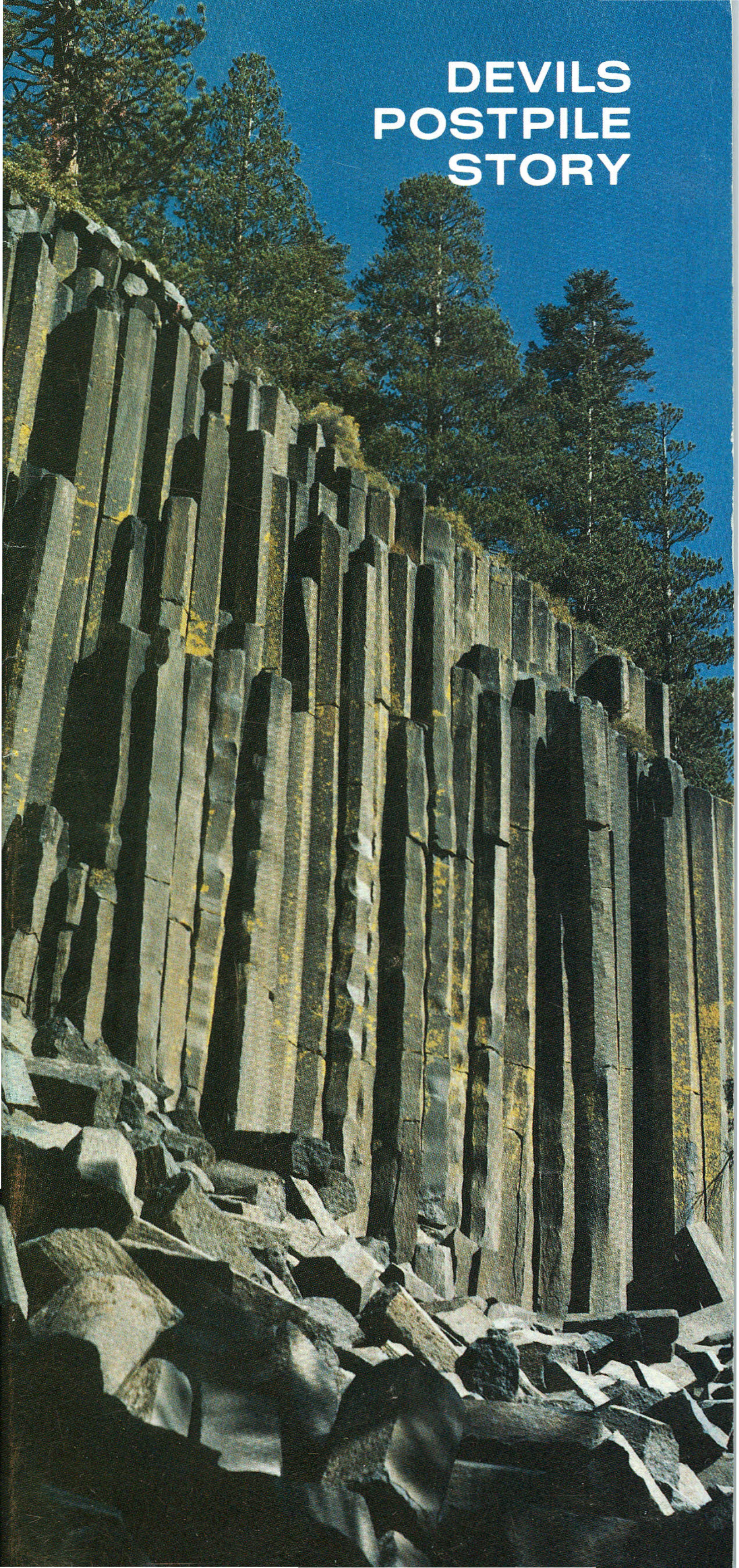
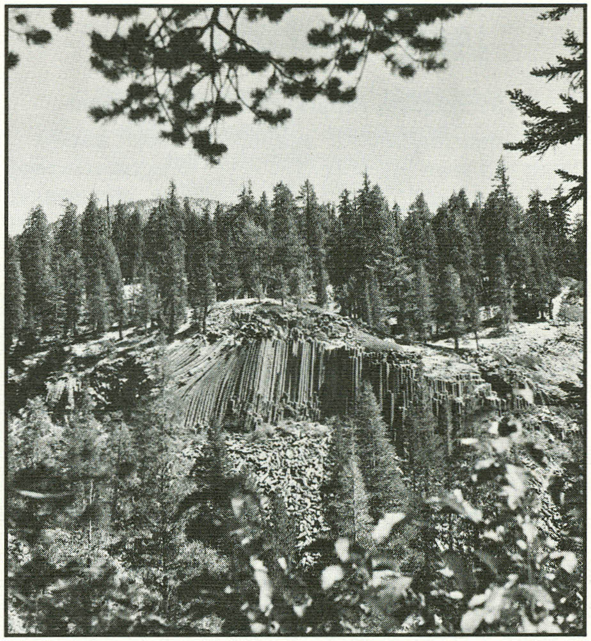

DEVILS
POSTPILE
STORY



Devils Postpile Story

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National Park Service
Department of the Interior

DEVILS POSTPILE STORY was first published as "A Brief Story of the Devils Postpile National Monument," by Richard J. Hartesveldt, Vol. 31, No. 10 (October, 1952) of *Yosemite Nature Notes.* It was revised in 1963 by Keith A. Trexler and William R. Jones, and published as *Your Guide to Devils Postpile National Monument.* In 1977 it was rewritten by Wymond Eckhardt and illustrated by Joseph L. Medeiros, and published as *Devils Postpile National Monument.*

The following people have contributed to this publication:
David W. Clow and Kenneth R. Collum — mapping of volcanic rocks.
Wymond W. Eckhardt — photographs.
Leroy L. Lambright — back cover photo of Rainbow Falls.
Joseph L. Medeiros and Gary L. Ogden — manuscript critique.

Front Cover — Columns of the Devils Postpile
Back Cover — Rainbow Falls of the Middle Fork of the San Joaquin River

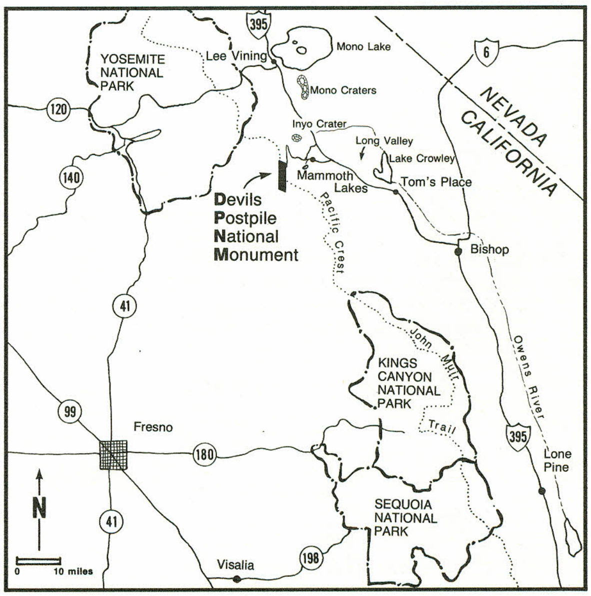
INTRODUCTION

Devils Postpile National Monument

Devils Postpile National Monument lies on the western slope of the Sierra Nevada near the resort community of Mammoth Lakes, California. The 800-acre Monument is two and one-half miles long, one-half mile wide, and is at an elevation of about 7,600 feet. The Monument includes one feature of dominant significance: a volcanic formation known as Devils Postpile. Also in the area are Soda Springs and Rainbow Falls. Pumice is the dominant rock-type encountered by the visitor, however, basalt and granite are just under the surface and crop out in many places throughout the area. The plants and animals in the Monument are those typical of the lodgepole pine-red fir forests of the western slope of the Sierra Nevada.

