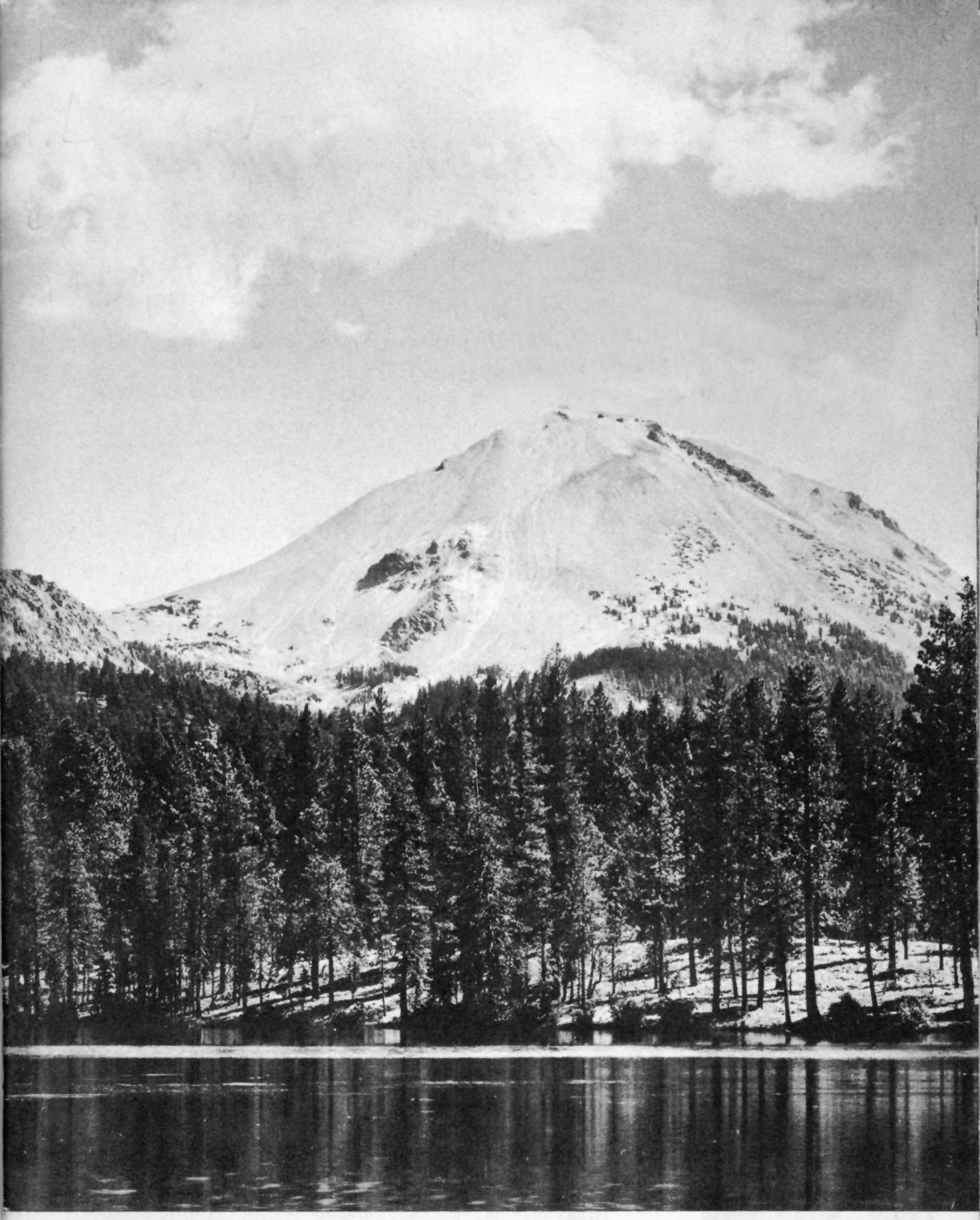
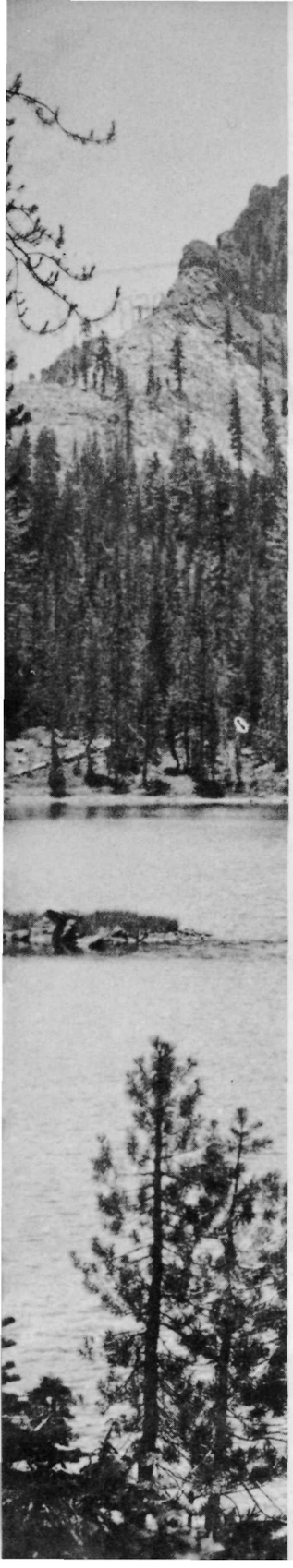


LASSEN VOLCANIC

NATIONAL PARK *California*



Lassen Volcanic

NATIONAL PARK

CALIFORNIA

Opening and Closing Dates Depend Upon Weather Conditions

Contents

Events OF HISTORICAL IMPORTANCE

1820 Arguello exploring party first to record and name Lassen Peak (St. Joseph's Mountain).

1850–51 Last lava flow from the Cinder Cone. Witnessed by travelers along the Noble Trail. Portions of this trail lie within the park boundaries.

1864 Helen Brodt, first white woman to climb Lassen Peak; made the ascent with Major Reading. Lake Helen named after Helen Brodt.

1906 Lassen Peak and Cinder Cone National Monuments set aside May 6 by President Theodore Roosevelt.

1914 May 30. First known eruption of Lassen Peak since coming of white man.

1915 May 19 and 22. Two major eruptions of Lassen Peak occurred on these dates and resulted in the devastation of several miles of fine timber and forest land.

1916 Lassen Volcanic National Park created by act of Congress.

1921 Lassen Peak ceased to erupt and subsided into a state of quiescence.

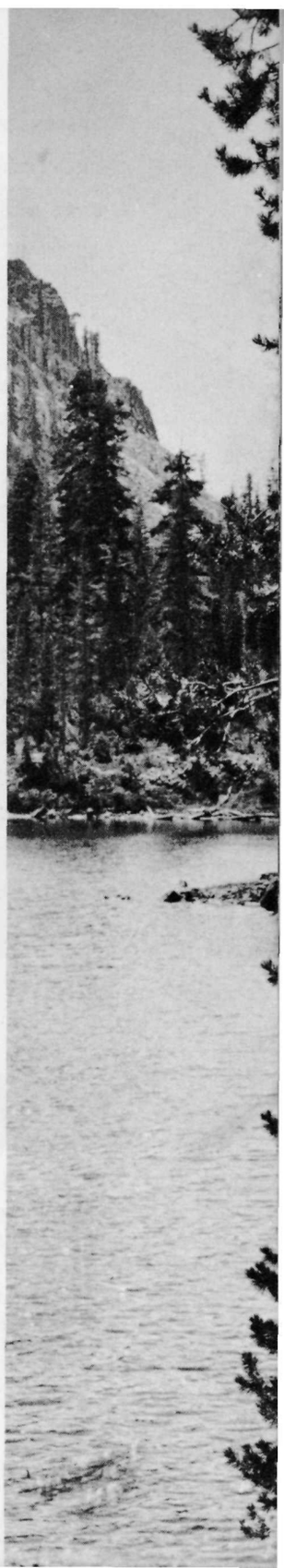
1925 Active development of park began. Lassen Peak Highway started.

