harry W. Child on February 4, 1931, after a long illness. Mr. Child was actively engaged for about 40 years in the development
and management of hotel and transportation utilities in Yellowstone National Park. His keen interest in the utilities under his control did not cease when illness forced him to relinquish active management to others, and he was planning further developments in their operations at the time of his death.

**LEGISLATION**

The members of the Public Lands and Appropriations Committees of both Houses of Congress were most interested in the legislation submitted by the department on behalf of the National Park Service, and on the floors of the Senate and House our bills in most cases were passed by unanimous consent in view of the strongly favorable committee recommendations.

The following is a summary of legislation affecting the National Park Service pending or considered in the third session of the Seventy-first Congress:

**BILLS ENACTED INTO LAW**

The act of December 20, 1930, making supplemental appropriations to provide for emergency construction on certain public works during the remainder of the fiscal year ended June 30, 1931, with a view to increasing employment (Public, No. 550) carried appropriations for the National Park Service as follows:

*Roads and trails.*—For the construction, reconstruction, and improvement of roads and trails, inclusive of necessary bridges in the national parks and national monuments, under the jurisdiction of the Department of the Interior, fiscal year 1931, $1,500,000.

The first deficiency act of February 6, 1931 (Public, No. 612), carried appropriations for the National Park Service as follows:

- Colonial National Monument:  
  - Acquisition of land $500,000  
  - For administration, protection, maintenance and improvement and purchase, maintenance, operation, and repair of motor-driven passenger-carrying vehicles $58,900  
  - Construction of physical improvements $76,100

The appropriation for the construction of roads and trails in the national parks and national monuments contained in the act approved December 20, 1930, was made available in so far as was necessary for the construction of highways within the areas authorized as national parks and for continuing construction of an approach road from the National Old Trails Highway to the south boundary of the Grand Canyon National Park.

The Interior Department appropriation act for the fiscal year ending June 30, 1932 (Public, No. 666, approved February 14, 1931), carried appropriations of $9,498,250 for the National Park Service in Washington and for the administration, protection, maintenance, and improvement of the various parks and monuments, as well as for the construction of roads and trails therein. Included in this sum was $1,000,000 for the acquisition of privately owned lands in the national parks, to be expended only when matched by equal amounts by donation. This act also carried authority for the entering into of contracts in the amount of $2,850,000 for roads and trails in the
parks and monuments, in addition to an appropriation of $5,000,000 for such work to be immediately available.

Other important items of the act are: Authority for attendance of employees of the Service at meetings concerned with their work, and authority for the employment of specialists and experts for examinations and investigations of lands to determine their suitability for national park and national monument purposes. Necessary funds for the examination of proposed park areas were provided. Of the unexpended balance of appropriations made for the acquisition of privately owned lands, $200,000 was made available for payment in full of the purchase price of any of those lands to be matched by subsequent donations.

The second deficiency act of March 4, 1931 (Public, No. 869), carried the following items for the parks and monuments administered by the National Park Service:

Mount Rainier National Park, for construction and operation of an electric power plant and distributing system at Yakima Park, fiscal years 1931 and 1932... $71,000

Wind Cave National Park, for a water-supply system, including the purchase of lands and/or interests in lands and/or water rights for protection thereof, fiscal years 1931 and 1932... 50,000

Yosemite National Park, for an additional amount for completion of a sewage-disposal system on the floor of the valley, fiscal year 1931... 32,500

National monuments: For an additional amount for a water supply at Chaco Canyon National Monument, fiscal year 1931... 3,000

It also provided for an additional amount for the construction, reconstruction, and improvement of roads and trails in national parks and monuments and of national park and national monument approach roads, inclusive of necessary bridges, $2,500,000 to remain available until expended.

S. 43, authorized the payment of $1,500 to George Snyder, the amount of the judgment recovered by him against W. W. Payne for acts committed by Payne while acting as superintendent of the Glacier National Park. (Private Law 448, approved March 4, 1931.)

S. 196, to provide for uniform administration of the national parks, by the United States Department of the Interior, provided authorizations in law, the need for which had been definitely felt, in a proper administration of the national parks and monuments. (Public, No. 574, approved January 26, 1931.)

S. 5248, authorized the addition of 1,200 acres of land to the Wind Cave National Park. (Public, No. 843, approved March 4, 1931.)

S. 5616, authorized the appropriation of $2,000,000 for all expenses incident to the examination and establishment of the monument and for the acquisition of lands and/or lands and improvements needed for the completion of the monument, including the securing of options and other incidental expenses. The area of the Yorktown battlefield was extended from 2,500 acres to not to exceed 4,500 acres, and all Government-owned lands within the boundaries of the monument as established by presidential proclamation were transferred to the administrative jurisdiction and control of the National Park Service. (Public, No. 792, approved March 3, 1931.)

S. 6106, authorized the Leo N. Levi Memorial Hospital to mortgage its property in Hot Springs National Park. (Public, No. 770, approved March 2, 1931.)
S. 6171, amended the authority of the Secretary of the Interior to assess and collect examination and registration fees from physicians and bath attendants at Hot Springs National Park. (Public, No. 771, approved March 2, 1931.)

S. 6279, authorized the National Capital Park and Planning Commission to provide a suitable memorial in connection with the park and playground system of the National Capital on the George Washington Parkway, to the late Stephen T. Mather, former Director of the National Park Service and ex officio member of the National Capital Park and Planning Commission. (Public, No. 861, approved March 4, 1931.)

H. R. 8534, authorized the transfer of jurisdiction over the Sullys Hill National Park from the Department of the Interior to the Department of Agriculture, to be maintained as the Sullys Hill National Game Preserve. (Public, No. 826, approved March 3, 1931.)

H. R. 10576, authorized exchange of lands with owners of private land holdings within the Chaco Canyon National Monument. (Public, No. 674, approved February 17, 1931.)

H. R. 12404, amended the National Park Roads and Trails act of April 9, 1924, so as to provide for national park approaches. (Public, No. 592, approved January 31, 1931.)

H. R. 13249, authorized the acceptance of a tract of land adjoining Hot Springs National Park for an addition thereto. (Public, No. 651, approved February 14, 1931.)

H. R. 15005, authorized the extension of the south and east boundaries of the Mount Rainier National Park so as to include approximately 34,000 acres of land formerly a part of the Rainier National Forest. (Public, No. 584, approved January 31, 1931.)

H. R. 15867, authorized the retention by the United States of a site within the Hot Springs National Park formerly occupied by the Arlington Hotel and Bathhouse, for park and landscape purposes. (Public, No. 659, approved February 14, 1931.)

H. R. 15876, authorized the addition by presidential proclamation of certain lands adjacent to Mesa Verde National Park, to protect the landscape along the Point Lookout Road, an approach road to the park. (Public, No. 737, approved February 26, 1931.)

H. R. 15877 authorized exchanges of land with owners of private land holdings within the Craters of the Moon National Monument. (Public, No. 714, approved February 21, 1931.)

H. R. 15987 authorized the President by proclamation to establish the Canyon de Chelly National Monument within the Navajo Indian Reservation, Ariz. (Public, No. 667, approved February 14, 1931.)

H. R. 16116 authorized the addition by presidential proclamation of approximately 6,360 acres to the Bryce Canyon National Park and eliminated therefrom 1,240 acres. (Public, No. 675, approved February 17, 1931.)

H. R. 17005 authorized the establishment of the Isle Royale National Park in the State of Michigan when necessary lands have been turned over to the United States. (Public, No. 835, approved March 3, 1931.)
OTHER MEASURES INTRODUCED OR PENDING IN THE THIRD SESSION OF THE SEVENTY-FIRST CONGRESS WHICH FAILED OF ENACTMENT

A bill to establish the Everglades National Park, in the State of Florida, was introduced and favorably reported upon by the National Park Service.

Bills to establish the following additional national parks were introduced and adversely reported upon by the National Park Service: Royal Gorge National Park; Ouachita National Park, Ark.; Grand Coulee National Park, Wash.; Roosevelt National Park, N. Dak.; and Killdeer Mountain National Park, N. Dak.

Bills to establish the following additional national parks and monuments were introduced and referred to the Public Lands Committee, but not to the National Park Service for report: The Daniel Freeman Homestead; a national park in the State of Texas; Fort Boonesboro National Monument, Ky.; Wichita Mountains National Park, Okla.; and Silver Creek Falls National Park, Oreg.

Other new bills introduced affecting the national parks proposed authorizing the department to permit J. B. Wofford to excavate for buried treasure alleged to be buried in the Gran Quivira National Monument (S. 2798; H. R. 7740); the giving of authority to the States of Montana, Idaho, and Wyoming to tax persons and corporations, their franchises and property within that portion of the Yellowstone National Park lying within the boundary lines of the respective States (S. 3049; H. R. 10294); accepting the grant by the State of Montana of concurrent police jurisdiction over the rights of way of the Blackfeet Highway and over the rights of way of its connections with the Glacier National Park road system on the Blackfeet Indian Reservation, Mont. (H. R. 4021); and the removal of the Otter Cliffs radio station to a site within the Acadia National Park, Me. S. Res. 316 (February 26, 1929), authorizing and directing the Committee on Public Lands to investigate the advisability of establishing additional national parks, was extended until the end of the Seventy-first Congress by S. Res. 252 (April 21, 1930), and until the end of the Seventy-second Congress by S. Res. 413 (January 26, 1931).

H. R. 8283 and 8284, which were introduced by Mr. Cramton, provided for a change in name of Platt National Park to Platt National Monument and the alternative of abolishing the park and providing for the disposal of the lands therein to the State of Oklahoma for a State park, respectively. Both bills were reported on favorably by the Secretary of the Interior.

PRESIDENTIAL PROCLAMATIONS

The President signed the following proclamations affecting the national parks and monuments:

November 14, 1930, adding 11,010 acres to the Petrified Forest National Monument.

December 19, 1930, adding 8,678 acres to the Aztec Ruins National Monument.

December 30, 1930, establishing the Colonial National Monument, containing 1,960.76 acres.

81715—31—7
January 5, 1931, adding 16,080 acres to the Bryce Canyon National Park.
April 1, 1931, establishing Canyon de Chelly National Monument, containing 83,840 acres.
April 13, 1931, adding 1,926.35 acres to the Pinnacles National Monument.
April 24, 1931, adding 1,609,600 acres to the Katmai National Monument.
May 4, 1931, adding 5,982.52 acres to the Bryce Canyon National Park.

EXECUTIVE ORDERS

On November 14, 1930, there were temporarily withdrawn 1,280 acres from which private interests could select land in lieu of privately owned lands within the Craters of the Moon National Monument.
On March 7, 1931, 28,640 acres in Utah were temporarily withdrawn for investigation to determine the suitability of establishing what would be known as the Kolob National Monument.
On August 12, 1931, there were temporarily withdrawn 7,890.72 acres for investigation and classification for an addition to the Dinosaur National Monument.

RECOMMENDATIONS

Realizing fully the seriousness of the present financial condition of the Government, I do not urge larger appropriations for the National Park Service activities, although certain of our activities are not provided for. Nevertheless, I do want to record here, even at the risk of reiterating previous proposals in earlier reports, the most serious needs of the Service, and the national park system:
1. Many national parks and monuments should have their boundaries revised to include territory naturally belonging to them and essential in their protection and development. Park extensions can be made now at little, if any, additional cost to the Government. Delay will impair land values for park purposes and make acquisition more difficult.
2. There are a few new parks that should be established. In a few years it will be too late to establish new members of the system. Revival of business may bring in its train exploitation of potential park areas, rendering them unfit for park status.
3. The military parks and monuments logically belong to the system and should be transferred to the jurisdiction of the National Park Service as recommended by several Secretaries of War.

CONCLUSION

It is a pleasure to look back over the achievements of the past year. It was not a period of spectacular developments here and there, but rather one of steady forward progress in all lines, consolidating the gains of past years, reorganizing where necessary, and generally strengthening the fabric of national-park structure.
The increase in travel, already referred to, has made me particularly happy, since it has shown that the national parks and monuments have a very useful function in times of stress as well as in those of prosperity. More and more our people are coming to realize the soothing influences of outdoor life on tired nerves, and to utilize more fully the advantages along this line placed at their disposal in our national park and monument system.

In closing, I want to express my sincere thanks to those who have made possible the successful achievements of the year just terminated. To the ability and faithfulness of our own personnel, verging often on self-sacrifice; the counsel of officers of the Department of the Interior; and the understanding and fair-minded consideration of Budget officers and members of the congressional appropriations committees of our problems and needs, based on careful study of the parks and monuments, is due most of the credit for this success. To work with such associates is inspiring.

I also want to express here the appreciation of the National Park Service of the ready cooperation furnished this bureau by technical and scientific bureaus of both this and other executive departments. Through taking advantage of the expert service thus available, the Service has achieved the best results at a minimum of cost to the Federal Treasury.

Based on the results of last year, officials of the Service face 1931-32 with enthusiasm and high hopes for a banner year along all lines of endeavor.

Respectfully submitted, 

HORACE M. ALBRIGHT, Director.
APPENDIX A

ORGANIZATION OF THE NATIONAL PARK SERVICE

(Department of the Interior, Washington, D. C.)

Horace M. Albright, director.
Arno B. Cammerer, associate director.
A. E. Demaray, senior assistant director, branch of operations.
G. A. Moskey, assistant director, branch of use, law, and regulation.
Harold C. Bryant, assistant director, branch of research and education.
Conrad L. Wirth, assistant director, branch of lands.
Isabelle F. Story, editor, chief, division of public relations.
Charles L. Gable, chief auditor, park operators' accounts.
R. M. Holmes, chief clerk.
Everett E. Tullett, chief accountant.
Charles R. Brill, chief, mails and files.

FIELD SERVICE

CIVIL ENGINEERING DIVISION

(409 Underwood Building, San Francisco, Calif.)

Frank A. Kittredge, chief engineer.

LANDSCAPE ARCHITECTURAL DIVISION

(409 Underwood Building, San Francisco, Calif.)

Thomas C. Vint, chief landscape architect.

FIELD EDUCATIONAL AND FORESTRY HEADQUARTERS

(333 Hilgard Hall, University of California, Berkeley, Calif.)

Ansel F. Hall, senior park naturalist and forester.
John D. Coffman, fire expert.
Carl P. Russell, field naturalist.

WILD LIFE SURVEY

(333 Hilgard Hall, University of California, Berkeley, Calif.)

George M. Wright, park naturalist aid.
Joseph S. Dixon, field naturalist.
Ben H. Thompson, park naturalist aid.

FISH-CULTURAL INSPECTIONS AND ACTIVITIES

(P. O. Box 988, Salt Lake City, Utah)

Fred J. Foster, district supervisor, Bureau of Fisheries.

SANITARY ENGINEERING

(420 Call Building, San Francisco, Calif.)

H. B. Hommon, sanitary engineer, Public Health Service.
Acadia, George B. Dorr, superintendent, Bar Harbor, Me.
Bryce Canyon, Thomas J. Allen, jr., superintendent, Zion National Park, Utah.
Carlsbad Caverns, Thomas Boles, superintendent, Carlsbad, N. Mex.
Crater Lake, Elbert C. Solinsky, superintendent, Crater Lake, Oreg.
General Grant, John R. White, superintendent, Sequoia National Park, Calif.
Glacier, Elvid T. Scoyen, superintendent, Glacier National Park, Mont.
Great Smoky Mountains, J. Ross Eakin, superintendent, Great Smoky Mountains National Park, Tenn.
Hawaii, Ernest P. Leavitt, superintendent, Hawaii National Park, Hawaii.
Hot Springs, Dr. George L. Collins, superintendent, Hot Springs National Park, Ark.
Mesa Verde, C. Marshall Finman, superintendent, Mesa Verde, Colo.
Mount McKinley, Harry J. Liek, superintendent, McKinley Park, Alaska.
Mount Rainier, Owen A. Tomlinson, superintendent, Mount Rainier, Wash.
Platt, William E. Branch, superintendent, Sulphur, Okla.
Rocky Mountain, Edmund B. Rogers, superintendent, Rocky Mountain National Park, Colo.
Sequoia, John R. White, superintendent, Sequoia National Park, Calif.
Wind Cave, Edward D. Freeland, superintendent, Hot Springs National Park, S. Dak.
Yosemite, Charles G. Thomson, superintendent, Yosemite National Park, Calif.
Zion, Thomas J. Allen, jr., superintendent, Zion National Park, Utah.

THE NATIONAL MONUMENTS

Frank Pinkley, superintendent, Southwestern Monuments, Coolidge, Ariz.¹
Aztec Ruins, Johnwill Faris, custodian, Aztec, N. Mex.
Capulin Mountain, Homer J. Farr, custodian, Capulin, N. Mex.
Chaco Canyon, Frank Fish, custodian, Chaco Canyon, N. Mex.
Craters of the Moon, Burton C. Lacombe, custodian, Arco, Idaho.
Devils Tower, George C. Crowe, custodian, Devils Tower, Wyo.
George Washington Birthplace, Oliver G. Taylor, engineer in charge, Oak Grove, Westmoreland County, Va.
Gran Quivira, W. H. Smith, custodian, Gran Quivira, N. Mex.
Montezuma Castle, Martin L. Jackson, custodian, Camp Verde, Ariz.
Mojave, John J. W. Waite, custodian, Bishop, Calif.
Natural Bridges, Zeke Johnson, custodian, Natural Bridges, Utah.
Navajo, John Wetherill, custodian, Kayenta, Ariz.
Petrified Forest, Charles J. Smith, custodian, Holbrook, Ariz.
Pinnacles, W. I. Hawkins, custodian, Hollister, Calif.
Pipe Spring, Charles Leonard Heaton, custodian, Pipe Spring, Ariz.
Scotts Bluff, A. N. Mathers, custodian, Scotts Bluff, Nebr.
Sitka, Peter Trierschield, custodian, Sitka, Alaska.
Tumacacori, George L. Boudhey, custodian, Tubac, Ariz.
Verendrye, Adolph Larsen, custodian, Verendrye, N. Dak.
Wupatki, J. C. Clarke, custodian, Wupatki, Ariz.

Note

The following national monuments have no local custodians:

Arches (Utah).
Canyon de Chelly (Arizona).
Colorado (Colorado).
Dinosaur (Utah).
Glacier Bay (Alaska).
Fossil Cycad (South Dakota).

¹ As superintendent of southwestern monuments, Mr. Pinkley is in charge of all monuments in New Mexico, Arizona, Colorado, and Utah, with the exception of the Dinosaur and Colorado National Monuments. His headquarters are at Coolidge, Ariz.
LOCATIONS OF 22 NATIONAL PARKS AND 34 NATIONAL MONUMENTS ADMINISTERED BY THE DEPARTMENT OF THE INTERIOR
## APPENDIX B

### NATIONAL PARKS AND NATIONAL MONUMENTS ADMINISTERED BY VARIOUS FEDERAL DEPARTMENTS

#### NATIONAL PARKS Table 1.—National parks administered by the National Park Service, Department of the Interior

<table>
<thead>
<tr>
<th>Name</th>
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<th>When established</th>
<th>Statute reference</th>
<th>Area square miles</th>
<th>Area, acres</th>
<th>Total alien lands (acres)</th>
<th>Special characteristics</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acadia 1, 1919</td>
<td>Maine coast</td>
<td>Mount Desert Ferry, Me. Central system.</td>
<td>Feb. 26, 1919</td>
<td>40 Stat. 1178</td>
<td>18.06</td>
<td>11,590.32</td>
<td></td>
<td>The group of granite mountains upon Mount Desert Island and also bold point on opposite mainland across Frenchmans Bay; formerly called the Lafayette National Park.</td>
</tr>
<tr>
<td>Bryce Canyon 1, 1928</td>
<td>Southwestern Utah</td>
<td>Cedar City, Union Pacific system, Marysvale, D. &amp; R. G. W.</td>
<td>June 7, 1924</td>
<td>43 Stat. 593</td>
<td>55.06</td>
<td>35,240.08</td>
<td></td>
<td>Box canyon filled with countless array of fantastically eroded pinnacles; best exhibit of vivid coloring of earth's materials.</td>
</tr>
<tr>
<td>Crater Lake, 1902</td>
<td>Southwestern Oregon</td>
<td>Medford or Klamath Falls, Southern Pacific, Chiloquin, Great Northern and Southern Pacific.</td>
<td>May 23, 1902</td>
<td>32 Stat. 202</td>
<td>240.00</td>
<td>150,360.00</td>
<td>1,946.27</td>
<td>Lake of extraordinary blue in crater of extinct volcano; sides 1,000 feet high; interesting lava formations; fine fishing.</td>
</tr>
<tr>
<td>General Grant 1, 1890</td>
<td>Middle eastern California</td>
<td>Fresno, Sanger, or Visalia, Santa Fe and Southern Pacific.</td>
<td>Oct. 1, 1890</td>
<td>26 Stat. 650</td>
<td>4.00</td>
<td>2,530.00</td>
<td>131.00</td>
<td>Created to preserve the celebrated General Grant Tree, and grove of Big Trees.</td>
</tr>
</tbody>
</table>