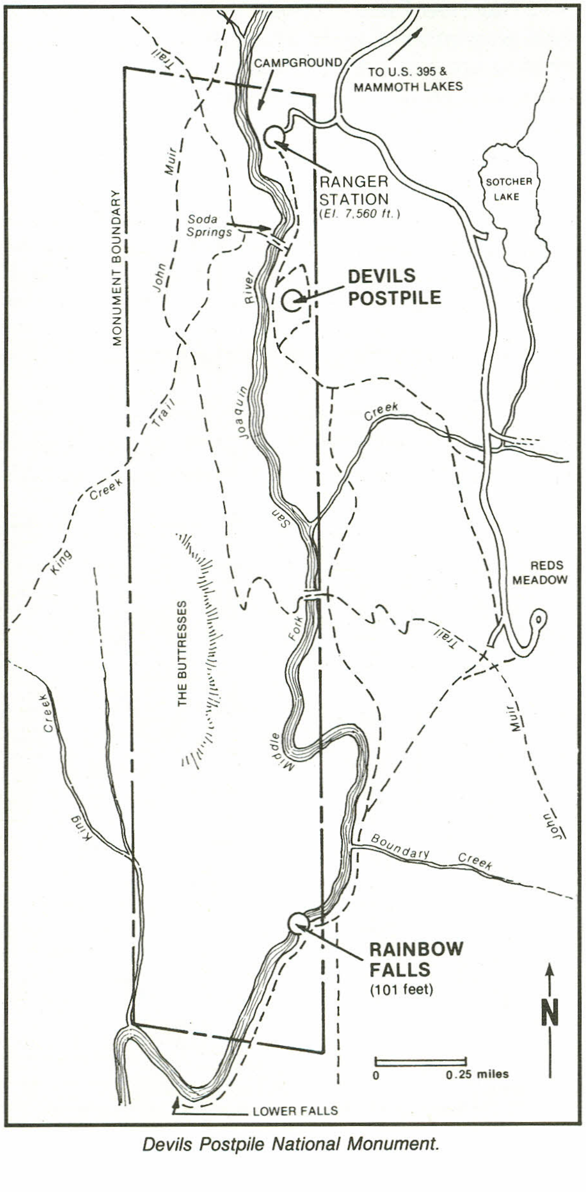
The approach road to the Monument passes through Mammoth Lakes from U.S. Highway 395 on the east side of the Sierra Nevada. Beyond Minaret Summit is a paved mountain road that is passable only during the summer months. In the winter the area is closed — the snow may be more than fifteen feet deep.

Food and lodging can be obtained at Mammoth Lakes or at nearby Reds Meadow. A campground is maintained in the Monument near the ranger sta-



tion. There are several other public campgrounds in the vicinity.

To see the features of the Monument one must walk. An easy trail leads south from the Monument ranger station: three-tenths of a mile to the Soda Springs, four-tenths of a mile to the Postpile, and two and three-tenths miles to Rainbow Falls. An alternate one mile route to Rainbow Falls begins in the Reds Meadow area.

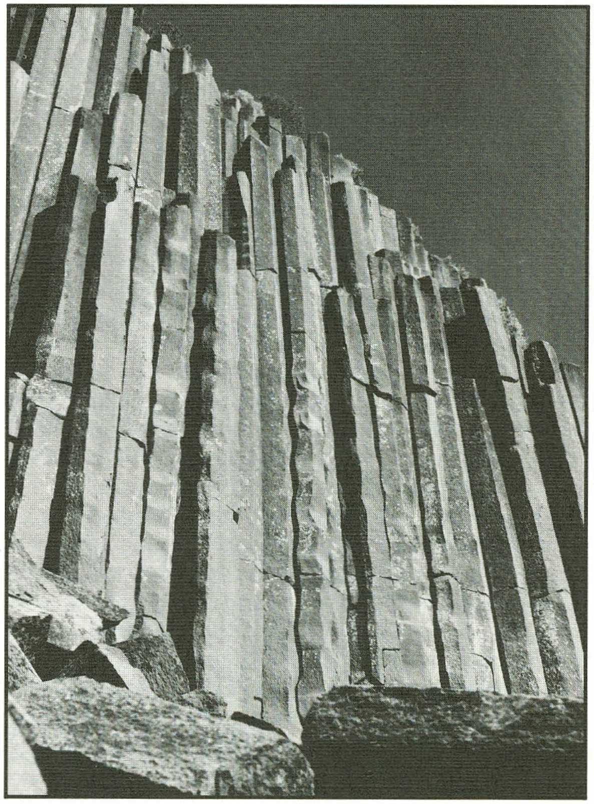


Devils Postpile National Monument.

GEOLOGIC STORY

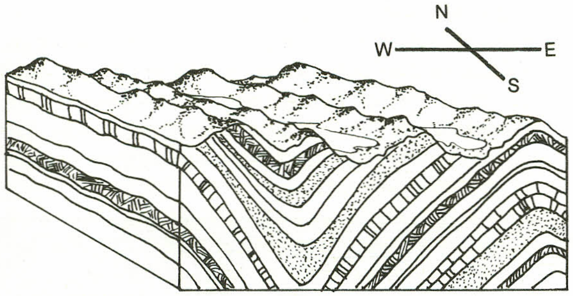
The Devils Postpile is a fine example of columnar basalt. Until recently, it was thought to have been formed about one million years ago. Current studies suggest that the Devils Postpile was formed less than 100,000 years ago when a cooling lava flow cracked into multisided columns. Other well-known examples of columnar-jointed lava are the Giant's Causeway in Ireland and Fingal's Cave in Scotland. The Palisades of New Jersey along the Hudson River and the columns at San Miguel Regla, Mexico, are noteworthy, but are less well known. Other occurrences are found throughout the world, but well-developed columns are not abundant.

Some details of the geologic origin of the Devils Postpile are not completely clear, but enough is known to reconstruct much of the story. To understand the geologic setting of the Postpile, we must go back hundreds of millions of years; to a time when sands and muds were being deposited in a vast sea that covered southeastern California and parts of adjoining states.



Origin of the Sierra Nevada

About 150 million years ago, in the Jurassic period of geologic time, the sediments that had been deposited in the sea and later compressed into sedimentary rocks began to be lifted above sea level. Then began a time of explosive volcanic eruptions that spewed forth vast quantities of lava and volcanic ash, deeply burying the sedimentary rocks. The layered sedimentary and volcanic rocks were then deformed and, in many places, folded intricately, changing or metamorphosing them into tougher, very resistant *metamorphic* rocks. Examples of these metamorphic rocks can be seen at Minaret Summit and along the road descending to Agnew Meadow.



Layers of sedimentary and volcanic deposits were compressed into rocks. These rock layers were then strongly squeezed and folded. Erosion caused more resistant layers to stand out as ridges. Streams carved valleys in softer layers.

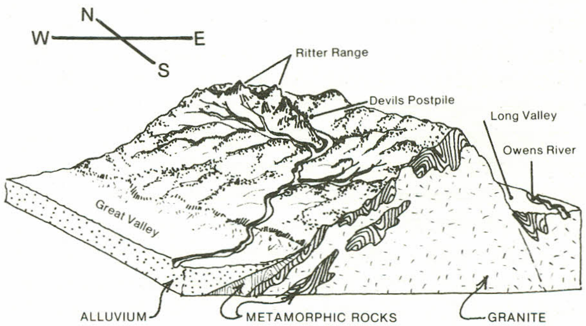
Concurrent with the folding and deformation of the layered rocks, molten rock bodies were intruded into these rocks under conditions of great heat and high pressure deep below the Earth's surface; some of this molten rock, or magma, reached the surface to form new volcanoes. This intrusive activity ended about 80 million years ago, in the Cretaceous period. The molten rock cooled slowly and in time solidified into the granite core of the Sierra Nevada.

The episode of deformation, intrusion, and volcanic eruption ended in the formation of a mountain range that can be considered an ancestral Sierra. Erosion followed, and by the end of Cretaceous time, about 60 million years ago, most of the older volcanic and metamorphic rocks had been worn away, exposing the granite core of the range. The area had a low relief compared to the mountains of today and posed little obstacle to streams draining westward from the interior of the continent.

