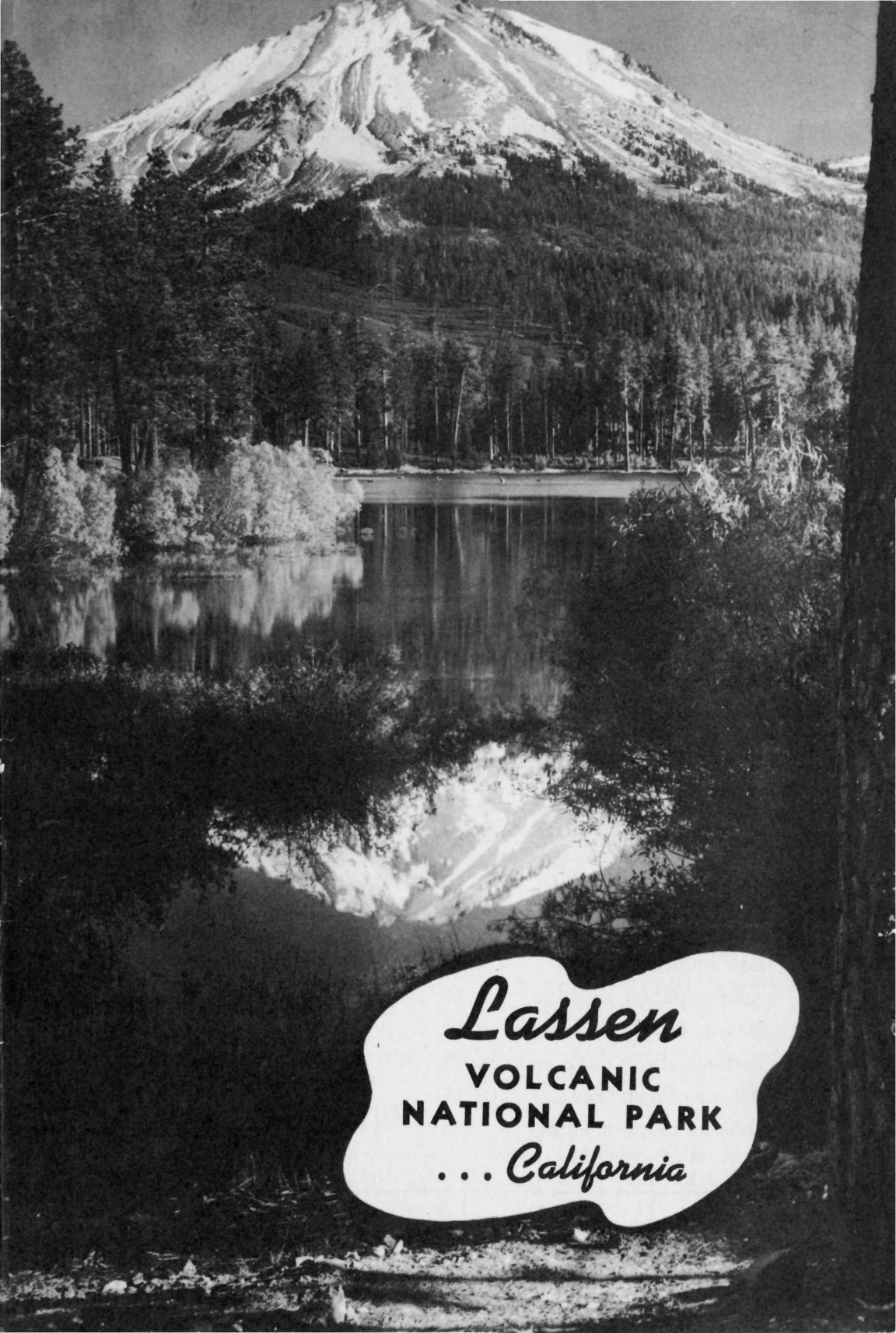
Lassen
VOLCANIC
NATIONAL PARK
... California

UNITED STATES
DEPARTMENT OF THE
INTERIOR

Harold L. Ickes, *Secretary*

19 41

NATIONAL PARK SERVICE
Newton B. Drury, *Director*

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Historic Events

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

1850-51 Last lava flow from Cinder Cone.