1931 Lassen Peak Highway completed. Three-day dedication celebration held in park.

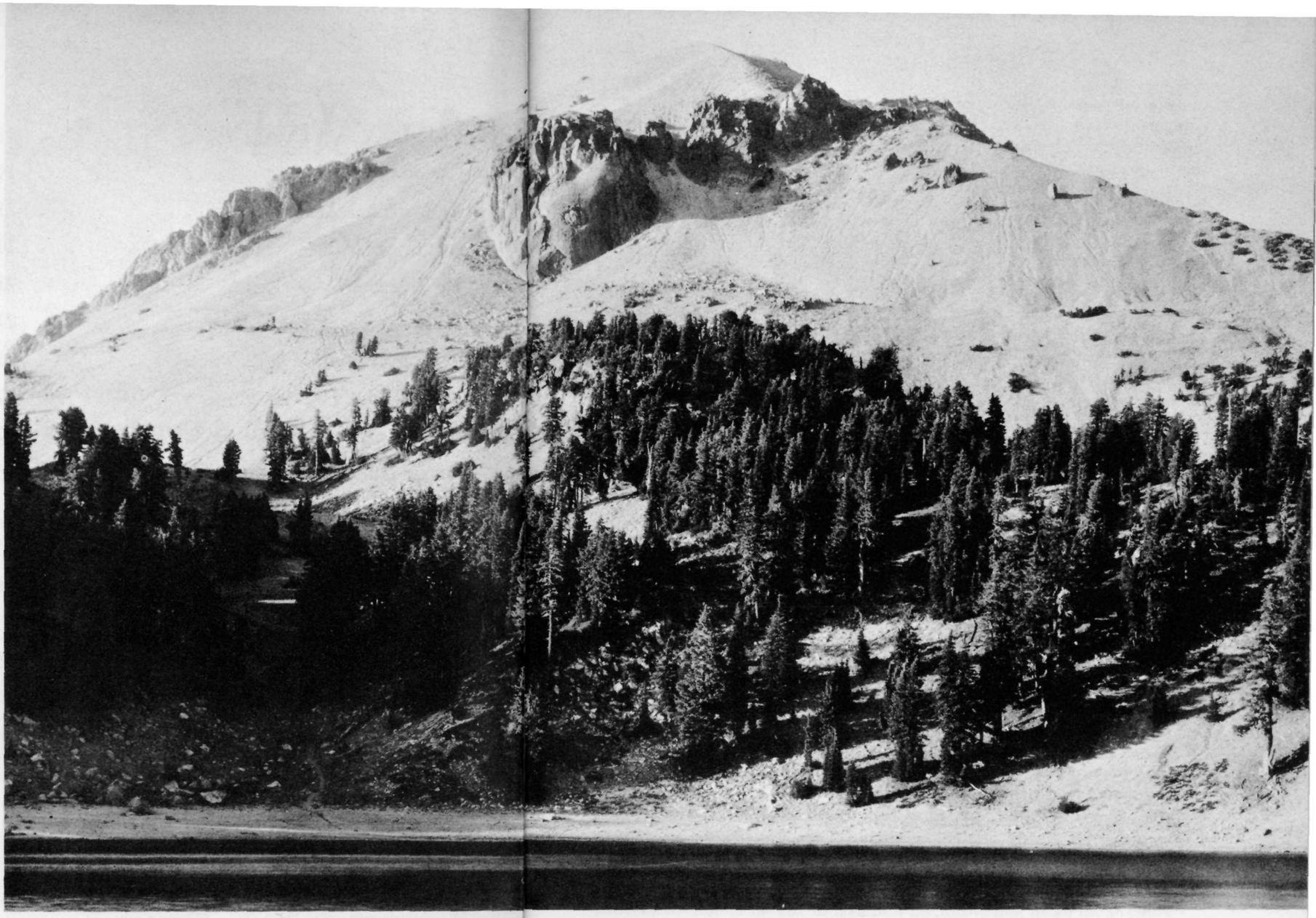
UNITED STATES DEPARTMENT OF THE INTERIOR - - - Harold L. Ickes, *Secretary*

NATIONAL PARK SERVICE

Arno B. Cammerer, *Director*



LASSEN PEAK FROM ACROSS LAKE HELEN



LASSEN VOLCANIC NATIONAL PARK, in northeastern California, was created by act of Congress approved August 9, 1916, to preserve Lassen Peak and the area containing spectacular volcanic exhibits which surrounds it. This impressive peak, from which the park derives its name, stands near the southern end of the Cascade Mountains and is the only recently active volcano in the United States proper. Its last eruptions, occurring between 1914 and 1921, aroused popular and scientific interest in the area.

Lassen Peak was named after Peter Lassen, an early pioneer in northern California. He was born in Copenhagen, Denmark, in 1800, and came to

the United States when a young man. After he became acquainted with northern California, he piloted emigrants from Humboldt, Nev., into the Sacramento Valley, using Lassen Peak as a landmark.

GEOLOGIC HISTORY [1]

The Cascades are volcanic in origin and are dotted with numerous inactive volcanic peaks or craters, the most noted being Mount Rainier, Mount Baker, Mount Adams, Mount Hood, Mount Saint Helens, Mount Jefferson, Mount Shasta, the Three Sisters, Crater Lake, and Lassen Peak Twenty-five miles south of Lassen Volcanic National Park this range meets abruptly the northern end of the Sierra Nevada, which is a great tilted block of the earth's crust, with lofty summits near its eastern border and long westward slopes dipping gently into the Central Valley of California.

The Cascade Range is not ancient measured in geologic time. Its beginning dates back about 2 million years, into the geologic period known as the Pliocene, about a million years before the great Ice Age, or Glacial epoch. The character and arrangement of the older rocks indicate that earlier mountains, long before worn down, had occupied the region. The present range rests upon a great platform of lava flows, which issued from many vents and fissures. These lavas accumulated, flow upon flow, to depths of several thousand feet over wide areas in Washington, Oregon, southern Idaho, and northern California. Later this platform was bent, or arched, slightly upward along the line of the Cascades. No more widespread floods of lava came forth, but numerous localized eruptions produced the magnificent series of peaks which are now snowcapped and for which the Cascades are famous. Old sediments deposited in ancient seas in adjacent regions, indicate that the Lassen area was probably at one time covered by an arm of the sea and that the volcanic formations which now cover it are underlain by much older strata, late Mesozoic or Tertiary in age.

LASSEN PEAK AND VICINITY

The western part of the park includes a profusion of volcanic peaks of the "dome" type, of which Lassen Peak itself is the outstanding example. Others include White Mountain, Chaos Crags, Eagle Peak, and Bumpas Mountain, all closely related in origin. They represent a northward-stepping succession of outlet vents from the same parent lava reservoir which formerly found outlet through the earlier and greater volcano of Mount Tehama, of which only relics are now found in Brokeoff Mountain, Mount Diller, Black Butte, and Diamond Peak.

The great cone of Lassen Peak, rising 10,453 feet above sea level, on the north slope of an ancestral mountain, is almost completely wrapped

[1] Abstracted from Geology of Lassen Volcanic National Park, by Howel Williams.

Loomis photo

THE LAST VIGOROUS ACTIVITY OF LASSEN PEAK IN 1915

in a smooth-sloping mantle of rock fragments, broken from its own cliffs. Lassen differs from the "strato-volcanoes", the most common type, which are built up of alternate beds of lava and fragmental material, sloping away steeply from a central crater. The mountain as it stands today has passed through two stages of growth. The earlier Lassen was a broad, gently sloping volcano of the "shield" type, built of layer upon layer of lava, like the volcanoes of the Hawaiian Islands. It rose by a succession of lava flows to an elevation above 8,500 feet, with a base 5 miles across from north to south and 7 miles from east to west. In the second stage the steep Lassen cone was built on this broad, substantial platform. This, the more conspicuous portion, represents a still rarer "dome" type of volcano, formed by stiff, viscous lava which was pushed up through the vent, like thick paste squeezed from a tube. Piling up in and around the old crater, this stiff lava rose in a bulging domelike form high above it.

Movements due to the rise of lava into the upswelling mass, the pressure of steam and gases imprisoned within it, and the chill of the outer portions on exposure to the air caused a continuous breaking away of huge blocks and slabs of rock accompanied by many smaller fragments. These accumulated about the rising dome while the mountain was still growing

and formed great rock slides on its slopes, much as they appear today. This rock mantle (talus) in places reaches almost to the summit and caps the bulging dome in the form of a cone.

Compared with the slow upbuilding of the more common type of volcano, the rate of growth of an upswelling dome is phenomenally rapid, as witnessed by the history of Santa Maria, in Guatemala, and Mont Pelee, in the Island of Martinique. By comparison with the growth of these two domes it has been estimated that the steep cone of Lassen Peak may have been thrust up in a comparatively short time.

Most dome volcanoes have no crater at the top, but at Lassen Peak gases escaping from lavas deep below maintain open conduits through the softer, central part of the cone. The violence of their discharge at times shoots forth lava in dustlike form, producing the so-called volcanic "ash" of the tuff beds and "mud" flows. Such activity opens a funnel-shaped or cuplike crater at the top. Before the eruptions of 1914–21 the crater of Lassen Peak was an oval bowl approximately 1,000 feet across and 360 feet deep.