Renewed Uplift and Stream Incision

About 25 million years ago, this lowland area began to be uplifted and tilted toward the southwest, a construction which would eventually lead to the present Sierra Nevada. As the rate and amount of southwest tilt increased, the gradients of streams flowing southwest also increased and the faster flowing streams cut deeper and deeper canyons. At that time the steep eastern Sierra Nevada escarpment had not yet formed. The main trunk of the San Joaquin River then had its headwaters perhaps as far east as Nevada, flowing in a channel that crossed what is now the Sierran crest north of Minaret Summit. Within the growing mountain range the specific course of the river was controlled by differing hardness of the bedrock as well as by the tilt of the range. For example, the highly resistant metamorphic rocks of the Ritter Range proved a great obstacle to the southwestward flow of the river and forced it to flow southeastward and then south through the Devils Postpile area. South of the Postpile the river finally was able to swing southwest across the less resistant granite at the south end of the Ritter Range.

About 3 million years ago the river channel north of Minaret Summit was filled by lava flows — reddish-colored, layered rocks visible on the slope above the road descending to Agnew Meadows. This blocked the former channel and isolated the present San Joaquin drainage basin from the area east of the crest. Also about this time the Long Valley-Mono Lake area began to lag behind as the present range continued to rise and the growth of the east-facing Sierra Nevada escarpment further



San Joaquin River Drainage -
More resistant rocks caused the river to flow south through the monument before turning west toward the Great Valley.

blocked any renewal of a trans-Sierra San Joaquin River. The Sierra Nevada continues to rise today.

During the Pleistocene epoch, or ice age, glaciers, fed by heavy snowpacks, descended slowly through the old stream-cut canyons, deepening and widening them. Ice accumulated on the east slope of the Ritter Range and flowed down the valley of the Middle Fork of the San Joaquin River several times, shaping the valley to near its present form. These glaciers, carving cirques back into the highly jointed, but resistant, rocks of the Ritter Range sculptured the magnificent Minarets and Matterhorn-like peaks of the range crest.

Rocks of Devils Postpile Formed

Although the rocks of the Devils Postpile formed during the ice age, the Postpile owes its origin to geologic processes initiated earlier. These rocks are but one manifestation of widespread volcanic activity in this part of the Sierra Nevada that began more than three million years ago and has continued to the present. Perhaps born of the same underlying cause as the volcanism, contemporaneous large-scale fault movements created the steep eastern front of the Sierra Nevada; volcanic activity was greatest along or adjacent to the eastern escarpment. Long Valley, from the headwaters of Owens River to Lake Crowley, is a giant volcanic caldera. Mammoth Mountain — a massive volcanic dome — has grown on the caldera margin.

Less than 100,000 years ago, basalt lava, which was to become the Devils Postpile, erupted in the already glaciated valley of the Middle Fork of the San Joaquin River. The age of volcanic rocks can be estimated by study of the radioactive decay of elements in the rocks. Previous estimates for the age of the Postpile basalt, ranging from about 600,000 years to nearly a million years, are now thought to be seriously in error. Although an exact age for the Postpile flow still is not known, we believe that an age of less than 100,000 years, based on radiometric age determinations on rocks thought to be correlative, is more reasonable.

The Postpile lava reached the surface in the vicinity of the Upper Soda Springs Campground at the north end of Pumice Flat (see map on page 14). Across the San Joaquin River from the campground, rust-colored basalt cinders — products of explosive eruptions — rest upon granite bedrock and are probably the remains of a volcanic cinder cone, similar

to the Red Cones southeast of the Monument. Two basalt dikes — tabular bodies of solidified lava — can be seen cutting upward through the cinder pile; when molten, these dikes may have been feeder-vents for lava flows. We do not know how extensive the lava outpourings were, because most of the basalt has been removed by combined glacial and stream erosion, but we can piece together some minimum figures from the scattered outcrops that remain. Lava filled the valley from side to side for a distance of at least three miles, from Pumice Flat south to the Devils Postpile, and in the vicinity of the Postpile the lava was probably more than 400 feet deep.

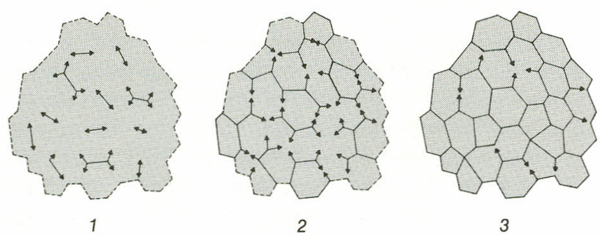
Genesis of the Posts

The lava flow that became the Devils Postpile was very fluid and remained molten almost throughout while it pooled in the valley of the San Joaquin River. Because its top was exposed to air and its bottom to underlying cooler granite bedrock, the flow cooled to solid rock inward from these surfaces. The flow shrank, too, because virtually all liquids occupy less space when frozen, or solidified.

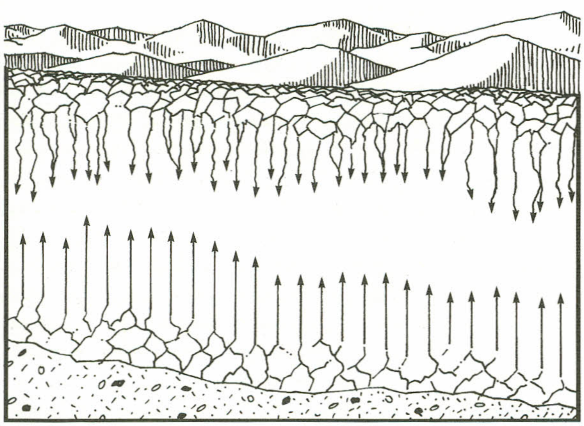
As the solidifying lava shrank, tensional stresses developed in response. Those stresses operating in a vertical direction simply caused the mass to settle in response to gravity, but those oriented in horizontal directions were relieved only by cracking of the solidifying rock. Columnar joints or cracks are formed as a lava flow cools and shrinks under certain conditions that allow the flow to crack into long vertical columns ideally tending toward a hexagonal cross section. Uniform cooling conditions tend to promote the development of columnar joints, but the degree of homogeneity of the solidifying lava is probably more important. It can be shown mathematically that the surface of a homogeneous medium should be divided by a crack system defining regular hexagons when it is subjected to uniform shrinkage because a hexagonal system provides the greatest relief with the fewest cracks. Regular hexagons are rare, because in natural lava flows, cooling stresses in rocks are never completely uniform, and therefore the columns are generally bounded by curved cracks forming irregular-shaped polygons with variable numbers of sides. Cooling conditions are never ideal at the surface of a flow, but as cooling, solidification, and cracking proceed from the surface of a flow into its interior, a point may be reached where the shrinkage forces may be uniform enough for irregular jointing to give way to the formation of columnar joints.

In higher parts of the Devils Postpile flow, remnants of which may still be seen in the general area, jointing is irregular or poorly columnar. In lower parts, where cooling was more uniform, nearly perfect columns formed. These are now exposed by erosion as the Devils Postpile. We see in the Postpile only the lower part of the lava flow.

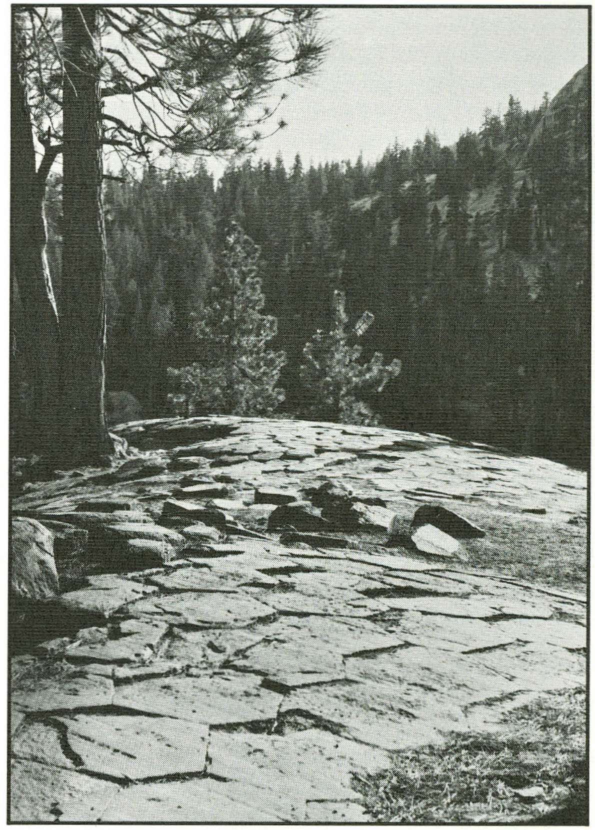
Columns have an average diameter of 2 feet and a maximum diameter of 3½ feet; some are 60 feet long. The columns have various numbers of sides, as indicated by a sample of 200 posts: 4 sides, 2%; 5 sides, 37%, 6 sides, 55%, 7 sides, 5%. A few columns have only three sides.



