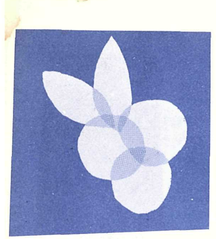
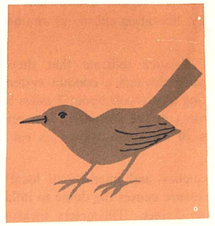
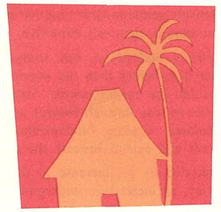
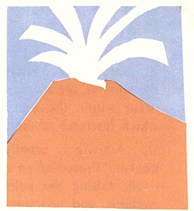





PLANTS AND ANIMALS

How did life begin upon this island? Geologically the youngest of the island chain, it no doubt received some forms from the older islands. Life also arrived by island-hopping from islands scattered toward Southeast Asia across the Pacific. Continents provided little, for the nearest continent is 2,400 miles away.

However, there are those living things whose design permits an ocean crossing. Ferns have dust-like spores that can be borne by wind for thousands of miles; the screw-pine, or hala, has seeds that are corky, and able to float for months or even years; other plants have sticky seeds, or seeds with hooks or hairs that can catch on the feathers of some wandering bird. When we look around us, we see that there have been many routes to Hawaii.

Animals that fly—insects, migratory birds, or birds off-course in a storm—given time enough would come. They had millions of years. But man alone introduced the larger forms of wildlife. The Polynesians on their incredible journey brought the pig that today runs wild almost everywhere, and probably the rat; and Captain Cook, discovering these islands in 1778, brought the goat. Cattle, sheep, and horses followed as the white man made his home. In fact, with the exception of the native bat, all mammals now wild in the park were once introduced—even the mongoose, as an attempt to control the Hawaiian rats!

Around Kilauea itself the vegetation is remarkably varied, from the lush jungle with its vigorous growth of tree ferns and other moisture-loving plants, to the sparse vegetation of the Kau Desert a few miles to the southwest. The northeast side of each island gets most of the rainfall, since predominant trade winds force moisture-laden clouds up the mountain slopes from this direction. Moisture remaining is rapidly dissipated as the clouds pass over Kilauea summit to the southwest, where they encounter higher temperatures. The area thus deprived of rainfall is said to be in a perennial "rainshadow." You can observe the striking contrast from Crater Rim Drive.

HISTORY

The First Settlers The settling of the Hawaiian Islands by early Polynesians, nearly 2,000 years ago, ranks as one of man's most remarkable exploits, but little is known about it. By the time the first missionaries arrived, in the early 1820's, Hawaiian culture had reached a high level of development. The people lived mostly near the seacoasts and normally ventured to the mountains only for worship of the volcano goddess, Pele, or other special purposes. According to tradition, Pele's home is within whichever Hawaiian volcano is currently active.

Touring the island of Hawaii in 1823, the Reverend William Ellis became the first white man to traverse what is now the park. He made the first written account of Kilauea Volcano in action, and narrated his journey from the summit crater to the coast. Ellis visited Kealakomo—a thriving community of more than 600; Kamoamoa; the abandoned Wahaula Heiau—where human sacrifices were recent; and the villages of Kalapana and Kaimu.

Additional information, though meager, on these seacoast villages comes from Henry M. Lyman who accompanied the Reverend Titus Coan of Hilo on his regular quarterly visit to outlying villages of his parish. He commented that "the inhabitants of this desolate region were chiefly fishermen and gatherers of salt, which they obtained by evaporation from shallow pools into which sea water was allowed to enter."

Wahaula Heiau is perhaps the oldest temple in Hawaii, and thought to be the last used in observance of the ancient Hawaiian religion. It was the first built by Paao, the priest from Kahiki (Tahiti). He installed a severe system of rites and ceremonies, rigid kapus, and human sacrifices. Hewahewa, the last high priest of King Kamehameha, was a lineal descendent of Paao. However, Hewahewa assisted in overthrowing Paao's system of rule in 1819 and aided in destroying the temples of the ancient gods.

You can learn more about the early Hawaiians by visiting the City of Refuge National Historical Park on the Kona (leeward) coast of Hawaii.