Following the rise of the Lassen Dome, there was a long period of quiescence. Nevertheless, prior to the activity of 1914–21 one or more "mud" flows had swept down the northeastern slope, probably within the past 500 years, as judged from the state of preservation of logs that were buried in the mud and recently have been uncovered along the course of Lost Creek.

On May 30, 1914, a series of eruptions began which lasted until February 1921, the most recent volcanic activity in United States proper. Unfortunately, during this period no scientific observer was present in the region to record and report the detailed account of events.

The first eruption, which was short and mild, opened a new vent within the old crater. Water from melting snow trickled down through crevices deep into the volcano and there was converted into steam. This may have aided or served to start the action, which was due primarily to rising heat within. The materials thrown out during the first year were not hot; in fact, most of them were too cold to melt the snow upon which they fell. By March 1915 more than 150 explosions had occurred, most of them mild. The coarser materials fell on the slopes of the peak, but the finer dust was spread over a much larger area, mostly toward the northeast with the prevailing winds, although some fell as far as 15 miles to the south.

Another violent eruption occurred in May 1915, possibly set off by the melting of the exceptionally heavy snow which had accumulated during the preceding winter. On May 19 the first glowing lava made its appearance, rising in the new crater and spilling through the western notch in the

Holmes photo

SOLFATARAS AND STEAM VENTS IN BUMPAS HELL

crater rim in the form of a tongue which reached down the slope 1,000 feet. During the night of May 19 the snow was melted on the northeastern slope, causing destructive flows of mud which swept boulders up to 20 tons in weight 5 to 6 miles into the valleys of Hat Creek and Lost Creek.

Three days later, on May 22, another and lesser mud flow moved down the same slope, and minor flows took place on the north and west flanks of the volcano. At the same time a terrific hot blast, heavily charged with dust and rock fragments, was discharged down the northeast flank of the peak. So violent was this outburst that trees on the slopes of Raker Peak, more than 3 miles away, were felled uniformly in the direction of the on-rushing blast. At the same time a vertical column of smoke and ash rose more than 5 miles above Lassen crater.

The energy of the volcano was largely spent by the end of the 1915 eruption. With only occasional outbursts of steam and ash, the activity subsided during the next 2 years. A series of violent explosions occurred in May and June 1917, again following the melting of considerable quantities of snow. The activity of 1916 and 1917 produced little effect besides modifying the form of the crater by opening new vents within it. Most of the crater is now filled by the rough, blocky lava which rose into it in May 1915; but at the northwest a yawning chasm through the crater wall was opened by later explosive eruptions. In view of the volcanic history of the region,

renewed activity at Lassen is not probable for many years, although there is no reason to suppose that the volcano is yet extinct.

OTHER DOME VOLCANOES NEAR LASSEN PEAK

Almost surrounding Lassen Peak on three sides, north, east, and south, are several other peaks which are similar to Lassen in their dome type of origin, although Lassen is the only one which has a crater in the top of its dome plug. The more common type of dome, without a crater at the top, is represented by White Mountain, Chaos Crags, and the hills north of Chaos Crags. With the exception of these hills, the domes named appear to be progressively younger from south to north. Those at the south, between Lassen and the old Mount Tehama, are preglacial in age, or were thrust up early in the Glacial Period. However, the lava forming the broad foundation of the Lassen dome is older than these domes.

CHAOS CRAGS AND CHAOS JUMBLES

Chaos Crags and Chaos Jumbles present the most spectacular scene of turbulent disorder to be found in the entire region. No words can convey an adequate picture of the piles of huge angular blocks thrown together in wild confusion over the surface of these domes, or of the bristling pinnacles and stacks that project above them. Enormous banks of angular talus, many of them more than 1,000 feet high, encircle the domes, merging at the northwest into the choppy disarray of the Jumbles.

The activity at Chaos Crags, like that of many volcanic domes the world over, was divided into three phases: First, explosive eruptions building a series of cinder cones, then the thrusting up of the molten viscous lava as steep-sided domes, and lastly the partial destruction of these domes by renewed explosions—all only a few hundred years ago.

The early violent eruptions formed several cinder cones at the north base of Lassen Peak. A portion of one of these cones, with its crater 600 feet in diameter and 60 feet deep, is still preserved against the south flank of the Crags, and the disorganized remains of at least two others are recognizable. The pushing up of the viscous lava doubtless followed soon afterward forming two domes, each about a mile in diameter, the older south dome partially encircling the later and higher north dome. Unable to flow for more than a short distance, this stiff lava piled up about the vents. Great strains were set up in the solidifying mass by the upward surge of the lava into the swelling dome and probably by frequent violent explosions of steam and gases from various parts of the stiffening mass. Thus vast talus slopes were formed by the breaking and crumbling of the rising masses, and the domes were thrust up through their own accumulating debris, as the famous "spine" of Mont Pelee.

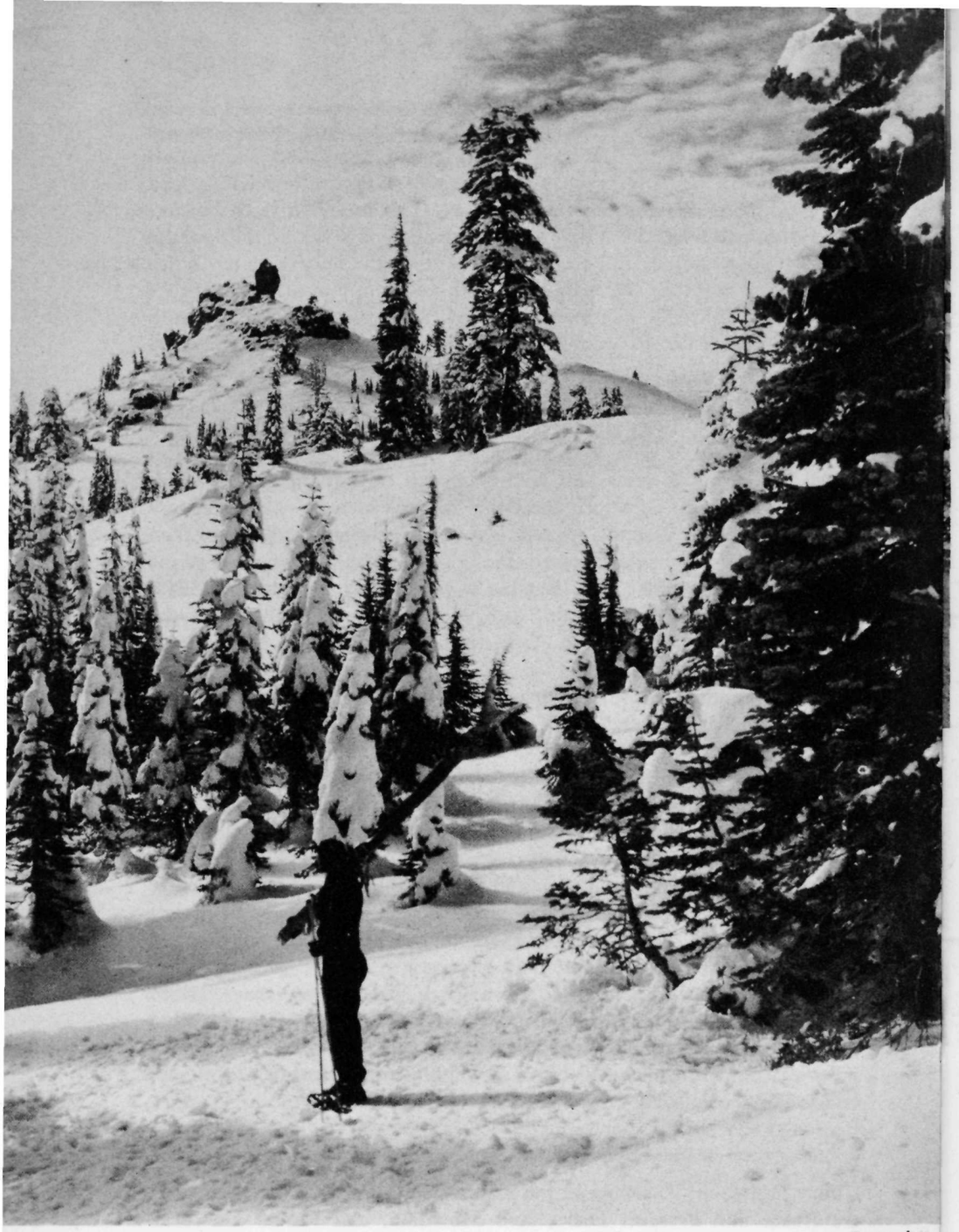
The north dome had risen 1,800 feet above the surrounding country when explosions at the base of the rising mass blasted away the support from the north face and hurled vast quantities of broken and falling lava out upon the cinder-covered region below. This rock blast was shot forward with such momentum that its front advanced 400 feet up the opposite slope of Table Mountain, 2 miles distant from the craters at the north foot of the Crags, and stopped there with an abrupt front. An area 2½ square miles in extent was thickly covered by angular rock mingled with finer, sandlike material. Manzanita Lake was formed where the Jumbles obstruct Manzanita Creek. The neighboring Reflection Lake is but the largest of many pools that occupy depressions in the Jumbles.