1. *Surface cracks started when the tension caused by the shrinkage of cooling was greater than the strength of the lava.*
2. *As cracks reached about 10 inches in length, they branched, thus forming angles of approximately 120° which provided the greatest stress relief.*
3. *Each new crack branched again when it obtained the critical length and together with other similar cracks formed an irregular polygonal pattern.*



Ideal conditions, existing within the cooling lava, allowed surface cracks to deepen which resulted in the formation of the long columns.

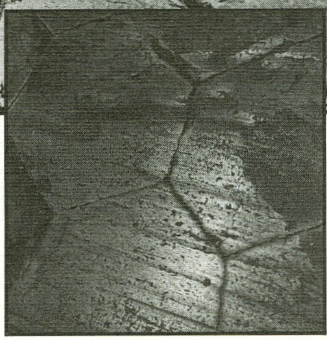


Exposed ends of columns on top of the Postpile.

The Postpile is Exposed

The glaciers that flowed down the valley of the Middle Fork of the San Joaquin River eroded most of the lava flows from the area. Although these slow-moving bodies of ice were large and powerful, they did leave a few remnants of the original lava flows. On the remnant known as the Devils Postpile, the glaciers cut a vertical face, exposing the interior of the flow and the sides of the columns. In the 10,000 years since the last glacier left, numerous columns have spalled from the face of the cliff, creating a talus pile of broken posts.

Other lava columns, less spectacular than those of the Devils Postpile, are found in several places within or near the Monument. Most of the exposures clearly indicate the direction of ice flow since they have steep downstream — that is, down-glacier — slopes with gentle upstream slopes. When glaciers move over fractured rock, the plucking action on the downstream side of the rock outcrop is much greater than the grinding action of ice overriding the upstream side, so that the downstream slopes are commonly precipitous.



Above: Exposed ends of columns.

Left: Glacial polish and striations on top of the columns.

Top of the Postpile

A hike to the top of the Postpile reveals not only a cross section of the posts, but interesting effects of the ice — the polished and scoured tops of the rock columns. The polygonal column-ends are exposed like a tiled floor, and exhibit shining surfaces where the ice polished them with fine silt; parallel striations and grooves show where the glacier dragged rocks across them.

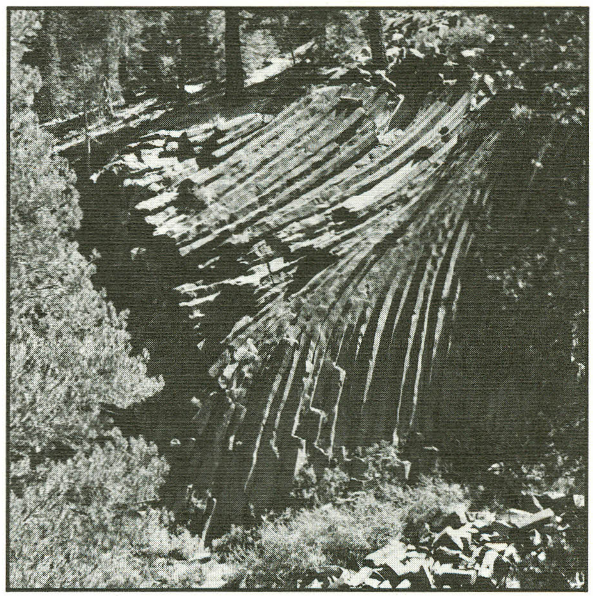
When the last glacier melted away, nearly all of the upper surfaces of the exposed rock in the Monument must have exhibited glacial polish. Now, however, weathering and subsequent erosion have removed almost all of the original polished surfaces, and only patches such as those on top of the Devils

Postpile remain. (In such a context, the regulation prohibiting the collection of rock specimens in the National Monument becomes especially meaningful. Without realizing it, collectors could remove the most dramatic proof that a glacier rode over the top of the Devils Postpile, thus, not only destroying scientific evidence but detracting from the undertanding and enjoyment of future visitors).

Curved Columns

Most of the columns in the Devils Postpile diverge from the vertical as though tilted and some are even curved as if they had been bent. Under ideal conditions, the long dimensions of basalt columns develop at right angles to the cooling surfaces. If a lava flow is homogeneous in chemical composition, of uniform thickness, and has level top and bottom cooling surfaces, then, theoretically, the flow cools uniformly into vertical columns. All of these factors were not fulfilled in the Devils Postpile flow, however, causing irregularities in cooling and consequently producing curved posts with various number of sides.

The exceptional aspect of the Devils Postpile is not that some columns are curved, but that in places the lava was homogeneous enough and had a cooling rate uniform enough to have produced many columns so long and regular.



Curved columns.

Other Volcanic Rocks In and Near the Monument

Not all of the volcanic rock in the Monument area belongs to the Postpile basalt flow, although much of it has been grouped into a single geologic unit on most published maps of the area. This has led to confusion both as to the composition of the Postpile flow (called andesite on some maps) and as to its source (said to be Mammoth Pass in some reports). Recent studies have given us a better understanding of the variation in rock types and the complex relationships between the different volcanic units. Individual volcanic units previously grouped with the Postpile flow, but here considered separately, are: andesite of Mammoth Pass; rhyodacite of Rainbow Falls; and basalt of The Buttresses (basalt of the Devils Postpile is the youngest unit; the others are listed in order of increasing age).

Lava that erupted from a vent near Mammoth Pass once was thought to be part of, and indeed the source of, the Postpile basalt. This was simply because this lava was erupted from an obviously higher elevation and cascaded into the Middle Fork valley toward the Postpile. The Mammoth Pass rock, however, is andesite, a rock with somewhat more silica than basalt, and resulted from a separate volcanic event. In appearance the andesite lacks the small, but visible, crystals of feldspar that characterize the Postpile basalt.

The rhyodacite of Rainbow Falls formed when lava erupted from vents just downstream from the present location of the Devils Postpile. Rhyodacite has an even higher silica content than andesite; it tends to be somewhat lighter-colored and finer-grained than either the basalt of the Devils Postpile or the andesite of Mammoth Pass. But perhaps the most striking difference is the presence of near-horizontal platy jointing in the rhyodacite, a feature well-displayed along the road west of Reds Meadow that leads to the Rainbow Falls trailhead.

The oldest volcanic unit formerly included with the basalt of the Devils Postpile is a basalt that makes up The Buttresses, southwest of the Postpile. In appearance this basalt superficially resembles the Postpile basalt, but the abundant visible crystals are mostly pyroxene rather than feldspar, a subtle but important difference between the two rock types. The basalt of The Buttresses was erupted from one or more vents west of the Monument and flowed