1864 Helen Brodt, first white woman to climb Lassen Peak, made ascent with Major Reading. Lake Helen named for her.

1906 May 6. Lassen Peak and Cinder Cone National Monuments established.

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

1915 May 19 and 22. Major eruptions of Lassen Peak devastated large forest area.

1916 Lassen Volcanic National Park created by act of Congress.

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

OPENING AND CLOSING DATES DEPEND UPON WEATHER CONDITIONS

Lassen Volcanic

NATIONAL PARK
CALIFORNIA

EARLY FALL SKIING ON SHORE OF 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 park area of 163.32 square miles 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 for Peter Lassen, an early pioneer in northern California. He was born near Copenhagen, Denmark, in 1800, and came to the United States when he was thirty. 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

The Cascade Range, which is volcanic in origin, is not ancient, measured in geologic time. Its beginning dates back to the Pliocene period, about a million years before the great ice age or glacial epoch. 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 snow-capped and for which the Cascades are famous.

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.

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 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.

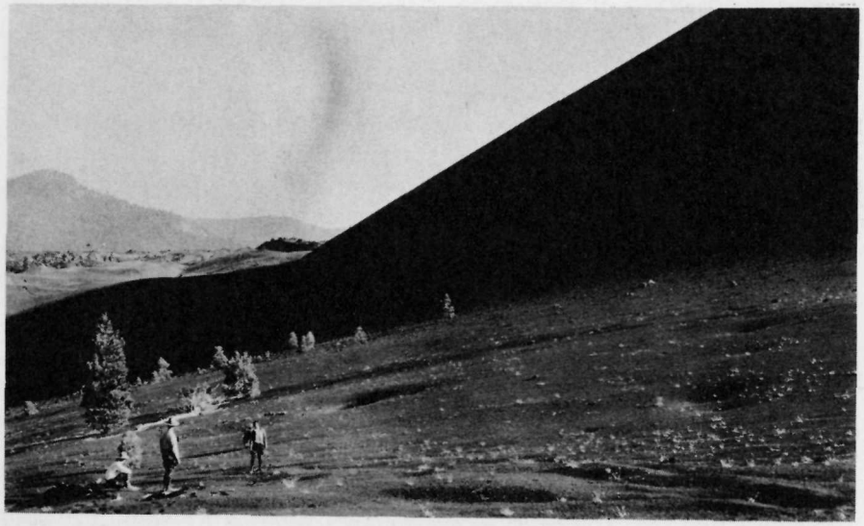
It rose by a succession of lava flows to an elevation above 8,500 feet, with a base 5 miles across from north to south and 7 miles from east to west. In the second stage the steep Lassen cone was built on this broad, substantial platform. This, the more conspicuous portion, represents a still rarer "dome" 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.



Grant Photo

WEIRD CINDER DEPOSITS NEAR BUTTE LAKE ARE COLORED IN SOFT SHADES OF RED, BROWN, AND YELLOW

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.

Violent eruptions occurred in May 1915. On May 19 the first glowing lava made its appearance, rising in the new crater and spilling through the western notch in the 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 20-ton boulders 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, 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.

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.

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.

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.

Ancestral Mount Tehama.—Three miles southwest of Lassen Peak once stood a great mountain known as Tehama 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, alternating with fragmental eruptions. 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.

Potts Photo

COLORFUL BUMPAS HOT SPRINGS ATTRACTS THOUSANDS OF VISITORS EACH YEAR

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 Little Hot Springs Valley, show that the lava beneath the surface has not yet entirely cooled. Farther east, similar types of activity may be seen at Devils Kitchen and Boiling Springs Lake. These fumeroles 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.

The Cinder Cone area.—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 en-

tirely 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.

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.

