YOSEMITE

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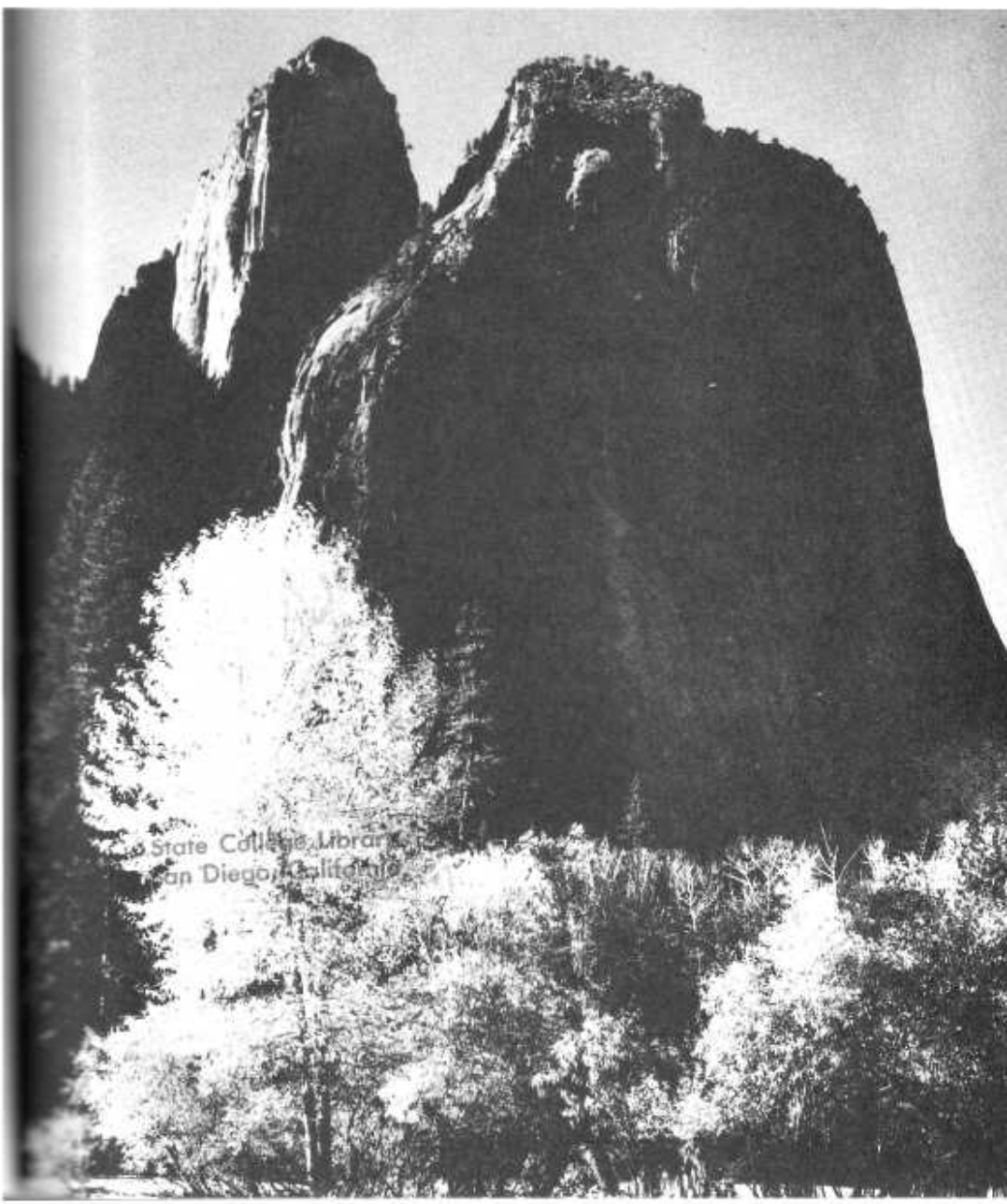

—*Whittenburg, NPS*

In cooperation with the National Park Service.

Cover — Autumn in Yosemite Valley
Photo by Ansel Ward

yosemite
NATURE NOTES

Since 1922, the monthly publication of the National Park Service and the Yosemite Natural History Association in Yosemite National Park.