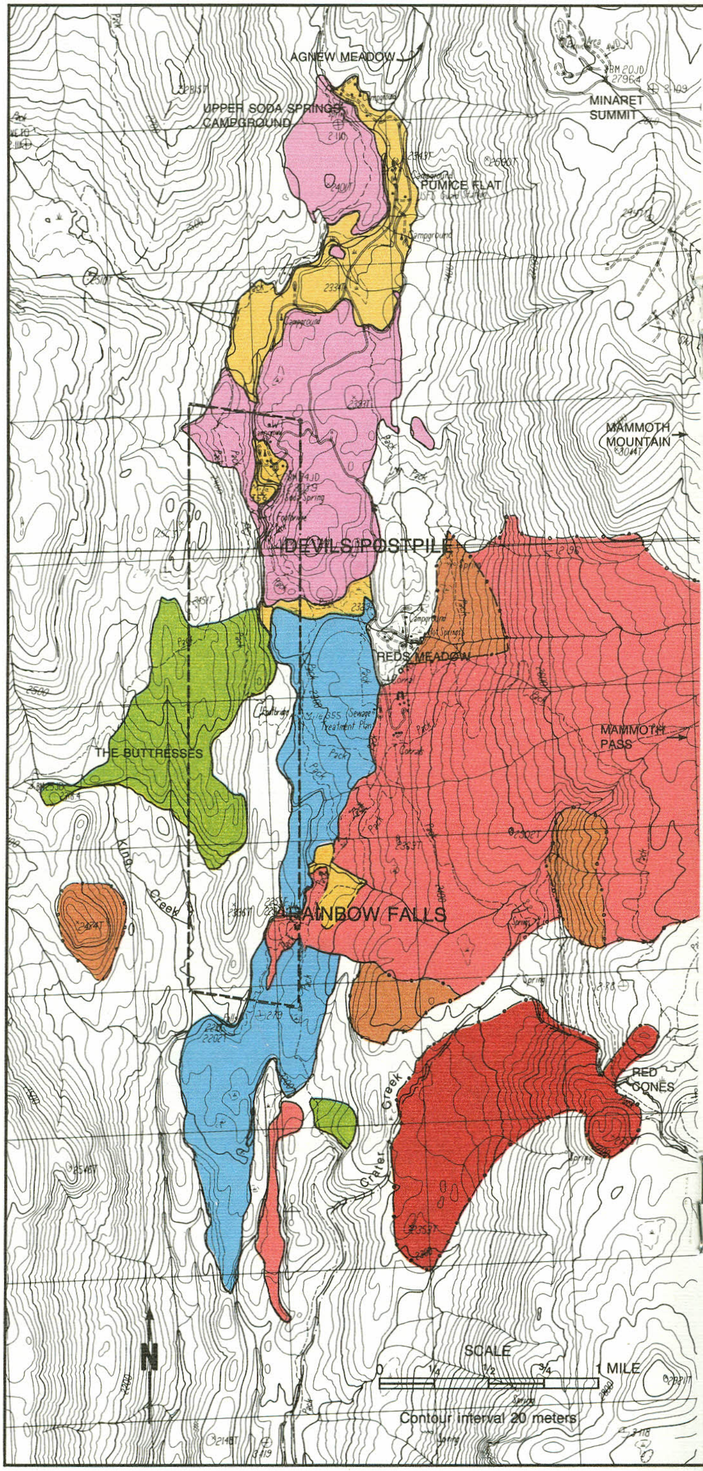
eastward into the Middle Fork valley.

A totally different type of volcanic rock that occurs near the Monument is a pyroclastic rock or welded-tuff. This tuff formed from volcanic ash that was hot and plastic when it fell and fused into a generally cohesive mass. Exposures of this tuff can be seen behind the old ranger cabin east of Reds Meadow. At this locality the tuff has columnar joints, but the columns are nearly horizontal rather than vertical. The exact source of the volcanic ash is not known, but it is probably related to the extensive deposits of the Bishop Tuff, a welded tuff that erupted from the Long Valley caldera, and can be seen in road cuts near Tom's Place on Highway 395.

The most recent volcanic event in the Devils Postpile area, the only one younger than that which produced the Postpile flow, built the Red Cones about one and one-half miles southeast of the Monument. The two basalt cinder cones, with well-preserved summit craters, illustrate what the eroded pile of cinders near the Upper Soda Springs Campground might once have looked like. A basalt lava flow that issued from the base of the southern cone extends down Crater Creek to within one mile of the Middle Fork, perhaps similar to the way that the Postpile flow might have issued from the ancient cinder cone that once existed near the Upper Soda Springs Campground. The Red Cones and their lava flow are so well preserved because they are less than 10,000 years old, and thus escaped the powerful excavating force of glacial erosion that so drastically modified the older volcanic rocks.

Pumice, a frothy volcanic glass, is a porous lightweight material of pastel shades that covers the ground at various places in the area. Its unweathered, loosely compacted nature indicates it was deposited recently. This pumice was formed in postglacial time when molten rock of high silica content and abundant dissolved gasses erupted from the Mono and Inyo Craters northeast of the Monument.

The recency of the Red Cones and widespread blanket of pumice, the presence of hot springs here and to the east, and the recent volcanic eruptions and earthquakes in Long Valley provide dramatic evidence that volcanoes in this region cannot be labeled "extinct." Within the framework of geologic time, which we tend to think of in terms of millions of years, the dormancy of local volcanism is a barely measurable pause that might, at any time, be abruptly terminated by the onset of new eruptions.



EXPLANATION

QUATERNARY

- Undifferentiated surface deposits, including: pumice, stream deposits, recent organic soils.
- Basalt of the Red Cones. Unglaciated red cinder cones and lava flows.
- Basalt of the Devils Postpile. Dark gray, fine-grained basalt flow, with abundant feldspar crystals.
- Andesite of Mammoth Pass. Light gray to dark gray, fine-grained andesite, with minor feldspar and pyroxene crystals.
- Rhyodacite of Rainbow Falls. Light gray, fine-grained rhyodacite, with minor oxyhornblende crystals. Exhibits horizontal to semi-horizontal platy weathering fractures. Some dense, black, columnar-jointed outcrops.
- Tuff of Reds Meadow. Similar to Bishop Tuff. Buff, ash-flow rhyolite exhibiting welding of pumice with abundant quartz, feldspar, and rock fragments.
- Basalt of The Buttresses. Dark gray basalt, with abundant olivine crystals, and minor pyroxene. Crude columnar jointing.

——— Contact, as mapped by Clow and Collum (1983).

—·—·— Contact, volcanic units as mapped by Huber and Rinehart (1965; 1967).

- - - - - Monument boundary.

DISTRIBUTION OF VOLCANIC ROCKS

DEVILS POSTPILE NATIONAL MONUMENT AND VICINITY

Geology by
DAVID W. CLOW and KENNETH R. COLLUM
1983

Modified from
N. K. HUBER and C. D. RINEHART
and
R. P. KOEPPEN

Base map by U.S. Geological Survey

Summary of Glacial and Volcanic History

The intertwining of glacial and volcanic events in the valley of the Middle Fork of the San Joaquin River is reasonably clear, but some events must be based upon inference derived from data obtained elsewhere in the Sierra Nevada. From our present knowledge we can summarize the glacial and volcanic history of the Devils Postpile region as follows (listed in order of decreasing age):

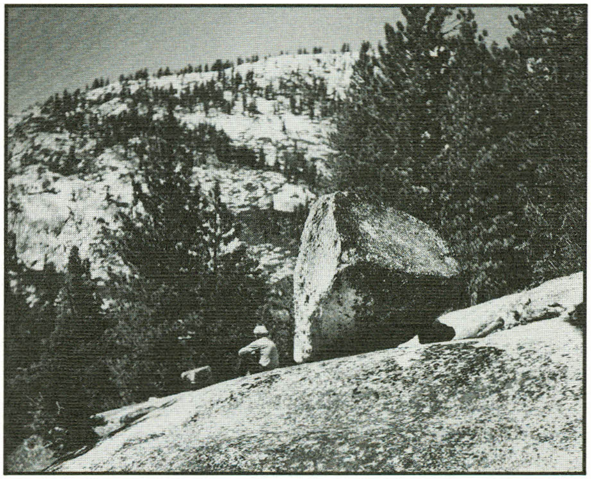
1. The oldest volcanic rock in the vicinity of the Monument is believed to be the basalt now exposed at The Buttresses, although its exact age is not known.
2. The valley of the Middle Fork of the San Joaquin River was glaciated, possibly more than once, prior to about 700,000 years ago.
3. Deposition of the tuff near Reds Meadow about 700,000 years ago was concurrent with extensive volcanic activity that created the Long Valley caldera and produced the Bishop Tuff.
4. Stream erosion, perhaps aided by another glaciation, removed much of the tuff from the central part of the valley.
5. Rhyodacite lava erupted from vents just downstream from the present site of the Postpile and flowed southward beyond Rainbow Falls.
6. Andesite lava erupted near Mammoth Pass and cascaded into the Middle Fork valley.
7. Less than 100,000 years ago basalt now exposed at the Devils Postpile erupted north of Pumice Flat and flowed out to cover, at the very least, several square miles of the valley floor.
8. Stream and glacial erosion again removed much of the accumulated volcanic rock from the Middle Fork valley. The last glaciation, which ended about 10,000 years ago, produced the polish and striations visible on the top of the Devils Postpile.
9. The Red Cones and their associated lava flow were formed sometime after the last glacier vanished from the valley.
10. Pumice erupted from the Inyo and Mono Craters and covers the area as a surface deposit.