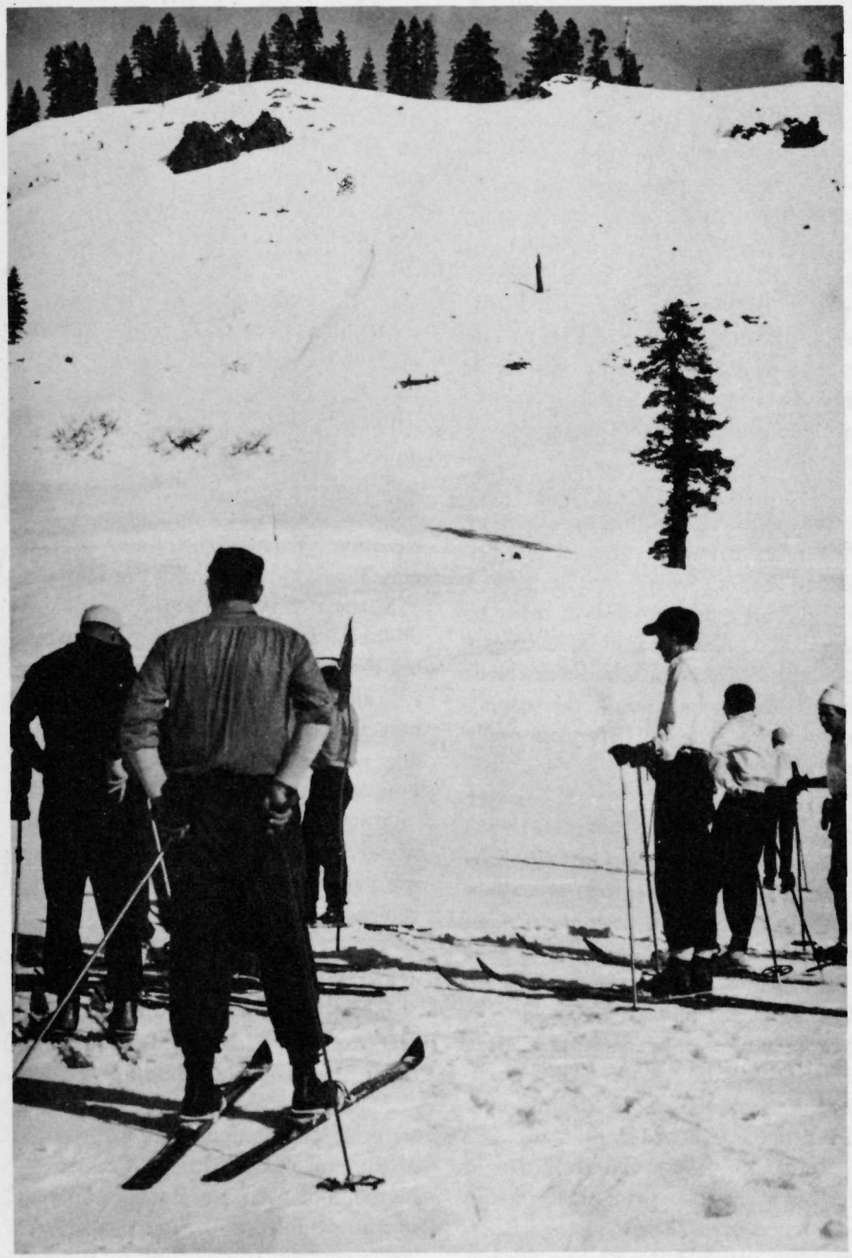
VIEW FROM LASSEN PEAK

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 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 three peaks which attain a height of over 9,000 feet above sea level.

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



Barton Photo

NOVICE AND EXPERT SKIERS EASILY FIND SLOPES TO CHALLENGE THEIR SKILL

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.

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 in either or both lakes. 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, in the southeastern part of the park, is approached via Chester, Calif., over an unimproved dirt road. The campground 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.