HOW TO REACH THE PARK

Hilo is served by major airlines with direct flights from mainland cities. There are several flights each day from Honolulu to Hilo and Kailua-Kona. Unscheduled ships are available. Taxis meet all planes and ships. Cars can be rented in Hilo and Kailua-Kona.

The Hawaii Visitors Bureau, with offices in Honolulu, Hilo, Wailuku, Lihue, and at 3440 Wilshire Boulevard, Los Angeles, CA 90005, will supply information about trips to and from the Hawaiian Islands.

WHERE TO STAY

Campgrounds and hikers' cabins. Stay limited to 7 days per campground per year. *Namakani Paio*—camper cabins (operated by Volcano House), eating shelters, fireplaces, water. *Kipuka Nene*—eating shelters, fireplaces, water. *Kamoamoa*—eating shelters, fireplaces; no water.

Hikers. Register at park headquarters to use the equipped overnight resthouses on Mauna Loa, one of which is at 10,000 feet, the other at the summit. (This is an extremely arduous climb; allow 3 or 4 days.) Also register for other overnight hikes.

Hotels. Volcano House, at 4,000 feet elevation on the rim of Kilauea Crater, is privately operated under franchise from the U.S. Department of the Interior and is open all year. Rates may be obtained by writing to Volcano House, Hawaii Volcanoes National Park, HI 96718.

Kilauea Military Camp, 1 mile west of park headquarters, is a rest and recreation camp for members of the Armed Forces stationed in Hawaii.

PARK SEASONS

Since this is a semi-tropical climate, seasons are not pronounced in Hawaii; summer tends to have the best weather. As Kilaueau Volcano is 4,000 feet above sea level, the weather can be cool at any time—be sure to bring warm clothing. Rainfall at park headquarters average 100 inches per year, so raingear is desirable.

GLOSSARY

Haleakala (HA-lay-ah-ka-LA)	house of the sun
Halemaumau (HA-lay-MA, OO-ma, oo)	house of the ferns
heiau (HAY-ee-a, oo)	pre-Christian temple
Hilo (HEE-low)	twisted (name of a Polynesian navigator)
Kalapana (KA-la-PA-na)	sunny place
kapu (KA-poo)	taboo, sacred, forbidden
Kealakekua (Kay-ALA-kay-KOO, ah)	path of the gods
Kealakomo (KAY-ala KO-mo)	way of entering
Keanakakoi (kay-ANA-ka-KOY)	cave of the axes
Kilauea (Key-la, oo-WAY-ah)	rising smoke cloud
kipuka (key-POO-ka)	a clear place within a lava bed
Lae Apuki (LIE-ah-POO-key)	short point
Makaopuhi (MA-ka-o-POO-hee)	eye of the eel
Mauna Loa (MA, oo-na LO, ah)	long mountain
Mokuaweoweo (mo-KOO-ah-WAY, o-WAY-o)	island of lurid burning
Napau (NA-pa, oo)	the end
Pauahi (pa, oo-AH hee)	fire destroyed
Puu Huluhulu (POO, oo-WHO-loo-WHO-loo)	shaggy hill
Uwekahuna (oo-WAY-ka-WHO-na)	wailing priest
Wahaula (WA-ha-OO-la)	red mouth

HELP PROTECT YOUR PARK

Park regulations are designed to protect the natural beauty of the park and to provide for your safety, comfort, and convenience. Park rangers are here to help and advise you as well as to enforce regulations. If you need information or are in any difficulty, see a park ranger. Complete regulations can be seen in the superintendent's office.

Preservation of natural features. Destruction, injury, or disturbance of plantlife, wildlife, or other natural features is strictly prohibited. Permits are required to collect specimens of any kind.

Camps. Camp or lunch only in designated areas. Dispose of all burnable rubbish in campfires. Put nonflammable refuse in garbage cans.

Fires are permitted only in designated spots. Do not leave your fire unattended, even for a few moments. Extinguish it completely before leaving camp.

Pets are not permitted in the park unless under physical control at all times.

Automobiles. Speed limit on park roads is 45 miles per hour unless otherwise posted.

Trail travel. Hikers and horseback riders should stay on the trails. For your safety, please register at the Kilauea Visitor Center.

Hunting and trapping are not allowed in the park. Firearms must be broken down or packed to prevent use.