Other Geologic Features

Other interesting geologic features of the Monument include glacial erratics and mineral springs.

Glacial erratics are boulders carried by ice from points upstream. They have been deposited in many places within the Monument, but are most abundant on the high granite hills and ridges west of the Middle Fork of the San Joaquin River. Many of the erratics are different from the rocks they now rest upon, and some are composed of metamorphic rock which occurs only north of the Monument. The erratics of metamorphic rock tell us that the ice carried them south from a distant source.

Mineral springs — some of them hot — occur within or near the National Monument. They are further manifestations of the recency of local volcanic activity. One cold, highly-carbonated spring flows out on a gravel bar on the west side of the Middle Fork of the San Joaquin River in Soda Springs Meadow, about one-tenth of a mile north of the Devils Postpile. Such springs often occur where gasses and water vapor are driven upward from hot areas deep in the Earth and combine with ground water near the surface to produce mineralized springs. At Soda Springs, iron present in solution in the acidic water oxidizes on exposure to the atmosphere and has stained the river gravel in the vicinity a reddish brown. A hot spring issues forth at Reds Meadow, just east of the Monument, further attesting to the continuing volcanic activity in the area.



Glacial erratic perched on bedrock slope.

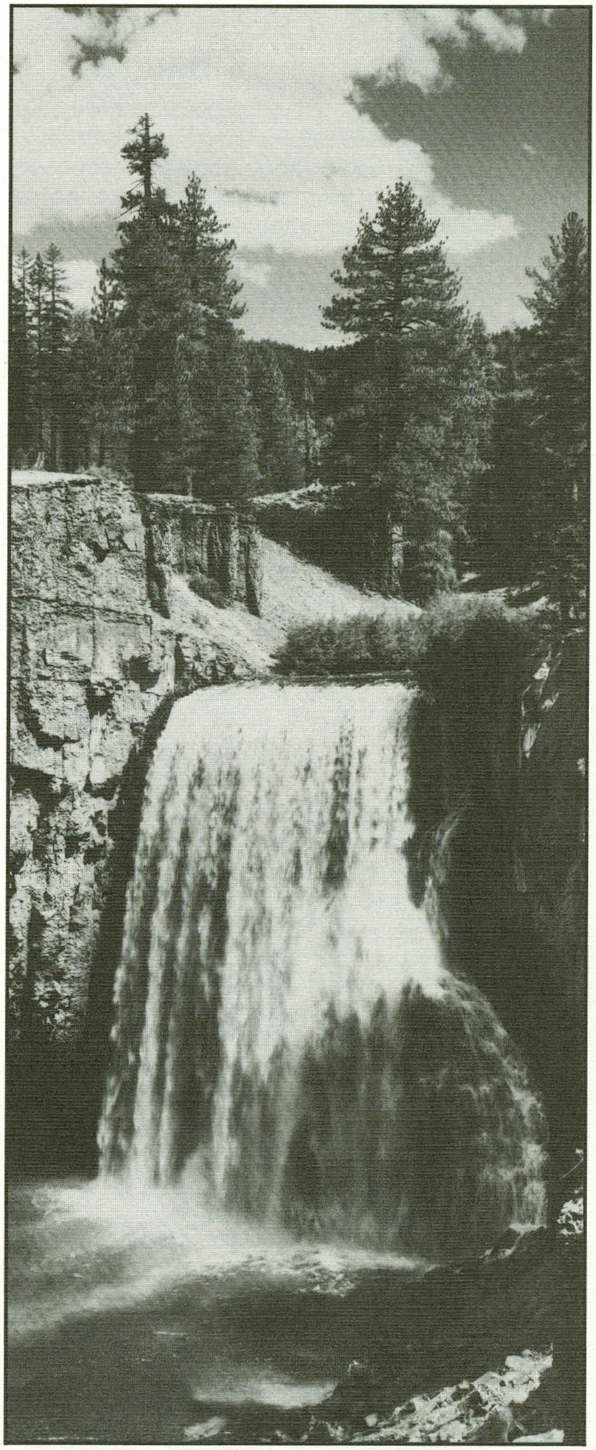
Rainbow Falls

At Rainbow Falls the Middle Fork of the San Joaquin River drops 101 feet over a cliff of volcanic rock that is somewhat different from the rock making up the Devils Postpile. Although the rock is locally massive or poorly jointed, as that near the top of the falls, it is generally characterized by nearly horizontal, thinly-spaced joints giving the rock a platy appearance. This rock is the rhyodacite of Rainbow Falls. While there is glacial polish on the top of the massive volcanic rock and the cliff at the falls is similar in appearance to glacially sculptured lee slopes, the cliff was not formed by ice.

After the last glacier melted, the Middle Fork of the San Joaquin River flowed downstream from the Devils Postpile in a channel close to The Buttresses and about 1,500 feet west of its present channel. The old channel can still be traced northward from its junction with the present river at the first bend downstream from Rainbow Falls. Another old channel is nearby, but it is not cut as deeply and, therefore, was probably not occupied as long.

When the Middle Fork flowed in these older channels, it cut through the lava flows down to granite, leaving a cliff for its eastern bank. Then, some distance upstream, its waters were diverted eastward. The river left its bed to follow its present path until it returned to its old channel by cascading down the cliff it had cut earlier, thus forming the predecessor of today's Rainbow Falls but more than 500 feet west of the present falls.

As the Middle Fork cascaded over its former bank, its water eroded into the softer platy rock at the base and undercut the harder massive rock above, causing it to cave in. The cliff has thus retreated 500 feet or more upstream to the present location of Rainbow Falls. Normally, streams tend to erode channels with uniform gradients, bevelling off and eventually eliminating irregularities such as waterfalls. Rainbow Falls is an exception, however, because of the two, unequally hard, horizontal rock layers in its cliff. It is like Niagara Falls in this respect, for Niagara has a similarly hard rock layer at the top of its cliff and is being undercut in the same fashion.



Rainbow Falls - Middle Fork San Joaquin River 101 feet high.

These very familiar leaning columns fell on August 7, 1980.

Recent Changes

In postglacial time the Devils Postpile has changed greatly. The huge talus pile of broken posts is evidence that the lava columns extended many feet in front of the present face after the last glacier melted. The prying action of water freezing in the cracks between the columns has probably been responsible for most of the fallen posts. The present rate of falling is sporadic and uncertain. A 1909 photograph showed three of the columns leaning far ahead of others in the formation. These were separated from nearby vertical columns by as much as 12 inches at the top. Although they appeared ready to fall, these three familiar leaning columns did not topple even during the strong earthquakes in the summer of 1952.

During May of 1980, intense earthquake swarms occurred at an epicentral site about two miles southeast of the community of Mammoth Lakes. This eastern Sierra community and the surrounding area were shaken by an unprecedented series of earthquakes that included four of a Richter magnitude of 6.0 within a 48-hour period. Lesser earthquake swarms accompanied by sporadic tremors continued throughout the summer of 1980. During this period the very familiar leaning columns tumbled down. Numerous other columns in the formation were cracked, and today rest precariously on their severed bases. Small earthquakes continue to contribute to the mechanical weathering process of the Postpile formation — columns continue to fall at an unpredictable rate. Columns that have fallen recently can be detected by looking for lighter shades of newly-exposed unweathered rock surfaces on the downed columns.

MONUMENT HISTORY

Little is known of the early human history of the Devils Postpile. What we do know is mainly inferred from historic accounts of adjacent areas and the memories of oldtimers. It is certain that Indians knew of the formation because the trails and the campsites they used are nearby.