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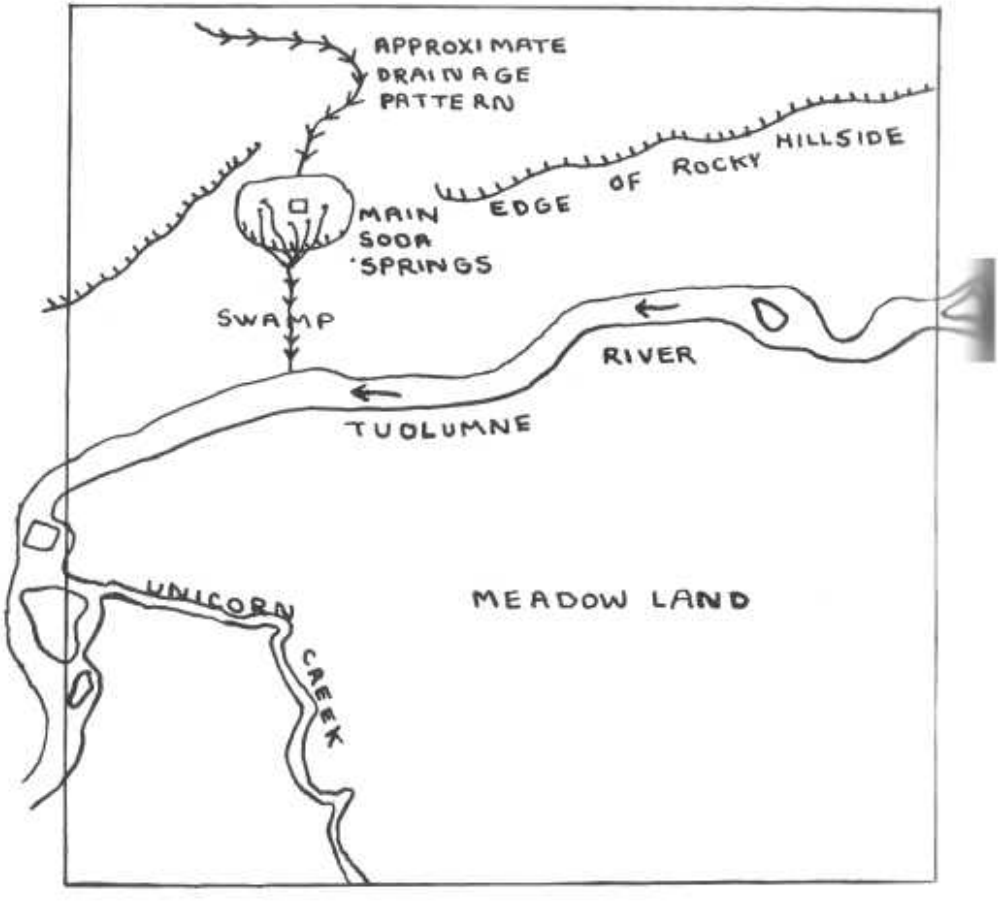
SODA SPRINGS

Mary E. Whittenburg, Ranger-Naturalist

Many a weary hiker has quenched his thirst with the ice cold bubbling waters of the somewhat famous Soda Springs which rise at the northern edge of Tuolumne Meadows. You should, too, if the opportunity presents itself. Fill your cup and then dangle your hand in the clear soda water; the chill of it seems to permeate right to the bone. Add a bit of lemonade or any fruit juice you prefer to your cup and settle yourself on the grass for the pause that refreshes. Soda water as a substitute for baking powder makes delicious biscuits and pancakes, too.

Besides the appeal of this refreshing water, there is the allure of mystery. No one seems to know where the springs come from. Reference to the springs is made in books, but nothing is said about their origin. So, here are the facts, the wild guesses, and the arguments that have been presented in books and in lively discussions among naturalists and bystanders. The problem now belongs to you, the reader, also.