YOUR SAFETY

Volcanoes are hazardous in many ways: Fumes aggravate lung and heart ailments; deep earth cracks, sometimes hidden by ferns and grasses, honeycomb Kilauea; crater rims are still unstable; and lava tubes and holes underlie most lava surfaces. Until you learn the way, stay on established trails.

SERVICES

Communications. Post office, telegraph, telephone, and radio communication with all parts of the world are available.

Automobiles. Gasoline and oil are available 2 miles from park headquarters toward Hilo. Repair facilities are 21 miles outside the park at Keaau.

Hospitals are at Hilo, 30 miles; and Pahala, 23 miles.

Supplies. Campers can buy food and miscellaneous merchandise at a small general store near the Hilo entrance. Tobacco, film, etc., are sold at Volcano House.

FOR FURTHER INFORMATION

Publications on the history and natural history of Hawaii Volcanoes National Park can be purchased at park headquarters, or can be ordered from the Hawaii Natural History Association, Ltd., Hawaii Volcanoes National Park, HI 96718. Write to the association for a list of titles and prices.

ADMINISTRATION

Hawaii Volcanoes National Park is administered by the National Park Service, U.S. Department of the Interior. A superintendent, whose address is Hawaii Volcanoes National Park, HI 96718, is in immediate charge. His offices are at park headquarters, Hilo entrance.

As the Nation's principal conservation agency, the Department of the Interior has basic responsibilities to protect and conserve our land and water, energy and minerals, fish and wildlife, park and recreation areas, and for the wise use of all those resources. The Department also has a major responsibility for American Indian reservation communities and for people who live in Island Territories under U.S. administration.

National Park Service
U.S. DEPARTMENT OF THE INTERIOR

REVISED 1974

HAWAII VOLCANOES

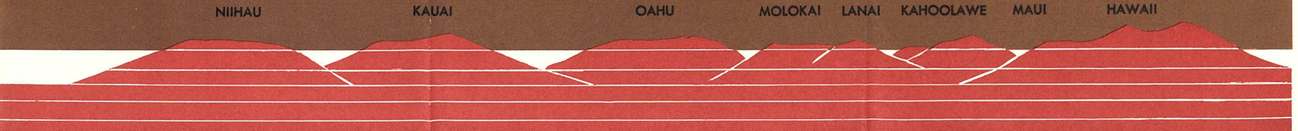
National Park, Hawaii

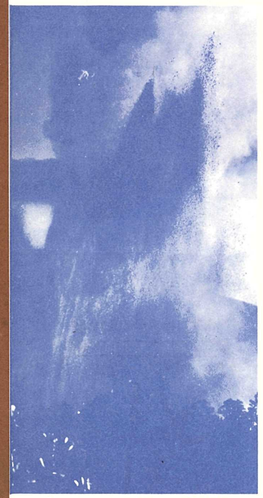
A smell of sulphur . . . a sound of crackling as if the surface of the earth were being torn apart . . . the sight of fire ebbing and exploding in the dark night . . . above me the snow-covered tip of the most massive single mountain in the world . . . around me the density of a tropical jungle with exotic trees and lovely flowers. . . .

That was my introduction to Hawaii Volcanoes National Park on one of the exciting occasions when the fire pit at Kilauea had become unusually active. A group of us from Honolulu stayed at the rim all night, watching with fascination as the dark-red fires formed endless patterns on the crater floor, with now and then an explosion which sent rocks hurtling toward us. It was an unforgettable view of the world's interior forces at work.

Later I was to know this magnificent park in its many other aspects, and I was to do much work here, exploring, reading, asking questions. I came to know it as one of America's noblest parks, a mixture of tropical beauty and mountainous power. But what I remember most vividly is the living volcano on whose edge I spent so many fascinating hours.

James A. Michener





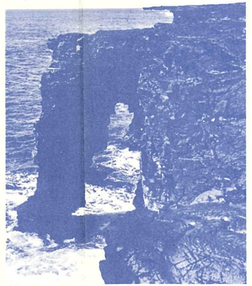
Lava fountain in Kilauea Iki (1959).

Rivers of lava flow from the walls of Kilauea Iki.

Hilina Pali, one of the southern fault-block cliffs.