Three miles southwest of Lassen Peak once stood a great mountain, with a base more than 12 miles in diameter and rising approximately 4,000 feet above the steaming vents and boiling springs of Sulphur Works. This mountain was built by a long succession of quiet lava flows, producing a sloping cone of the "shield" type, similar to the volcanoes of the Hawaiian Islands. After this activity ceased, the crater and the upper parts of the volcano were destroyed, thus forming a great bowl, or caldera, with a jagged rim. Brokeoff Mountain, with an elevation of 9,232 feet, is the largest remnant of this old rim. Other remnants are Mount Diller, Black Butte, and Pilot Pinnacle.

The beginning of this ancient mountain dates back a million and a half years to the late Pliocene epoch. Before the ice age its great eruptions had ceased and the broad basin of the caldera was formed. Numerous steam and hot gas vents (fumaroles) and hot springs in the old caldera, including Sulphur Works, Bumpas Hell, and Steamboat Springs, show that the lava beneath the surface has not yet entirely cooled. Farther east, similar types of activity may be seen at Cold Boiling Springs Lake, Devils Kitchen, Boiling Springs Lake, and Terminal (Opal) Geyser. These fumaroles are of the type known as solfataras, because of the sulphur content of the gases. They decompose the lavas with which they come in contact and change them into soft olive green, yellow, or red earthy material, or into a white claylike substance. The vents are characterized by escaping vapors (mostly steam), thermal springs, and churning mud pots of various colors. Their activity is most striking in the early or late hours of the day, when the colder air rapidly condenses the steam into visible cloudlike masses.

VOLCANOES OF THE CENTRAL PLATEAU

Four prominent volcanoes in the landscape eastward from Lassen Peak are Raker and Prospect Peaks, Red Mountain, and Mount Harkness.



Barton photo

WINTER IN THE PARK. DIAMOND PEAK IN THE BACKGROUND

They belong to the "shield" type and were built up during the Glacial epoch, about the same time as the steep cone of Lassen Peak, by a sequence of numerous quiet flows of lava, like the broad base of Lassen itself.

CINDER CONE AND THE EASTERN RANGE

One of the most beautiful and unusual features of the park is Cinder Cone, 10 miles east-northeast from Lassen Peak, with its rugged and fantastic lava beds and its multicolored explosion products. The almost total absence of vegetation intensifies the appearance that the eruption occurred not long ago. Actually its last lava flow is not much older than the recent activity of Lassen itself, dating back only to the winter of 1850–51. The beginning of its history was considerably earlier, although it is entirely post-glacial and hence very recent in the geologic sense.

After most of the present cone had been piled up by explosive cinder eruptions, lava flowed out from its base; then followed a second series of cinder eruptions and also a second series of lava flows. The last of the second series was erupted in 1851, when flaring lights, which persisted for many nights, were observed from various distant points. Later examination has shown that this activity produced the prominent black lava stream which emerged from the southern base of the cone, curved to the south, then east and northeast, and flowed into Butte Lake. An earlier flow of this late series separates Butte and Snag Lakes, which may formerly have been connected as one large lake.

All eruptions from the crater of Cinder Cone have been of the cinder-producing explosive type. The lava flows, on the other hand, have pushed their way through the loose cinders at or near the base of the cone.

Some lava flows can be dated with a fair degree of accuracy by estimating the age of trees that are growing upon them. The flow which now separates Butte and Snag Lakes and which preceded that of 1851 is thought to be about 200 years old. The eastern ridges, including the prominent Bonte Peak and Mount Hoffman, embody some of the oldest lavas of the park; hence their original volcanic features have been modified not only by glacial action but also by the preglacial erosion of streams.

GLACIATION

During the Glacial epoch most of the park, excepting its dominating peaks, was under a thick, slowly moving cover of ice which left a mantle of glacial drift in some of the valleys and on much of the Central Plateau. Although the maximum thickness of the ice was probably less than 1,000 feet, few mountain peaks extended above it. Warner Valley, just south of the park boundary, was filled with ice to a depth of 1,600 feet.

OTHER INTERESTING FEATURES

Ranging in elevation from 5,300 to 10,453 feet, the park offers a wide array of flowers and trees. From June first, in the lower elevations, to mid-summer, at the higher levels, there is a constant floral display. There are several hundred species to delight the flower lover, and more than 20 species of trees are to be found from the Transition through the Hudsonian zones.

Through the forest curtain the silvery sheen and shimmer of innumerable lakes greet the eye. The splendid Chain-of-Lakes in the eastern region of the park extends from Juniper, with a shore line of 5 or 6 miles at the northerly base of Mount Harkness to the northward, including Horseshoe Lake, which divides its waters between the Feather and the Pit, to flow apart for several hundred miles and meet again; then linking in Snag Lake with its broad beaches of volcanic sand formed by the ejecta from Cinder Cone; and on to Butte Lake near the eastern base of Prospect Peak with its rugged shores of lava and its scenic setting. Through the clear waters of Snag Lake, and at many places above the surface of the water, can be seen standing the remains of trees that grew at the south end of the lake before it was dammed by the lava flow and raised to its present shore level.

At a point 1.3 miles from the Lassen Peak Highway are the beautiful Kings Creek Falls. The trail starts at Kings Creek Meadows at the lower crossing of the highway. By following down the left-hand side of the creek both the cascades and the falls can be seen.

A most inspiring view may be obtained from the summit of Lassen Peak. For a radius of 150 miles the magnificent panorama unfolds. To the west and southwest the Sacramento Valley spreads, like a great map, from the base of Shasta to where it merges into the great Central Valley of California, a sweep of fully 200 miles; to the north Mount Shasta looms in splendid majesty, and far beyond the peaks of southern Oregon link Lassen Volcanic with its sister park at Crater Lake; to the eastward the Susan River drainage guides the eye to Honey Lake Valley and the distant mountains of Nevada; to the south the view is over the High Sierra, across the broad expanse of forested mountain region in the Feather River country, until the picture dissolves in the purple mysteries which veil the distances.

In the foreground of the picture the splendid mountains viewed from the lower elevations now seem pigmies. At the base of Lassen to the north the Chaos Crags and to the east White Mountain stand out in bold relief. Curving from the southerly base, the serrated edges of the ancient crater rim, with Lake Helen, a gemlike setting in its crescent, include six peaks which attain a height of over 9,000 feet above sea level. Brokeoff Mountain and Mount Diller are prominently among the encircling peaks which

form the amphitheater, marking the location of the once dominating volcano of the region.

WILDLIFE

Lassen Volcanic National Park, like all the other national parks, is an absolute game sanctuary. Before active administration of the park began, hunting in certain sections was carried on excessively, and consequently wild game was seldom seen in any quantity. Under the protection afforded during the past few years, the park has apparently succeeded in establishing itself as a sanctuary for wild animals, which are now more numerous than before. Blacktail and mule deer may be seen in most any section of the park, and a variety of smaller animals affords much pleasure to visitors. Occasionally a black bear appears.

FISHING

A regular program of fish stocking in the many lakes and streams of Lassen Volcanic National Park has made this park one of the finest fishing areas in the State. The most numerous species is the rainbow trout. Brown trout, Loch Leven, and eastern brook are also found in abundance. The waters are very cold, and the clean, sandy bottoms of the lakes and plentiful food supply make the trout very fine eating.

All fishing waters in the park are now within an easy half day's hike from some entering road. The trout in park waters will almost always rise to a fly. The wet fly is usually the most successful. Occasionally use of bait (hellgramites and eggs) is practiced with good results in some lakes. The Professor, Black Gnat, Blue Upright, Queen of the Waters, Improved Governor, mosquito, and gray hackle are recommended.