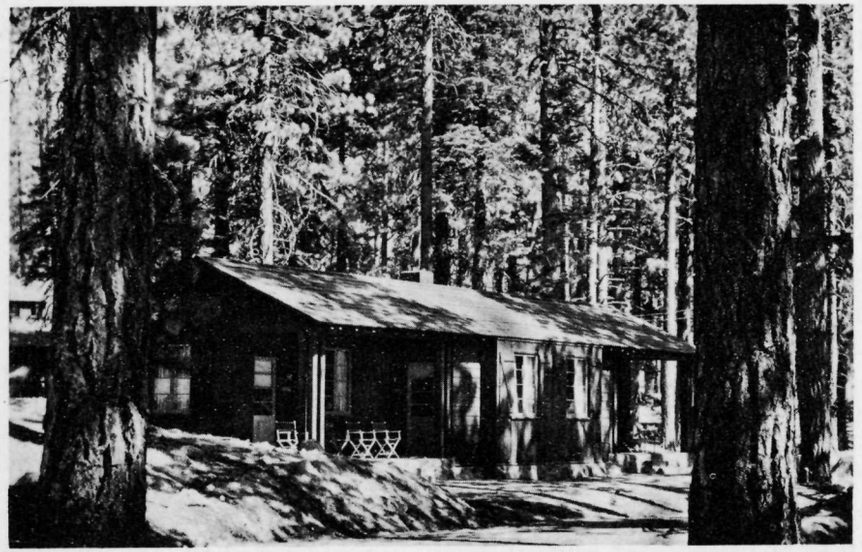
Kings Creek Campground, on the Lassen Peak Highway, is at a high elevation. This delightful area is open only about 6 weeks during the summer.

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.

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.



Lassen National Park Co. Photo

HOTEL BUNGALOWS ARE SITUATED IN PLEASANT SURROUNDINGS

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 Interior, through the National Park Service, with the superintendent 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.