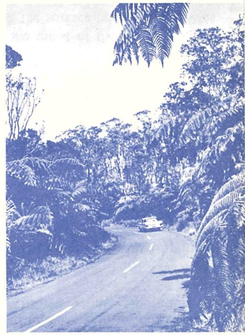
Chain of Craters Road—Pauahi, Aloi, Alae, and Makaopuhi craters.

Nene geese on Mauna Loa.

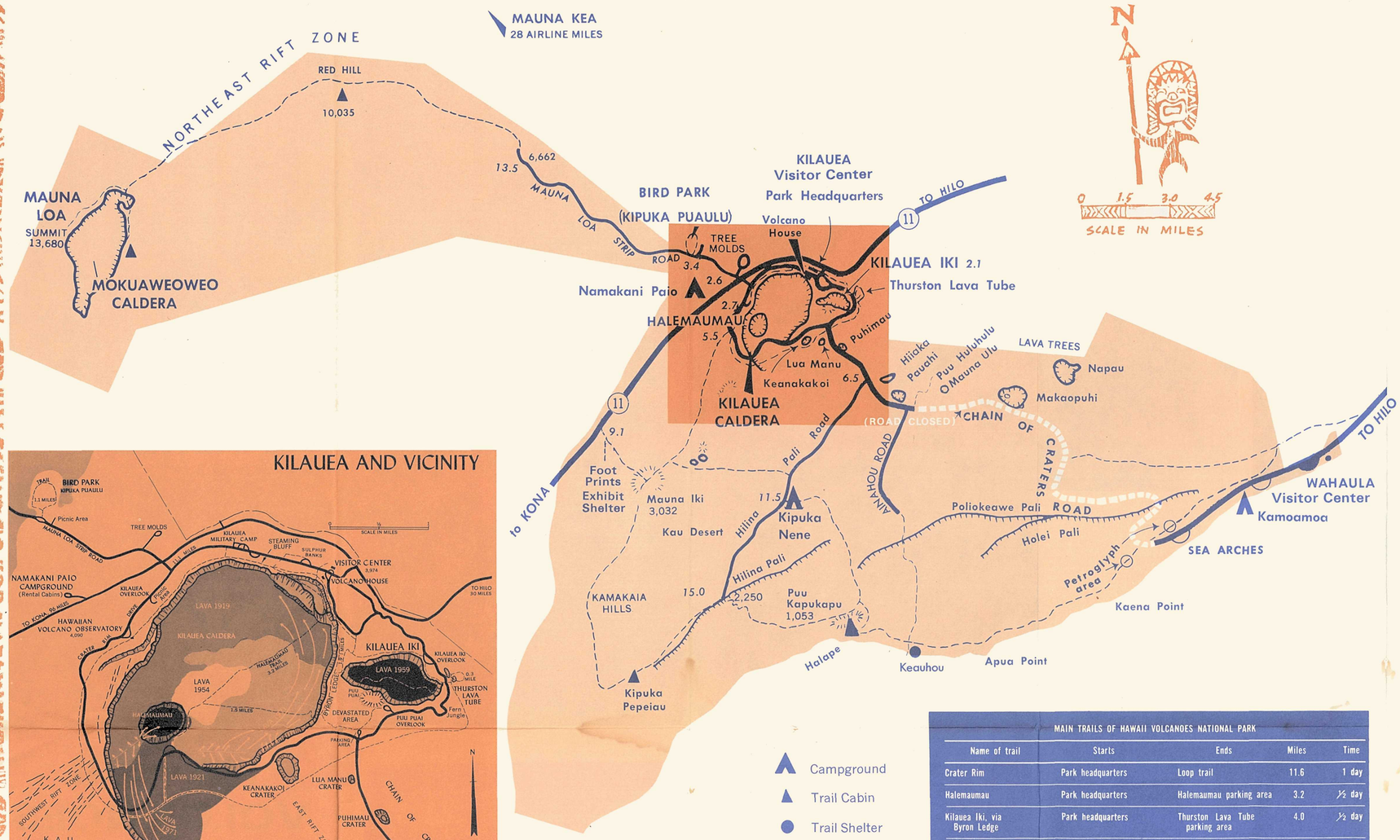


Coast on way to Kalapana.

Crater Rim Drive—passing through tree fern-ohia jungle.