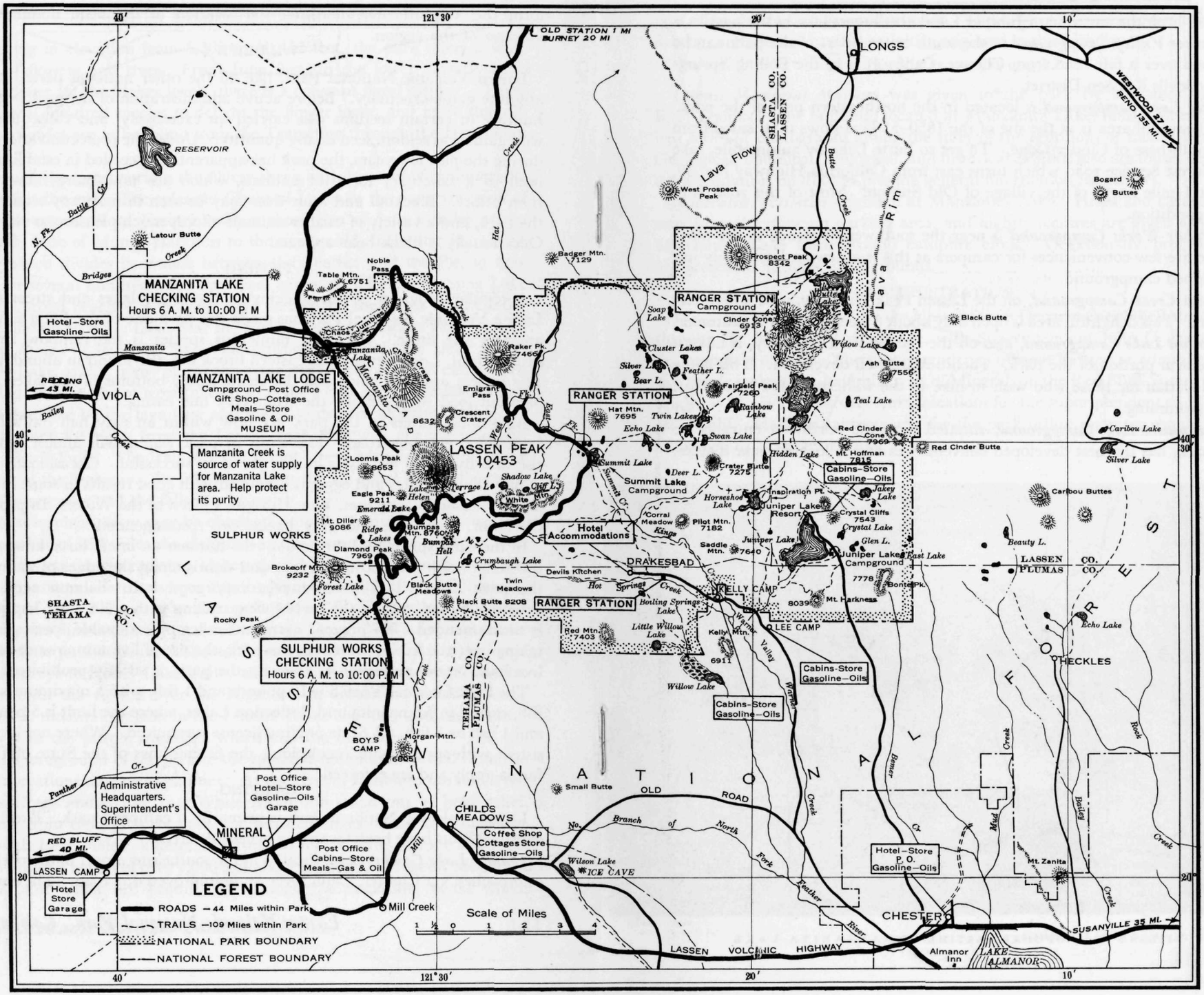
In the early spring and throughout the summer an insect larva known as the hellgramite is found under logs and debris along the edges of many of the park lakes. This insect makes very good bait. Salmon eggs are extensively used, and in the early spring trolling with a No. 2 or 3 spinner is recommended. To prevent carp and other objectionable species from taking over the fishing waters in the park, the use of live minnows or other live bait, or the possession of them in the park, is strictly prohibited.

The limit for a day's catch is 10 pounds and 1 fish, with a maximum of 10 fish, except in Manzanita and Reflection Lakes, where the limit is 5 pounds and 1 fish or 5 fish. A State angling license is required. Where not inconsistent with special park regulations, the fishing laws of the State of California apply and are enforced.

CAMPING

Lassen Volcanic National Park is primarily a campers' park. Excellent camping spots have been located in accessible areas.

Juniper Lake Campground, located in the southeastern part of the park, is approached via Chester, Calif., over an unimproved dirt road. The camp-



MAP OF LASSEN VOLCANIC NATIONAL PARK AND VICINITY

ground is on the east side of Juniper Lake, the largest lake in the park.

Warner Valley Campground in the south central part of the park can be reached over a fair road from Chester, Calif. It is in the Boiling Springs Lake-Devils Kitchen District.

Butte Lake Campground is located in the northeastern part of the park. This beautiful area is at the site of the 1850–51 lava flows that issued from the south base of Cinder Cone. To get to Butte Lake by automobile, take the Forest Service road which turns east from California Highway No. 89, about 1 mile north of the village of Old Station. Most of this road is in poor condition.

Sulphur Works Campground is near the southwest entrance to the park. There are few conveniences for campers as this is a new and relatively undeveloped campground.

Kings Creek Campground, on the Lassen Peak Highway, is at a high elevation. This delightful area is open only about 6 weeks during the summer.

Summit Lake Campground, also on the Lassen Peak Highway, is nearest the central portion of the park. Facilities are well developed. This is the best location for those who wish to hike to the wilderness and lake areas. Fine swimming.

Manzanita Lake Campground, situated near the northwest entrance to the park, has the best developed conveniences and is located near a store, post office, boats, and general supplies. The Loomis Memorial Museum is nearby, and most naturalist activities originate in this vicinity.

EDUCATIONAL ACTIVITIES

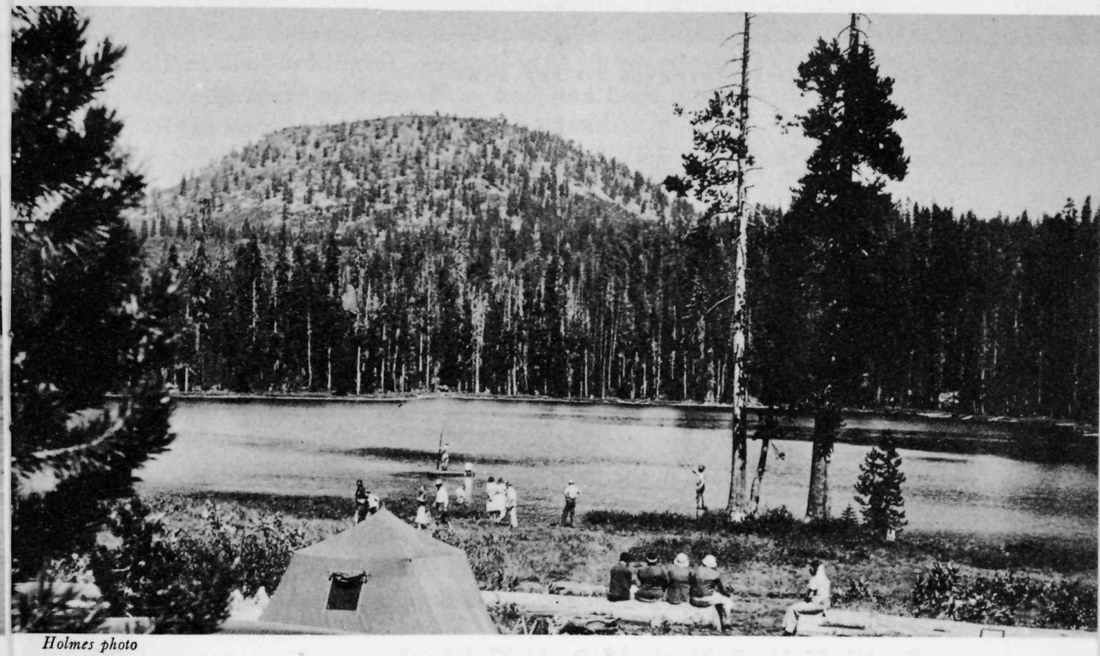
Loomis Memorial Museum was given to the park by Mr. and Mrs. B. F. Loomis. The building, located at Manzanita Lake, houses an excellent series of photographs giving the story of the eruptions of Lassen Peak. Geological, botanical, zoological, and historical exhibits also are found here. An attendant is on duty to provide general information for visitors.

Naturalist activities originate at Manzanita Lake. Hikes and caravans start from the museum parking area, and nightly lectures are given at the Manzanita Lake Campground campfire circle. Occasionally programs are presented at other campgrounds.

ADMINISTRATION

The park is administered by the United States Department of the Interior, through the National Park Service, with Superintendent John C. Preston in immediate charge. The superintendent's office is located at administrative headquarters one-half mile west of Mineral, on the Red Bluff-Susanville Highway No. 36. Address communications for the superintendent to Mineral, Calif. Mail for campers and for the park utility operator should be addressed to Manzanita Lake, Calif.