1 General information circulars on these parks may be obtained free on application.
2 Boundary changed.
3 Date acquisition private land as provided by act of June 7, 1924.
<table>
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<th>Name</th>
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<tbody>
<tr>
<td>Glacier</td>
<td>North western Montana.</td>
<td>Glacier Park Station</td>
<td>May 11, 1910</td>
<td>36 Stat. 354.</td>
<td>1,533.87</td>
<td>981,651.00</td>
<td>19,250.81</td>
<td>Rugged mountain region of unsurpassed alpine character; 250 glacier-fed lakes of romantic beauty; 60 small glaciers, precipices thousands of feet deep; almost sensational scenery of marked individuality; fine trout fishing.</td>
</tr>
<tr>
<td>Grand Canyon</td>
<td>North central Arizona.</td>
<td>Grand Canyon Station</td>
<td>Feb. 26, 1919</td>
<td>40 Stat. 1175.</td>
<td>1,000.00</td>
<td>615,506.79</td>
<td>25,325.45</td>
<td>The greatest example of erosion and the most sublime spectacle in the world.</td>
</tr>
<tr>
<td>Grand Teton</td>
<td>Northwestern Wyoming.</td>
<td>Victor, Idaho</td>
<td>Feb. 26, 1929</td>
<td>45 Stat. 1314.</td>
<td>150.00</td>
<td>96,000.00</td>
<td>1,322.04</td>
<td>Includes most spectacular portion of Teton Mountains, an uplift of unusual grandeur. This area is not to be developed as a national park until at least 427,000 acres have been donated to the United States, as specified in the organic act. Meanwhile the park area of 158,576.50 acres already in Federal ownership is being protected by the National Park Service.</td>
</tr>
<tr>
<td>Great Smoky Mountains</td>
<td>North Carolina and Tennessee.</td>
<td>Maryville, Knoxville</td>
<td>Aug. 28, 1930</td>
<td>248.24</td>
<td>155,876.50</td>
<td>158,876.50</td>
<td>25,325.45</td>
<td>This area is not to be developed as a national park until at least 427,000 acres have been donated to the United States, as specified in the organic act. Meanwhile the park area of 158,576.50 acres already in Federal ownership is being protected by the National Park Service.</td>
</tr>
<tr>
<td>Hawai i</td>
<td>Hawaii</td>
<td>Interisland steamers</td>
<td>Aug. 1, 1916</td>
<td>39 Stat. 432.</td>
<td>245.00</td>
<td>156,300.00</td>
<td>25,325.45</td>
<td>Interesting volcanic areas—Kilauea and Mauna Loa, active volcanoes on the island of Hawaii; Haleakala, a huge extinct volcano on the island of Maui.</td>
</tr>
<tr>
<td>Hot Springs</td>
<td>Middle Arkansas.</td>
<td>Hot Springs, Rock Island and Missouri Pacific systems.</td>
<td>Mar. 4, 1921</td>
<td>41 Stat. 1407.</td>
<td>1.50</td>
<td>927.00</td>
<td>25,325.45</td>
<td>46 hot springs said to possess healing properties; many hotels and boarding houses; 19 bathhouses under Government supervision. Reserved by Congress in 1833 as the Hot Springs Reservation to prevent exploitation of hot waters.</td>
</tr>
<tr>
<td>Park</td>
<td>State/Region</td>
<td>Description</td>
<td>Date Established</td>
<td>See Statutes</td>
<td>Area (Ac)</td>
<td>Elevation (Feet)</td>
<td>Notes</td>
<td></td>
</tr>
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<td></td>
</tr>
<tr>
<td>Lassen Volcanic</td>
<td>Northern California</td>
<td>Only active volcano in United States proper; Lassen Peak 10,433 feet; cinder cone, 6,913 feet; hot springs, mud geysers.</td>
<td>Apr. 20, 1832</td>
<td>39 Stat. 442</td>
<td>163.32</td>
<td>104,526.61</td>
<td>906.40</td>
<td></td>
</tr>
<tr>
<td>Mesa Verde</td>
<td>Southwestern Colorado</td>
<td>Most notable and best preserved prehistoric cliff dwellings in United States, if not in the world.</td>
<td>Apr. 26, 1917</td>
<td>38 Stat. 798</td>
<td>2,450.00</td>
<td>1,692,800.00</td>
<td>790.00</td>
<td></td>
</tr>
<tr>
<td>Mount McKinley</td>
<td>South Central Alaska</td>
<td>Highest mountain in North America; rises higher above surrounding country than any other mountain in the world.</td>
<td>Feb. 26, 1917</td>
<td>39 Stat. 903</td>
<td>3,377.78</td>
<td>241,782.00</td>
<td>1,125.59</td>
<td></td>
</tr>
<tr>
<td>Mount Rainier</td>
<td>West Central Washington</td>
<td>Largest accessible single peak glacier system; 28 glaciers, some of large size; 48 square miles of glacier; 50 to 600 feet thick; wonderful alpine wildflower fields.</td>
<td>Mar. 2, 1899</td>
<td>40 Stat. 803</td>
<td>790.00</td>
<td>848.31</td>
<td>983.87</td>
<td></td>
</tr>
<tr>
<td>Mesa Verde</td>
<td>Southwestern Colorado</td>
<td>Sulphur and other springs said to possess healing properties.</td>
<td>Jan. 9, 1903</td>
<td>Pub. 848, 71st Cong.</td>
<td>18.90</td>
<td>12,065.00</td>
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<td></td>
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<tr>
<td>Mesa Verde</td>
<td>Southwestern Colorado</td>
<td>Heart of the Rockies; snowy range, peaks 11,001 to 14,255 feet altitude; remarkable records of glacial period.</td>
<td>Jan. 9, 1903</td>
<td>Pub. 848, 71st Cong.</td>
<td>18.90</td>
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<tr>
<td>Mount Rainier</td>
<td>West Central Washington</td>
<td>Largest accessible single peak glacier system; 28 glaciers, some of large size; 48 square miles of glacier; 50 to 600 feet thick; wonderful alpine wildflower fields.</td>
<td>Mar. 2, 1899</td>
<td>40 Stat. 803</td>
<td>790.00</td>
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<td>12,065.00</td>
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</tbody>
</table>

1 General information circulars on these parks may be obtained free on application.
2 Boundary changed.
3 Established as a reservation Apr. 20, 1832.
### National Parks Table 1—National parks administered by the National Park Service, Department of the Interior—Continued

[Number, 22; total area, 12,542.46 square miles or 8,027,216.36 acres]

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<tr>
<td><strong>Yellowstone</strong></td>
<td>Northwestern, Wyoming, southwestern Mont., and northeastern Idaho.</td>
<td>Gardiner, Mont., Northwestern Frontier; West Yellowstone, Mont., Union Pacific; Cody, Wyo.,</td>
<td>Mar. 1, 1872</td>
<td>17 Stat. 32, 33</td>
<td>13,426.00</td>
<td>2,192,640.00</td>
<td>7,194.00</td>
<td>More geysers than in all rest of world together; boiling springs; mud volcanoes; petrified forests; Grand Canyon of the Yellowstone, remarkable for gorgeous coloring; large lakes; many large streams and waterfalls; vast wilderness, one of the greatest wild-bird and animal preserves in the world; exceptional trout fishing.</td>
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</tr>
<tr>
<td><strong>Yosemite</strong></td>
<td>Middle eastern, California.</td>
<td>Merced, Southern Pacific and Santa Fe; thence Yosemite Valley Railroad to El Portal.</td>
<td>Oct. 1, 1890</td>
<td>26 Stat. 650</td>
<td>1,162.43</td>
<td>743,959.38</td>
<td>2,531.65</td>
<td>Valley of world-famed beauty; lofty cliffs; romantic vistas; many waterfalls of extraordinary height; 3 groves of Big Trees; High Sierra, Waterwheel Falls; good trout fishing.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Feb. 7, 1905</td>
<td>33 Stat. 702</td>
<td></td>
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<td></td>
</tr>
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<td></td>
<td></td>
<td></td>
<td>June 11, 1906</td>
<td>34 Stat. 531</td>
<td></td>
<td></td>
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<td></td>
</tr>
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<td></td>
<td></td>
<td></td>
<td>May 28, 1926</td>
<td>45 Stat. 787</td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Apr. 14, 1929</td>
<td>45 Stat. 1456</td>
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<td></td>
<td></td>
<td></td>
<td>Apr. 11, 1929</td>
<td>45 Stat. 1486</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td>Proc. 1904</td>
<td></td>
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<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td><strong>Zion</strong></td>
<td>Southwestern, Utah.</td>
<td>Cedar City, Union Pacific system; Marysvale, D. &amp; R., U. W.</td>
<td>Nov. 19, 1919</td>
<td>41 Stat. 550</td>
<td>148.26</td>
<td>94,387.73</td>
<td>1,121.72</td>
<td>Magnificent gorges (Zion Canyon); depth from 1,500 to 2,500 feet, with precipitous walls; of great beauty and scenic interest.</td>
</tr>
</tbody>
</table>

1 General information circulars on these parks may be obtained free on application.
2 Boundary changed.
3 In Wyoming, 3,139 square miles; in Montana, 240 square miles; in Idaho, 47 square miles.

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In Wyoming, 3,139 square miles; in Montana, 240 square miles; in Idaho, 47 square miles.
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<tr>
<td>Arches</td>
<td>Utah</td>
<td>Thompson, Rio Grande Western-U. S. 450 to monument.</td>
<td>Apr. 12, 1929</td>
<td>Proc. 1873</td>
<td>4,320.00</td>
<td>320.00</td>
<td>Contains extraordinary examples of wind erosion in the shape of gigantic arches, windows, and other unique formations.</td>
</tr>
<tr>
<td>Aztec Ruins</td>
<td>New Mexico</td>
<td>Aztec, D. &amp; R. G. W.</td>
<td>Jan. 24, 1929</td>
<td>42 Stat. 2265</td>
<td>25.88</td>
<td></td>
<td>Prehistoric ruin of pueblo type containing 600 rooms and other ruins.</td>
</tr>
<tr>
<td>Canyon de Chelly</td>
<td>Arizona</td>
<td>Gallup, Santa Fe system</td>
<td>Apr. 1, 1931</td>
<td>Proc. 1945</td>
<td>83,840.00</td>
<td></td>
<td>Many cliff dwellings in caves and crevasses containing records of cultural progress covering longer period than any other ruins discovered in Southwest. Twenty-mile box canyon joined by lateral canyon. Walls of red sandstone from 700 to 1,000 feet high.</td>
</tr>
<tr>
<td>Casa Grande</td>
<td>Arizona</td>
<td>Florence, Southern Pacific</td>
<td>Mar. 2, 1889</td>
<td>25 Stat. 961</td>
<td>472.50</td>
<td></td>
<td>These ruins are one of the most noteworthy relics of a prehistoric age and people within the limits of the United States. Discovered in ruinous condition in 1894.</td>
</tr>
<tr>
<td>Chaco Canyon</td>
<td>New Mexico</td>
<td>Thoreau, Santa Fe system</td>
<td>Mar. 11, 1907</td>
<td>36 Stat. 219</td>
<td>10,266.24</td>
<td>21,512.37</td>
<td>Numerous cliff-dweller ruins, including communal houses, in good condition and but little excavated.</td>
</tr>
<tr>
<td>Colonial</td>
<td>Virginia</td>
<td>Williamsburg or Lee Hall, Chesapeake &amp; Ohio R. R.</td>
<td>Dec. 30, 1930</td>
<td>Proc. 1929</td>
<td>1,960.52</td>
<td></td>
<td>Three areas of great historic importance with connecting parkway—Jamestown Island, where first permanent English settlement in America was made in 1607; Williamsburg, seat of government of Colonial Virginia for nearly a century; and Yorktown, scene of the culminating battle of the Revolution.</td>
</tr>
<tr>
<td>Colorado</td>
<td>Colorado</td>
<td>Grand Junction, Denver &amp; Rio Grande Western.</td>
<td>May 24, 1911</td>
<td>37 Stat. 1681</td>
<td>13,749.47</td>
<td></td>
<td>Many lofty monoliths; is wonderful example of erosion, and of great scenic beauty and interest.</td>
</tr>
</tbody>
</table>

1 Donated to United States.  
2 Boundary changed.  
3 From June 22, 1892, until August 3, 1918, classified as a national park.  
4 Estimated.  
5 Present boundary not yet definitely determined.
<table>
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<th>Name</th>
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<td>Craters of the Moon</td>
<td>Idaho</td>
<td>Arco, Oregon Short Line</td>
<td>May 2, 1924; July 25, 1928</td>
<td>43 Stat. 1947; 45 Stat. 2950</td>
<td>49,601.90</td>
<td>1,579.96</td>
<td>Best example of fissure lava flows; volcanic region with weird landscape effects.</td>
</tr>
<tr>
<td>Devils Tower</td>
<td>Wyoming</td>
<td>Moorcroft, Burlington Route</td>
<td>Sept. 24, 1908</td>
<td>34 Stat. 3326</td>
<td>1,152.91</td>
<td></td>
<td>Remarkable natural rock tower, of volcanic origin, 1,200 feet in height. Deposits of fossil remains of prehistoric animal life of great scientific interest.</td>
</tr>
<tr>
<td>Dinosaur</td>
<td>Utah</td>
<td>Watson, Uintah Ry</td>
<td>Oct. 4, 1915</td>
<td>39 Stat. 1752</td>
<td>80.00</td>
<td></td>
<td>Deposits of fossil remains of prehistoric animal life of great scientific interest.</td>
</tr>
<tr>
<td>El Morro</td>
<td>New Mexico</td>
<td>Gallup or Grant, Santa Fe system</td>
<td>Dec. 8, 1906; June 15, 1917</td>
<td>34 Stat. 2264; 40 Stat. 1673</td>
<td>240.00</td>
<td></td>
<td>Enormous sandstone rock eroded in form of a castle, upon which inscriptions have been placed by early Spanish explorers. Contains cliff-dweller ruins. Of great historic, scenic, and ethnologic interest.</td>
</tr>
<tr>
<td>Glacier Bay</td>
<td>Alaska</td>
<td>Juneau, by boat</td>
<td>Feb. 26, 1925</td>
<td>43 Stat. 1989</td>
<td>1,164,800.00</td>
<td></td>
<td>Contains tidewater glaciers of first rank.</td>
</tr>
<tr>
<td>Gran Quivira</td>
<td>New Mexico</td>
<td>Mountainair, Santa Fe system</td>
<td>Nov. 1, 1909; Nov. 25, 1919</td>
<td>36 Stat. 2502; 41 Stat. 1773</td>
<td>610.94</td>
<td></td>
<td>One of the most important of earliest Spanish mission ruins in the Southwest. Monument also contains pueblo ruins. Four groups of prehistoric towers, pueblos, and cliff dwellings.</td>
</tr>
<tr>
<td>Katmai</td>
<td>Alaska</td>
<td>Sailing vessel from Kodiak, reached by steamer from Seattle</td>
<td>Sept. 24, 1918; Sept. 5, 1923; Apr. 24, 1931</td>
<td>40 Stat. 1855; Ex. Order No. 3897; Ex. Order No. 1090</td>
<td>2,697,590.00</td>
<td></td>
<td>Immense limestone cavern of great scientific interest, magnificently decorated with stalactite formations. Now closed to public because of depredations by vandals.</td>
</tr>
<tr>
<td>Location</td>
<td>State</td>
<td>Description</td>
<td>Date</td>
<td>Statute</td>
<td>Page Reference</td>
<td>Price</td>
<td></td>
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</tr>
<tr>
<td>Montezuma Castle</td>
<td>Arizona</td>
<td>Prehistoric cliff-dwelling ruin of unusual size situated in a niche in face of a vertical cliff. Of scenic and ethnologic interest.</td>
<td>Dec. 8, 1906</td>
<td>34 Stat. 3265</td>
<td>4109.00</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Muir Woods</td>
<td>California</td>
<td>One of the most noted redwood groves in California, and was donated by the late Hon. William Kent, ex-Member of Congress. Located 7 miles from San Francisco.</td>
<td>Jan. 9, 1906</td>
<td>35 Stat. 2174</td>
<td>426.43</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Natural Bridges</td>
<td>Utah</td>
<td>Three natural bridges, among largest examples of their kind. Largest bridge is 222 feet high, 55 feet thick at top of arch; arch is 28 feet wide; span, 261 feet; height of span, 157 feet. Other two slightly smaller.</td>
<td>Apr. 16, 1908</td>
<td>35 Stat. 2183</td>
<td>2,740.00</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Navajo</td>
<td>Arizona</td>
<td>Contains numerous pueblo, or cliff-dweller ruins, in good preservation.</td>
<td>Mar. 20, 1900</td>
<td>34 Stat. 2491</td>
<td>380.00</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Petrified Forest</td>
<td>Arizona</td>
<td>Abundance of petrified coniferous trees, one of which forms a small natural bridge. Is of great scientific interest.</td>
<td>Dec. 8, 1906</td>
<td>34 Stat. 3206</td>
<td>36,918.37</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pinnacles</td>
<td>California</td>
<td>Many spirelike rock formations, 600 to 1,000 feet high, visible many miles; also numerous caves and other formations.</td>
<td>Jan. 16, 1908</td>
<td>35 Stat. 2177</td>
<td>100.00</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pipe Spring</td>
<td>Arizona</td>
<td>Old stone fort and spring of pure water in desert region. Serves as memorial to early western pioneer life.</td>
<td>May 31, 1923</td>
<td>36 Stat. 2705</td>
<td>160.00</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rainbow Bridge</td>
<td>Utah</td>
<td>Unique natural bridge of great scientific interest and symmetry. Height 309 feet above water, and span 278 feet, in shape of rainbow.</td>
<td>May 30, 1910</td>
<td>36 Stat. 2706</td>
<td>160.00</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Scotts Bluff</td>
<td>Nebraska</td>
<td>Region of historic and scientific interest. Many famous old trails traversed by the early pioneers in the winning of the West passed over and through this monument.</td>
<td>Dec. 12, 1919</td>
<td>41 Stat. 1779</td>
<td>1,893.83</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sitka</td>
<td>Alaska</td>
<td></td>
<td>Mar. 23, 1910</td>
<td>36 Stat. 2601</td>
<td>57.00</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

1 Donated to United States.
2 Boundary changed
3 Estimated.
<table>
<thead>
<tr>
<th>Name</th>
<th>Location</th>
<th>Approaches</th>
<th>When established</th>
<th>Statute reference</th>
<th>Area, acres</th>
<th>Total alien lands (acres)</th>
<th>Special characteristics</th>
</tr>
</thead>
<tbody>
<tr>
<td>Verendrye</td>
<td>North Dakota</td>
<td>Sanish, Soo Line</td>
<td>June 29, 1917</td>
<td>40 Stat. 1677</td>
<td>250.04</td>
<td>250.04</td>
<td>Includes Crowhill Butte, from which Explorer Verendrye first beheld territory beyond the Missouri River.</td>
</tr>
</tbody>
</table>

1 Donated to United States.
<table>
<thead>
<tr>
<th>Name</th>
<th>Location</th>
<th>Approaches</th>
<th>When established</th>
<th>Statute reference</th>
<th>Area, acres</th>
<th>Special characteristics</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bandelier</td>
<td>New Mexico</td>
<td>Santa Fe, Santa Fe system, and Denver &amp; Rio Grande Western.</td>
<td>Feb. 11, 1916</td>
<td>39 Stat. 1764</td>
<td>22,075</td>
<td>Vast number of cliff-dweller ruins of unusual ethnological and educational interest, including ruins of Rito de los Frijoles, Otowi, Tsankawi, and others. Some of the tools, implements, and simple household equipment of the former inhabitants have been restored as they were centuries ago.</td>
</tr>
<tr>
<td>Chiricahua</td>
<td>Arizona</td>
<td>Wilcox, Southern Pacific</td>
<td>Apr. 18, 1924</td>
<td>43 Stat. 1946</td>
<td>4,480</td>
<td>Natural rock formations—pillars, balanced rocks, and formations resembling animals, faces, etc.</td>
</tr>
<tr>
<td>Devils Postpile</td>
<td>California</td>
<td>Laws, Southern Pacific, thence stage to Mammoth.</td>
<td>July 6, 1911</td>
<td>37 Stat. 1715</td>
<td>800</td>
<td>Consists of peculiar hexagonal basaltic columns, like an immense pile of posts. The columns lie in the pile at all angles from vertical to almost horizontal. Said to rank with famous Giant's Causeway of Ireland.</td>
</tr>
<tr>
<td>Gila Cliff Dwellings</td>
<td>New Mexico</td>
<td>Silver City, via Pinos Altos, Santa Fe system.</td>
<td>Nov. 16, 1907</td>
<td>35 Stat. 2162</td>
<td>100</td>
<td>Cliff-dweller ruins. Four natural cavities in the face of an overhanging cliff 150 feet high, of a grayish-yellow volcanic formation, are divided into small rooms by walls built of adobe and small stones, which are in a good state of preservation. The ruins are situated in a rough and broken country and are accessible only by trail.</td>
</tr>
<tr>
<td>Holy Cross</td>
<td>Colorado</td>
<td>Redcliff, Denver &amp; Rio Grande</td>
<td>May 11, 1929</td>
<td>Proc. 1877</td>
<td>1,392</td>
<td>Consists of peculiar hexagonal basaltic columns, like an immense pile of posts. The columns lie in the pile at all angles from vertical to almost horizontal. Said to rank with famous Giant's Causeway of Ireland.</td>
</tr>
<tr>
<td>Lava Beds</td>
<td>California</td>
<td>Mount Hebron, Southern Pacific</td>
<td>Nov. 21, 1925</td>
<td>44 Stat. 2991</td>
<td>45,967</td>
<td>Unusual and unique exhibits of volcanic action and lava flows in the shape of peculiar lava caves and tunnels in great numbers and of considerable size. In many of these caves rivers of perpetual ice are found and Indian petroglyphs carved and painted upon their walls indicate possible occupancy by early historic and prehistoric races. Battle ground of Modoc Indian war of 1873.</td>
</tr>
</tbody>
</table>

1 Estimated.
# National Parks Table 3—National monuments administered by the Department of Agriculture—Continued

[Number, 16; total area, 506.22 square miles or 381,185 acres]

<table>
<thead>
<tr>
<th>Name</th>
<th>Location</th>
<th>Approaches</th>
<th>When established</th>
<th>Statute reference</th>
<th>Area, acres</th>
<th>Special characteristics</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mount Olympus</td>
<td>Washington</td>
<td>Port Angeles by ferry from Seattle.</td>
<td>Mar. 2, 1909</td>
<td>35 Stat. 2247</td>
<td>298,700</td>
<td>Contains many objects of unusual scientific interest, including numerous glaciers. It is a real wilderness area, having no settlements, no supply points, nor human habitations within it. Bands of the rare Roosevelt elk, numbering several thousand head, of a species native to the region and not found elsewhere, have their summer feeding grounds within the monument area.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Apr. 17, 1912</td>
<td>37 Stat. 1737</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>May 11, 1914</td>
<td>39 Stat. 1729</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Oregon Caves</td>
<td>Oregon</td>
<td>Grants Pass, Southern Pacific.</td>
<td>July 12, 1909</td>
<td>36 Stat. 2497</td>
<td>480</td>
<td>Caves in limestone formation of great variety and beauty. These assume odd, grotesque, and fantastic forms of considerable extent and are situated in an attractive environment. A volcanic crater with lava flows and ice caves, near famous San Francisco Peaks.</td>
</tr>
<tr>
<td>Sunset Crater</td>
<td>Arizona</td>
<td>Flagstaff, Santa Fe system.</td>
<td>May 26, 1930</td>
<td>Proc. No. 1911</td>
<td>3,040</td>
<td>Limestone cavern. The cave is almost 600 feet in length. Many beautiful effects are emphasized by the electric lights installed in the cave.</td>
</tr>
<tr>
<td>Timpanogos Cave</td>
<td>Utah</td>
<td>American Fork, Union Pacific system; D. &amp; R. G. W.</td>
<td>Oct. 14, 1922</td>
<td>42 Stat. 2235</td>
<td>200</td>
<td>Two cliff-dweller ruins just off the Roosevelt Globe Highway, one to the southwest of the road and the other on the west side of the canyon. They consist of two and three storied walls of adobe with the supporting beams and lintels of windows and low doors still in place.</td>
</tr>
<tr>
<td>Tonto</td>
<td>Arizona</td>
<td>Globe, Southern Pacific.</td>
<td>Dec. 19, 1907</td>
<td>35 Stat. 2168</td>
<td>1,640</td>
<td>Contains cliff dwellings of marked scientific and popular interest built in under the outward sloping canyon walls, utilizing the projecting limestone ledges as foundations. Instead of being of the communal type, these cliff houses were apparently built for separate families and contain from six to eight rooms.</td>
</tr>
</tbody>
</table>