Kamoamoa village



Campground

Trail Cabin

Trail Shelter

Road

Trail

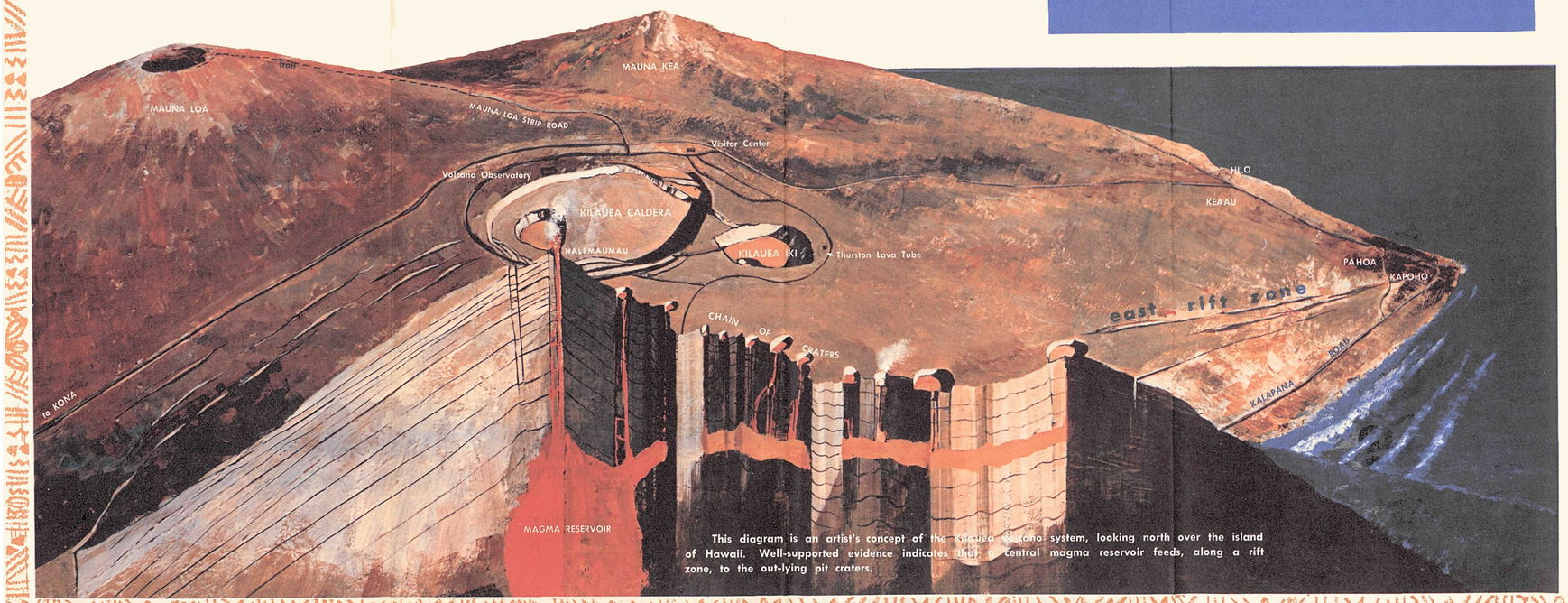
Pali (Cliff)

3.4 mileage from Kilauea visitor center

MAIN TRAILS OF HAWAII VOLCANOES NATIONAL PARK

Name of trail	Starts	Ends	Miles	Time
Crater Rim	Park headquarters	Loop trail	11.6	1 day
Halemaumau	Park headquarters	Halemaumau parking area	3.2	½ day
Kilauea Iki, via Byron Ledge	Park headquarters	Thurston Lava Tube parking area	4.0	½ day
Thurston Lava Tube	Thurston Lava Tube parking area	Loop trail	0.3	¼ hour
Devastation Trail	Overlook	Parking area	0.6	½ hour
Bird Park (Kipuka Puaulu)	Mauna Loa Strip Road	Loop trail	1.1	1 hour
Mauna Iki (Footprints)	9.1 miles southwest of park headquarters on Hawaii 11	Mauna Iki (return same way)	1.8	½ day

STAY ON TRAILS— Ask a park ranger about long hikes.