FISHING IS A POPULAR PASTIME AT MANZANITA LAKE



Holmes photo

SUMMIT LAKE CAMPGROUND

Barton photo

THE NORTHWEST ENTRANCE TO THE PARK

PARK SEASON

The Lassen Peak Highway usually is open to public travel between the latter part of June and the middle of October. Opening and closing dates are entirely dependent upon prevailing weather conditions in the high country. An effort is made to keep the Manzanita Lake and Sulphur Works sections open throughout the winter, so they may be available to winter sports enthusiasts.

HOW TO REACH THE PARK

BY AUTOMOBILE

All approach roads to the park are in excellent condition. They are oil surfaced.

From Redding, on United States Highway No. 99, one may take State Highway No. 44 to the Manzanita Lake entrance, by way of Viola. State Highway No. 89, from Mount Shasta via Burney, connecting with Alturas

via United States Highway No. 299, is also a popular route leading to the Manzanita Lake entrance.

From Red Bluff, Chester, Westwood, and Susanville approach is over State Highway No. 36 to the Mineral entrance, thence through the park to Manzanita Lake over the Lassen Peak Highway.

The roads into Warner Valley and to Juniper Lake Branch off from Highway No. 36 at Chester. These are ordinary dirt roads and generally are in very poor condition.

BY RAIL

The Mount Lassen Transit Co. makes daily connection with the Southern Pacific trains at Red Bluff, and the bus of the Lassen National Park Co. makes connections with the same railroad at Redding on Mondays, Thursdays, and Saturdays. Bus connection with the Western Pacific at Keddie can be made by transfer at Westwood with the Mount Lassen Transit Co.

BUS TRANSPORTATION

There is no regular commercial transportation service to and through Lassen Volcanic National Park at the present time. The Mount Lassen Transit Co. autobus leaves Red Bluff at 7:15 a. m. daily, via State Highway No. 36, passing through Mineral, Chester, Westwood, and Susanville. Its terminus is at Reno, Nev. Corresponding service in the opposite direction also is maintained daily. Visitors may use this line as far as Mineral, the southwest entrance to the park, via the Lassen Peak Highway. The fare from Red Bluff to Mineral, one way, is $2.10; round trip, $3.35. Connections can be made at Reno, Nev., and Red Bluff, Calif., with transcontinental bus lines.

From Mineral the Lassen National Park Co., with headquarters at Manzanita Lake, will furnish "on call" transportation over the Lassen Peak Highway to Manzanita Lake and return. Fares are: For one person, one way, $4; round trip, $6.50. Two or more persons (each), $3; round trip, $4.90.

This company is also prepared to furnish transportation for visitors from the Manzanita Lake Lodge to various points of interest along the Lassen Peak Highway "on call."

From Redding, Calif., the Lassen National Park Co. operates a stage line to Manzanita Lake on Mondays, Thursdays, and Saturdays. Fare per person, one way, is $3.

ACCOMMODATIONS IN THE PARK

MANZANITA LAKE AREA

Manzanita Lake Lodge, located one-half mile from the Manzanita Lake

Holmes photo

IN SUBWAY CAVE, A LAVA TUBE 15 MILES NORTH OF THE PARK

entrance, is operated by the Lassen National Park Co. It is the only service of the kind operating in the park under Government contract. The post-office address is Manzanita Lake, Calif. Souvenirs and gifts are on sale.

Dining room: Meals are served at the following rates: Breakfast, 25 to 75 cents; lunch, 25 cents to $1; dinner, 75 cents to $1.25. Coffee shop and fountain service are also available.

General store: Groceries, fresh meats, fresh vegetables, drugs, sundries, and fishing and miscellaneous supplies are available.

Gasoline service: A service station furnishes gasoline, oil, motor supplies, and tire service.

Communication service: Local and long-distance service is available at Manzanita Lake Lodge. Telegrams may be received or sent from this point.

Cottage accommodations: Modern cottages are available. The standard type cottage consists of two bedrooms and kitchen, with bathroom facilities used jointly for the two bedrooms. Each bedroom is equipped with a double bed, mattress, pillows, chair, and electric lights. Kitchens are equipped with wood cook stove, tables, benches, sink, electric lights. The bathroom is equipped with cold running water, shower, toilet, and lavatory. Hot water for the kitchen and bathroom is generated by fire in the kitchen stove. Guests may rent one bedroom, with or without linen, blankets, etc., and secure meals at the Lodge, or may rent one or both bedrooms and kitchen, with or without equipment, and do their own house-

Eastman photo

MANZANITA LAKE LODGE

keeping. Daily rates for two persons for the standard type cottage varies from $1.75 for bedroom without equipment to $3 for bedroom and kitchen equipped with linen, blankets, cooking utensils, etc.

The deluxe type cottage consists of a kitchen and two bedrooms, each bedroom with its individual bathroom. Each bedroom is equipped with a double bed, mattress, pillows, chair, heating stove, and electric lights. The kitchens are equipped with gas cook stove, hot and cold running water, tables, benches, and electric lights. Each bathroom is equipped with hot and cold running water, shower, lavatory, and toilet. Guests may rent one bedroom, with or without linen, blankets, etc., and secure meals at the Lodge, or may rent one or both bedrooms and kitchen, with or without equipment, and do their own housekeeping. Daily rates for two persons for the deluxe type cottage varies from $2 without equipment, to $3.25 for bedroom and kitchen equipped with linen, blankets, cooking utensils, etc.

Before June 15 and after September 15, a discount of 10 percent is allowed on cottage charges for a 2 weeks' stay or longer.

No charge for children under 3 years of age requiring no housekeeping equipment; children 3 to 11 years of age, half regular rate; children 11 years and over, regular rate.

During the period June 20 to September 10, prospective guests should apply in advance for reservations, addressing all communications to Lassen National Park Company, Manzanita Lake, Calif.

An information sheet giving full details on all cottage rates, as well as charges for other facilities, is furnished on request.

Photographic Shop.—Mrs. B. F. Loomis, a pioneer of the region, maintains an interesting photographic shop at Manzanita Lake, selling views of the eruptions of Lassen Peak as well as scenic photos, films, etc.

ADDITIONAL ACCOMMODATIONS IN AND NEAR THE PARK

Mineral Lodge, Mineral, Calif.: Lodge, meals, cabins, groceries, garage, post office, fountain, golf, winter sports center.

Room rates are as follows: Hotel rooms, single, $2.50 per night; double, $3.50 per night. Cabins are furnished with or without bedding, and are charged for as follows: One person, per night, with bedding, $1.50; two persons, per night, with bedding, $2.50. Without bedding, one person, per night, $1; two persons, per night, without bedding, $1.25 and $1.50.

Drakesbad Resort is located on privately owned land within the park. It is operated by Mr. R. D. Sifford, and is not under Government supervision. This resort is reached over a dirt road through Warner Valley, maintained by the county and usually in poor condition. The Devils Kitchen and the Boiling Springs Lake are areas of scenic interest located on Mr. Sifford's land. A charge of 25 cents per person is made to nonpatrons of the resort who visit any of the Drakesbad property.

Tents and cabin accommodations are $4 and $5 per day per person, American plan. Saddle horses may be hired for $2 per day. Mounted guide service is $5 per day.

Lee's Camp and Kelly's Camp, also located in Warner Valley, offer accommodations at rates similar to those of nearby resorts. Address for all Warner Valley camps is Wonderland Post Office, Calif.

Juniper Lake Resort is located on privately owned land within the park. Reached over poor dirt road from Chester, Calif. Post Office address is Juniper Lake, via Chester, Calif. Nonpatrons visiting the area are charged a fee for parking or passing through this property.

Other camps are located on the highways approaching the park. The usual tourist accommodations may be obtained at these camps.

This booklet is issued once a year. ***The rates mentioned herein may have changed slightly since issuance,*** but the latest rates approved by the Secretary of the Interior for the Government-controlled accommodations are on file with the superintendent and park operator.

INTERESTING PLACES NEAR THE PARK

Subway Cave.—Fifteen miles north of the park, on California Highway Number 89, an old lava tube has been discovered. This tube is several hundred feet long, with a flat, level floor, 6 to 25 feet high, and runs through an old lava flow. It can be explored safely with flashlights and makes an interesting side trip from the park.

Loomis photo

THE LOOMIS PHOTOGRAPHIC SHOP AT MANZANITA LAKE

Auto caravans from Manzanita Lake to the Subway Cave are conducted three times each week by ranger naturalists.

Lumber Mill, Westwood.—One mile off the Red Bluff-Susanville Highway is the town of Westwood, owned and operated by the Red River Lumber Co. This huge mill normally employs several thousand men.