* Estimated.
<table>
<thead>
<tr>
<th>Name</th>
<th>Location</th>
<th>Approaches</th>
<th>When established</th>
<th>Statute reference</th>
<th>Area, acres</th>
<th>Special characteristics</th>
</tr>
</thead>
<tbody>
<tr>
<td>Abraham Lincoln Birthplace Memorial</td>
<td>Kentucky</td>
<td>Hodgenville, Illinois Central</td>
<td>July 17, 1916</td>
<td>39 Stat. 385</td>
<td>110.50</td>
<td>Contains the log cabin and part of the farm where Abraham Lincoln was born.</td>
</tr>
<tr>
<td>Big Hole Battlefield</td>
<td>Montana</td>
<td>Divide, Union Pacific</td>
<td>June 23, 1910</td>
<td>Ex. Order</td>
<td>5.00</td>
<td>Site of battlefield on which battle was fought Aug. 9, 1877, between a small force of United States troops and a much larger force of Nez Perce Indians, resulting in rout for the Indians. Civil War Battle of Big Hole.</td>
</tr>
<tr>
<td>Cabrillo</td>
<td>California</td>
<td>San Diego, Southern Pacific and Santa Fe system</td>
<td>Oct. 14, 1913</td>
<td>38 Stat. 1965</td>
<td>.50</td>
<td>Of historic interest because of discovery of the territory now partly embraced in the State of California by Juan Rodriguez Cabrillo, who at this point first sighted land on Sept. 28, 1542.</td>
</tr>
<tr>
<td>Fort Mchenry</td>
<td>Maryland</td>
<td>Baltimore, Philadelphia, Baltimore &amp; Washington,</td>
<td>Mar. 3, 1926</td>
<td>43 Stat. 1109</td>
<td>1.00</td>
<td>Site for erection of cross to commemorate a cross erected by Father Millett in 1688 on what is now the Fort Niagara Military Reservation.</td>
</tr>
<tr>
<td>Fort Pulaski</td>
<td>Georgia</td>
<td>Pulaski, Central of Georgia</td>
<td>Oct. 15, 1924</td>
<td>43 Stat. 1968</td>
<td>20.00</td>
<td>Site for erection of cross erected by Father Millett in 1688 on what is now the Fort Niagara Military Reservation.</td>
</tr>
<tr>
<td>Fort Wood</td>
<td>New York</td>
<td>New York City</td>
<td>Feb. 15, 1928</td>
<td>110 Stat. 1968</td>
<td>60.00</td>
<td>Site of the Battle of Liberty.</td>
</tr>
<tr>
<td>Monocacy</td>
<td>Maryland</td>
<td>Near Sharpsburg, Norfolk &amp; Western</td>
<td>Mar. 1, 1929</td>
<td>45 Stat. 1144</td>
<td>1.00</td>
<td>Famous group of prehistoric mounds in Camp Sherman Military Reservation.</td>
</tr>
<tr>
<td>Tupelo</td>
<td>Mississippi</td>
<td>Baldwyn, Mobile &amp; Ohio</td>
<td>Feb. 21, 1929</td>
<td>43 Stat. 1224</td>
<td>None</td>
<td>Memorial tablet to commemorate the Battle of Tupelo, fought on July 2, 1861.</td>
</tr>
</tbody>
</table>
### National Parks Table 5.—National military and other parks administered by the War Department

[Number, 11; total area, 22 square miles or 14,131.86 acres]

<table>
<thead>
<tr>
<th>Name</th>
<th>Location</th>
<th>Nearest rail stations</th>
<th>When established</th>
<th>Statute reference</th>
<th>Area, acres</th>
<th>Special characteristics</th>
</tr>
</thead>
<tbody>
<tr>
<td>Antietam Battlefield</td>
<td>Maryland</td>
<td>Antietam, Norfolk &amp; Western</td>
<td>Aug. 30, 1890</td>
<td>26 Stat. 401</td>
<td>40.00</td>
<td>Scene of one of the greatest battles of the Civil War.</td>
</tr>
<tr>
<td>Chickamauga and Chattanooga</td>
<td>Georgia and Tennessee</td>
<td>Chattanooga, several southern roads</td>
<td>Aug. 19, 1890</td>
<td>26 Stat. 333</td>
<td>6,541.64</td>
<td>Beautiful natural park; embraces battlefields of Chickamauga and Missionary Ridge.</td>
</tr>
<tr>
<td>Fredericksburg and Spotsylvania</td>
<td>Virginia</td>
<td>Fredericksburg, R., F. &amp; P.</td>
<td>Feb. 14, 1927</td>
<td>44 Stat. 1091</td>
<td>None</td>
<td>Scene of battles of Fredericksburg, Spotsylvania, Wilderness, Chancellorsville, and Salem Church at or near Fredericksburg.</td>
</tr>
<tr>
<td>Gettysburg</td>
<td>Pennsylvania</td>
<td>Gettysburg, Philadelphia &amp; Reading and Western Maryland</td>
<td>Mar. 21, 1895</td>
<td>28 Stat. 601</td>
<td>2,310.86</td>
<td>Beautiful natural park; scene of Civil War combat; probably better marked than any other battlefield in the world.</td>
</tr>
<tr>
<td>Guilford Courthouse</td>
<td>North Carolina</td>
<td>Greensboro, Southern and Atlantic &amp; Yardkin</td>
<td>Feb. 11, 1895</td>
<td>39 Stat. 996</td>
<td>110.46</td>
<td>Near Greensboro; scene of one of the great battles of the Revolution; fought in 1781.</td>
</tr>
<tr>
<td>Moores Creek</td>
<td>do</td>
<td>Burgaw, A. C. Line</td>
<td>Feb. 13, 1895</td>
<td>44 Stat. 684</td>
<td>30.00</td>
<td>Scene of one of most memorable battles of Revolutionary War.</td>
</tr>
<tr>
<td>Petersburg</td>
<td>Virginia</td>
<td>Petersburg, Seaboard Air Line, Atlantic Coast Line, and N. &amp; W.</td>
<td>July 3, 1926</td>
<td>44 Stat. 822</td>
<td>185.00</td>
<td>Scene of campaign and siege and defense of Petersburg, Virginia, in 1864 and 1865.</td>
</tr>
<tr>
<td>Shiloh</td>
<td>Tennessee</td>
<td>Corinth, Miss., Illinois Central and Southern</td>
<td>Dec. 27, 1894</td>
<td>28 Stat. 387</td>
<td>5,583.69</td>
<td>Natural park embracing the battlefield of Shiloh near Pittsburg Landing.</td>
</tr>
<tr>
<td>Vicksburg</td>
<td>Mississippi</td>
<td>Vicksburg, Alabama &amp; Vicksburg, Vicksburg, Shreveport, Pacific, and Yazoo &amp; Mississippi Valley</td>
<td>Feb. 21, 1899</td>
<td>30 Stat. 841</td>
<td>1,324.21</td>
<td>Beautiful natural park; scene of the siege and surrender of Vicksburg in 1863 during the Civil War.</td>
</tr>
</tbody>
</table>

1 Donated in whole or in part to the United States.
### NATIONAL PARKS TABLE 6.—Holdings acquired by deed for national park and monument purposes

<table>
<thead>
<tr>
<th>Parks and monuments</th>
<th>Holdings acquired by purchase</th>
<th>Holdings acquired otherwise than by purchase</th>
<th>Total area acquired prior to July 1, 1930</th>
<th>Total holdings acquired through Sept. 30, 1931</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Government funds</td>
<td>Donated funds</td>
<td>Area in acres</td>
<td>How acquired</td>
</tr>
<tr>
<td>1. Acadia National Park</td>
<td>31,900.00</td>
<td></td>
<td>6.88</td>
<td>Donation</td>
</tr>
<tr>
<td>2. Aztec Ruins National Monument</td>
<td>1,500.00</td>
<td></td>
<td>6.88</td>
<td>Donation</td>
</tr>
<tr>
<td>3. Carlsbad Caverns National Park</td>
<td>20,000.00</td>
<td></td>
<td>20.00</td>
<td>Donation (right of way)</td>
</tr>
<tr>
<td>4. Colonial National Monument</td>
<td>474,714.14</td>
<td></td>
<td>1,673.19</td>
<td>By transfer, War Department</td>
</tr>
<tr>
<td>5. Crater Lake National Park</td>
<td>474,714.14</td>
<td></td>
<td>1,673.19</td>
<td>By transfer, Treasury Department</td>
</tr>
<tr>
<td>6. Craters of the Moon National Monument</td>
<td>20,000.00</td>
<td></td>
<td>20.00</td>
<td>Donation</td>
</tr>
<tr>
<td>7. General Grant National Park</td>
<td>474,714.14</td>
<td></td>
<td>1,673.19</td>
<td>By transfer, Treasury Department</td>
</tr>
<tr>
<td>8. George Washington Birthplace National Monument</td>
<td>204,400.00</td>
<td></td>
<td>166.62</td>
<td>Donation</td>
</tr>
<tr>
<td>9. Glacier National Park</td>
<td>204,400.00</td>
<td></td>
<td>166.62</td>
<td>Donation, State of North Carolina</td>
</tr>
<tr>
<td>10. Great Smoky Mountains National Park</td>
<td>474,714.14</td>
<td></td>
<td>1,673.19</td>
<td>By transfer, State of North Carolina</td>
</tr>
<tr>
<td>11. Hawaii National Park</td>
<td>474,714.14</td>
<td></td>
<td>1,673.19</td>
<td>By transfer, State of North Carolina</td>
</tr>
<tr>
<td>12. Hot Springs National Park</td>
<td>204,400.00</td>
<td></td>
<td>166.62</td>
<td>Donation</td>
</tr>
<tr>
<td>13. Lassen Volcanic National Park</td>
<td>474,714.14</td>
<td></td>
<td>1,673.19</td>
<td>Donation</td>
</tr>
<tr>
<td>14. Mesa Verde National Park</td>
<td>474,714.14</td>
<td></td>
<td>1,673.19</td>
<td>Donation</td>
</tr>
<tr>
<td>15. Muir Woods National Monument</td>
<td>474,714.14</td>
<td></td>
<td>1,673.19</td>
<td>Donation</td>
</tr>
<tr>
<td>16. Pinnacles National Monument</td>
<td>474,714.14</td>
<td></td>
<td>1,673.19</td>
<td>Donation</td>
</tr>
<tr>
<td>17. Rocky Mountain National Park</td>
<td>474,714.14</td>
<td></td>
<td>1,673.19</td>
<td>Donation</td>
</tr>
<tr>
<td>18. Sequoia National Park</td>
<td>474,714.14</td>
<td></td>
<td>1,673.19</td>
<td>Donation</td>
</tr>
<tr>
<td>19. Elk Refuge north of Yellowstone National Park</td>
<td>474,714.14</td>
<td></td>
<td>1,673.19</td>
<td>Donation</td>
</tr>
<tr>
<td>20. Yosemite National Park</td>
<td>474,714.14</td>
<td></td>
<td>1,673.19</td>
<td>Donation</td>
</tr>
<tr>
<td>21. Zion National Park</td>
<td>474,714.14</td>
<td></td>
<td>1,673.19</td>
<td>Donation</td>
</tr>
<tr>
<td>22. Yucca House National Monument</td>
<td>474,714.14</td>
<td></td>
<td>1,673.19</td>
<td>Donation</td>
</tr>
<tr>
<td>Total</td>
<td>807,999.14</td>
<td></td>
<td>57,540.00</td>
<td></td>
</tr>
</tbody>
</table>

**Note:** Prior to Oct. 1, 1931, the Government expended $2,051,580.61. During that period $1,683,317.80 and many acres of land were donated.

### TABLE OF PRIVATE HOLDINGS ACQUIRED

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Acquired land</td>
<td>Acres</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>-------------------------------------------------------------------------------</td>
<td>-------</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>A. Hancock County Trustee of Public Reservations</td>
<td>1,131.32</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lafayette National Park Museum of Stone Age Antiquities</td>
<td>2.3</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>John D. Rockefeller, Jr.</td>
<td>305</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>B. American Museum of Natural History</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>C. Jamestown Corporation</td>
<td>41.88</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Martha G. Iager</td>
<td>.85</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>J. M. Dozier</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>D. Edward B. Arthur, Kilpatrick Brothers.</td>
<td>228.00</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>E. Wakefield National Memorial Association</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>River Holding Corporation</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>F. Emma A. Krikava</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>G. Fred. C. Hallar</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>H. County of San Benito, Calif.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I. Don Tresidder</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mary Curry Tresidder</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Report of Director of National Park Service
## APPENDIX C

### TRAVEL AND FINANCIAL STATISTICS

#### National Parks Table 7.—Visitors to the national parks, 1916–1931

<table>
<thead>
<tr>
<th>Name of park</th>
<th>1916</th>
<th>1917</th>
<th>1918</th>
<th>1919</th>
<th>1920</th>
<th>1921</th>
<th>1922</th>
<th>1923</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acadia</td>
<td>12,260</td>
<td>11,745</td>
<td>13,251</td>
<td>9,384</td>
<td>24,135</td>
<td>23,189</td>
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| Total                  | 1,422,383 | 1,760,872 | 1,930,955 | 2,554,649 | 3,322,188 | 2,680,597 | 2,774,564 | 3,152,885 |

1 Formerly Lafayette National Park.
2 Estimated.
3 No record.
4 Actual park visitors; some mines and prospectors also passed through park.
5 National park established by act of May 14, 1930. Formerly a national monument.
6 Much of this travel, which is estimated, originated in the locality.
7 In 1931, this area was transferred to the Department of Agriculture to be administered as a game preserve.

---

111
### National Parks Table No. 8.—Detail comparative statistics of travel and campers, 1930–31

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<tr>
<td>Ominapechee entrance</td>
<td>2,598</td>
<td>4,068</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>62,832</td>
<td>25,564</td>
<td></td>
<td></td>
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<td></td>
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</table>

<table>
<thead>
<tr>
<th>Rocky Mountain</th>
<th>71,000</th>
<th>173,188</th>
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<tbody>
<tr>
<td>Bear Lake entrance</td>
<td>9,880</td>
<td>18,278</td>
</tr>
<tr>
<td>Fall River entrance</td>
<td>16,425</td>
<td>22,365</td>
</tr>
<tr>
<td>High Drive entrance</td>
<td>4,450</td>
<td>6,450</td>
</tr>
<tr>
<td>Grand Lake entrance</td>
<td>1,445</td>
<td>14,621</td>
</tr>
<tr>
<td>Other entrances</td>
<td>3,789</td>
<td>2,196</td>
</tr>
<tr>
<td>Total</td>
<td>46,425</td>
<td>68,919</td>
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</table>

<table>
<thead>
<tr>
<th>Sequoia</th>
<th>35,205</th>
<th>40,787</th>
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</thead>
<tbody>
<tr>
<td>Ash Mountain entrance</td>
<td>3,425</td>
<td>3,914</td>
</tr>
<tr>
<td>Mineral King entrance</td>
<td>3,425</td>
<td>3,914</td>
</tr>
<tr>
<td>Total</td>
<td>38,531</td>
<td>44,701</td>
</tr>
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<table>
<thead>
<tr>
<th>Wind Cave</th>
<th>20,000</th>
<th>25,000</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total</td>
<td>63,488</td>
<td>63,836</td>
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</table>

<table>
<thead>
<tr>
<th>Yellowstone</th>
<th>87,022</th>
<th>85,296</th>
</tr>
</thead>
<tbody>
<tr>
<td>North entrance</td>
<td>13,419</td>
<td>15,311</td>
</tr>
<tr>
<td>West entrance</td>
<td>22,479</td>
<td>21,407</td>
</tr>
<tr>
<td>East entrance</td>
<td>20,746</td>
<td>21,825</td>
</tr>
<tr>
<td>South entrance</td>
<td>6,705</td>
<td>7,093</td>
</tr>
<tr>
<td>Total</td>
<td>141,091</td>
<td>139,906</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Yosemite</th>
<th>42,832</th>
<th>42,832</th>
</tr>
</thead>
<tbody>
<tr>
<td>Arch Rock entrance</td>
<td>87,022</td>
<td>85,296</td>
</tr>
<tr>
<td>Mariposa Grove</td>
<td>13,581</td>
<td>17,698</td>
</tr>
<tr>
<td>Alder Creek</td>
<td>10,144</td>
<td>15,361</td>
</tr>
<tr>
<td>Tuolumne Grove</td>
<td>16,524</td>
<td>15,365</td>
</tr>
<tr>
<td>Aspen Valley</td>
<td>6,567</td>
<td>7,716</td>
</tr>
<tr>
<td>Tioga Pass</td>
<td>7,034</td>
<td>10,958</td>
</tr>
<tr>
<td>Matthes</td>
<td>4,239</td>
<td>4,756</td>
</tr>
<tr>
<td>Total</td>
<td>141,091</td>
<td>139,906</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Zion</th>
<th>15,638</th>
<th>15,215</th>
</tr>
</thead>
</table>

1 No record kept.
2 Estimated.
Arches (Utah)........................................... 5,446 7,268 10,350 15,193 24 500 4,400 4,405
Aztec Ruins (New Mexico).......................... 10,906 26,436 46,335 76,522 76,000 12,982 10,710
Canyon de Chelly (Arizona)......................... 16,542 28,818 35,274 37,244 36,066 27,675
Capulin Mountain (New Mexico).................... 14,605 20,647 7,000 12,000 12,000 4,500 18,000
Casa Grande (Arizona).................................. 2,500 1,500 1,425 2,700 3,200 1,700
Canyon de Chaco (New Mexico)..................... 8,000 5,500 16,000 12,000 12,000 18,000
Colorado (Colorado)..................................... 4,620 5,771 7,608 7,720 3,605 5,855
Crater Lake (Oregon)................................... 10,640 10,400 2,000 12,000 14,720 11,000
El Morro (New Mexico).................................. 5,794 5,178 5,356 2,625 5,356 5,834
George Washington Birthplace (Virginia)........... 27,900 22,900
Gran Quivira (New Mexico).......................... 1,877 2,034 2,779 3,367 4,912 4,232
Hovenweep (Utah-Colorado)........................... 2,290 263 240 1,400 440
Montezuma Castle (Arizona)......................... 12,585 14,100 16,222 17,284 19,296 14,411
Muir Woods (California)............................... 97,426 101,514 105,371 95,688 77,311 73,717
National Bridges (Utah).............................. 65 83 175 200 300 300
Navajo (Arizona)......................................... 1,250 1,290 315 965 215
Papago Saguaro (Arizona)............................. 53,000 60,540 65,450 27,090 50,600
Petrefied Forest (Arizona)............................ 55,343 61,761 75,225 69,350 105,433 98,885
Pinnacles (California)................................. 10,187 11,265 16,216 9,980 11,862 13,313
Pipe Spring (Arizona)................................... 10,728 13,563 17,251 24,588 8,765 2,330
Rainbow Bridge (Utah).................................. 2,300 2,300 2,900 2,400 325 330
Scots Bluff (Nebraska)................................. 37,000 30,000 37,300 42,450 45,480 48,000
Shoshone Cavern (Wyoming)............................ 6,900 6,900
Sierra (Alaska).......................................... 2,500 3,000 3,000 3,000 2,500 2,500
Tumacacori (Arizona).................................... 13,693 16,761 17,341 18,200 16,003 12,036
Verendrye (North Dakota)............................. 13,000 15,000 15,000 11,000 9,000 9,000
Wupatki (Arizona)........................................ 2,600 1,650 7,500 650 660
Yucca House (Colorado)............................... 1,150 196 174 250 220 264

Total........................................... 384,040 443,197 502,656 557,697 472,095 392,011

1 No records for other national monuments.
2 Estimated.
3 Made a national park by act of Congress approved May 14, 1930.

NATIONAL PARKS TABLE 10.—Private automobiles entering the national parks during seasons 1924-1931

<table>
<thead>
<tr>
<th>Name of park</th>
<th>1924</th>
<th>1925</th>
<th>1926</th>
<th>1927</th>
<th>1928</th>
<th>1929</th>
<th>1930</th>
<th>1931</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acadia</td>
<td>12,561</td>
<td>9,351</td>
<td>15,361</td>
<td>29,181</td>
<td>31,908</td>
<td>35,972</td>
<td>37,118</td>
<td>40,393</td>
</tr>
<tr>
<td>Bryce Canyon</td>
<td>15,462</td>
<td>12,098</td>
<td>11,289</td>
<td>15,489</td>
<td>17,619</td>
<td>17,774</td>
<td>17,087</td>
<td>15,800</td>
</tr>
<tr>
<td>Crater Lake</td>
<td>2,500</td>
<td>1,500</td>
<td>1,200</td>
<td>1,425</td>
<td>2,700</td>
<td>3,200</td>
<td>1,700</td>
<td>1,841</td>
</tr>
<tr>
<td>General Grant</td>
<td>6,118</td>
<td>11,108</td>
<td>12,869</td>
<td>13,172</td>
<td>14,641</td>
<td>12,955</td>
<td>13,924</td>
<td>16,245</td>
</tr>
<tr>
<td>Glacier</td>
<td>6,756</td>
<td>7,685</td>
<td>6,727</td>
<td>7,880</td>
<td>9,880</td>
<td>14,300</td>
<td>18,315</td>
<td>16,416</td>
</tr>
<tr>
<td>Grand Canyon</td>
<td>13,062</td>
<td>19,910</td>
<td>22,484</td>
<td>26,479</td>
<td>32,316</td>
<td>37,648</td>
<td>35,597</td>
<td>36,544</td>
</tr>
<tr>
<td>Grand Staircase</td>
<td>10,150</td>
<td>12,650</td>
<td>6,439</td>
<td>8,848</td>
<td>14,505</td>
<td>18,847</td>
<td>28,251</td>
<td>31,026</td>
</tr>
<tr>
<td>Great Smoky Mountains</td>
<td>1,500</td>
<td>2,500</td>
<td>2,800</td>
<td>3,200</td>
<td>3,600</td>
<td>4,000</td>
<td>4,400</td>
<td>4,800</td>
</tr>
<tr>
<td>Hawaii</td>
<td>10,150</td>
<td>12,650</td>
<td>6,439</td>
<td>8,848</td>
<td>14,505</td>
<td>18,847</td>
<td>28,251</td>
<td>31,026</td>
</tr>
<tr>
<td>Lassen Volcanic</td>
<td>1,850</td>
<td>2,197</td>
<td>3,054</td>
<td>3,315</td>
<td>4,903</td>
<td>4,224</td>
<td>5,025</td>
<td>5,994</td>
</tr>
<tr>
<td>Mount Rainier</td>
<td>39,351</td>
<td>39,860</td>
<td>39,626</td>
<td>48,275</td>
<td>50,006</td>
<td>61,998</td>
<td>62,566</td>
<td>74,947</td>
</tr>
<tr>
<td>Sequoia</td>
<td>4,500</td>
<td>41,000</td>
<td>45,700</td>
<td>54,100</td>
<td>54,150</td>
<td>73,182</td>
<td>74,429</td>
<td></td>
</tr>
<tr>
<td>Sylvania</td>
<td>11,062</td>
<td>14,273</td>
<td>26,503</td>
<td>30,165</td>
<td>29,200</td>
<td>35,200</td>
<td>36,531</td>
<td>44,701</td>
</tr>
<tr>
<td>Wind Cave</td>
<td>17,289</td>
<td>22,589</td>
<td>26,979</td>
<td>33,300</td>
<td>36,317</td>
<td>40,000</td>
<td>25,030</td>
<td>25,030</td>
</tr>
<tr>
<td>Yellowstone</td>
<td>20,600</td>
<td>27,600</td>
<td>44,800</td>
<td>49,050</td>
<td>58,164</td>
<td>69,415</td>
<td>63,588</td>
<td>65,795</td>
</tr>
<tr>
<td>Yosemite</td>
<td>32,814</td>
<td>49,229</td>
<td>74,855</td>
<td>137,296</td>
<td>131,689</td>
<td>132,903</td>
<td>141,267</td>
<td>151,126</td>
</tr>
<tr>
<td>Zion</td>
<td>1,093</td>
<td>3,928</td>
<td>4,706</td>
<td>6,203</td>
<td>7,532</td>
<td>8,612</td>
<td>15,033</td>
<td>18,215</td>
</tr>
</tbody>
</table>

Total........................................... 315,916 368,212 417,386 557,079 559,236 688,945 779,275 887,938

1 Automobiles and motor cycles entering parks with or without license, to including Sept. 30, 1931.
2 No license required.
3 Formerly Lafayette National Park.
4 Estimated.
5 Count made only at public camp ground.
6 License required only for Giant Forest Road.
7 National park established by act of May 14, 1930. Formally a national monument.
8 By act of Congress of Mar. 3, 1931, this area was transferred to the Department of Agriculture to be administered as a game preserve.
### NATIONAL PARKS Table 11.—Automobile and motor-cycle licenses issued during seasons 1927–1931

<table>
<thead>
<tr>
<th>Name of park</th>
<th>1927</th>
<th>1928</th>
<th>1929</th>
<th>1930</th>
<th>1931</th>
</tr>
</thead>
<tbody>
<tr>
<td>Crater Lake</td>
<td>15,046</td>
<td>18</td>
<td>27,898</td>
<td>46</td>
<td>23,644</td>
</tr>
<tr>
<td>General Grant</td>
<td>6,702</td>
<td>0</td>
<td>9,300</td>
<td>5</td>
<td>6,266</td>
</tr>
<tr>
<td>Glacier</td>
<td>5,196</td>
<td>5</td>
<td>7,350</td>
<td>33</td>
<td>7,377</td>
</tr>
<tr>
<td>Grand Canyon</td>
<td>21,629</td>
<td>47</td>
<td>26,429</td>
<td>33</td>
<td>26,929</td>
</tr>
<tr>
<td>Mount Rainier</td>
<td>25,340</td>
<td>61</td>
<td>32,885</td>
<td>61</td>
<td>32,184</td>
</tr>
<tr>
<td>Sequoia</td>
<td>16,383</td>
<td>43</td>
<td>16,599</td>
<td></td>
<td>16,799</td>
</tr>
<tr>
<td>Yellowstone</td>
<td>49,092</td>
<td>191</td>
<td>54,130</td>
<td>179</td>
<td>56,169</td>
</tr>
<tr>
<td>Yosemite</td>
<td>40,580</td>
<td>218</td>
<td>75,213</td>
<td>183</td>
<td>74,229</td>
</tr>
<tr>
<td>Zion</td>
<td>4,069</td>
<td>451</td>
<td>6,107</td>
<td></td>
<td>6,822</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>239,965</td>
<td>262</td>
<td>237,256</td>
<td>459</td>
<td>256,865</td>
</tr>
</tbody>
</table>

1 No licenses required for Wind Cave, Hot Springs, Platte, Hawaii, Lassen Volcanic, Sullys Hill, Rocky Mountain, Mount McKinley, and Acadia National Parks.
2 License required only for Giant Forest Road.