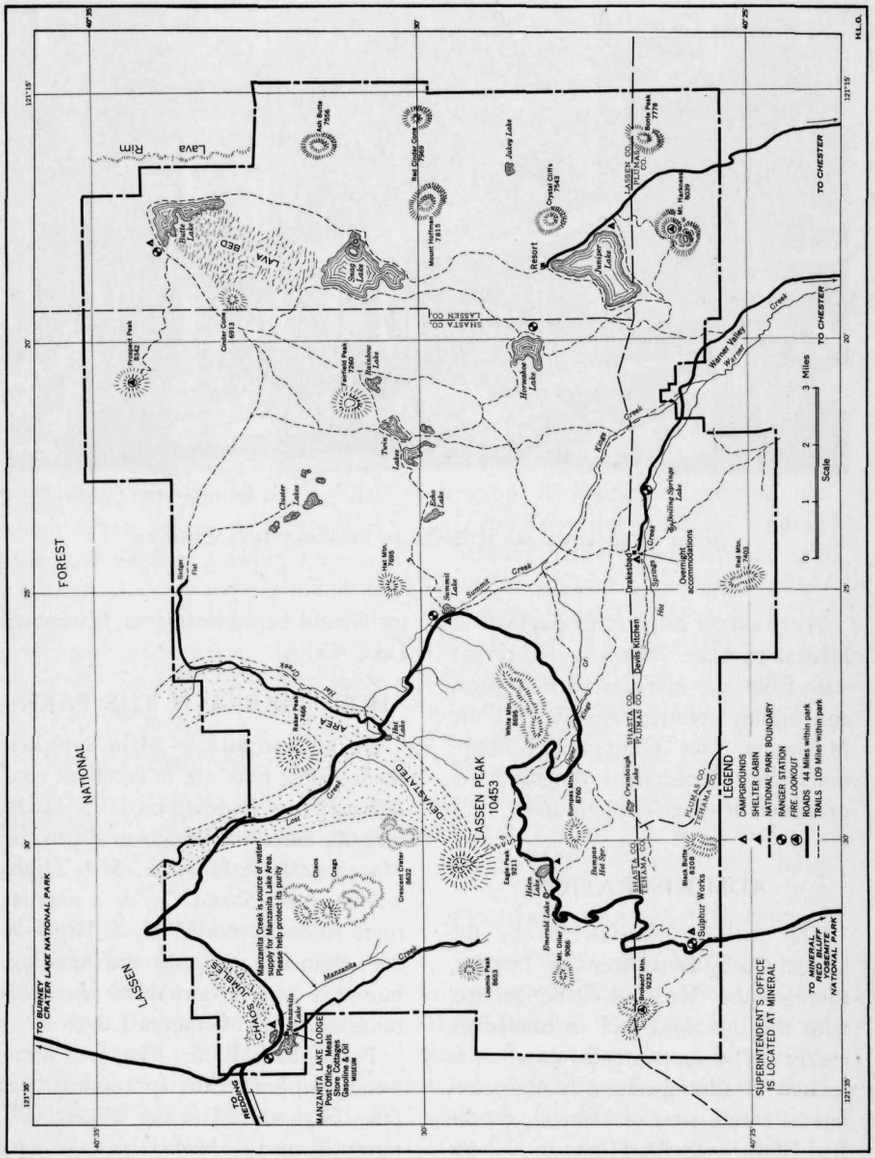
HOW TO REACH THE PARK

By automobile. — Main approach roads to the park are in excellent condition. From Redding on U. S. Highway 99, take State Highway 44 to the Manzanita Lake Entrance. State Highway 89 from Shasta City is a popular route from the north. U. S. Highway 299, connecting Alturas and Redding, intersects State Highway 89 about 38 miles north of Manzanita Lake.

From Red Bluff, Chester, Westwood, and Susanville, approach is over State Highway 38 to the Mineral Entrance, thence to Manzanita Lake over the Lassen Peak Highway.

Roads into Warner Valley and to Juniper Lake branch off from State

MAP OF LASSEN VOLCANIC NATIONAL PARK AND VICINITY



Highway 36 at Chester. These roads are in poor condition.

By rail.—Nearest railroad connections to the park are at Red Bluff and Redding on the Southern Pacific line and at Keddie on the Western Pacific line.

By bus.—The Mount Lassen Transit Co. makes daily connections with Southern Pacific trains at Red Bluff. The bus of the Lassen National Park Co. makes connections with the same railroad at Redding on Mondays, Thursdays, and Saturdays. Bus connections with the Western Pacific at Keddie can be made by transfer at Westwood with the Mount Lassen Transit Co. The Burlington Transportation Co. provides bus service to Reno, Nev., and the Pacific Greyhound Lines to Reno and Red Bluff. Bus service is also available to Redding.

From Mineral, the Lassen National Park Co., with headquarters at Manzanita Lake, will furnish "on call" transportation over the Lassen Peak Highway and to various points along the way. For complete details write to the Lassen National Park Co., Manzanita Lake, Calif.

By air. — The nearest trans-continental air depot is at Red Bluff.

ACCOMMODATIONS AND SERVICES

Manzanita Lake Lodge. — Located one-half mile from the Manzanita Lake Entrance, is operated by the Lassen National Park Co. It is the only service operating in the park under Government contract. The post office address is Manzanita Lake, Calif.

Cottage and bungalow accommodations. — Cottage bedrooms, $1.50 up; modern housekeeping cottages, $2.25 up; hotel bungalows, $3.50 up.

Dining room and fountain.—Meals served at rates from 25 cents to $1.25. A la carte and fountain service available.

Gift shop.—In the lobby of Manzanita Lake Lodge. Indian crafts of local and southwest tribes; wooden, metal, and leather gifts and souvenirs.

General store. — Groceries, fresh meats, fresh vegetables, drugs, and fishing and miscellaneous supplies.

Boats. — Rowboats on Manzanita and Reflection Lakes. Rates: 35 cents per hour, $1 per half day, $1.50 per day, $7 per week.