Mount Shasta.—This famous mountain may be seen looming up in the distance from several points along the road to the park from Redding and Red Bluff.

Old Shasta.—The picturesque ruins of this old mining town are located 10 miles west of Redding, on the highway to Eureka.

Lake Almanor.—This large artificial lake has long been known for its excellent trout fishing.

Foothill Craters.—Several extinct volcanoes, with their characteristic craters, flat tops, and conical shapes, may be seen when passing through the valley foothills. In this same area, where a mass of boulders strews over the acres of land a short distance out of Red Bluff, is broken lava rock carried down in mud flows from volcanoes higher up. Later the lighter soil surrounding these boulders washed away, with the result that today the ground is covered with thousands of lava blocks.

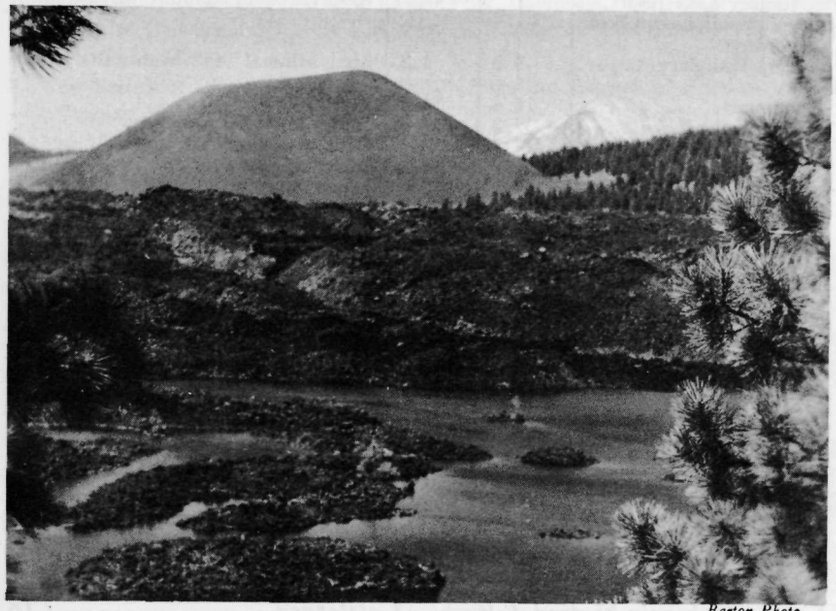
POINTS OF INTEREST—LASSEN PEAK HIGHWAY

Miles from southwest entrance (Mineral)	Name	Remarks	Miles from northwest entrance (Manzanita Lake)
0.0	Southwest Park Boundary.	Raker Memorial Gateway. Elevation, 6,550 feet. Mineral, 8.2 miles. Viola, 36.7 miles.	29.7
0.6	Sulphur Works—Checking Station.	Stop and obtain permit. Firearms must be declared and sealed.	29.1
2.0	Sulphur Works.....	Steam vents, boilers, mud pots, etc., can be seen from the road.	27.7
4.0	Diamond Peak.....	The highway from the park boundary to Lake Emerald winds up inside of the old original Brokeoff Crater, one side of it having been broken through by Mill Creek. Rounding Diamond Peak, a ragged agglomerate point rising up in the center, it is often possible to see steam vents in the old crater wall across the canyon and Steamboat Springs in the bottom of Little Hot Springs Valley.	25.7
5.7	Soda Spring.....	Water considered medicinal.....	24.0
6.7	Lake Emerald.....	Rainbow trout in lake can be seen from bank. No fishing.	23.0
7.1	Bumpas Hell Trail.....	Bumpas Hell, one of the largest areas of spectacular hot springs, mud pots, boiling pools, and other types of volcanic activity, is reached from this point by trail, 1.3 miles long. About 2½ hours.	22.6
7.2	Lake Helen.....	Named after the first white woman to climb Lassen Peak, Helen Tanner Brodt.	22.5
7.9	Lassen Peak Trail.....	A good trail, 2½ miles in length, to the top of the only recently active volcano in continental United States. About 3 hours.	21.8
8.2	Summit of Highway...	Elevation, 8,512 feet. Descending and going east, Lake Almanor and surrounding country are seen in the distance.	21.5
12.6	Kings Creek Meadows.	Free public campground. Elevation, 7,400 feet.	17.2
17.5	Summit Lake.....	Excellent campground, convenient for hikes, fishing, and to points of interest.	12.2
20.0	Devastated Area.....	An extensive area denuded of all vegetation by hot blasts and mud flows from the May 1915 eruptions of Lassen Peak.	9.7

POINTS OF INTEREST—LASSEN PEAK HIGHWAY—Continued

Miles from southwest entrance (Mineral)	Name	Remarks	Miles from northwest entrance (Manzanita Lake)
22.5	Hot Rock.....	Large black lava rock carried by mud flow from Lassen Peak. Observers state this rock remained quite warm over a week.	7.2
27.5	Chaos Crags and Chaos Jumbles.	The Chaos Crags are old lava plugs, believed to have been pushed up a few hundred years ago, the top of which broke off and avalanched down to form Chaos Jumbles.	2.2
29.0	Manzanita Lake—Educational headquarters, post office, stores, lodge.	Mae Loomis Memorial Museum. Free public campground; cabins, lunches, groceries, rowboats, gas and oil, photographs, and supplies.	0.7
29.4	Manzanita Lake—Checking station.	Stop and obtain permit. Declare and have guns sealed.	0.3
29.7	Northwest park boundary.	Viola, 6.3 miles. Butte Lake, 30 miles. Mineral, 37.9 miles.	0.0

For information, service, or assistance of any kind, ASK A PARK RANGER.



Barton Photo

CINDER CONE AND LASSEN PEAK FROM BUTTE LAKE

DISTANCES TO PRINCIPAL PLACES

BY AUTOMOBILE FROM PARK HEADQUARTERS AT MINERAL

To—	Distance between points	Distance from Mineral	Remarks
Manzanita Lake:	*Miles*	*Miles*	
Park boundary	8.2	8.2	Elevation, 6,300 feet; declare guns.
Summit	8.2	16.4	Elevation, 8,512 feet.
Manzanita Lake	20.8	37.2	Museum, cabins, store, gas, camping.
Park boundary	.8	37.9	Road continues on to Redding and Red Bluff, to Hat Creek, and to Butte Lake.
Warner Valley (Devils Kitchen and Boiling Lake):			
Chester	32	32	Red River Lumber Co. holdings.
Lee's Camp	12	44	Resort accommodations.
Kelly's Camp	2	46	Do.
Park boundary	.4	46.4	
Ranger station	1.2	47.6	Information, maps.
Drakesbad (Warner Valley).	1.6	49.2	Resort accommodations (private land); 25 cents charge for nonpatrons.
Ranger station	.5	46.5	Park boundary, information, maps.
Drakesbad (Warner Valley).	2.5	49	Resort accommodations (private land); 25 cents charge for nonpatrons.
Juniper Lake:			
Chester	32	32	
Juniper Lake campground.	11	43	On south shore of Juniper Lake.
Juniper Lake resort	1	44	Resort accommodations (private land).
Butte Lake via Lassen Peak Highway:			
Park boundary	8.2	8.2	See Mineral to Manzanita Lake schedule.
Summit	16.4	16.4	Elevation, 8,512 feet.
Manzanita Lake	37.2	37.2	Educational headquarters.
Old Station	14.3	50.5	Store, gasoline, post office.
Subway Caves	.9	51.4	Interesting lava tubes.
Butte Lake	17.2	69	When approaching Butte Lake over sand keep car in tracks to avoid getting stuck. Good fishing. Cinder Cone (via trail) 2 miles.

BY TRAIL FROM THE LASSEN PEAK HIGHWAY TO—

	Miles
Lassen Peak	2.5
Bumpas Hell	1.2
Brokeoff Mountain Lookout	3.0
Kings Creek Falls	1.3
Echo Lake	1.8
Twin Lakes	3.2
Cluster Lakes (from Badger Flat)	2.7
Shadow Lake	.8
Cliff Lake	1.5
Devils Kitchen (from Summit Lake)	5.3

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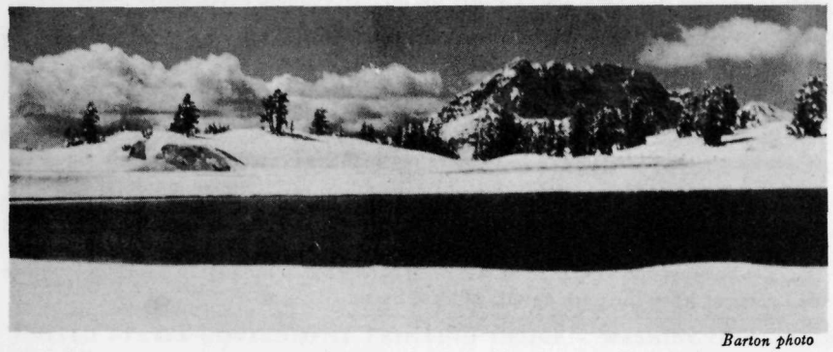

Barton photo

LAKE HELEN WITH BROKEOFF MOUNTAIN IN THE BACKGROUND

RULES AND REGULATIONS

[Briefed]

THE PARK REGULATIONS are designed for the protection of the natural beauties as well as for the comfort and convenience of visitors. The complete regulations may be seen at the office of the superintendent of the park and at all ranger stations. The following synopsis is for the general guidance of visitors, who are requested to assist in the administration of the park by observing the rules.