### NATIONAL PARKS Table 12.—Receipts collected from automobiles and motor cycles during seasons 1927–1931

<table>
<thead>
<tr>
<th>Name of park</th>
<th>1927</th>
<th>1928</th>
<th>1929</th>
<th>1930</th>
<th>1931</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>$15,064.00</td>
<td>$27,944.00</td>
<td>$34,000.00</td>
<td>$37,623.00</td>
<td>$35,803.00</td>
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<tr>
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<td>$3,351.00</td>
<td>$3,190.00</td>
<td>$3,014.00</td>
<td>$3,568.50</td>
<td>$3,608.00</td>
</tr>
<tr>
<td></td>
<td>$5,196.00</td>
<td>$7,350.00</td>
<td>$7,377.00</td>
<td>$10,650.00</td>
<td>$11,362.00</td>
</tr>
<tr>
<td></td>
<td>$21,629.00</td>
<td>$26,429.00</td>
<td>$26,929.00</td>
<td>$35,799.00</td>
<td>$36,707.00</td>
</tr>
<tr>
<td></td>
<td>$2,665.00</td>
<td>$4,266.00</td>
<td>$3,944.00</td>
<td>$4,844.00</td>
<td>$4,917.00</td>
</tr>
<tr>
<td></td>
<td>$25,340.00</td>
<td>$32,885.00</td>
<td>$32,184.00</td>
<td>$35,408.00</td>
<td>$41,217.00</td>
</tr>
<tr>
<td></td>
<td>$16,383.00</td>
<td>$16,599.00</td>
<td>$16,799.00</td>
<td>$29,998.00</td>
<td>$21,998.00</td>
</tr>
<tr>
<td></td>
<td>$49,092.00</td>
<td>$54,130.00</td>
<td>$56,169.00</td>
<td>$63,833.00</td>
<td>$56,491.00</td>
</tr>
<tr>
<td></td>
<td>$40,580.00</td>
<td>$75,213.00</td>
<td>$74,229.00</td>
<td>$81,365.00</td>
<td>$70,678.00</td>
</tr>
<tr>
<td></td>
<td>$4,069.00</td>
<td>$6,107.00</td>
<td>$6,822.00</td>
<td>$10,284.00</td>
<td>$15,764.00</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>$416,757.00</td>
<td>$434,962.50</td>
<td>$437,531.50</td>
<td>$506,467.50</td>
<td>$494,075.50</td>
</tr>
</tbody>
</table>

1 No licenses required for Wind Cave, Hot Springs, Platte, Hawaii, Lassen Volcanic, Sullys Hill, Rocky Mountain, Mount McKinley, and Acadia National Parks.
2 License required only for Giant Forest Road.

### NATIONAL PARKS Table 13.—Statement of appropriations made for, and revenues received from, the various national parks and national monuments, and expenditures made therefrom during recent fiscal years.1

<table>
<thead>
<tr>
<th>Name of the national park</th>
<th>Appropriations</th>
<th>Revenue received</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Appropriated</td>
<td>Expended</td>
</tr>
<tr>
<td>Acadia (formerly Lafayette):</td>
<td>$37,940.00</td>
<td>$37,376.99</td>
</tr>
<tr>
<td>1927</td>
<td>$39,000.00</td>
<td>$40,014.00</td>
</tr>
<tr>
<td>1929</td>
<td>$59,000.00</td>
<td>$58,701.32</td>
</tr>
<tr>
<td>1930</td>
<td>$59,000.00</td>
<td>$56,984.42</td>
</tr>
<tr>
<td>1931</td>
<td>$61,600.00</td>
<td>$61,600.00</td>
</tr>
<tr>
<td>1932</td>
<td>$62,600.00</td>
<td>$62,600.00</td>
</tr>
<tr>
<td>Bryce Canyon</td>
<td>$26,100.00</td>
<td>$21,580.00</td>
</tr>
<tr>
<td>1927</td>
<td>$13,700.00</td>
<td>$13,700.00</td>
</tr>
<tr>
<td>1928</td>
<td>$20,000.00</td>
<td>$20,000.00</td>
</tr>
</tbody>
</table>

1 For statement of appropriations and revenues prior to 1917 see 1920 Annual Report, pp. 354-358, and for 1918 to 1927 see 1930 Annual Report, pp. 66-72.
NATIONAL PARKS Table 13.—Statement of appropriations made for, and revenues received from, the various national parks and national monuments, and expenditures made therefrom during recent fiscal years

<table>
<thead>
<tr>
<th>Name of the national park</th>
<th>Appropriations</th>
<th>Revenue received</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Appropriated</td>
<td>Expended</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Carlsbad Caverns National Park:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1928</td>
<td>$30,000.00</td>
<td>$28,492.84</td>
</tr>
<tr>
<td>1929</td>
<td>76,000.00</td>
<td>63,490.00</td>
</tr>
<tr>
<td>1930</td>
<td>105,000.00</td>
<td>126,220.75</td>
</tr>
<tr>
<td>Crater Lake:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1928</td>
<td>$63,500.00</td>
<td>$62,382.53</td>
</tr>
<tr>
<td>1929</td>
<td>47,100.00</td>
<td>46,146.00</td>
</tr>
<tr>
<td>General Grant:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1928</td>
<td>13,650.00</td>
<td>12,529.26</td>
</tr>
<tr>
<td>1929</td>
<td>15,650.00</td>
<td>15,802.00</td>
</tr>
<tr>
<td>Great Smoky Mountains:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1928</td>
<td>128,760.00</td>
<td>128,268.33</td>
</tr>
<tr>
<td>1929</td>
<td>169,000.00</td>
<td>161,051.00</td>
</tr>
<tr>
<td>1930</td>
<td>3,650.00</td>
<td>2,490.00</td>
</tr>
<tr>
<td>Glacier:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1928</td>
<td>163,300.00</td>
<td>162,525.28</td>
</tr>
<tr>
<td>1930</td>
<td>188,200.00</td>
<td>181,061.00</td>
</tr>
<tr>
<td>1931</td>
<td>30,000.00</td>
<td>21,576.91</td>
</tr>
<tr>
<td>Hot Springs:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1932</td>
<td>50,300.00</td>
<td>29,048.47</td>
</tr>
<tr>
<td>Hawaii:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1928</td>
<td>15,250.00</td>
<td>15,119.10</td>
</tr>
<tr>
<td>1929</td>
<td>21,500.00</td>
<td>21,070.00</td>
</tr>
<tr>
<td>1930</td>
<td>27,400.00</td>
<td>25,700.05</td>
</tr>
<tr>
<td>1931</td>
<td>32,900.00</td>
<td>32,490.55</td>
</tr>
<tr>
<td>1932</td>
<td>40,000.00</td>
<td>37,930.90</td>
</tr>
<tr>
<td>Lassen Volcanic:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1928</td>
<td>15,625.00</td>
<td>15,468.52</td>
</tr>
<tr>
<td>1929</td>
<td>22,400.00</td>
<td>22,688.00</td>
</tr>
<tr>
<td>1930</td>
<td>25,300.00</td>
<td>25,051.16</td>
</tr>
<tr>
<td>Mesa Verde:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1928</td>
<td>50,750.00</td>
<td>48,343.59</td>
</tr>
<tr>
<td>1929</td>
<td>88,000.00</td>
<td>78,134.00</td>
</tr>
<tr>
<td>1930</td>
<td>50,000.00</td>
<td>58,910.86</td>
</tr>
<tr>
<td>1931</td>
<td>96,500.00</td>
<td>95,799.70</td>
</tr>
<tr>
<td>1932</td>
<td>57,300.00</td>
<td>55,560.00</td>
</tr>
</tbody>
</table>

1 For statement of appropriations and revenues prior to 1917 see 1920 Annual Report, pp. 354-358, and for 1918-1927 see 1930 Annual Report, pp. 69-72.
2 Appropriations augmented by transfers from other appropriations under 10 per cent clause.
3 Reappropriated items. See Table 14.
### Table 13—Statement of appropriations made for, and revenues received from, the various national parks and national monuments, and expenditures made therefrom during recent fiscal years—Continued

<table>
<thead>
<tr>
<th>Name of the national park</th>
<th>Appropriations</th>
<th>Revenue received</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Appropriated</td>
<td>Expended</td>
</tr>
<tr>
<td>Mount Rainier:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1928</td>
<td>$108,000.00</td>
<td>$105,447.74</td>
</tr>
<tr>
<td>1929</td>
<td>141,000.00</td>
<td>141,285.00</td>
</tr>
<tr>
<td>1929 (deficiency)</td>
<td>5,370.00</td>
<td></td>
</tr>
<tr>
<td>1930</td>
<td>2,500.00</td>
<td>125,214.00</td>
</tr>
<tr>
<td>1931</td>
<td>180,000.00</td>
<td>174,823.33</td>
</tr>
<tr>
<td>1932</td>
<td>196,000.00</td>
<td></td>
</tr>
<tr>
<td>Mount McKinley:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1928</td>
<td>22,000.00</td>
<td>21,314.12</td>
</tr>
<tr>
<td>1929</td>
<td>35,000.00</td>
<td>36,165.00</td>
</tr>
<tr>
<td>1930</td>
<td>740.00</td>
<td>23,000.00</td>
</tr>
<tr>
<td>1931</td>
<td>15,000.00</td>
<td>15,299.14</td>
</tr>
<tr>
<td>1932</td>
<td>35,000.00</td>
<td></td>
</tr>
<tr>
<td>Pikes:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1928</td>
<td>97,620.00</td>
<td>95,612.07</td>
</tr>
<tr>
<td>1929</td>
<td>95,500.00</td>
<td>94,831.94</td>
</tr>
<tr>
<td>1930</td>
<td>2,380.00</td>
<td></td>
</tr>
<tr>
<td>1931</td>
<td>46,300.00</td>
<td>42,686.45</td>
</tr>
<tr>
<td>1932</td>
<td>35,000.00</td>
<td></td>
</tr>
<tr>
<td>Sequoia:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1928</td>
<td>100,000.00</td>
<td>108,863.10</td>
</tr>
<tr>
<td>1929</td>
<td>111,000.00</td>
<td>104,830.57</td>
</tr>
<tr>
<td>1930</td>
<td>130,000.00</td>
<td>111,513.95</td>
</tr>
<tr>
<td>1931</td>
<td>185,000.00</td>
<td></td>
</tr>
<tr>
<td>Wind Cave:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1928</td>
<td>19,000.00</td>
<td>19,000.00</td>
</tr>
<tr>
<td>1929</td>
<td>11,000.00</td>
<td>11,000.00</td>
</tr>
<tr>
<td>1930</td>
<td>13,000.00</td>
<td>13,424.51</td>
</tr>
<tr>
<td>1931</td>
<td>54,000.00</td>
<td>54,271.94</td>
</tr>
<tr>
<td>1932</td>
<td>25,200.00</td>
<td></td>
</tr>
<tr>
<td>Yellowstone:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1928</td>
<td>400,000.00</td>
<td>$300,150.00</td>
</tr>
<tr>
<td>1929</td>
<td>424,000.00</td>
<td>$348,230.00</td>
</tr>
<tr>
<td>1930</td>
<td>12,230.00</td>
<td></td>
</tr>
<tr>
<td>1931</td>
<td>463,000.00</td>
<td>463,306.47</td>
</tr>
<tr>
<td>1932</td>
<td>501,275.00</td>
<td>500,066.39</td>
</tr>
<tr>
<td>Yosemite:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1928</td>
<td>301,000.00</td>
<td>$257,303.73</td>
</tr>
<tr>
<td>1929</td>
<td>15,000.00</td>
<td></td>
</tr>
<tr>
<td>1930</td>
<td>387,300.00</td>
<td>$449,150.00</td>
</tr>
<tr>
<td>1931</td>
<td>413,290.00</td>
<td>$390,204.38</td>
</tr>
<tr>
<td>1932</td>
<td>510,000.00</td>
<td>574,302.64</td>
</tr>
<tr>
<td>Zion:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1928</td>
<td>30,000.00</td>
<td>30,737.69</td>
</tr>
<tr>
<td>1929</td>
<td>38,000.00</td>
<td>40,580.00</td>
</tr>
<tr>
<td>1930</td>
<td>35,000.00</td>
<td>$42,280.11</td>
</tr>
<tr>
<td>1931</td>
<td>33,290.00</td>
<td>$32,588.60</td>
</tr>
<tr>
<td>1932</td>
<td>34,100.00</td>
<td></td>
</tr>
<tr>
<td>George Washington B. P. Natl., Mon.:</td>
<td>996.18</td>
<td>987.71</td>
</tr>
<tr>
<td>1930 (deficiency)</td>
<td>80,000.00</td>
<td>78,792.34</td>
</tr>
<tr>
<td>1931</td>
<td>3,100.00</td>
<td></td>
</tr>
<tr>
<td>1932</td>
<td>26,500.00</td>
<td></td>
</tr>
</tbody>
</table>

1 For statement of appropriations and revenues prior to 1917 see 1920 Annual Report, pp. 351-358, and for 1918-1927 see 1930 Annual Report, pp. 66-72.
2 Appropriation augmented by transfers from other appropriations under 10 per cent clause.
3 Reappropriated items. See Table 14.
<table>
<thead>
<tr>
<th>Name of the national park</th>
<th>Appropriations</th>
<th>Revenue received</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Appropriated</td>
<td>Expended</td>
</tr>
<tr>
<td>Colonial National Monument: 1931-32 (deficiency)</td>
<td>$135,000.00</td>
<td>$132.00</td>
</tr>
<tr>
<td>National Park Service:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fighting forest fires:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>General expenses, N. P. S.:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Forest protection and fire prevention:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Emergency reconstruction and fighting forest fires:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Construction of roads and trails:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Insect control:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Southern Appalachian:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Purchase of lands:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Extension of winter-feed facilities:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Purchase of lands, Colonial National Monument, Va.: 1931-32 (deficiency):</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

1 For statement of appropriations and revenues prior to 1917 see 1920 Annual Report, pp. 354-358, and for 1918-1927 see 1930 Annual Report, pp. 66-72.
2 Appropriation augmented by transfers from other appropriations under 10 per cent clause.
3 Reappropriated items. See Table 14.
4 Available until expended.
TABLE 14.—Statement of amounts reappropriated and made available for expenditure in subsequent fiscal years

<table>
<thead>
<tr>
<th>Appropriated for fiscal year</th>
<th>Reappropriated for fiscal year</th>
<th>Park</th>
<th>Amount</th>
<th>Purpose</th>
</tr>
</thead>
<tbody>
<tr>
<td>1928</td>
<td>1929</td>
<td>Yosemite</td>
<td>32,000.00</td>
<td>Hospital building.</td>
</tr>
<tr>
<td>1928</td>
<td>1929</td>
<td>Southern Appalachian</td>
<td>1,112.87</td>
<td>To remain available; general.</td>
</tr>
<tr>
<td>1928</td>
<td>1929</td>
<td>Emergency reconstitutio and fighting forest fires</td>
<td>32,124.54</td>
<td>Do.</td>
</tr>
<tr>
<td>1929</td>
<td>1930</td>
<td>Yosemite</td>
<td>8,661.78</td>
<td>Construction of water supply and camp-ground facilities.</td>
</tr>
<tr>
<td>1929</td>
<td>1930</td>
<td>Carlsbad Caverns</td>
<td>4,950.00</td>
<td>Superintendent's residence.</td>
</tr>
<tr>
<td>1929</td>
<td>1930</td>
<td>Southern Appalachian</td>
<td>1,662.55</td>
<td>To remain available; general.</td>
</tr>
<tr>
<td>1929</td>
<td>1930</td>
<td>Grand Canyon</td>
<td>20,000.00</td>
<td>Hospital building.</td>
</tr>
<tr>
<td>1930</td>
<td>1931</td>
<td>Acquia</td>
<td>2,580.00</td>
<td>Equipment storage building.</td>
</tr>
<tr>
<td>1930</td>
<td>1931</td>
<td>Crater Lake</td>
<td>1,951.00</td>
<td>Ranger station.</td>
</tr>
<tr>
<td>1930</td>
<td>1931</td>
<td>Mesa Verde</td>
<td>1,622.18</td>
<td>2 ranger stations.</td>
</tr>
<tr>
<td>1930</td>
<td>1931</td>
<td>Yosemite</td>
<td>32,662.70</td>
<td>Physical improvements.</td>
</tr>
<tr>
<td>1930</td>
<td>1931</td>
<td>National monuments</td>
<td>3,500.00</td>
<td>Employees' quarters (2) at Petrified Forest.</td>
</tr>
<tr>
<td>1930</td>
<td>1931</td>
<td>Southern Appalachian</td>
<td>1,248.50</td>
<td>To remain available; general.</td>
</tr>
<tr>
<td>1930</td>
<td>1931</td>
<td>Glacier</td>
<td>6,550.00</td>
<td>One-third of cost of constructing a telephone line.</td>
</tr>
</tbody>
</table>

TABLE 15.—Statement of amounts transferred under the authority contained in the appropriation acts to transfer 10 per cent from one appropriation to another, fiscal year 1931

<table>
<thead>
<tr>
<th>Year</th>
<th>Amount</th>
<th>From—</th>
<th>To—</th>
</tr>
</thead>
<tbody>
<tr>
<td>1931</td>
<td>$300</td>
<td>Hawaii National Park</td>
<td>Forest protection and fire prevention.</td>
</tr>
<tr>
<td>1931</td>
<td>610</td>
<td>Glacier National Park</td>
<td>Yellowstone National Park.</td>
</tr>
<tr>
<td>1931</td>
<td>800</td>
<td>Carlsbad Caverns National Park</td>
<td>Do.</td>
</tr>
</tbody>
</table>

TABLE 16.—Summary of appropriations for the administration, protection, and improvement of the national parks and national monuments, together with the revenues received, for the fiscal years 1917-1931, inclusive

<table>
<thead>
<tr>
<th>Year</th>
<th>Department</th>
<th>Appropriation</th>
<th>Revenues</th>
</tr>
</thead>
<tbody>
<tr>
<td>1917</td>
<td>Interior Department</td>
<td>$537,366.67</td>
<td>$109,652.30</td>
</tr>
<tr>
<td></td>
<td>War Department</td>
<td>247,200.00</td>
<td>274,786.67</td>
</tr>
<tr>
<td>1918</td>
<td>Interior Department</td>
<td>380,650.00</td>
<td>217,500.00</td>
</tr>
<tr>
<td></td>
<td>War Department</td>
<td>217,500.00</td>
<td>274,786.67</td>
</tr>
<tr>
<td>1919</td>
<td>Interior Department</td>
<td>965,105.00</td>
<td>316,577.96</td>
</tr>
<tr>
<td></td>
<td>War Department</td>
<td>50,000.00</td>
<td>217,330.55</td>
</tr>
<tr>
<td>1920</td>
<td>Interior Department</td>
<td>1,055,915.00</td>
<td>196,457.40</td>
</tr>
<tr>
<td></td>
<td>War Department</td>
<td>907,070.76</td>
<td>316,577.96</td>
</tr>
<tr>
<td>1921</td>
<td>Interior Department</td>
<td>1,088,066.16</td>
<td>325,928.27</td>
</tr>
<tr>
<td></td>
<td>War Department</td>
<td>1,088,066.16</td>
<td>325,928.27</td>
</tr>
<tr>
<td>1922</td>
<td>Interior Department</td>
<td>1,455,220.00</td>
<td>322,594.59</td>
</tr>
<tr>
<td></td>
<td>War Department</td>
<td>1,455,220.00</td>
<td>322,594.59</td>
</tr>
<tr>
<td>1923</td>
<td>Interior Department</td>
<td>1,448,520.00</td>
<td>513,706.36</td>
</tr>
<tr>
<td></td>
<td>War Department</td>
<td>1,448,520.00</td>
<td>513,706.36</td>
</tr>
<tr>
<td>1924</td>
<td>Interior Department</td>
<td>1,892,601.00</td>
<td>663,886.32</td>
</tr>
<tr>
<td></td>
<td>War Department</td>
<td>1,892,601.00</td>
<td>663,886.32</td>
</tr>
<tr>
<td>1925</td>
<td>Interior Department</td>
<td>2,027,857.00</td>
<td>670,920.98</td>
</tr>
<tr>
<td></td>
<td>War Department</td>
<td>2,027,857.00</td>
<td>670,920.98</td>
</tr>
<tr>
<td>1926</td>
<td>Interior Department</td>
<td>2,225,400.00</td>
<td>820,444.17</td>
</tr>
<tr>
<td></td>
<td>War Department</td>
<td>2,225,400.00</td>
<td>820,444.17</td>
</tr>
<tr>
<td>1927</td>
<td>Interior Department</td>
<td>2,695,920.00</td>
<td>703,849.60</td>
</tr>
<tr>
<td></td>
<td>War Department</td>
<td>2,695,920.00</td>
<td>703,849.60</td>
</tr>
<tr>
<td>1928</td>
<td>Interior Department</td>
<td>4,889,655.00</td>
<td>808,255.81</td>
</tr>
<tr>
<td></td>
<td>War Department</td>
<td>4,889,655.00</td>
<td>808,255.81</td>
</tr>
<tr>
<td>1929</td>
<td>Interior Department</td>
<td>4,754,015.00</td>
<td>840,372.95</td>
</tr>
<tr>
<td></td>
<td>War Department</td>
<td>4,754,015.00</td>
<td>840,372.95</td>
</tr>
<tr>
<td>1930</td>
<td>Interior Department</td>
<td>7,815,317.18</td>
<td>1,015,740.56</td>
</tr>
<tr>
<td></td>
<td>War Department</td>
<td>7,815,317.18</td>
<td>1,015,740.56</td>
</tr>
<tr>
<td>1931</td>
<td>Interior Department</td>
<td>12,113,435.00</td>
<td>940,384.79</td>
</tr>
<tr>
<td></td>
<td>War Department</td>
<td>12,113,435.00</td>
<td>940,384.79</td>
</tr>
<tr>
<td>1932</td>
<td>Interior Department</td>
<td>12,754,250.00</td>
<td>940,384.79</td>
</tr>
</tbody>
</table>