Discovery

We may only guess at the date of the discovery of the Postpile by non-Indians. It is possible that a prospector, searching for mineral riches, was the first to report the basalt columns to the outside world, though it may have been an early herder or trapper. For a time before the turn of the century, the formation was known locally as Devils Woodpile. Hardy early-day wanderers often recognized the work of his Satanic majesty in scenic freaks, for there are over 150 features in California credited to the devil.

Mines, Miners and Hermits

Activity in the area remained largely unrecorded until 1877 when James Parker discovered several well-defined veins of gold- and silver-bearing quartz in the vicinity of Mammoth Lakes. In that year the Lake Mining District was organized, and subsequently three small communities with two newspapers were established. Peak activity was between 1878 and 1881. The frontier editors gave spirited and sometimes highly embroidered accounts of the mountain scenery and miners' activities, but failed to mention the Postpile.

It is surprising that the Devils Postpile was scarcely referred to at this time since the Mammoth Trail from Fresno Flats passed nearby. Also known as the French trail, after the engineer who built it, this trail provided access for people and pack trains traveling to the booming but short-lived Lake Mining District. The principal mining companies closed in 1881, and the area was left to herders, a few prospectors, an occasional tourist, and several somewhat legendary hermits.

"Red" Sotcher (sometimes spelled Satcher) settled in what is now Reds Meadow in the late 1870's. According to some accounts, he provided homegrown vegetables to the miners for fabulous prices. Red-bearded, probably somewhat of a recluse, Sotcher is rumored to have been a cattle- and horse-thief, a claim unsubstantiated by contemporary newspaper accounts.

Just north of Devils Postpile is Agnew Meadows. There, Theodore C. (Tom) Agnew mined as early as 1877, remained through the 1890's and acted as guide for the U.S. Army troops protecting Yosemite National Park. The San Francisco Sunday Call in March 1912 commented on the number of bullet holes found in a building at Agnew Meadows.

Park Status

In 1890 the area surrounding Yosemite Valley was set aside by Congress as Yosemite National Park. The original boundary encompassed a large area southeast of the present parkline, including the Devils Postpile, Rainbow Falls, the Minarets, and the Ritter Range.

Early Park administrators, Army officers assigned as acting superintendents, made little mention of the Postpile in their annual reports to the Secretary of the Interior. It was in Captain Alex Rodgers' report of 1895 that one of the first, if not the first, written mentions of the Postpile was made. In remarking on earlier recommendations (in 1891, 1892, and 1894) that the southeastern portion of the Park be returned to the public domain, Captain Rodgers noted, "The Devils Post Piles. . . constitute in themselves a good reason for not cutting that country off the park." His report also contains the first published map with the Postpile indicated.

Reports of the Acting Superintendents for the years 1897 through 1902 recommended or reported upon construction and reconstruction of trails leading to the Postpile. In 1903 an Army substation was maintained at the Postpile for nearly a month; Reds Meadow and Agnew Meadows were also used as outpost stations prior to 1905.

Removal from the Park

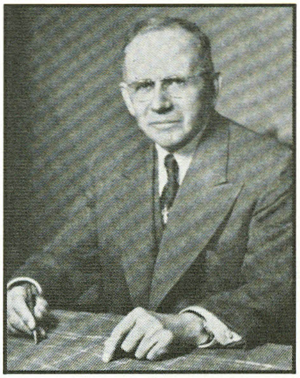
Action to delete the Minarets area began almost as soon as Yosemite National Park had been established. Pressures from mining and timber interests, supported intermittently by the Park's Army guardians, had much to do with the creation of a special commission to study the boundaries of the Park. In 1904 this group recommended that lands in the southeastern portion be returned to the public

domain. With the approval of Congress, the Devils Postpile and more than 500 square miles of adjacent lands were removed from the Park in 1905. Although there has since been much prospecting in the area, little if any mineral production has been achieved.

Soon after the commission studies in the Postpile area, the oddity of this geological formation became more renowned and the first newspaper articles about it were published. Anxious to give an explanation for the peculiar columns, an early writer described their origin: "Once it (the liquid basalt) flowed in a molten torrent from a nearby crater, plunged over a precipice, split into prisms, and hardened in mid-air." It was several years before Dr. Francois Matthes and other investigators gave us a much subdued but logical version of how the remarkable columns formed.

National Monument Status

In 1910 Walter L. Huber, then district engineer for the U.S. Forest Service at San Francisco, received an application for permission to blast the Devils Postpile into the Middle Fork of the San Joaquin River to create a rock-fill dam. The impounded water was to have been conducted past Rainbow Falls, and used in generating electric power for mining operations.



Walter L. Huber. His farsighted efforts set in motion the train of events that led to the establishment of Devils Postpile National Monument in 1911.

Gladser Studio

Mr. Huber was personally opposed to this tragic destruction, as were officials of the Sierra Club. William E. Colby, then secretary of the Club, took up the matter with Prof. Joseph N. LeConte of the University of California, a man more intimately acquainted with the Postpile than any other person of his day. These two presented their objection to the granting of this permit, and Mr. Huber was designated to prepare a draft of a proclamation for submission to the President of the United States.

At the same time, John Muir, Joseph LeConte, and E.T. Parsons of the Sierra Club wrote to the President and the Secretaries of Agriculture and Interior, urging that the Postpile be saved by making it a national monument. Acting upon these recommendations and under authority of the Act for the Preservation of American Antiquities of 1906, President William Howard Taft proclaimed the area Devil Postpile National Monument on July 6, 1911.*

At first the new Monument was administered by the U.S. Forest Service of the Department of Agriculture, as was the surrounding land. There was little visitation until 1928 when early mining roads were built into the area. Even then, administrative duties were light because the poor-quality road was uninviting to motorists.

On August 10, 1933, after a reorganization in federal agencies, jurisdiction of the Monument was given to the National Park Service of the Department of the Interior, and on March 24, 1934, the Superintendent of Yosemite National Park was made responsible for its management and protection. On October 4, 1971, responsibilities for the area were transferred to the Superintendent of Sequoia and Kings Canyon National Parks.

★In the presidential proclamation establishing this National monument, the word Devil appears without an "s": Devil Postpile. At first this was thought to be a clerical error, but subsequent research has shown the Devil spelling on the 1901 U.S. Geological Survey map of the Mount Lyell quadrangle. In 1953 the U.S. Board of Geographical Names approved Devils Postpile (without an apostrophe) for general usage.

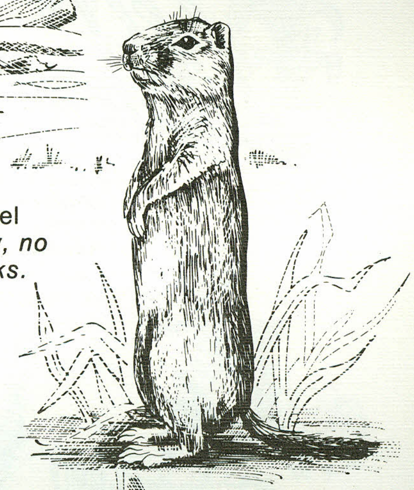
The Monument Today

Today, the National Park Service continues to administer Devils Postpile National Monument and is constantly planning ways to better provide for the increasing numbers of visitors while still preserving the area's features. Nearly 100,000 visitors come to the Monument each summer.

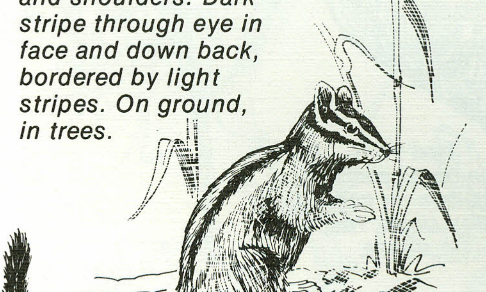
PLANTS AND ANIMALS

Most visitors to Devils Postpile are interested mainly in the geologic formations, and only secondarily are they aware of the plants and animals. Nevertheless, the piercing call of a Belding ground squirrel (picket pin) may be all-absorbing as the animal dives into its hole. This book, however, does not pretend to aid in the identification of local plants and animals; there are many books with that purpose. Instead, only a few of the most common birds, mammals, and plants are listed here. All of them may be easily seen along the trail to the Postpile.