This diagram is an artist's concept of the Kilauea volcano system, looking north over the island of Hawaii. Well-supported evidence indicates that a central magma reservoir feeds, along a rift zone, to the out-lying pit craters.

What To Do and See

Crater Rim Drive □ Your best orientation to Hawaii Volcanoes National Park is the 11.1-mile Crater Rim Drive. Traveling clockwise from park headquarters you will pass lush jungle, raw craters, and great areas of devastation; you will see pumice piled high from recent eruptions, and lava flows only a few years old. Along the road you will come to trails and overlooks: Kilauea Iki Overlook and its exhibits, Thurston Lava Tube with a trail through jungle and part of a tunnel through which once rushed glowing lava, the overlook at Puu Puai, the boardwalk Devastation Trail, Kilauea Overlook north of the Hawaiian Volcano Observatory, and Sulfur Bank. Each offers an opportunity to stop and explore. All explain something of the violence of the not-so-distant past, the story of the eruptions, and life in a world that has changed violently and swiftly many times.

Hilina Pali □ From a turnoff point halfway down the Chain of Craters Road, you can drive to the top of Hilina Pali, a steep cliff that affords a fine view of the southeast seacoast of the island. Late afternoon is a good time to visit the pali, for the sunset can be superb from there. The Hilina Pali Road passes through good examples of pahoehoe lava at the edge of the Kau Desert.

Bird Park (Kipuka Puaulu) and Mauna Loa Strip Road □ Kipukas are islands of old surface or soil areas surrounded by more recent lava flows. On the slopes of Mauna Loa to the northwest of park headquarters, the kipukas support grassy meadows dotted with clumps of koa, ohia, soapberry, kolea, and mamani trees. In Kipuka Puaulu, west of park headquarters, a self-guiding nature trail leads into the open forest where many varieties of native trees grow.

The 10-mile drive from Kipuka Puaulu to an overlook part way up Mauna Loa is over a narrow, paved road, but on a clear day the view is well worth the trip. From the end of the road, it is 18.2 miles by trail to the summit.

Chain of Craters Road □ Recent volcanic eruptions have led to frequent closing of some road segments. The local situation can change with little advance warning. Check at park headquarters for the current status.

From its junction with Crater Rim Drive, the Chain of Craters Road passes Lua Manu, Puhimau, and Kokoolau Craters, but Kokoolau is the only crater that shows evidence of eruption. Beyond the Hilina Pali road junction, the road passes Hiiaka Crater, where an eruption occurred in May 1973. A mile farther on, the road is blocked by lavas from the eruption which began in May 1969 and continues intermittently. The main vent is in the summit of Mauna Ulu, a barren lava dome that is visible from a scenic viewpoint near the parking area at the end of the road.

The other end of the road is accessible via Hawaii 13 from Keaau on Hawaii 11 leading from Hilo. From the visitor center at Wahaula Heiau, near the eastern entrance, the road skirts the coast and passes the historic Hawaiian villages of Kamoamoa and Lae Apuki. Numerous scenic turnouts along this section of road provide ample opportunity to enjoy the rugged beauty of this storied land.

The Park Museums □ The Thomas A. Jaggar Memorial Museum at park headquarters tells the story of the park with exhibits, relief models, and paintings. Daily programs include a talk by a park ranger and a color film of recent eruptions. In the coastal district, the Wahaula Visitor Center contains another museum (Chain of Craters Road) that explains the human history of this coastal area.

The Volcano Story

Millions of years ago a disturbance occurred far off in the midst of the Pacific Ocean. The floor began to tremble, and from cracks 18,000 feet beneath the surface lava and hot gases issued—the birth of the newest island of a volcanic chain some 1,600 miles long.

With each succeeding eruption a new layer spread itself upon the old. Finally, emerging from that sea, came the island now called Hawaii—70 miles across its base, from ocean floor to summit, more than 31,000 feet. On this island are the most recent of the active volcanoes—13,680-foot Mauna Loa, and Kilauea Volcano 9,000 feet below.

The active Hawaiian volcanoes, or "shields," as they are termed by geologists, are broad masses shaped much like inverted saucers. They have resulted from numerous outpourings of very hot, fluid lavas that often flow 20 miles or more before congealing. Thus, steep, symmetrical cones such as Mount Hood and Fujiyama, which are built of more viscous lavas, are not formed here. Again, unlike their more scenic counterparts, the Hawaiian volcanoes are relatively gentle in their eruptive activity, liberating enormous amounts of molten rock from vents and fissures but seldom becoming dangerously explosive.