1 For summary of appropriations and revenues prior to 1917 see 1920 Annual Report, p. 239.
2 The revenues from the various national parks were expendable during the years 1904 to 1918, inclusive, with the exception of those received from Crater Lake, Mesa Verde, and Rocky Mountain National Parks, the revenues from which were turned into the Treasury to the credit of miscellaneous receipts.
<table>
<thead>
<tr>
<th>Fiscal year</th>
<th>Appropriation acts</th>
<th>Cash appropriation</th>
<th>Authority to enter into contractual obligations</th>
<th>Total program by fiscal years</th>
</tr>
</thead>
<tbody>
<tr>
<td>1925</td>
<td>Act Dec. 5, 1924, 43 Stat. 686</td>
<td>$1,000,000</td>
<td>$1,000,000</td>
<td>$1,000,000</td>
</tr>
<tr>
<td>1926</td>
<td>Act Mar. 3, 1925, 43 Stat. 1179</td>
<td>2,000,000</td>
<td>2,000,000</td>
<td>2,000,000</td>
</tr>
<tr>
<td>1927</td>
<td>Act May 10, 1926, 44 Stat. 491</td>
<td>2,000,000</td>
<td>2,000,000</td>
<td>2,000,000</td>
</tr>
<tr>
<td>1928</td>
<td>Act Jan. 12, 1927, 44 Stat. 966</td>
<td>2,000,000</td>
<td>2,000,000</td>
<td>2,000,000</td>
</tr>
<tr>
<td>1929</td>
<td>First deficiency act, Dec. 22, 1927, 45 Stat. 19</td>
<td>1,000,000</td>
<td>1,000,000</td>
<td>1,000,000</td>
</tr>
<tr>
<td>1929</td>
<td>Act Mar. 7, 1928, 45 Stat. 337</td>
<td>2,500,000</td>
<td>2,500,000</td>
<td>2,500,000</td>
</tr>
<tr>
<td>1930</td>
<td>Act Mar. 4, 1929, 45 Stat. 1601</td>
<td>5,000,000</td>
<td>5,000,000</td>
<td>5,000,000</td>
</tr>
<tr>
<td>1931</td>
<td>Act May 14, 1930, 46 Stat</td>
<td>5,000,000</td>
<td>5,000,000</td>
<td>5,000,000</td>
</tr>
<tr>
<td>1931</td>
<td>Emergency construction funds transferred by the President</td>
<td>578,800</td>
<td>578,800</td>
<td>578,800</td>
</tr>
<tr>
<td>1932</td>
<td>Act Feb. 14, 1931, 46 Stat</td>
<td>2,500,000</td>
<td>2,500,000</td>
<td>2,500,000</td>
</tr>
</tbody>
</table>

Total appropriated: $29,578,800
Authorization (unappropriated): $2,500,000
Total program to date: $32,078,800

1 Of this amount $4,290.39 was reappropriated Dec. 22, 1927 (45 Stat. 19) and $510 on May 29, 1928 (45 Stat. 933).
2 Funds appropriated in next fiscal year.
APPENDIX D

REPORTS OF ENGINEERING, LANDSCAPE ARCHITECTURAL, EDUCATIONAL, FORESTRY, SANITATION, FISH-CULTURAL OPERATIONS, AND WILD-LIFE SURVEY DIVISIONS

REPORT OF CIVIL ENGINEERING DIVISION

FRANK A. KITTRIDGE, Chief Engineer, San Francisco, Calif.

Engineering effort covered by 1932 fiscal-year funds is embodied in approximately 308 projects amounting to approximately $10,200,000, of which 44 projects and approximately $8,400,000 represent major road work handled by the Bureau of Public Roads, and 264 projects and approximately $1,800,000 represent physical improvements and minor road and trail projects handled by the Park Service.

It is desired that proposed work should have: First, educational review as to location and development of all points of educational interest; second, engineering study as to the safe and economical routing of traffic such as location and construction of roads and trails, location of public buildings which by their nature will affect public travel, sanitary engineering, structural engineering, bridge designing, hydroelectric engineering, and practically every other branch of engineering; and third, thorough and careful landscape study, review, and suggestions, in order that necessary development may cause the least possible change of natural conditions, and that necessary physical improvements may be so designed as to harmonize with and become a part of the surroundings.

While the routing of traffic is essentially and primarily an engineering problem, and the location and outward design of buildings is in this case a matter for consideration by a landscape architect, we feel that neither problem can be safely considered or plans advanced by architect or engineer alone. In the location of every road and trail there are landscape architectural problems. In the location and structural design of every building there are essential engineering problems.

Where fundamental engineering principles have been observed in the location of public buildings and the location and construction of roads, all to facilitate and simplify the movement of traffic, the beauty of the landscape is brought within the reach of all; while a development where those engineering principles have not been observed may result in such mental confusion that all beauty and harmony of the natural surroundings is nullified.

Increased funds for engineering study and construction have made possible the long-cherished engineering ambition to build not only with economy but for permanence and harmony.

ORGANIZATION

The engineering work is largely coordinated under the chief engineer at field headquarters; except in a few of the parks where there are park engineers, the engineering division at field headquarters, at the request of the various superintendents, is furnishing practically all of the engineering personnel.

The engineering work is, to a large extent, divided into two classes—field work or surveys and construction, and office work or planning and design. Owing to the limited working season in the majority of the parks, it is possible for the field engineers to supervise the various construction activities during the summer months, and spend the winter months at field headquarters preparing plans, estimates, etc., and making detailed studies of the special problems that arise.
During the construction season engineers were assigned to practically all of the parks, also personnel for survey parties. These engineers with their assistants aid the superintendents in carrying out their construction programs and in making surveys and obtaining data for planning proposed work. Efficient and adequate supervision of all construction projects is of the utmost importance to assure their completion within available appropriations and in accordance with plans.

By combining the seasonal activities in this manner it has been possible up to the present time to handle a large volume of planning, drafting, design, and map work, besides construction, with only a very small permanent force.

CONSTRUCTION PROJECTS

The construction jobs and designs which the engineering division is called upon to handle are of two different classes: "Roads and trails" projects, and "Physical improvement" projects. Owing to lack of space, no attempt will be made to enumerate all of the projects initiated during the year, but the lists following will give an idea of the wide variety and great number of problems encountered. They cover nearly the entire field of engineering, and require a wide versatility in engineering education and training, and years of experience and mature judgment to execute properly and economically.

ROADS AND TRAILS PROJECTS

Major roads projects.—There have been allotted to major roads projects the following projects and sums:

<table>
<thead>
<tr>
<th>Type</th>
<th>Number of projects</th>
<th>Total cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Emergency labor relief appropriation, 7 projects</td>
<td>7</td>
<td>$2,078,000</td>
</tr>
<tr>
<td>From regular park appropriation, 30 projects</td>
<td>30</td>
<td>$4,822,000</td>
</tr>
<tr>
<td>From approach road appropriation, 7 projects</td>
<td>7</td>
<td>$1,500,000</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
<td><strong>$8,400,000</strong></td>
</tr>
</tbody>
</table>

The Bureau of Public Roads, at the request of the National Park Service, is handling the survey and construction of major projects. There are 44 major projects under construction this year as a part of the 1932 fiscal-year appropriation program. These projects are covered by large contracts.

Park handled projects.—There were 264 projects, involving an expenditure of approximately $1,802,000, handled by park day-labor forces, of which 82 were minor road-and-trail projects amounting to $762,000, and 182 physical-improvement projects amounting to approximately $1,040,000.

The following tabulation gives an analysis of the various classes of minor road-and-trail projects:

<table>
<thead>
<tr>
<th>Type</th>
<th>Number of projects</th>
<th>Total cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Trail construction</td>
<td>33</td>
<td>$245,000.00</td>
</tr>
<tr>
<td>Road oiling and semiprocessing</td>
<td>14</td>
<td>122,700.00</td>
</tr>
<tr>
<td>Rock parapets</td>
<td>2</td>
<td>7,000.00</td>
</tr>
<tr>
<td>Telephone lines</td>
<td>4</td>
<td>24,500.00</td>
</tr>
<tr>
<td>Landscaping—restoration</td>
<td>8</td>
<td>12,000.00</td>
</tr>
<tr>
<td>Roadside clean-up</td>
<td>5</td>
<td>25,000.00</td>
</tr>
<tr>
<td>Post construction of roads and road</td>
<td>12</td>
<td>100,000.00</td>
</tr>
<tr>
<td>betterment</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
<td><strong>$630,700.00</strong></td>
</tr>
</tbody>
</table>

All minor projects are 1-year projects; are covered by cash allotments; and, in most cases, are done by day labor.

PHYSICAL IMPROVEMENT PROJECTS

The physical improvements in the parks and monuments cover all construction activities not included under "Roads and trails" and "Fire protection."
The following tabulation gives an analysis of the various classes of physical improvement projects:

<table>
<thead>
<tr>
<th>Type</th>
<th>Number</th>
<th>Appropriation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Administration or office buildings</td>
<td>3</td>
<td>$30,800</td>
</tr>
<tr>
<td>Equipment sheds, garages, and gas stations</td>
<td>21</td>
<td>26,700</td>
</tr>
<tr>
<td>Employees’ quarters and ranger stations</td>
<td>55</td>
<td>266,600</td>
</tr>
<tr>
<td>Camp-ground development</td>
<td>12</td>
<td>46,400</td>
</tr>
<tr>
<td>Checking stations</td>
<td>2</td>
<td>4,000</td>
</tr>
<tr>
<td>Comfort stations</td>
<td>27</td>
<td>136,000</td>
</tr>
<tr>
<td>Elevator stations</td>
<td>1</td>
<td>25,000</td>
</tr>
<tr>
<td>Fences, road camps, and other structures</td>
<td>8</td>
<td>10,700</td>
</tr>
<tr>
<td>First-aid stations</td>
<td>1</td>
<td>2,400</td>
</tr>
<tr>
<td>Garbage disposal and incinerators</td>
<td>3</td>
<td>11,600</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Type</th>
<th>Number</th>
<th>Appropriation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Landscaping</td>
<td>4</td>
<td>$6,500</td>
</tr>
<tr>
<td>Lighting and wiring</td>
<td>3</td>
<td>700</td>
</tr>
<tr>
<td>Museum and information buildings</td>
<td>1</td>
<td>1,300</td>
</tr>
<tr>
<td>Power systems and houses</td>
<td>6</td>
<td>162,900</td>
</tr>
<tr>
<td>Water development and reservoirs</td>
<td>21</td>
<td>203,100</td>
</tr>
<tr>
<td>Revetments and river protection</td>
<td>1</td>
<td>8,000</td>
</tr>
<tr>
<td>Sewer systems</td>
<td>15</td>
<td>120,000</td>
</tr>
<tr>
<td>Underground trails</td>
<td>1</td>
<td>10,000</td>
</tr>
<tr>
<td>Telephone systems</td>
<td>3</td>
<td>12,000</td>
</tr>
<tr>
<td>Relocation Indian village</td>
<td>1</td>
<td>7,000</td>
</tr>
</tbody>
</table>

The following are descriptive statements of a few of the more important physical-improvement projects supervised entirely or partly by the engineering division during the past year:

**Water-supply system, Craters of the Moon Monument.**—Prior to the summer of 1931 there was no water for any use in Craters of the Moon except what was hauled in tanks. To remedy this very undesirable feature, an appropriation of $18,750 was made. A pipe line approximately 5 miles long was surveyed in August, 1930, and constructed during the season of 1931. Two-inch cast-iron pipe and 2-inch galvanized-iron pipe were used. This job was located and constructed under the supervision of the engineering division.

**Deep water well, Mesa Verde Park.**—Well-drilling operations began December 22, 1930, by spudding in with an 18-inch bit. The 18-inch hole was drilled for 80 feet and reduced to 12½ inches. As the well now stands, there are 880 feet of 12½-inch casing, 1,220 feet of 10-inch casing, and 3,423 feet of 8½-inch casing. The drilling was continued to a depth of 3,553 feet, but was stopped at that depth because the $40,000 appropriation for this work was exhausted.

Several different sources of water were encountered during drilling operations, but none of them is entirely suitable. It is expected that additional funds will be appropriated at the next session of Congress, with which it is contemplated continuing drilling operations next season until all water-bearing sands have been tested, and it is hoped that a satisfactory water supply will be obtained. A limited supply of potable water was obtained at a depth of 880 feet, and this can be utilized if a more satisfactory supply is not obtained below the Dakota sands.

**Electric system, Wind Cave National Park.**—This interesting cave-lighting project was completed early in the summer. Two hundred and ninety-six lights, ranging from 15 watts to 300 watts in size, and totaling 15,400 watts load, are installed within the cave. In dry sections, standard enameled steel reflectors were used. In wet locations, specially cast brass waterproof fixtures were installed. A few large flood lights and some color lighting were also placed to show to better effect some of the formations.

The lighting circuits of the cave are divided into 11 sections and these are controlled at both ends of each section, requiring lights to be on in only one section at a time.

All lighting has been placed to eliminate direct glare. Indirect lighting effects have been used in the majority of places, and in other instances lights have been installed to illuminate some scenic feature or directed to the foot trail.

The engine is a 25-horsepower Fairbanks Morse semi-Diesel type, with short belt drives to generator and exciter. The generator has a rating of 12 kilowatts output. This small power plant is modern in every respect. Economy was effected in transferring this engine-generator set from Carlsbad Caverns where it was of inadequate capacity for any service there.

Through control of the cave lighting by sections, this power plant is adequate for the service required, although the connected lighting load is several times its rated capacity.

81715—31—9
River channel change and revetment, Devils Tower Monument.—The Belle Fourche River, which runs through Devils Tower National Monument, became blocked with ice during the winter of 1929–30, causing it to overflow its banks and change its channel, which endangered the new steel bridge and washed out its approaches.

On August 18, 1930, the engineering division was instructed to construct a channel change and protect the old banks from erosion. Teams and fresnoes were used to excavate the new channel which is 1,800 feet long, the material being moved for 23.7 cents per cubic yard.

Thirty-nine reinforced concrete tetrahedrons of special design were poured in place and connected with cables to deflect the current into the newly-excavated channel. Sections of the old river bank were protected from erosion by brush mats and felled trees.

This type of bank protection has served remarkably well in certain other projects.

River channel change and revetment, Zion Park.—The type of protection structures employed in Zion was entirely different from that used at Devils Tower. While at Devils Tower it was only necessary to protect about one-half mile of river bank and a bridge, at Zion revetments were necessary at many places for a distance of 5 or 6 miles.

Conditions made the use of tetrahedrons inadvisable, yet it was essential that a structure capable of resisting the strong river currents and yet economical in first cost be obtained. Basket dams—medium-sized rock encased and held together by heavy wire mesh—were employed. Both wing dams and dikes were constructed in this manner and have given excellent service.

Approximately 2,000 linear feet of basket dams and 2,500 linear feet of channel change have been constructed to date under the supervision of the engineering division. This method, then practically unheard of, has been amply justified in cost-saving and durability.

Hot-water collection and distribution system, Hot Springs Park.—During the spring of 1930 surveys were made and data gathered on which to base the designs and construction of this system, and a topographic survey was made, map plotted, and other information shown graphically or tabulated.

Study of the data indicated that the problem could best be solved by retaining the existing 380,000-gallon collecting reservoirs, providing pump and storage capacity sufficient to care for one day's flow of the springs, and by rebuilding the entire collecting system. It was decided to install duplicate centrifugal pumps and pipe lines and to minimize power costs by using two storage reservoirs at different levels. One reservoir has storage capacity of 400,000 gallons, and the other 100,000 gallons. Comparative studies of two possible locations determined that the one chosen was the less expensive and more suitable from the landscape architect's standpoint.

The actual design and drawing of the contract plans and specifications called for much study of many special problems. The reservoirs required extra heavy reinforcing and the installation of expansion joints to strengthen them against temperature stresses in addition to the heavy stresses of water pressure. To preserve water and keep the pumps primed, an elaborate automatic-control system was designed. The pipes were insulated very effectively against heat losses; the reservoirs were covered to conserve heat and to conceal them; they were waterproofed.

The contract for the distributing system was let December 15, 1930, to the Wickes Engineering & Construction Co. of Des Moines, Iowa, which started work January 3, 1931. Construction offered a number of extraordinary difficulties. More rock was encountered than anticipated, and since blasting was cut to the minimum and the seams of the rock in one excavation were full of hot water, delay occurred.

The collecting system was built by park forces. All springs were cleaned and insulated from contamination from surface waters. They were connected by an entirely new system of piping to the existing collecting reservoir.

Meters have been installed on all of the lines leading to bathhouses, and it will hereafter be possible to determine the actual amount of water being used by each consumer.

The engineering division prepared all plans and specifications for both contract work and purchase of materials and proposed construction.

Much landscaping, consisting of regrading and reseeding of lawns, was done, and the concrete sidewalk along Central Avenue was rebuilt.
Temperature tests of the water in the storage reservoirs indicated the effectiveness of the pipe insulation, as the water in these reservoirs is only a few degrees cooler than where it leaves the springs.

The entire system should prove to be much more satisfactory than the several old systems which it replaces, both on account of the water now being delivered to the bathhouses at a much higher temperature, and because of the larger storage capacity and lessened probability of a shortage.

Power development at Sunrise Park, Mount Rainier Park.—An allotment of $71,000 was made for the construction of a power house, the necessary distribution system and the purchase of a 320-horsepower Diesel engine and generator. This power unit will be completed and ready to operate this season. It will generate 175.2 kilowatts of electricity at the altitude of 6,500 feet.

High-lift pumping plant at Sunrise, Mount Rainier Park.—An allotment of $15,000 was made for the purchase of equipment and construction of a high-lift pumping unit and pipe line to supply the Sunrise area. A plant having a capacity of 100 gallons per minute under a 900-foot head is being built and will be in operation before the end of the season. The pump will be operated by a 40-horsepower electric motor utilizing approximately 34 kilowatts.

Sewage-disposal system, Yosemite Park.—In 1921 the Park Service built a sewer system and a sewage-disposal plant to protect the waters of the Merced River. By 1928 this system had become overloaded and an enlargement was imperative. Surveys were made and plans and estimates prepared in 1929. The construction of the new plant was begun in 1930 and completed in 1931. The capacity of the new plant is ample to care for an average population of 30,000 people. The total allotment was $148,500. There are 4.03 miles of 20-inch sewer pipe. The sewage-disposal plant is the activated sludge type, and consists of 1,057 cubic yards of reinforced concrete in the tanks alone.

Trestle replacement, Yosemite Park.—The substructure carrying the pipe line to the hydroelectric plant on the Merced River gave a great deal of trouble for several years through failure of sills and bent caps by crushing and shearing. A thorough inspection of this structure was made in May and June, 1930, and an adequate replacement plan was worked out by the engineering division. Bents and footings were redesigned and heavier bracing specified. Forty thousand board feet of redwood timber and 28,000 board feet of Douglas fir were used. The construction work was carried out under the direction of an engineer from field headquarters and the superintendent.

The total length of trestle rebuilt is approximately 1,000 feet. The cost of this work was $10,672.44.

Passenger elevators, Carlsbad Caverns Park.—A shaft 8 by 16 feet in size and 754 feet long was excavated through solid limestone to permit the installation of two passenger elevators. These will be the largest single-lift passenger elevators in the world, and their use will eliminate the strenuous climb out of the cavern and facilitate the transportation of supplies and material into the cavern.

The survey traverse, establishing the top and the bottom of the shaft, closed within one-quarter of an inch. This was very accurate, considering the unevenness of the line and the total darkness in which the work had to be done. The excavation of the shaft was carried down from the top and up from the bottom simultaneously. The continuous solid rock encountered the entire distance, honeycombed by thousands of water holes, made drilling and shooting difficult. The waste material from the shaft was used for road surfacing and that from the raise for trail dressing and leveling of the lunch-room floor. The entire surface of the shaft has been gunited with concrete to prevent weathering and the possibility of falling stones. A special quick-setting cement was used. The steel struts supporting the elevator guides were set in stiches 9 inches deep in the solid rock walls and concreted in place. All of the inside metal was treated to prevent rust.

The elevator is of the gearless traction type with a speed which is variable to 700 feet per minute. Its capacity is 2,000 pounds, which is equivalent to 12 passengers. All modern safety devices are used. One cage only is being installed at this time, but all provisions have been made for the installation of the second cage. The plans for this installation were prepared in the San Francisco office, and the construction was carried on by contract under the supervision of the engineering division.
Water supply and sanitary sewer, Wind Cave Park.—These two projects were contracted and work carried on under the engineering supervision of field headquarters.

The new water supply system consists of 3 miles of water pipe laid in a trench 5 feet deep, and is made up of 3,500 feet of 2½-inch and 8,500 feet of 2-inch galvanized iron pipe supplying water to the concrete reservoir. From the reservoir to park headquarters 2,350 feet of 4-inch wood stave pipe was laid. Air valves and drains were installed to enable the line to be drained during extreme cold weather, and to insure constant flow when supplying water to the reservoir. The appropriation for this project was $7,400.

The sewer line consists of three-quarters of a mile of 4-inch vitrified sewer pipe laid between park headquarters and the aeration plant. Provision was made for connections to future buildings as well as to the present buildings. The appropriation for this work was $5,000.

FIRE PROTECTION

Under this classification are included all projects which are directly connected with protecting the national parks and monuments against the hazard of fire. During the last year expenditures were made on such items as fire lookouts, fire lanes, telephone lines, fire storehouses, fire trucks, etc.