Automobiles.—Many sharp unexpected curves exist on the Lassen Peak Highway, and fast driving is dangerous. Park speed limit is 35 miles per hour. At the Manzanita Lake area, a 20-mile zone has been established and is patrolled. Drive slowly keeping always well to the right, and enjoy the scenery. Fee for automobile permit is $1.

Specimens and souvenirs.—In order that future visitors may enjoy the park unimpaired and unmolested, it is strictly prohibited to break any formation; to take any minerals, lava, pumice, sulphur, or other rock specimens; to injure, molest, or disturb any animal, bird, tree, flower, or shrub in the park. Driving nails in trees or cutting the bark of trees in campgrounds is likewise prohibited. Deadwood may be gathered for camp fires.

Trash.—Scraps of paper, lunch refuse, film cartons, and similar trash scattered along the roads and trails and in campgrounds and parking areas are unsightly. Consider the park as yours. Help us keep it clean and attractive by carrying trash with you until it can be burned, buried, or placed in receptacles.

Camping.—Camp only in designated areas. Keep your camp clean. As far as possible burn garbage in campfire, and empty cans and residue into garbage cans provided for that purpose. Keeping dogs or cats in camp overnight is prohibited. A 30-day camping limit in any one campground in the park is enforced.

Trails.—Cutting corners and taking short cuts on trails is a dangerous practice and causes considerable damage to the trails. This practice is prohibited and the regulation strictly enforced.

Fishing.—State license required. Limit: 10 pounds and 1 fish or 10 fish, except in Manzanita and Reflection Lakes, where the limit is 5 pounds and 1 fish or 5 fish.

Fires.—Light carefully and in designated places. Extinguish completely before leaving camp, even for temporary absence. A written fire permit must be obtained from a park ranger before building fires outside established campgrounds.

Hot Spring areas.—Dangerous. Do not take chances. Keep on trails or step where others have stepped before. Injuries have resulted from carelessness in these areas.

Park rangers.—The rangers are on duty to help and advise you as well as enforce the regulations. When in doubt, ask a ranger.

Hours.—The two checking stations are open between 6 a. m. and 10 p. m. No vehicle may enter or leave the park outside of these hours.

NATIONAL PARKS IN BRIEF

ABRAHAM LINCOLN, KY.—Birthplace of Abraham Lincoln. Established 1916; 0.17 square mile.

ACADIA, MAINE.—Combination of mountain and seacoast scenery. Established 1919; 26.01 square miles.

BRYCE CANYON, UTAH.—Canyons filled with exquisitely colored pinnacles. Established 1928; 56.23 square miles.

CARLSBAD CAVERNS, N. MEX.—Beautifully decorated limestone caverns. Established 1930; 15.75 square miles.

CRATER LAKE, OREG.—Beautiful lake in crater of extinct volcano. Established 1902; 250.52 square miles.

FORT McHENRY, MD.—Its defense in 1814 inspired writing of Star Spangled Banner. Established 1925; 0.07 square mile.

GENERAL GRANT, CALIF.—General Grant Tree and grove of Big Trees. Established 1890; 3.98 square miles.

GLACIER, MONT.—Unsurpassed alpine scenery; 200 lakes; 60 glaciers. Established 1910; 1,537.98 square miles.

GRAND CANYON, ARIZ.—World's greatest example of erosion. Established 1919; 1,008 square miles.

GRAND TETON, WYO.—Most spectacular portion of Teton Mountains. Established 1929; 150 square miles.

GREAT SMOKY MOUNTAINS, N. C.-TENN.—Massive mountain uplift; magnificent forests. Established for protection 1930; 683.75 square miles.

HAWAII: ISLANDS OF HAWAII AND MAUI.—Interesting volcanic areas. Established 1916; 248.54 square miles.

HOT SPRINGS, ARK.—Forty-seven hot springs reserved by the Federal Government in 1832 to prevent exploitation of waters. Made national park in 1921; 1.54 square miles.

LASSEN VOLCANIC, CALIF.—Only recently active volcano in United States proper. Established 1916; 163.48 square miles.

MAMMOTH CAVE, KY.—Interesting caverns, including spectacular onyx cave formation. Established for protection 1936; 60.2 square miles.

MESA VERDE, COLO.—Most notable cliff dwellings in United States. Established 1906; 80.21 square miles.

MOUNT McKINLEY, ALASKA.—Highest mountain in North America. Established 1917; 3,030.46 square miles.

MOUNT RAINIER, WASH.—Largest accessible single-peak glacier system. Established 1899; 377.78 square miles.

OLYMPIC, WASH.—Forests of unusual density; rare Roosevelt elk. Established 1938; 1,012.5 square miles.

PLATT, OKLA.—Mineral springs. Established 1906; 1.32 square miles.

ROCKY MOUNTAIN, COLO.—Peaks from 11,000 to 14,255 feet in heart of Rockies. Established 1915; 405.33 square miles.

SEQUOIA, CALIF.—Outstanding groves of Sequoia gigantea. Established 1890; 604 square miles.

SHENANDOAH, VA.—Outstanding scenic area in Blue Ridge. Established 1935; 282.14 square miles.

WIND CAVE, S. DAK.—Beautiful cavern of peculiar formations. 19.75 square miles.

YELLOWSTONE, WYO.-MONT.-IDAHO.—World's greatest geyser area and an outstanding game preserve. Established 1872; 3,471.51 square miles.

YOSEMITE, CALIF.—Valley of world-famous beauty; spectacular waterfalls; magnificent High Sierra country. Established 1890; 1,176.41 square miles.

ZION, UTAH.—Zion Canyon, 1,500 to 2,500 feet deep. Spectacular coloring. Established 1919; 138.04 square miles.

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WHAT TO DO AND SEE

ONE-DAY TRIP

ONLY a small portion of Lassen Park can be seen in 1 day, but those who cannot stay longer will find the following suggestions helpful:

Obtain the schedule of conducted trips and hikes from the ranger at the checking station.

Drive over the entire Lassen Peak Highway (30 miles) from one checking station to the other, stopping en route at:

The Sulphur Works.	The Devastated Area.
The Soda Spring.	Chaos Jumbles and Dwarf Forest.
Lake Emerald.	The Mae Loomis Memorial Museum.

If time permits, climb Lassen Peak (allow at least 3 hours for the round trip) or hike into Bumpas Hell (2 hours is the average time required).

Lunches, cottages, meals, and supplies are available at Manzanita Lake.

TWO DAYS AND LONGER

Stay at Manzanita Lake Lodge (see accommodations), or at private resorts in or near the park.

If camping, the Manzanita Lake campground, equipped with tables and fireplaces, running water, and modern sanitary comfort stations, is recommended. Fishing is good in Manzanita Lake; groceries and supplies are available at this point; and all daily conducted trips and hikes by ranger naturalists originate here.

Nightly campfire programs, consisting of informal talks, music, stories, and stunts by campers and rangers, are held at Manzanita Lake, and occasionally in the other campgrounds.

OTHER SECTIONS OF PARK

WARNER VALLEY

Famous Boiling Lake and Devils Kitchen. Several private resorts in this section offer comfortable accommodations and feature guided horseback trips to various points of interest in the park. A fair dirt road leads in from Chester. Campgrounds are located beyond the ranger station.

JUNIPER LAKE

In the neighborhood of splendid fishing. A private resort on Juniper Lake offers tent and cabin accommodations, with a grocery store, post office, and boats for rent. There is a free public campground at the south end of the lake, the largest body of water in the park; 12 miles from Chester; low-grade dirt road.

BUTTE LAKE

Perhaps the most unusual section of the park. The remarkable Cinder Cone is only a short hike from the lake. Excellent campgrounds, but no accommodations or supplies are available. Accessible from the east by the Westwood-Pittville Road; from the south and west by the Lassen Peak Highway and Hat Creek Road. About 15 miles of poor road from either direction.