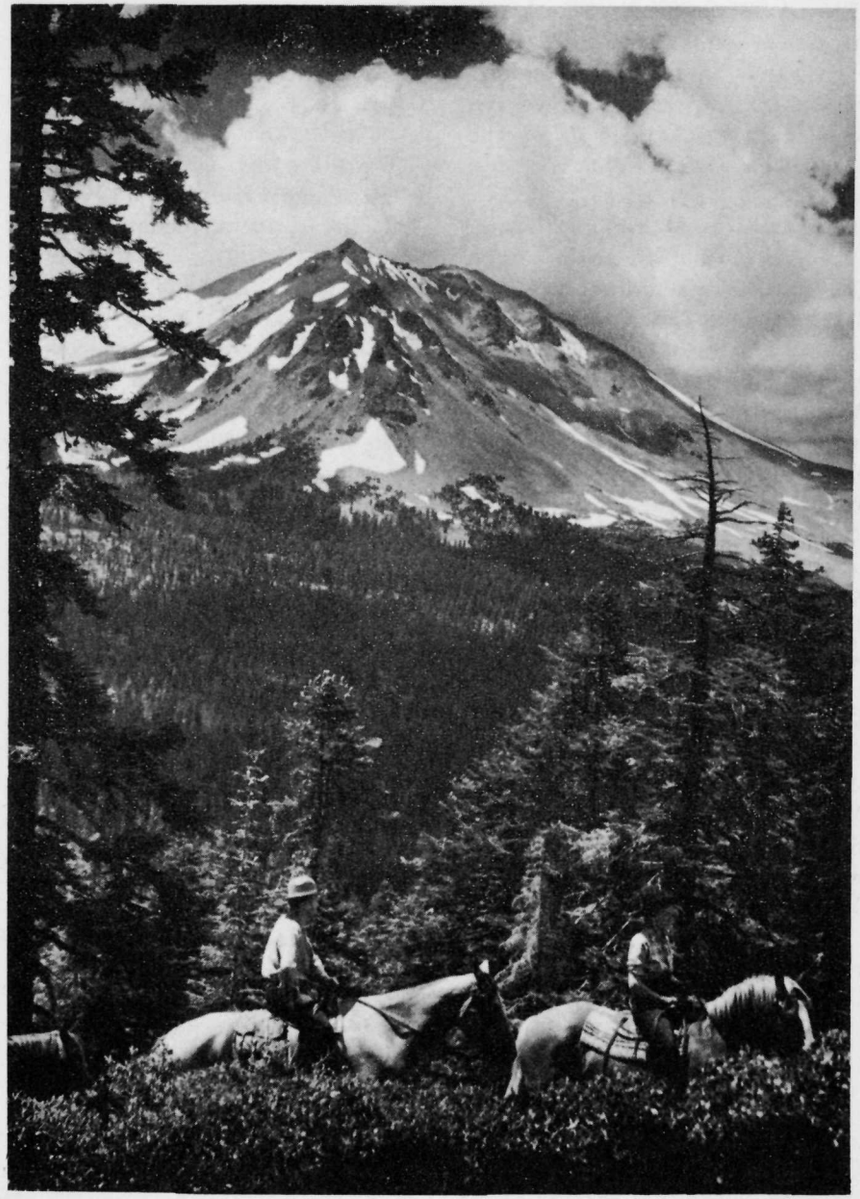
Gasoline service.—Service Station at Manzanita Lake furnishes gasoline, oil, minor accessories, and tire service.

Saddle and pack horses.—Available at Summit Lake, 12 miles from Manzanita Lake Lodge. From Summit Lake one can ride into the wilderness area of the park, with its many lakes and snow-fed streams, over trails seldom used by hikers.

Communication service. — Telephone and telegraph services are available at Manzanita Lake Lodge.

Other camps, lodges, and resorts.—At Mineral Lodge, Drakesbad, Lee's Camp, Kelly's Camp, Juniper Lake, and other points in and near the park. Accommodations range from campsites to cabin and hotel rooms.

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



Lassen National Park Co. Photo

HORSEBACK PARTY ON HAT MOUNTAIN

LASSEN'S BEAUTIFUL WILDERNESS AREAS ARE ACCESSIBLE ONLY TO HIKERS OR HORSEBACK PARTIES

of the Interior for the Government-controlled accommodations are on file with the superintendent and park operator.

Information concerning all services and accommodations provided by the Lassen National Park Co. may be obtained by writing the company at Manzanita Lake, Calif. Advance reservations should be made during the main travel season, June 20 to September 10.

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.

Lake Emerald.

The Devastated Area.

Chaos Jumbles and Dwarf Forest.

The Mae Loomis Memorial Museum.

If time permits, climb Lassen Peak (allow at least 3 hours for the round trip) or hike into Bumbas 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.

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; housekeeping trailers $1 additional.

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. Dead wood may be gathered for campfires.

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 in either or both lakes.

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.

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