Twenty projects were under construction during the year under an appropriation of $40,000, as follows:

<table>
<thead>
<tr>
<th>Project</th>
<th>Number</th>
<th>Appropriation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lookout stations</td>
<td>4</td>
<td>$16,200</td>
</tr>
<tr>
<td>Other fire buildings</td>
<td>7</td>
<td>$12,075</td>
</tr>
<tr>
<td>Telephone lines</td>
<td>5</td>
<td>$4,375</td>
</tr>
<tr>
<td>Fire lanes and trails</td>
<td>4</td>
<td>$6,750</td>
</tr>
<tr>
<td>Total</td>
<td>20</td>
<td>$40,000</td>
</tr>
</tbody>
</table>

SURVEYS

Surveys preparatory to construction or investigations for construction planning have been necessary in connection with the larger projects. Development and construction surveys were made in 15 of the national parks and monuments. These surveys have been carried on by the engineer sent from field headquarters and the necessary assistants, usually hired in the parks.

Surveys to obtain topographical maps have been made in 12 national parks and monuments. Two topographic survey parties have been in the field the greater part of the past season, and in addition a number of topographic surveys were made by survey parties engaged on other work as time could be spared from their regular assignments.

During the season topographic surveys were made of 21 separate areas, totaling 7,860 acres.

In an effort to expedite topographic surveys without increasing the personnel, the greater portion are now being made on a scale of 1 inch=100 feet, and only small special areas are made on the former general scale of 1 inch=40 feet. This change in scale has resulted in greatly speeding up the work and making it possible for the same survey crews to cover several times the area possible with the larger scale.

MAPS

Topographic maps.—Tracings have been made of 81 standard-size topographic sheets and the balance will be prepared in the drafting room during the winter.

Road-and-trail maps.—Approximately 194 maps showing the road-and-trail systems of the various national parks and their approach roads have been prepared. These maps indicate by symbols and colors the existing and the proposed roads and trails in all of the national parks in so far as they have been prepared to date. There is still a large amount of this work remaining to be done.
PLANS AND DESIGNS

There have been approximately 95 plans prepared covering general undertakings in a great many of the parks. These plans cover items such as supplementary features for pipe lines, camp-ground development, and mechanical details, etc.

One hundred and twelve separate engineering designs were prepared covering projects in 12 of the parks and monuments. These designs incorporate the results of careful, detailed planning of technical features and computations as to stress and suitability of most of the structures. They cover a great variety of types of work and almost every conceivable form of structure, from the smallest to 500,000-gallon reinforced concrete reservoirs, and a modern passenger elevator and shaft 754 feet deep through solid rock.

- Elevator. —The designs and plans for an elevator shaft 754 feet deep and installation of a passenger elevator required 40 drawings and carefully prepared designs for the lining of the shaft walls, the steel framing through possible caverns, the supports for shaft equipment and elevator, the reinforced concrete details for the penthouse, housing and layout of electrical equipment, a special concrete foundation and collar at top of shaft, and innumerable other detailed plans in connection with the project.

- Hot-water system. —Design of 400,000 and 100,000 gallon hot-water storage reservoirs, two pump houses, and the reconstruction and remodeling of the entire hot-water system which carries the water from the numerous hot springs to the 19 bathhouses and resorts. Some 41 drawings and designs were required for the two reinforced-concrete reservoirs and pump houses, and various pipe, electrical, and other details. Special provision had to be made in the design of the tanks and pipe lines so as to retain the high temperature of the water.

- River revetment. —Design for 39 reinforced concrete tetrahedrons for river protection work. It was also necessary to design the "forms" for these tetrahedrons.

- Bridges and culverts. —Eight designs requiring 10 drawings were prepared for various bridges and culverts in Lassen, Sequoia, and Yosemite National Parks.

- Reservoir. —Design of 200,000-gallon water storage tank. Five drawings showing reinforced concrete and other details.

- Cliff stairways. —Design for ramp and stairs along the cliff face at Moro Rock. There were 16 ramps, 13 stairways, 180 steps, 6 platforms, and protection walls.

- Miscellaneous. —Designs were also prepared for a steel and concrete ramp at the Pinnacles National Monument, a pipe trestle replacement, a boat dock, an upward extension of dam to increase water storage of a lake, and many other smaller projects.

ESTIMATES

Estimates were prepared of 66 preliminary sketch plans and 33 final building construction plans submitted by the Landscape Architectural Division; also, eight bills of material were made up, based on final construction plans.

EQUIPMENT PURCHASES

From September 1, 1930, to August 31, 1931, field headquarters has made purchases for 26 parks and monuments upon superintendents' requests. Four hundred and seventy-two transactions amounting to $348,000, requiring 274 formal contracts and 198 purchases without contract, were involved. There were 64 of these purchases which combined the needs of two or more parks.

For the period January 1, 1931, to June 30, 1931, only, which corresponds to that reported upon last year, there were 392 transactions, or 50 more purchases than for the corresponding period of 1930, with an expenditure of $310,600, or $32,600 more than last year.

The more extensive use this year of field headquarters purchasing facilities by the superintendents as a whole is significant.

Prompt payments were made on all purchases, and discounts were taken amounting to $2,524. The greatest saving to the parks, however, is in instances
where it has been possible to combine the needs of several parks, resulting in greater competition and lower prices. This greater saving is, of course, indeterminate.

The director's circular letters of February 21 and March 10 to all park superintendents, giving them the option of deciding whether purchases of equipment and supplies, regardless of cost limitation, should be made by field headquarters or by the parks locally, has been quite generally taken advantage of by them.

Thirty-four sets of specifications upon which to make purchases direct have been furnished the superintendents at their request. This has been advantageous in that it has permitted good-will purchasing from local dealers to some extent and has enabled the parks to purchase special equipment in a restricted field of bidders which would be difficult to obtain in the broader field of competition in the San Francisco Bay area.

The work of standardizing specifications (by no means complete as yet) is being steadily carried on and at present covers 58 separate specifications.

Through close connection with the area coordinator's office, advance information was obtained of the existence of a large quantity of small tools, surplus to the Navy, which upon inspection were found to be all new and in first-class condition. Field headquarters selected such tools as it was thought would prove serviceable in the national parks. The actual cost in the aggregate was only $445, while the purchase value of the equipment selected at the best wholesale prices was approximately $4,400.

Deliveries this year have been very much better than for the last season's purchases, due to a much closer follow-up system from the date of the order to the actual delivery at the park or to the carrier. The delays beyond contract time this year for the greater part have been very small, ranging from two to five days, with few cases serious enough to invite comment. Of course, there were cases where requests to purchase came late, and, although these were rushed, their arrival at the park was late.

DISBURSEMENTS

Disbursements during the fiscal year 1931 amounted to the sum of $807,812.65. Payments made included purchases of equipment, supplies, and materials for various parks, particularly where the contracts and orders were prepared by this office. Payments were made in practically all cases where the proposals were issued and orders and contracts prepared by field headquarters, so that the transactions were completely handled by the same office from initiation to completion. This was found to be very satisfactory from the standpoint of both the parks and the engineering division, resulting in the minimum of confusion and work to all concerned.

Payments were also made on construction contracts where the work was under the direct supervision of this office, such as the construction of an elevator shaft and installation of elevator at Carlsbad Caverns National Park and installation of the hot-water collecting and distributing system at Hot Springs National Park. Payments on monthly estimates were expedited as much as possible.

Payments under construction contracts of the Bureau of Public Roads are now being made from field headquarters to the extent of approximately $250,000.

Funds allotted to the engineering, landscape, educational and forestry, and purchase of lands divisions, and all expenditures for Craters of the Moon, Muir Woods, and Pinnacles National Monuments are disbursed from field headquarters, as well as payments mentioned above which are handled for other parks and monuments. During the fiscal year 1931 the disbursements amounted to over $800,000.

REPORT OF LANDSCAPE ARCHITECTURAL DIVISION

THOMAS C. VINT, Chief Landscape Architect, San Francisco, Calif.

The landscape architectural division acts as professional adviser to the Service on matters of architecture and landscape architecture. The office at San Francisco operates not unlike the usual private professional office with the park superintendents and various engineers as clients.

The aim of the division is to obtain a logical, well-studied development plan for each park, which includes determination of the appropriate type of archi-
architecture. Within such a development plan, a general plan of each tourist center or community makes a problem of its own. While the division administers no construction funds or assumes no direct charge of any construction, it is concerned with every phase of park development. The protection of the landscape, location of buildings, bridges and grading work; the selection of types of architecture, and the restoration of natural planting which has been destroyed are problems which must be fitted into the general development plan.

The division prepares the landscape and architectural plans for the Government facilities constructed by the park superintendents' organizations. It reviews the plans submitted by the park operators for the tourists' accommodations. It reviews the plans for road projects and prepares the architectural plans for bridges constructed by the Bureau of Public Roads.

The year being reported was by far the busiest the division has yet seen. To a Government building program, more ambitious than yet attempted, were added the additional activities attending an unusually large road program through the Bureau of Public Roads of nearly $9,000,000. The latter included an emergency employment program, arising out of the $1,500,000 appropriated by Congress December 22, 1930, augmented later by a special allotment exceeding $500,000.

Spring came six weeks early in most parks, and we were not always able to supply plans and specifications as soon as the superintendents would have liked. Preference was naturally given the northern parks with short construction seasons, and the only incomplete plans at the end of the year were in the parks having an all-year construction climate.

A development of unusual interest during the year was the establishment of an Eastern branch of this office. One man was sent East in October as the nucleus of an organization which has since grown to four men. The office is at Yorktown, Va., and from there the landscape problems of the following parks and monuments are handled: Acadia, Great Smoky Mountains, and Hot Springs National Parks, the proposed Shenandoah park area, and the George Washington Birthplace and Colonial National Monuments. Much of their work consists of the restoration of historic buildings to a state as nearly as possible like the original.

A larger number of men were in the field this season than ever before, and projects were more frequently inspected than has been possible heretofore.

PERSONNEL

During the year three positions were reallocated to higher grades and four new junior positions authorized. We now have authority for 1 landscape architect, 1 associate, 6 assistants, and 6 juniors in the San Francisco office, and 3 assistants and 1 junior in the Yorktown office. As the year closes 4 junior positions are being filled temporarily, pending the establishment of a register from the Civil Service examination which closed May 6. Three of the temporary juniors, all doing very satisfactory work, must be replaced from the register as they were deemed ineligible by the Civil Service Commission.

During the year it was decided to start all future positions in the junior grade, and promote as individual work and the occurrence of higher positions may warrant. As the year closes, the personnel problem is more satisfactory than it has been for several years, and, as a result of the examination held for us, it is expected that all positions will be filled with permanent appointees by November 1.

OFFICE WORK

This work constitutes the preparation of plans and specifications for the current year's construction program. It is mainly a drafting-room job. Field men are brought into the San Francisco office when not required in the parks. This procedure has continued to be very satisfactory as the men are familiar with the purpose of all features of a plan when they follow it through its preparation and are thus well prepared to carry out its intent in the field.

While in the office the men not only prepare plans, but review the plans prepared by others. Office work falls into two general classes: The first includes the items within the regular park appropriation and the construction performed by public utility operators or the work done by the superintendents' organizations; the other class constitutes road work carried out through the Bureau of Public Roads under the roads-and-trails appropriation.
During the year just starting much time and study in the office will be devoted to the beginning of a 6-year development plan. This program is a result of the employment stabilization act of 1931. The plan will give a general picture of the park, showing roads and trails, communication facilities, wilderness areas, developed areas, communities, etc. This plan, originated as a guide to development, will naturally be in a constant state of revision and will be brought up to date annually and made a matter of record. The plan will be the work of the park superintendents and the chief landscape architect, chief civil engineer, and the sanitary engineer. The construction estimates for 1933 will constitute the first year of the 6-year program.

Building plans and specifications constitute the major part of our drafting-room work.

Although the year did not see the beginning of the construction of any remarkably large buildings, very interesting administration buildings were commenced in the Southwestern Monuments at Casa Grande and Petrified Forest, together with residences, comfort stations, and utility buildings. These monuments in the Southwest have afforded our first opportunity to develop parks completely—that is, from the standpoint of community planning as well as the detailed plans of the individual buildings themselves.

The year's building plans included many residences, comfort stations, fire-lookout towers, shelter cabins, and utility buildings of all kinds. More complete working drawings were prepared than formerly, and we feel that the standard of park buildings has been raised considerably.

An unprecedented number of bridges were designed in conjunction with the Bureau of Public Roads. Several concrete bridges built this year were stained to harmonize with the predominant color of the surrounding landscape. This was a new step for us, and the experiment is proving quite satisfactory.

This year marked the establishment of our goal of preparing sketches to accompany park superintendents' 1933 estimates. This procedure is sure to reflect favorably in obtaining allotments sufficiently large to obviate the practice of cutting plans down to fit the funds.

Office filing systems were simplified considerably and a new numbering system was adopted, as suggested by Assistant Director Wirth after his visit in May.

PARK OPERATORS' CONSTRUCTION PROGRAM

Reflecting the general uncertainty of business, the operators' program was devoid of many large new projects during the year, but numerous additions and improvements were projected. The largest undertaking of the year was the building of a lodge service building in the Sunrise area by the Rainier National Park Co. Plans were drawn up and areas selected for additional cabins by both the Rainier and Glacier Park companies.

A very interesting tourist service and observation building at Desert View, South Rim of the Grand Canyon, is being planned by the Fred Harvey Co.

An increasing demand for housekeeping-cabin facilities was noticeable during the year. The standard of such cabins is being gradually raised.

From a landscape viewpoint, a most desirable and encouraging development is the way in which operators are being won to the desirability of a well-thought-out plan for cabin camps, even though they are but partially built in one season, rather than starting a camp and later adding to it wherever they can find room. Another good sign is the way in which the operators are being converted to the additional and justifiable expense of underground wiring. This is going to overcome the "spider web" appearance of the cabin camps in the future.

BUREAU OF PUBLIC ROADS

Our work with the bureau has gone smoothly throughout the year. The centralizing of bridge plans at the bureau's regional office enables us to confer frequently on points which come up about bridge plans and specifications. Not only are we now furnishing architectural sheets of bridge plans, but our sheets on parking areas, sidewalks, and curbs are being incorporated into their plans.

Many of the engineers are now becoming justifiably proud of results being attained with our type "B" excavation.

During the year specifications were further revised and standardized covering such points as rounding and flattening of slopes, removal of form marks, and methods of blasting less injurious to the surroundings. Quarries, borrow
pits, and abandoned contractors' camps were left in better condition than formerly, as a result of inspections and recommendations by our field men.

In some cases sod was removed from road right of ways and transplanted where needed. Duff is now being saved and applied on finished fill slopes. Our efforts toward protection of roadside and natural landscape also are showing encouraging results.

TRAVEL AND FIELD WORK

The summer construction season, May to November, marks the period of our field work.

Assistant and junior landscape architects are assigned to a park or several adjacent parks for the season. Having men assigned to cover a district enables the work to progress without the delay to construction forces which would arise were they not on hand to interpret plans and make decisions from time to time.

We have found it impossible to make a good national-park man in less than a year of service. Hence, we do not assign the landscape men to a field territory until they have been in the office at least a season.

During the year park superintendents requested more time of our men than we were able to give. The demand for our services is growing and the time is near when each park of any size will need the full time of one landscape man.

This year's field assignments were one man to each, as follows:

1. Rainier and Glacier.
2. Yellowstone, Grand Teton, Craters of the Moon, with a junior handling Rocky Mountain, Wind Cave, and Devils Tower in conjunction with the assistant regularly assigned to these areas.
6. Yosemite.

It was necessary this season to assign a junior to Yosemite and Sequoia Parks to assist the regular field men in the preparation of plans.

This year I was able to visit several times most of the parks having an active construction program. In conjunction with a trip to Washington in the winter, I visited the Wakefield and Colonial Monuments, and Shenandoah area, and Hot Springs and Carlsbad on my way West. I feel that our work in the field has been most successful. Besides covering the well-established parks, road and building programs were started in heretofore neglected parks and monuments.

LANDSCAPE PROJECTS

Following is a list of drawings and road projects under study by the landscape division at field headquarters:

**BRYCE CANYON**

*Drawings.*—Dormitory building, mess house, employee's quarters, general plan.

*Road projects.*—Rim Road, 1-A (grading and surfacing).

**CARLSBAD**

*Drawings.*—Bunk and mess house, machine shop, 2-room cabins, elevator entrance building, alterations to old power house.

**CRATER LAKE**

*Drawings.*—Employee's quarters, addition to utility unit at Government Camp, house over gas pump, watchman peak fire lookout tower, storeroom and garage at headquarters' parking area at the lodge.

*Roads.*—East Entrance Road, 5-A-1 (olling), Rim Road, 7-A (grading), Diamond Lake Road, 8, and North Boundary Diamond Lake Road, 46-A.

**AZTEC RUINS**

*Drawings.*—Comfort station, custodian's quarters, tool and implement shed, general plan.
CASA GRANDE

Drawings.—Administration building, comfort station, superintendent’s residence, employee’s residence, tool and implement shop, shelter for ruins, housing-unit plan, entrance gateway.

PETRIFIED FOREST

Drawings.—Administration building, custodian’s residence, two employees’ residences, tool and implement shop, six parking areas, Rio Puerco Bridge, Dry Creek Bridge, headquarters’ area plan.

Roads.—Project 1 (grading) and bridges.

CRATERS OF THE MOON

Drawings.—Custodian’s residence.

DEVILS TOWER

Drawings.—Custodian’s residence.

PINNACLES

Drawings.—Comfort station.

MUIR WOODS

Drawings.—Garage.

DINOSAUR

Drawings.—General plan, custodian’s residence, ranger’s residence, comfort station, equipment building, administration building, warehouse and stone wall, museum building.

GENERAL GRANT

Drawings.—Comfort station.

Road.—Project 1 (grading).

GLACIER

Drawings.—Double comfort station; shelter cabin; Logan Pass comfort station; road-maintenance camp; snowshoe cabin; woodshed, barn, and ranger’s station; powder house; fire lookout; Babb-Piegans customhouse; hose-drying tower; hose house; fire cache and garage; Baring Creek Bridge; parking area at Sun Camp; property-ownership map of Lake McDonald.


GRAND CANYON

Drawings.—Superintendent’s residence, two employees’ quarters, Westside Museum, barn and equipment shed, bunk house and mess house, oil and gas house, comfort station, laborers’ cabins, community building.

Roads.—Grand Canyon-Desert View, project 1, Old Trails Highway, 2-D-1 (improvement), 2-A-2, B-2, C-2 (surfacing), Bright Angel Springs-North Entrance, 4 (surfacing), Cameron-Desert View, 10 (review of survey).

HAWAII

Drawings.—United States commissioner’s residence, administration building, two employees’ quarters.

LASSEN VOLCANIC

Drawings.—Employee’s quarters, equipment shed, barn, Raker Memorial gateway.

Roads.—Loop Route-Northwest Entrance, project 1 (oiling and surfacing), north approach road connection, 6 (grading).

MESA VERDE

Roads.—North and South Highway, 1-A, B, C, and D (surfacing).

MOUNT MCKINLEY

Drawings.—Three shelter cabins, gas and oil house, comfort station, garage and machine shop.
MOUNT RAINIER

Drawings.—Memorial arch, employee's quarters, comfort stations (Yakima Park, Longmire, and Tahoma Vista), Sunrise Lodge, power house at Sunrise, gas and oil station, parking areas at North Puyallup and Reflection Lakes, St. Andrews Bridge, general plan of Tipsoo Lake area, layout of open-air garage, Paradise, Yakima Park entrance and general plan.
Roads.—White River Highway, project 3 (clearing, grading and surfacing, and bridge), Westside Highway, project 2 (grading and surfacing and bridges), Stevens Canyon, 4-A (grading).

ROCKY MOUNTAIN

Drawings.—Shelter cabins, Timber Creek; mess house, equipment shed, woodshed, and garage; employee's quarters, ranger station, blacksmith shop, Shadow Mountain fire lookout tower, plan at administration area.
Road projects.—Fall River, west side, 1-C (grading).

SEQUOIA

Drawings.—Ash Mountain employee's quarters, comfort station at Giant Forest, ranger station, addition to superintendent's residence, Lodge Pole Camp bridge.

WIND CAVE

Drawings.—Mess house, dormitory, power house, employee's quarters, superintendent's garage.
Roads.—Grading and surfacing, 1-A.

YELLOWSTONE

Drawings.—Snowshoe cabin, mess house, bunk house, comfort station, Tower Falls Bridge, Seven Mile Gardiner River Bridge, six bridges on Red Lodge-Cooke City approach road, addition to Lake ranger station, checking station North Entrance, Pilgrim Creek Bridge.
Roads.—Grand Loop, project 1, East Gate-Lake Junction, project 5-A, B, C (oil processing), Red Lodge-Cooke City approach road, Moran South Boundary approach road.

YOSEMITE

Drawings.—Hospital, garage, comfort stations at Tuolumne Meadows, Indian Village, and Mariposa Grove, garage at Indian Village, Tiltit Trail Bridge; Indian Village cabins, South Fork Merced Bridge; parking area at Wawona Tunnel; El Capitan Bridge; Stoneman Bridge; addition to girls' dormitory; apartment house, Glacier Point ranger cabin, doctor's residence, dentist's residence.
Roads.—Wawona Road, project 2-A-5 (clearing, grading, and tunneling); South Fork Merced Bridge, project 2-B-2; Crane Flat-Mather Road (inspection of survey).

ZION

Drawings.—Wood shed and garage, parking area at Temple of Sinawava, Cable Creek Bridge, employee's quarters, comfort station.
Roads.—Floor of Valley, 2-A and 4-A (grading and surfacing), Virgin River Bridge, 1-A-1.

PARKS GENERAL

Drawings.—Merit insignia, ranger badge, employee's badge, typical sections for flattening and rounding of slopes, license plates for operators' cars, revision of fire lookout towers, fireguard badge, letterhead design.
REPORT OF FIELD HEADQUARTERS BRANCH OF EDUCATION

ANSEL F. HALL, Senior Park Naturalist, Berkeley, Calif.

NEW FIELD HEADQUARTERS AT BERKELEY, CALIF.

Through the cooperation of the University of California space is provided for the field headquarters of the branch of education at Hilgard Hall, Berkeley, Calif. Until recently these quarters were greatly crowded and activities were severely limited. During the past year, however, with the completion of new buildings, the university has very generously made nine rooms available so that at the present time we are adequately provided with offices, library space, photographic laboratories, and laboratories for the preparation of museum exhibits.

The photographic laboratories are exceptional in their convenient layout, and their new location in Hilgard Hall greatly adds to the efficiency of the photographer's work.

MUSEUM DEVELOPMENT

Field Naturalist Carl P. Russell devoted practically his entire time to museum problems, his principal assignment being to problems connected with the establishment of museums in Yellowstone National Park. Senior Park Naturalist Ansel F. Hall also devoted a large portion of his time to museum problems, concentrating upon the Yavapai station and branch museum at Grand Canyon National Park. Other minor museum problems were handled in Yosemite, Crater Lake, Sequoia, and Rocky Mountain National Parks.