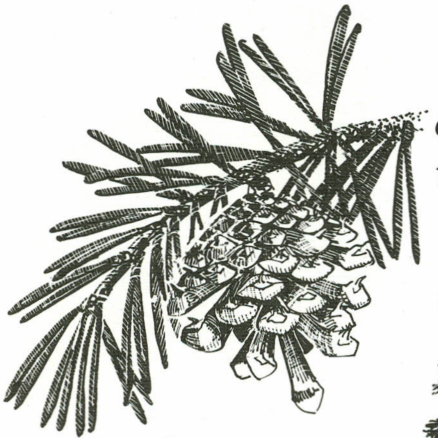
Golden-manteled Ground Squirrel
Head and shoulders golden-yellow. White stripe bordered by two black stripes on each side of back. On ground, low in trees and shrubs.



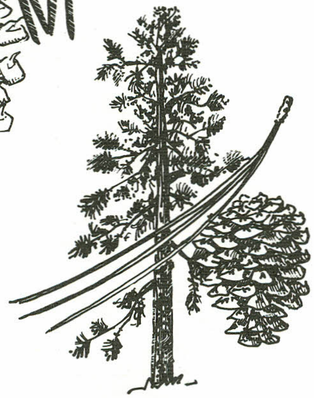
Belding Ground Squirrel
Brownish-grey, no stripes or flecks. In meadows.



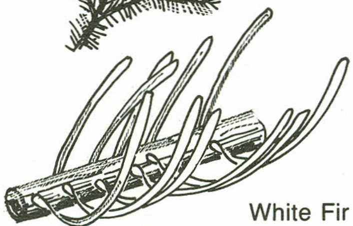
Lodgepole Chipmunk
Brownish-grey head and shoulders. Dark stripe through eye in face and down back, bordered by light stripes. On ground, in trees.



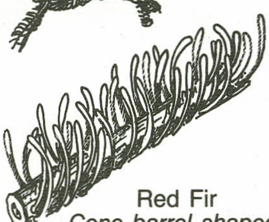
Lodgepole Pine
Cone 1-2 inches,
needles in 2's.
Throughout area.



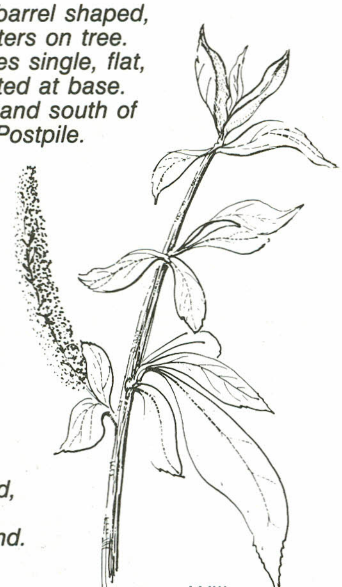
Jeffrey Pine
Cone 3-6 inches,
needles in 3's.
On dry slopes.



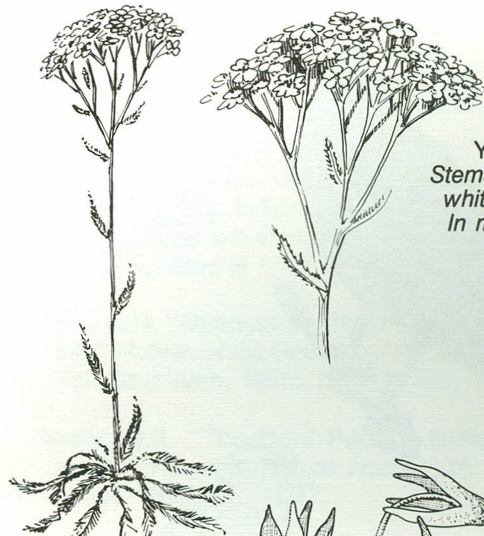
White Fir
Cone barrel shaped,
shatters on tree.
Needles single, flat,
twisted at base.
East and south of
Postpile.



Red Fir
Cone barrel shaped,
shatters on tree.
Needles single, round.
On slopes.



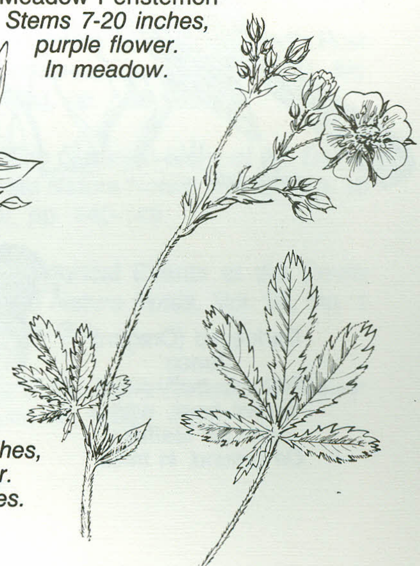
Willow
Stems 6-25 feet.
Along river.



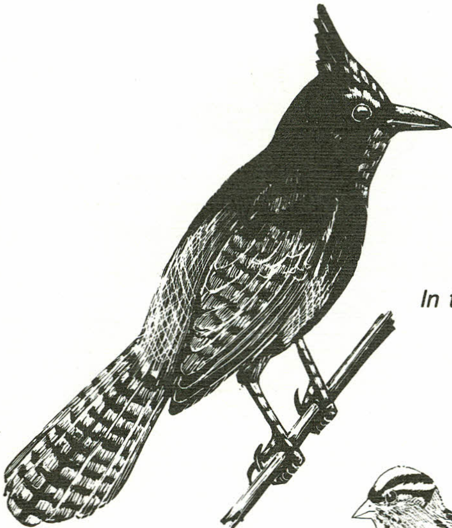
Yarrow
Stems 1-2 feet,
white flower.
In meadow.

Shooting-star
Stems 12-18 inches,
pink-purple flower.
In meadow.

Meadow Penstemon
Stems 7-20 inches,
purple flower.
In meadow.

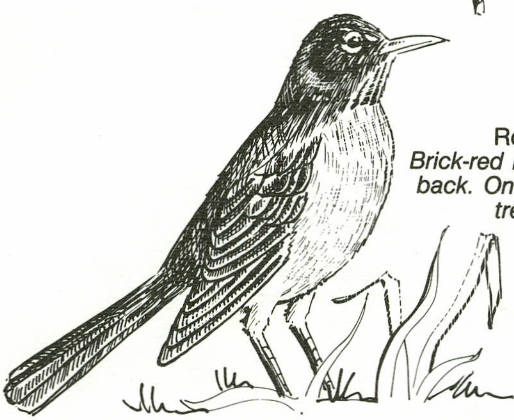


Cinquefoil
Stems 6-24 inches,
yellow flower.
In moist places.

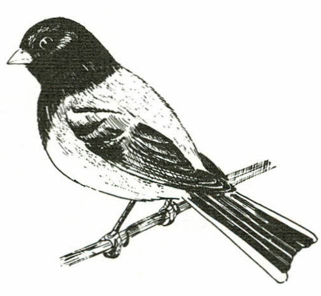


Stellar's Jay
Crested, dark blue-grey. In trees, on ground.

White-crowned Sparrow
Stiped crown, greyish throat. On ground, low in trees and shrubs.



Robin
Brick-red breast, grey back. On ground, in trees.



Dark-eyed (Oregon) Junco
Rusty or buffy sides, brown back, white outer tail feathers. On ground, in trees.

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The National Park Service, of which Devils Postpile National Monument is a unit, is dedicated to the preservation of America's scenic, scientific, and historic heritage for the enjoyment of the people today and those of future generations.

The Sequoia Natural History Association is a nonprofit organization cooperating with the National Park Service in its programs of interpretation for visitors to Sequoia and Kings Canyon National Parks and Devils Postipile National Monument.

EPILOGUE

In an earlier time, our fathers and grandfathers saw the wonders of nature every day. To live better — or to survive — they studied what they saw. Now we are insulated from the Earth by civilization, and study nature (sometimes casually) for enjoyment and mental refreshment rather than for food, clothing, and shelter.

Men considered blasting the Devils Postpile into the nearby river to form a dam, but decided that the formation was more important as a source of wonder than as a source of hydroelectric power, and instead passed laws that required it to be preserved for the enjoyment of future generations.