Eruptions are incompletely understood, but studies of Kilauea indicate that they begin with magma rising (because it is lighter than the overlying pile) through a conduit system from its source some 35 miles within the earth's mantle. After filling a reservoir about 2 miles beneath the summit, the magma works its way through fissures and erupts at the surface. Most eruptions occur within the summit caldera or along fundamental lines of weakness known as rift zones, which intersect at the summit and extend beneath the sea.


TILT-METER

Activity is usually preceded by an increase in the frequency and intensity of local earthquakes. Preceding an eruption, an increase in underground pressure causes the dome to inflate and swell, raising the volcano's summit at times by as much as 5 feet. Tilt-meters measure this swelling, and seismographs record the volcano's earthquake pulse.

Both Kilauea and Mauna Loa are relatively young volcanoes, for their growth keeps well ahead of the ever-present agents of erosion. Geologists calculate from its present rate of growth that Mauna Loa could have been formed within the last million years. Since man has watched it, Mauna Loa has been intermittently active, with periods of quiet ranging from a few months to more than two decades. Many of its eruptions are confined within the caldera of Mokuaweoweo; others start there, then split open the side of the mountain and gush from cracks in the flank far below the summit. A tremendous flank lava flow occurred in 1881 from the northeast rift, entering what are now the outskirts of the city of Hilo. Another flow from the southwest rift in 1926 destroyed the village of Hoopuloa. In 1942, lava from the northeast rift zone of Mauna Loa flowed to within 12 miles of the city of Hilo.

One of the most voluminous flows in historic times began the night of June 1, 1950, on the southwest rift. The highly fluid lava, liberated through a fissure 13 miles long, reached the sea in less than 3 hours, having advanced at an average speed of 5.8 miles an hour. A small village and a number of buildings were destroyed by this 23-day eruption, which produced about 600 million cubic yards of lava—enough to pave a 4-lane highway 4½ times around the earth!

The summit of Kilauea has collapsed to form a broad, shallow depression, technically a caldera, that is paved with recent lava flows. Within the great depression is Halemaumau, historically the most active vent. In the past, Halemaumau has contained a boiling lake of lava, which at times rose and overflowed onto the adjacent caldera floor.

Although Kilauea eruptions have been characterized by mild, nonexplosive activity, on rare occasions water has filtered into the volcano's "plumbing," and the resulting steam pressure has caused explosions. One of these, which occurred in 1790, is noted in Hawaiian history because the hot blast of rock and dust overwhelmed and killed part of a native army marching near the crater. Since then, Halemaumau has been active many times; the great steam eruption in 1924 ended the lava lake, and enlarged the crater in diameter from 1,400 feet to approximately one-half mile.


SEISMOGRAPH

One of Kilauea's most spectacular eruptions began on November 14, 1959, when fountains played from a rift along the side of Kilauea Iki Crater. One fountain grew until it was measured at 1,900 feet—by far the highest fountain of molten lava ever witnessed in Hawaii and probably in the world. Lava poured into Kilauea Iki to a depth of 414 feet—now dropped to 360 feet. Today the surface is cool enough to walk on, but the interior will be hot for many years.

Less than a month after activity terminated in Kilauea Iki, lava broke out anew near the village of Kapoho in the Puna district, 28 miles away. A flow was produced that buried most of the village, entered the sea, and added 500 acres to the island of Hawaii. In February and March, drainage beneath Kilauea left the floor of Halemaumau unsupported, and it collapsed 300 feet.

Kilauea is one of the most studied and best understood volcanoes in the world. Scientists have been keeping a careful record of its activity since 1911, when the Hawaiian Volcano Observatory was established by Dr. Thomas A. Jaggar. These studies continue today under the direction of the Geological Survey, U.S. Department of the Interior.

In addition to the activity of Mauna Loa and Kilauea, the observatory has noted several earthquakes with their centers off-shore to the southeast. Also, there on the ocean floor, are several sea mounts, or underwater volcanoes—but whether or not there will ever be another Hawaiian island only the future can answer.