Museum development in Yellowstone.—Throughout the entire year Field Naturalist Carl P. Russell was engaged in the planning and installation of museum exhibits for Yellowstone National Park. In 1930 four museums had been erected in Yellowstone Park under the direction of the committee on outdoor education of the American Association of Museums. By September, 1930, these institutions were all functioning, but numerous details in each museum fell short of completion. During September, October, and November consideration was given to general unfinished work, to the new Fishing Bridge Museum project, and to the need of additional exhibit material in the departments of history and ethnology. Trips were made in search of Montana collectors possessing significant items, and this prospecting resulted in the locating of a number of desirable collections. A gift of $500 from Senator F. C. Walcott and Mr. George Pratt enabled the Yellowstone museums to purchase a part of the W. H. Everman collection in Bozeman, Mont. During the spring of 1931 Field Naturalist Russell undertook completion of the installation plan for the Obsidian Cliff exhibit and the Fishing Bridge Museum. Research, writing label copy, and supervision of technical work in preparing exhibits have occupied his time to date. A staff of seven workers was employed on the Fishing Bridge project.

Dr. H. C. Bumpus, of the American Association of Museums, in charge of the Yellowstone educational program, arrived in Yellowstone Park on June 22 and until July gave his personal attention to the direction of museum work. Final plans for the Fishing Bridge exhibits were formulated with his assistance. He gave careful consideration to existing exhibits in all Yellowstone museums and directed certain changes which will be made when time is available for the completion of numerous unfinished projects.

August 1, 1931, finds the central bird room of the Fishing Bridge Museum open to the public. A number of cases are unfinished but will be in readiness by September 1. The geology room will be opened to visitors about August 15. The Lake biology room will be completed in time for the opening of the 1932 travel season.

During the spring of 1931 an interesting new museum project was carried out under the direction of Senior Park Naturalist Ansel F. Hall. This was the excavation and preparation for exhibit in place of a section of one of the fossil forests near Camp Roosevelt. The project was financed privately and the work carried out by a group of 11 Eagle Scouts working under the leadership of Dr. Harvey E. Stork, formerly a member of the educational staff in Yellowstone National Park and later field assistant to the senior park naturalist. Technical supervision of this important project was furnished by the Milwaukee Public Museum. Dr. W. A. Barrett, director of the museum; Dr. Ira Edwards, curator of geology; and E. R. Nelson, Jr., assist-
ant curator of geology, contributed their personal services during the entire project. Some remarkably interesting discoveries were made, including one root approximately 20 feet in length and also unmodified or only partially modified wood preserved within a casing of silica. A technical report on this project is being prepared by Dr. Ira Edwards, who is also drafting a popular bulletin on the fossil forests of the Yellowstone. This latter publication will be offered as a contribution to the National Park Service.

Grand Canyon National Park.—During the summer of 1930 Senior Park Naturalist Ansel F. Hall concentrated upon the problem of planning and installing equipment and exhibits in the Yavapai station at the South Rim of Grand Canyon, in cooperation with Dr. John C. Merriam and the Grand Canyon Committee of the National Academy of Sciences. The following paragraphs briefly outline this development:

The north side of the building is entirely open to the canyon. From a 60-foot parapet visitors view 15 carefully selected points, each of which has great significance in the general story of the history of the earth and development of life in this region. Binocular telescopes and field glasses are adjusted in fixed positions to indicate the essential features.

The statement of the scientific story told at the Yavapai station has entailed a great deal of careful study on the part of Dr. John C. Merriam, assisted by Dr. W. W. Atwood, Dr. Fred Wright, Dr. David White, and other prominent geologists. After the preliminary statement was carefully drafted on key labels, the materials were brought together by Doctor Merriam in the form of a 20-page publication, "Guide to Parapet Views of Yavapai Station," Grand Canyon.

After the installation of telescopes and field glasses at the Yavapai parapet difficulty was experienced in maintaining these in fixed positions. This was overcome by constructing a parapet at the rim near the station and mounting two movable telescopes through which visitors could view other points of interest not shown from the parapet.

During the previous year a "geological column" had been constructed at the rear of the porch facing the parapet. This column is made up of rocks brought from the Grand Canyon and arranged in order of their actual occurrence, the dimensions of the rocks corresponding with the relative thicknesses of the strata. A similar "fossil column" was constructed during the summer of 1930 and cross-referenced to the geological column. On this fossil column is represented the development of life from the earliest known plants in the Algonkian up to 4-footed animals in the Coconino sandstone.

From the parapet are pointed out the locations of fossil footprints within the Grand Canyon, in the Supai formations, in the Hermit shale, and in the Coconino sandstone. These can easily be reached from the Yaki trail, and spur trails were constructed by the National Park Service so that each important locality can conveniently be visited. At the suggestion of Dr. John C. Merriam, the scout-naturalists who were on duty at Grand Canyon during the summer of 1930 organized an expedition and spent a week hunting similar fossil footprints in the region just below Yavapai Point. A number of important discoveries were made, but the footprints found can not be shown by telescope direct on account of being located at the base of the cliff, immediately under the station.

In the interior exhibit room at the Yavapai station 17 mahogany exhibit cases were installed. These were oriented to correspond with the similar parapet views and were so arranged as to repeat the story in greater detail. This was accomplished by means of transparencies showing significant features in even greater detail than they could be seen through the telescopes. In connection with the transparencies is a series of supporting exhibits brought from the exact points shown in the photographs. Also there are four translucent charts which indicate respectively the geological formations, the fossils found within the Grand Canyon, the effect of geological separation due to the Grand Canyon, and life zones as influenced by the Grand Canyon. There are also installed in the interior exhibit rooms two automatic Balopticons in which are shown lantern slides pertaining to the geology and the life zones of the region. A motion picture has been prepared which demonstrates the great power of the Colorado River.

In the area surrounding the Yavapai station an extensive garden of native plants has been established. Plants from the Canadian Zone at the North Rim and from the Lower Sonoran Zone within the canyon have been established in specially defined plots, and the remainder of the area has been landscaped with...
plants from the Upper Sonoran Zone which is the natural habitat here at the South Rim. The establishment of the natural garden surrounding Yavapai station was a contribution of the 1930 scout-naturalist expedition which served in Grand Canyon during the summer of 1930. Subsequently many additional plants have been added by members of the Grand Canyon educational staff.

During the summer of 1930 an expedition from the Gila Pueblo Museum at Globe, Ariz., under the direction of Dr. Harold S. Gladwin, excavated a large pueblo ruin a short distance from the rim, near Lipan Point. A portion of the quadrangle was left untouched while certain rooms were thoroughly cleaned and prepared for exhibit. Mrs. Winifred MacCurdy contributed $5,000 for the construction of a museum near this point. Plans are being drawn by the landscape architectural division, and the building will be erected by the National Park Service.

Besides the activities briefly listed above, the Gila Pueblo Museum expedition was engaged during the summer of 1930 in very extensive exploration to determine former Indian cultures throughout the Southwest. This was accomplished by means of identification of pottery fragments collected at ancient dwelling sites. Assistance in this project was rendered by the scout-naturalist expedition working in Grand Canyon National Park in 1930. Under the direction of their leader, these lads thoroughly explored an area of 27 square miles, extending from El Tovar to Grand View and from the rim of the canyon south to the boundary of the park. The necessary scientific records were made and the data turned over to Doctor Gladwin for incorporation in the official exploration reports.

**Museum development in Yosemite National Park.**—The outstanding new museum development in Yosemite National Park was the completion of the Mariposa Grove branch museum. This building is an exact replica of the picturesque log cabin which has occupied the same site for the past 50 or more years. Under the direction of the National Park Service Landscape Division the building was faithfully reproduced, the only change being the elimination of a portion of the central partition to provide for more ample exhibit space. Senior Park Naturalist Hall spent several days in Yosemite National Park early in the season of 1931, working out with Park Naturalist Harwell and Assistant Park Naturalist Presnall the details of a plan of installation. The material exhibited will be limited to that having a bearing upon the story of the giant sequoia. Relief models of the State of California, upon which the distribution of the giant sequoia and coast redwood can be shown, were prepared at Berkeley headquarters and shipped to Yosemite, where the details were completed by the park educational staff. Also Photographer George A. Grant spent considerable time in Yosemite making negatives necessary for the carefully planned exhibit panels. These panels were started by Assistant Park Naturalist Presnall, but the greater part of the work will have to be completed at the end of the 1931 summer season, due to the urgency of current educational activities.

In the main Yosemite museum the arrangement of two rooms was carefully redstudied in cooperation with the park naturalist and assistant park naturalist. A plan was outlined whereby the Mather room, which has heretofore been kept locked and used only for historical research, could be made available for museum use. By providing locked glass doors for the bookcases, all rare publications will be protected and exhibit cases will be provided so that exceedingly interesting old hotel registers, historical photographs, and other similar material can be exhibited. These exhibits will be changed from time to time.

The arrangement of the geological room at the Yosemite Museum was redstudied and certain changes effected which will greatly aid in the matter of circulation of visitors. Small cases were designed so that transparencies can be exhibited, and a series of three transparencies which were furnished by Doctor Merriam were colored in preparation for their installation in connection with the metamorphic rocks of the region.

**Museum development at Crater Lake National Park.**—Up to the present time Crater Lake has been without a museum. During the past year, however, considerable time was devoted to assisting the landscape division in planning the Sinnott Memorial lookout and museum which was to be built under congressional appropriation at Victor Rock, just below the rim of Crater Lake. The building was constructed during the summer and fall of 1930 and completed in the spring of 1931. The planning and installation of exhibits, which are being carried out by the senior park naturalist in cooperation with Dr.
John C. Merriam and a special committee appointed by the National Academy of Sciences, will be completed during the coming fiscal year.

During the past year Senior Park Naturalist Hall and Fire-Control Expert Coffman assisted the landscape architectural division in the development of plans for a combined forest fire lookout and educational observation station at the summit of the Watchman at the west rim of Crater Lake. This will be an attractive stone building and is so accessible that thousands of visitors will be entertained there. The building will be erected during the summer of 1931 and will be ready for the installation of exhibits during the season of 1932.

Miscellaneous museum development.—In certain other national parks and monuments the members of the field educational headquarters staff rendered assistance in museum problems. Field Naturalist Carl P. Russell conferred with Superintendent Rogers of Rocky Mountain National Park concerning the lay-out and exhibits for the new museum being erected at Estes Park.

Senior Park Naturalist Hall visited Sequoia National Park and spent some little time with Park Naturalist Been discussing the possible development of the Giant Forest museum. At the present time this museum is inadequately housed and is suffering from the lack of adequate space and attention.

The new museum displays developed at Many Glacier and at Lake McDonald by Park Naturalist Ruhle of Glacier National Park proved to be immensely popular during the season of 1931. These temporary displays are performing an important function in the park and their permanent development should be carefully planned.

Senior Park Naturalist Hall met with Supt. Frank Pinkley of the southwestern national monuments at Casa Grande during the summer of 1930 and in a preliminary way discussed the development of museums in the southwestern monuments. On account of the importance of the Grand Canyon project, however, no additional time could be devoted to the monument problems. With the appointment of Park Naturalist Rose, the educational activities in the southwestern monuments are facing certain successful development, and it is recommended that the entire problem of museums in the Southwest be carefully studied.

In Muir Woods National Monument assistance was rendered by the staff of field educational headquarters in the establishment and labeling of a nature trail. Metal labels were prepared through the cooperation of scout naturalists of past seasons and contributed to the National Park Service. Also arrangements were made by Senior Park Naturalist Hall for Custodian Herschler to meet Mr. John Rothschild, of San Francisco, who has very generously offered to finance the reestablishment of the native flora of Muir Woods. Species such as the azalea, the dogwood, and other flowering plants which have been almost exterminated in the past, will be reestablished under the direction of the landscape division and branch of Education.

PHOTOGRAPHIC DEPARTMENT

The photographic department was established in 1929 and operated for one year on funds contributed from outside sources. During the past fiscal year the department has been operated under regular National Park Service appropriation.

Photographer George A. Grant spent the summer season of 1930 in field work at Grand Canyon, Rocky Mountain, Grand Teton, and Yellowstone National Parks. During the early part of the 1931 season field work was continued in Yosemite National Park and Craters of the Moon National Monument.

During the winter of 1930-31 new laboratories were made available in connection with the enlarged headquarters at the University of California. This has greatly increased the efficiency of the work of the photographic department. During the winter approximately 12,000 prints and 2,500 lantern slides were made from about 1,000 negatives from Grand Canyon, Rocky Mountain, Grand Teton, and Yosemite National Parks and the Southwestern National Monuments. Many of the slides were colored for individual parks by Miss Florence E. Taylor, working on a contract basis at Berkeley headquarters.

Thus far printing has been completed on the negatives from Grand Canyon, southwestern monuments, Mesa Verde, Zion, Bryce Canyon, Grand Teton, and Rocky Mountain National Parks. Complete sets of prints, with numerous duplicates, were furnished to the Washington office, and it is now possible to order prints and slides of the above park photographs by number. Negatives are
available for Sequoia, Yosemite, Lassen Volcanic, Crater Lake, and Mount Rainier National Parks, but the making of prints will require several months' additional work.

Photographer George A. Grant was transferred from field headquarters at Berkeley to the Washington office of the National Park Service, effective July 1, 1931.

NATURE TRAILS

During the past fiscal year cooperation has been extended to a number of national parks in the matter of establishing nature trails. Several hundred metal labels have been prepared on the Roover stamping press for Grand Canyon, Mesa Verde, Rocky Mountain, Yellowstone, Glacier, and other national parks.

STATISTICAL ANALYSIS OF THE DEVELOPMENT OF THE EDUCATIONAL DIVISION

During the past year Senior Park Naturalist Ansel F. Hall completed a statistical analysis which presents in tabular form an accurate record of the development of the educational activities in all of the national parks during the past 11 years. This work, completed in February, 1931, will be kept up to date.

Summary of current educational activities in the national parks for the year ended September 30, 1931

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<th>Lectures</th>
<th>Museum attendance</th>
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<td>389</td>
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<tr>
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<td>141,326</td>
<td>77,004</td>
<td>1,105,354</td>
<td>2,313,821</td>
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</table>

Total number of contacts on all field trips ........................................... 141,326
Total number of contacts on all auto caravans ....................................... 77,004
Total number of contacts at all lectures ............................................. 1,105,354
Total number of contacts at all museums ............................................ 969,637

Grand total .................................................................................. 2,313,821

Under "Museum attendance," Mount Rainier and Rocky Mountain, the figures given include estimated number of persons using nature trails. September figures estimated.
Graph showing steady increase in use of educational facilities compared with similar increase in park attendance. This year, for the first time, the number of contacts made by ranger naturalists was greater than the total number of visitors in those parks where educational facilities were available. In this graph only the parks offering such facilities have been considered.

REPORT OF THE FORESTRY DIVISION

ANSEL F. HALL, Chief Forester, Berkeley, California
JOHN D. COFFMAN, Fire Control Expert

There has been considerable increase in the forest protection activities within the national parks, as a result of serious increase in insect infestations and a fortunate corresponding increase in the appropriation for insect and tree disease control to combat these serious conditions.

The unusual drought conditions of the past few years have unfortunately been favorable to an increase in the bark-beetle infestations, so that many of the normal infestations have rapidly increased to epidemic proportions. This increase has also been aided in a few instances as, for example, in Glacier National Park, by the occurrence of forest fires during the past few years, which leave in their wake weakened trees that prove easy prey to the attacks of bark beetles and tend to concentrate the attacks of such beetles in the regions of such burns.

Conditions of this character have resulted in such a heavy concentration of the mountain pine beetle (Dendroctonus monticolae) in the North Fork of the Flathead drainage in both Glacier National Park and the Blackfeet National Forest that, upon recommendation of the Bureau of Entomology, the attempt to control this infestation was abandoned, because of the small promise of success and the exposure of the area to reinestation from outside infested areas. The 1932 Interior Department appropriation bill carried an item of $70,000 for insect and tree-disease control, which was a material increase over former
allotments for this purpose and made possible very essential bark-beetle control in Yellowstone, Mount Rainier, Crater Lake, Yosemite, General Grant, and Sequoia National Parks and maintenance follow-up work in Glacier National Park within areas treated last year.

The deficiency in precipitation is unfortunately more marked during the present season than last year, so that according to entomologists the prospects are excellent for continued serious development of bark-beetle infestations within the forests of the West. This makes it essential that follow-up maintenance control be provided for all those areas worked this year if permanent benefits are to be derived from the funds already expended.

In addition to bark-beetle control, operations in blister-rust control were continued in Acadia and Mount Rainier National Parks. It is hoped that in the calendar year 1932 the initial control work for blister-rust may be completed in Acadia Park.

Although a slight increase was made in the amount allotted to blister-rust control in Mount Rainier National Park this year, so many evidences of the spread of the disease were found that the work should be still further speeded up next year and initial control completed within the next couple of seasons in all areas which it is finally decided should be worked. A more complete field supply is being made this summer upon which to base the final decision as to the specific areas to be included in the control project.

Excellent cooperation has been rendered in every instance by the representatives of the Bureau of Entomology and the Office of Blister Rust Control in furnishing technical advice and field assistance in connection with insect control and blister-rust projects.

One development of the past year which is worthy of note is the very decided progress in Yellowstone National Park in providing for adequate attention to forestry problems. Yellowstone forests are seriously threatened with a devastating infiltration of bark beetles from heavily infested surrounding regions, and the utmost care must be exercised to discover and control all threatening infestation as promptly as it becomes established.

To discover such infested areas, a careful examination of all stands susceptible to attack must be made each season. In connection with this work an accurate type map is essential, which will likewise indicate the distribution of species susceptible to blister rust and other tree diseases and insect attacks, as well as forest types of varying degrees of inflammability and fire hazard of which it is necessary to have record for effective fire-control plans.

During the past year a member of the Yellowstone ranger organization, who has had technical training as a forester and practical experience as a park ranger, was definitely assigned to the special work of handling forestry problems under the general direction of the chief ranger, including type mapping, forest entomology, timber operations, and fire protection.

Material progress was made in the preparation of an intensive type map, which work is being continued during the present field season; and the Yellowstone insect control project of the past spring, although the first major project of this character for this park, was planned and carried out with such care and detail that it has received the heartiest commendation of representatives of the Bureau of Entomology for its efficiency.

Organization to provide similar intensive supervision for forest problems is essential in a number of other parks if the pressing problems now demanding serious attention are to be efficiently handled.

A forestry policy for the national parks was prepared, approved by the director, and distributed to the field, which more effectively defines the objectives for the various lines of forest activities within the parks.

With increased appropriations for fire-prevention personnel, equipment, and physical improvements, material advancement has been made in providing the parks with more effective fire protection organizations, fire suppression equipment, and fire lookout houses and other buildings essential to fire protection. Much remains, however, to be accomplished before the protection organizations will have reached the degree of effectiveness essential for the adequate protection of the park forests and structures.

During the past spring a suggested code for fire-prevention safeguards for park buildings was distributed to the field to serve as an inspection guide and for assisting the Bureau of Fire Underwriters in its permanent adoption. Material assistance has been received from the National Board of Fire Underwriters and the National Fire Protection Association in furnishing to the parks and monuments literature relating to fire-prevention safeguards for buildings. The local representatives of the National Board of Fire Underwriters have been gen-
erous in furnishing expert advice when requested in connection with building inspection, testing fire apparatus and fire streams, and in recommending suitable fire-protection installations where special problems are involved.

During the past year the National Fire Protection Association has effected the organization of a forest committee dealing with forest protection and forest fire equipment. The National Park Service is represented on this committee through its fire-control expert, who is also a member of the equipment committee of the California Rural Fire Institute.

Field examinations were made by the fire-control expert and fire-protection programs prepared and approved for various parks. The fire-control expert also participated in six fire training meetings held in the various parks during the spring.

Cooperation in fire suppression between the park organizations and the adjacent Forest Service and State fire protection organizations proved most satisfactory and harmonious.

Features of the past year's developments deserving special mention are: The further extension of the fire lookout system in several parks; the material progress in the fire-trail construction program in Glacier Park; a material start in the construction of a very valuable system of fire motorways in Crater Lake Park; the Mount Harkness fire lookout and meteorological station in Lassen Volcanic National Park, which is one of the finest, if not the finest, of fire lookout buildings in the country; the Mount Sheridan fire lookout building in Yellowstone Park, which probably rates next to the Mount Harkness lookout; and the purchase by a number of the parks of fire trucks for the quick transportation of men and equipment to roadside and forest fires.

During the calendar year 1930 a total of 150 fires burned inside the boundaries of the national parks. The record of distribution of these fires by parks, area burned, causes, and expenditures, is given in the appended annual fire report.

### NATIONAL PARK SERVICE FOREST FIRE STATISTICS, CALENDAR YEAR 1930

<table>
<thead>
<tr>
<th>Classification of fires</th>
<th>Location of origin of fires</th>
<th>Area burned inside parks (to nearest whole acre)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Inside parks</td>
<td>Outside parks</td>
</tr>
<tr>
<td></td>
<td>Acres</td>
<td>Acres</td>
</tr>
<tr>
<td>Park</td>
<td>Number</td>
<td>Number</td>
</tr>
<tr>
<td></td>
<td>1/4 acre or less</td>
<td>Between 1/4 and 10</td>
</tr>
<tr>
<td>Acadia</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>Bryce Canyon</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Crater Lake</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>General Grant</td>
<td>3</td>
<td>1</td>
</tr>
<tr>
<td>Glacier</td>
<td>28</td>
<td>23</td>
</tr>
<tr>
<td>Grand Canyon</td>
<td>8</td>
<td>2</td>
</tr>
<tr>
<td>Grand Teton</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>Great Smoky Mountains</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Hawaii</td>
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</tr>
<tr>
<td>Hot Springs</td>
<td>2</td>
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<tr>
<td>Lassen Volcanic</td>
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<td>2</td>
</tr>
<tr>
<td>Mesa Verde</td>
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</tr>
<tr>
<td>Mount McKinley</td>
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<td>Mount Rainier</td>
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<td>Platte</td>
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<td>Rocky Mountain</td>
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<td>Sequoia</td>
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<td>Yosemite</td>
<td>4</td>
<td>6</td>
</tr>
<tr>
<td>Zion</td>
<td>3</td>
<td>3</td>
</tr>
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</table>

| Total                   | 102         | 45           | 139                         | 6      | 5     |       | 3,248 | 407   | 537   | 4,342 |
### Timber destroyed inside parks

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<th>Park</th>
<th>Government</th>
<th>Private</th>
<th>Total</th>
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<td>M. B. F.</td>
<td>M. B. F.</td>
<td>Dollars</td>
<td>Dollars</td>
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<td>3,484.25</td>
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<td>1,065.33</td>
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<td>33,270</td>
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<td>Yosemite</td>
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<td>459.10</td>
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</table>

**Total** 34,096

M. B. F.—Thousand board feet. Figures on timber destroyed are estimates and not actual cruises.

1 Acadia costs include cost of suppressing a class C fire outside, threatening the park.

### Causes of fires

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<thead>
<tr>
<th>Park</th>
<th>Lightning</th>
<th>Railroads</th>
<th>Camp fires</th>
<th>Smokers</th>
<th>Brush burning</th>
<th>Incendiary</th>
<th>Lumbering</th>
<th>Miscellaneous</th>
<th>Total man caused</th>
<th>Grand total</th>
</tr>
</thead>
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<td>Number</td>
<td>Number</td>
<td>Number</td>
<td>Number</td>
<td>Number</td>
<td>Number</td>
<td>Number</td>
<td>Number</td>
<td>Number</td>
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</tr>
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<td>3</td>
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<td>1</td>
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</tr>
<tr>
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<td>1</td>
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</tr>
<tr>
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</tr>
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<td></td>
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<td></td>
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</tr>
<tr>
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</tr>
<tr>
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<td></td>
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<td></td>
<td></td>
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<tr>
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<td></td>
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<tr>
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<td>50</td>
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<td>0</td>
<td>15</td>
<td>101</td>
<td>199</td>
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</table>

1 Outside park and possibly a smoker fire.
### National Park Service forest fire statistics, calendar year 1930—Continued

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<thead>
<tr>
<th>Park</th>
<th>$25 and under</th>
<th>$26 to $50</th>
<th>$51 to $100</th>
<th>$101 to $200</th>
<th>$201 to $500</th>
<th>$501 to $1,000</th>
<th>$1,001 to $5,000</th>
<th>Over $5,000</th>
<th>Total</th>
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<tr>
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<td></td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Great Smoky Mountains</td>
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### REPORT OF SANITATION DIVISION


In accordance with an agreement between the Director of the National Park Service and the Surgeon General of the Public Health Service, made in 1921, sanitary engineers of the Public Health Service continued, as in previous years, to cooperate with the superintendents of the national parks and custodians of the national monuments on all problems of sanitation. The general plan of work consisted of general inspections of hotels, lodges, and all other places where operators handled or served food products or provided lodgings; inspections of automobile and housekeeping camp grounds and Government messes; inspection of water supplies, sewage-treatment plants and garbage incinerators; preparation of plans for water-supply systems, sewage-treatment plants, and garbage incinerators; mosquito-control work; and miscellaneous activities pertaining to sanitation.

### INSPECTION OF HOTELS AND LODGES

During the year inspections were made at hotels, lodges, and other public places handling or serving food products in 17 national parks and 4 national monuments. Each year shows not only a continued improvement in general sanitary conditions at hotels, lodges, cafeterias, stores, etc., but a better understanding and more cooperation on the part of operators in matters pertaining to sanitation.

Some difficulties have been experienced during the past year, as in other years, with regard to the operation and maintenance of water supplies, sewage systems, and treatment plants owned and operated by the public utilities. It is believed that the only permanent solution to this problem is for the Government to take over all sanitary facilities and charge the utilities for operation and maintenance.

The housekeeping cottages constructed at Sunrise and Paradise Valley by the Rainier National Park Co. complied with the standard plan adopted by the National Park Service for cottages having two double beds and kitchen, except for size of building, whereas the partition was omitted in the cottages with one bed. The general manager of the Rainier National Park Co. stated his company was satisfied with the cottage with two rooms and kitchen and...
that the tourists were well pleased with this type of cabin. He stated, how­
ever, that his company had constructed a few of the cottages with bedroom
and kitchen according to the standard plan but that the tourists did not
consider them favorably and that the partitions between the kitchens and
bedrooms were removed.

The superintendent of the park stated that there had been no complaints
against the cottages at Sunrise and Paradise Valley and the local managers
reported that many favorable comments had been made by tourists regarding
the conveniences provided in the cottages.

The housekeeping cottages at Mount Rainier were inspected in July by the
writer and they were found substantially constructed, equipped with standard
plumbing fixtures, and provided with comfortable beds and suitable cooking
stoves, tables, and benches. The general sanitary conditions were highly
satisfactory.

The general impression gained from the inspections and from personal inter­
views with tourists and various officials of the Government and operators,
was that the cottage with the two bedrooms and kitchen, separated by wood
partitions, is acceptable to the tourist and is a practical unit from the stand­
point of operation and maintenance. The only information obtained regard­
ing the single room and kitchen with partition was that from the operator
whose comment has already been given.

At Crater Lake the operator stated that his company would submit plans
this fall for improvements to the housekeeping cottages that will bring them
up to practically the standard plan recommended by the National Park Service
for the two rooms and kitchen. He believed the tourists do not want a
partition between the kitchen and bedroom.

From the information obtained at Mount Rainier and Crater Lake, it would
appear that the housekeeping cottages constructed in conformance with the
standard plan recommended by the Park Service for two rooms and kitchen
is a satisfactory unit for the tourists and operators. The two operators re­
ferred to do not believe the tourists want a partition to separate the kitchen
from the bedroom. This, however, may be due to the fact that the buildings
constructed are smaller than the one recommended by the Park Service and
that a partition in the smaller building makes the space appear to be too
 cramped for comfort.

The writer believes that real progress has been made during the past year
toward the adoption of the standard plans and equipment for housekeeping
cottages in the national parks. It is recommended, however, that the standard
plan for the single-room cottage be modified to the extent of omitting the
partition wall between the bedroom and kitchen. Consideration also might
be given to reducing to a limited extent the size of the two different types of
building.

INSPECTION OF AUTOMOBILE CAMPS

The automobile camps were taxed to their limits in many of the parks, but
there were only a very few complaints regarding the accommodations furnished
or the general sanitary conditions. The bears have caused a considerable
annoyance to tourists in many of the camps and their depredations at night,
particularly with reference to breaking into cars and tents and overturning
garbage cans, have brought about a problem that should be corrected as early
as possible.

During the last few years the camps have been enlarged and better accom­
modations provided and there have been installed in practically all the parks
new and larger water-supply systems, sewerage systems and treatment plants,
and garbage incinerators.

The costs of enlarging and equipping the camps and installing the utilities
have been very high and in some of the parks there have not been provided
sufficient funds for proper maintenance and operation.

WATER SUPPLIES

The drought of the past two years affected the supplies in the parks and
monuments to such an extent that many of them, believed to be ample for
many years, had to be augmented from other sources. Fortunately there were
no serious shortages, but the experience will be a guide in developing new
supplies for the future.
The major work done during the year in connection with water supplies included cooperation with the superintendents and chief engineer of the National Park Service in getting out data and plans for new or supplementary supplies for Mammoth Hot Springs in Yellowstone, Yosemite Valley, Tuolumne Meadows and Mariposa Grove in Yosemite, Giant Forest and Ash Mountain in Sequoia, headquarters and rim areas in Crater Lake, Many Glacier, headquarters and Manzanita Lake in Lassen, Sunrise Camp in Mount Rainier, South Rim of the Grand Canyon, headquarters at Wind Cave, and Carlsbad Caverns.

In addition to the work outlined above, most of the supplies in the national parks and monuments visited were inspected and a large number of bacteriological and chemical analyses made of samples of water. The problem of securing a sufficient volume of pure water for the large number of employees and visitors in some of the parks and monuments is rapidly becoming serious and in the near future it will be necessary to take water from the larger streams and rivers and install filtration and disinfection plants. Up to the present time only two supplies in the parks are sterilized.

**SEWAGE DISPOSAL**

Sewage-treatment plants were designed for Mammoth Hot Springs in Yellowstone, headquarters area in Lassen, and Longmire in Mount Rainier. Recommendations also were given for disposal of sewage in many smaller places in other national parks and many of the monuments.

A sewerage system and sewage-treatment plant, described in the annual report for 1930, were constructed by force account during the year at Yosemite Valley, at a cost of approximately $165,000. The infiltration in the new sewer system in September was approximately 2,500 gallons per mile and it is believed that it will be considerably less than 10,000 gallons when the water table is high in the spring. These figures represent volumes of infiltration water far below those ordinarily permitted in sewer construction work. The treatment plant was practically completed on June 30, and after a trial test with river water in the tanks on July 9, it was placed in operation on August 8. Although it is too early to predict what results will be obtained, the operation to date indicates that a highly satisfactory effluent will be produced, that there will be no odors, and that the cost of operation will be reasonable.

Director Albright and the House Appropriations Committee for the Interior Department, together with Colonel Thomson and members of his staff, were present when the treatment plant was first placed in operation, and all were pleased with the manner in which the plant was working and the general appearances of the structures and grounds.

This plant, as noted above, was constructed by force account, and judging from estimates given by contractors, the cost would have been at least $200,000 if the work had been done by contract.

The sewerage-treatment plant at the South Rim of the Grand Canyon continued to produce during the year an effluent equal in quality, from a bacteriological standpoint, to drinking water. This plant has attracted considerable favorable comment throughout the country, particularly in the Southwest where the drought of the past two years has made it necessary to consider every possible means of obtaining additional water for domestic, industrial, and irrigational purposes.

**GARBAGE DISPOSAL**

The plans originally prepared for incinerators for burning the wet garbage produced in the parks included provisions for burning wood as auxiliary fuel. It was assumed that wood was plentiful and would be more economical than fuel oil. Experience has proven, however, that wood of the kind that is available is more expensive, and plans were prepared for a new design that will use fuel oil and have other improvements. The units now in use have proven very satisfactory from every standpoint except fuel economy, and the costs for installation are far below those for commercial incinerators suitable for the parks. It is estimated that the new design will lower the fuel cost approximately 50 per cent.

The average amount of garbage and refuse incinerated daily in 10 hours in 1 unit at Old Faithful during July was 126 cans of garbage and 1.2 loads of dry refuse. No data are available as to the weight of this material, but from information available in other parks it is reasonable to estimate that the total weight was over 5 tons. This is the largest amount of garbage and refuse incinerated daily in one unit for one month in any of the parks.
The waste tin-can baling machines, operated in Yosemite and at the Grand Canyon to bale waste cans, have operated satisfactorily for several years. The cans are reduced 94 per cent in volume and disposal of the bales at Yosemite is by dumping in a ravine and covering. At the canyon the bales are shipped by the Santa Fe Railway Co. to its reclaiming plant at Chicago, but no data can be obtained from the railroad company regarding the actual value of the products recovered. From the information available it is believed that the cost of shipping the baled cans out of the parks will be greater than the value of the materials recovered.

A used baling machine was purchased from the American Can Co. by the superintendent of Mount Rainier Park and installed at a net saving of $700. Since this machine and those used in the other parks were made by the American Can Co. and are no longer being made, and since the supply of used machines has been exhausted, it is planned to recommend another type, recently put on the market, for use in the parks. The cost of this machine will be approximately $1,200, which is practically the same as estimates given by machine shops for the design used to date.

REPORT OF FISH-CULTURAL INSPECTIONS AND ACTIVITIES

FRED J. FOSTER, District Supervisor, Bureau of Fisheries

The creation of the Rocky Mountain District of the Bureau of Fisheries and the placing of the writer in charge of that district has necessitated a slight change in the cooperative policy between the National Park Service and Bureau of Fisheries outlined in last year's report. The Commissioner of Fisheries has relieved the writer of cooperative work with the National Park Service in national parks located east of the Mississippi River and in the States of Washington and Oregon. The fish-cultural activities in the eastern parks will be looked after directly by the Washington office, and those in Washington and Oregon by the Seattle office.

The writer will continue supervision of the fish-cultural work and investigations in the following national parks: Glacier, Yellowstone, Teton, Rocky Mountain, Grand Canyon, and give such assistance as may be possible to the parks located in California.

During the past year approximately one-third of the writer's time has been devoted to fish-cultural work and investigations in the above national parks, principally, however, in administrative matters.

This partial loss of the writer's services has, however, been more than offset by the detail of a party of trained biologists, under the immediate direction of Dr. A. S. Hazzard, of the Bureau of Fisheries, who have started a systematic study of the waters of the national parks, to be carried on during a period of approximately five years. These studies should add materially to the knowledge of aquatic life in the national parks, as well as forming a basis for a comprehensive stocking policy for fishes and indicating general policies necessary to the maintenance of a maximum of aquatic life.

FISH-CULTURAL ACTIVITIES

YELLOWSTONE PARK

During the present season the take of blackspotted trout eggs in Yellowstone Park increased to 17,500,000, which is a greater number than for either of the past two years and above the average for the past 10 years.

It is of interest that 1,000,000 grayling eggs were taken, experimentally, at Grebe Lake, and it is believed upward of 10,000,000 eggs of this species may be taken hereafter. Inasmuch as few waters in the United States now contain grayling and, except in rare instances, this species has been declining in numbers, the possibility of fish-cultural work with this species is of considerable importance.

In accordance with the suggestion of the director, an attendant in uniform was placed in the aquarium room at Yellowstone Lake Hatchery for the purpose of explaining to visitors the aquarium exhibit and the cooperative work of the Bureau of Fisheries and National Park Service. This service, together with an attractive aquarium display, met with very great popular favor. Up to August 20, 24,501 visitors were afforded opportunity of seeing this work and having it explained.
The Mammoth rearing pools were operated throughout the year and a greatly increased number of fish from 3 to 8 inches in length were planted in park waters as a result. It is regretted, however, that water conditions at the Mammoth pools do not justify the continued operation during the winter months. A new site has been selected near Old Faithful, where rearing pools will be constructed for operation throughout the entire year, as soon as funds are available. In this connection attention is called to the necessity for increased fish-cultural facilities to take care of park waters, as, with increased fishing from year to year, it is problematical how long waters of the national parks can be maintained in productivity under present conditions.

Reports of the superintendent show an increased number of fish taken in Yellowstone Park this season. While this indicates that fish are still in abundance in certain waters, it should not be construed as an increased number of fish in these waters but rather as an increase in the number of fishermen who are enjoying the privilege of removing fish from the waters of Yellowstone Park.

The writer wishes to express appreciation for the appointment of a park ranger for fisheries activities, as recommended in last year's report. His services have been very valuable to both the Park Service and the Bureau of Fisheries and should become increasingly so as time goes on.

GLACIER NATIONAL PARK

The Bureau of Fisheries operates a small hatchery at Glacier Park entrance during the summer months. This hatchery has been operated to capacity, and in addition thereto the Bozeman Station of the Bureau of Fisheries has supplied two carloads of trout for planting in Glacier Park waters during the present season.

There is urgent need of additional fish-cultural facilities in Glacier Park, particularly on the west side. The Commissioner of Fisheries has approved the expenditure of a limited sum for rearing pools, and inspection has been made of several sites, none of which is considered suitable, owing to the limited volume of water at a suitable temperature. Studies are being continued with the view to determining the best possible location.

TETON NATIONAL PARK

At the present time the Teton National Park is remote from any State or Federal fish hatchery, the Lake Hatchery at Yellowstone Park being the nearest. Since the Yellowstone Lake Hatchery is operated but a short period during the summer months and can not adequately supply the needs of Yellowstone Park, the Teton National Park and the Jackson Hole Region in general is probably in greater need of a hatchery and rearing pools capable of being operated throughout the entire year than any other national park, or any other section of the West.

There has been a tremendous increase in travel in the Jackson Hole country during the past three years, and the limited fish available for planting within the waters of this area and the great expense necessary to transport these fish is a matter of serious concern. Here, also, the Commissioner of Fisheries has authorized the expenditure of a small sum for rearing pools, but, as in Glacier Park, an appropriation of not less than $60,000 should be made as soon as possible in order to prevent the continued serious depletion of waters of this section.

During the present season the waters of Teton National Park are being examined by Dr. A. S. Hazzard, associate biologist, United States Bureau of Fisheries, assisted by Drs. Vasco M. Tanner and Wayne B. Hales, of the Brigham Young University, Provo, Utah, and Messrs. J. Everett Hancy and Marion J. Madsen, senior biological assistants. A complete report of these investigations will be transmitted later during the year when material collected has been examined. It is proposed to have these investigations continued in Glacier National Park next season.

GRAND CANYON NATIONAL PARK

A shipment of rainbow trout eggs was successfully hatched at Havasu Creek, Grand Canyon National Park, this past winter. Shipments of Loch Leven and rainbow trout eggs were also planted in Bright Angel Creek and a consignment of brook trout eggs planted in Clear Creek.
The hatching of these fish in Havasu Creek and the planting of eyed eggs in the other streams represents as difficult plantings as are experienced anywhere in the United States, as each shipment has to be transported by mule-back and then, in some instances, for miles on the backs of the rangers.

The superintendent and chief ranger of Grand Canyon National Park are to be greatly commended for their interest and acceptance of hardship in so successfully stocking their limited park waters.

ROCKY MOUNTAIN AND SEQUOIA NATIONAL PARKS

Rocky Mountain National Park has not yet been visited by the writer, but it is hoped that a preliminary study of waters in this park may be made during the present fall.

It is also planned to visit Sequoia Park sometime during the winter months.

ACKNOWLEDGMENT

The writer wishes to express his sincere appreciation for the whole-hearted interest and cooperation extended him by the personnel of the National Park Service, who have always been ready to assist in doing all they can and have freely given of their time and information.

REPORT OF PRELIMINARY WILD LIFE SURVEY

GEORGE M. WRIGHT, Scientific Aid, Berkeley, Calif.

Preliminary investigation of the status of animal life in the national parks has progressed so satisfactorily that presentation of the final report in this calendar year is practically assured. In fulfillment of the cause which sponsored the undertaking of this survey it is hoped that permanent organization of the wild-life division of the National Park Service will be effected soon after the appearance of the report. Need for a defined policy of wild-life administration becomes increasingly apparent each season. Members of this party are united in beseeching the early adoption of a constructive program.

Opportunity is taken here for our grateful acknowledgment of the fine cooperation received throughout the year from the personnel of the Washington and San Francisco offices, as well as from the superintendents and their staffs.

PROGRAM AND METHODS

Detailed schedules of work for the period were arranged in accordance with the broad program of the project, which is:
(a) To assist the director in formulating wild-life policies in the National Park Service.
(b) To provide data for the director useful in organizing a permanent wild-life division.
(c) To promote adequate consideration of wild-life requirements in drafting boundaries of parks yet to be created.
(d) To determine the major animal problems in each park, at the same time giving as much assistance as possible in meeting those problems where the immediate emergency is great.

Space will not permit of enumerating methods employed. They will be fully discussed in the final report. This is important, as these methods will be largely applicable to any sustained program of animal administration, and it is planned that the report will thus have a lasting reference value. This year's experimentation with various approaches to problems of administrative policy, as well as specific questions, means that certain techniques can be recommended as having proven value.

REPORT OF PROGRESS

Some phases of the work in which definite progress has been made are briefly discussed here. Others are merely mentioned.

Cooperation externally.—Probably no other resource of the national parks is more absolutely dependent for its welfare upon successful cooperation with other governmental bureaus and external agencies. Parks are not independent biological units and animals can not read boundary markers. Cooperative measures have been studied and members of the party have made contacts which would promote their enactment. Mr. Dixon was official delegate to the
Kaibab deer conference in May. He and Mr. Thompson, who also attended, reported real progress through agreement of all parties upon a definite program.

Areas considered for park or monument status.—A field party visited Death Valley to study the suitability from a faunal standpoint of the proposed monument boundaries. The report rendered exemplifies this important phase of the work. Brief visit was made to the proposed Everglades National Park area.

Appreciation of wild-life needs.—The greatest step forward observed this year is the more acute consciousness of the wild life resource which pervades the parks' personnel generally, and the increasing realization that mere security from human trespass is not sufficient to maintain this asset unimpaired or to restore it to its original value.

A wild-life division.—Careful evaluation of wild-life requirements, the product of field observations and discussions with many people, both scientists and laymen, has resulted in the formulation of concrete ideas for the organization of a wild-life division. These thoughts, together with a tentative program, will be presented soon for the director's consideration.

The historical record.—This must be had to determine the status of wild life before the encroachment of civilization, and this original picture is an important part of the knowledge upon which intelligent handling of the animal is predicated. Because much of this information lies where it is rapidly going beyond reach, i.e., the eye-witness accounts of early settlers, effort has been made to gather such data. These notes will be in the files until a comprehensive record of the history of the animal life can be made in each park.

Game surpluses.—Theoretically, with all factors in balance, the numbers of all game species would be automatically checked. Good enough! But natural conditions do not obtain. Surpluses exist. Some of these difficulties have been successfully met. Bears and white pelicans in Yellowstone are current problems included in the field party's program. Other problems involving increase beyond range capacity are imminent. The problem of elk in Rocky Mountain Park was studied, Mr. Dixon and Mr. David Madsen collaborating on a report which recommended certain boundary additions.

Reintroduction of exterminated species.—This phase of animal management will undoubtedly be conspicuous in the future, and data are being gathered on species that have disappeared from any park. Looming up are the possibilities of restoring the Sierra mountain sheep to Yosemite and the Merriam turkey to the Southwest parks. The survey has gathered much material on the latter problem. Projects for the restoration of fisher and wolverine are future possibilities.

Conflict between the animal and human species.—Many problems which the survey has tried to assist park superintendents in solving fall in this class. The field party has assisted in the following cases: The bear problem, of greatest moment in Yellowstone but also presenting difficulties in Yosemite, Rainier, and Rocky Mountain; porcupine damage to the scene of the cliff dwellings of Mesa Verde; destruction of the scenic values along the roads in Rocky Mountain by beavers; deer damage to the landscape gardening around buildings in Yosemite, Sequoia, and other parks; undesirable effects of physiological nature to the animals themselves resulting from the tourist feeding of deer and bear and feeding of garbage to the latter; control of rodents, such as ground squirrels, around centers of human occupation in Yosemite, Rocky Mountain, and other parks; the many-sided predatory animal problem, etc.

Range depletion.—Many of the most pressing difficulties to-day relate to the concentration of animals upon ranges that will not support them. Artificial feeding is resorted to, but this is unsatisfactory for many reasons. This administrative stumbling block is closely tied up with boundary questions. The outstanding example is to be found in Yellowstone, where elk, mountain sheep, deer, and antelope are all crowded on a pitifully inadequate range in winter. The survey is cooperating with Mr. Bush in his extensive study of this situation.

Zoological survey.—While the body of this very necessary work will have to be done by the permanent organization of the wild life department of the future, much valuable material has been assembled in the course of the survey this year.

Species in danger of extermination.—The case of the trumpeter swan is so outstanding, because this bird is on the very brink of extinction, that the largest single effort of the survey has been devoted to learning as much as possible about the remnant that still breeds in Yellowstone and to encouraging
the focusing of every available resource on a united attempt to save the largest of American waterfowl.

**STATISTICAL SUMMARY OF OPERATIONS**

**Office.**—At the office, field observations on 150 species of birds and 110 mammals were transcribed to species cards. Negatives and prints to the number of 1,445, all originating from pictures made by the field party, were added to the valuable photographic file. Increases were made to the library which now contains 126 volumes plus reprints and pamphlets to a much larger total. This year the Library of Congress system was installed. Also, a reference file was inaugurated, which is repository for all pertinent information not otherwise provided for.

The entire recording system, including species card file, photographic files, library card file, correspondence file, and reference file, is now synchronized so that data pertinent to the fauna of the national parks will not be restricted to the use of a few but will always be readily available to anyone upon inquiry addressed to the secretary.

**Field itinerary.**—Field work was carried on in 12 national parks, 14 national monuments, 1 proposed national park, and 1 proposed monument. There were one or more members in the field a little over half the year.

**Costs.**—Expenses of the year are summarized here for future reference value in setting up maintenance costs for an organized division of wild-life management. The total of $11,200.40 compares with $12,620.66 for the 1930 fiscal year, a decrease of $1,420.26. The difference is largely due to the large outlay for equipment in the first year of operation. However, the items of salaries and field expense were greater in 1931 through the addition of Ben H. Thompson to the personnel.

**Big game animals in various national parks estimated on the basis of censuses made in 1931**

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<tr>
<td>17. Rocky Mountain</td>
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<tr>
<td>19. Wind Cave 2</td>
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<td>22. Zion</td>
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<td>700</td>
<td>12,000</td>
<td>(7)</td>
<td>50</td>
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1 Caribou, Mount McKinley, 25,000.
2 Buffalo, Yellowstone, 1,400; Wind Cave, 100.
3 No estimate.