A geology book will tell you that soda or carbonated springs usually arise in volcanic districts where there are subterranean sources of carbonic acid. If this acid under pressure comes in contact with percolating water, a large amount is dissolved. When the water reaches the surface, the pressure is released and bubbles of carbon dioxide gas escape. We then have a carbonated spring. However, the books also say that Soda Springs is not in a volcanic district. The word "volcanic" refers to openings in the earth from which molten material is ejected. Although these springs may not be in a volcanic area, the granite dome from which the water emerges was once molten magma. Of the gases present in ordinary magmas, steam usually comprises about eighty to almost one hundred per cent. Second in abundance is carbon dioxide, which results principally from the inclusion of limestone in the molten mass. If



Soda Springs — Tuolumne Meadows

the source of carbon dioxide can be found, then the mystery will be solved. Perhaps magmatic carbon dioxide was included in minerals and percolating water is absorbing the carbon dioxide.

Soda Springs is only about twenty seven miles from Mono Lake which contains about seventy-five million tons of sodium carbonates. The carbonates are probably deposited when excessive evaporation takes place. There may be lakes supplying water to Soda Springs containing a fairly high concentration of carbonates which would be the source of carbon dioxide. Objections to this theory would be that a constant source of carbon dioxide would be needed and that the lakes in the immediate area of Soda Springs seem to be mostly neutral.

Glaciers once covered Tuolumne Meadows. One of the deposits made in glaciation would be terrestrial organic matter. The decay of organic matter releases carbon dioxide. Water may be percolating through some organic glacial deposit and absorbing the carbon dioxide. This theory may be a little far-fetched, but nothing should be overlooked.

Probably the best solution yet was presented by Bill Steinkraus, a ranger naturalist in Yosemite. He investigated and followed the drainage

pattern above Soda Springs. The approximate drainage pattern is found in the diagram opposite this page. Running parallel to this drainage pattern just above the springs were found major fractures in the granite. Near the fractures, Bill found some volcanic rock and a piece of granite with a thick coating of iron oxide. Volcanic carbon dioxide may be originating from somewhere in the depths of the underlying granite or even below it and mixing with the ground water. The iron coated granite and the iron colored mound from which the spring bubbles may have a common source of iron in the fractures where a concentration of minerals is likely to occur. The reddish mound which marks each spring is carbonate of lime colored with iron oxide. This deposit is very common in carbonated springs. Besides the iron colored lime carbonate deposit, there are soda salts which appear in the adjoining grassy land. The following analysis shows the water to be primary and secondary alkaline in character.

Analysis of the Lambert Soda Springs

(Analyst and authority, F. M. Eaton (1909). Constituents are in parts per million)

Temperature ..... 8° C. (47° F.)

Properties of reaction:

Primary salinity	11
Secondary salinity	0
Tertiary salinity	0
Primary alkalinity	36
Secondary alkalinity	53
Tertiary alkalinity	7

Constituents:	By Weight	Reacting Value
Sodium	229	9.96
Potassium	5.3	.14
Calcium	196	9.81
Magnesium	20	1.64
Iron, Aluminum	6.2	.22
Sulphate (SO_4)	24	.49
Chloride	66	1.87
Carbonate (CO_3)	564	18.80
Silica (SiO_2)	58	1.93
	1,168.5	.....
Carbon dioxide (CO_2)	present	present

There are the facts. Perhaps you will be the one to find the solution.

DIGGER PINES AT 5200 FEET

Jack F. Fry, Ranger-Naturalist
Rolf W. Benseler, Junior Specialist in Forestry
School of Forestry, University of California

The digger pine (*Pinus sabiniana*) is usually found in the lower foothills. Cole ("The Cone Bearing Trees of Yosemite National Park", YNN XVIII; 5), states that this tree is normally found between 600 and 2000 feet in the Yosemite region. A group of digger pines at approximately 5000 feet was called to our attention; the purpose of this article is to give a brief report of the location and some of the pertinent information regarding these trees.

This group of digger pines is located in Section 17, Township 4 South, Range 21 East, M.D.M. It is just west of the Wawona Road at a point .8 miles north of the junction of Alder Creek and Wawona Road. The trees are growing on a steep, south-facing slope at an elevation of from 5100 to 5200 feet. The soil is shallow and is of granite origin. The most northerly tree is about 20 yards down from the road and is opposite U.S.G.S. benchmark K715. This particular tree is also located higher on the hillside than any of the others.

The number of mature trees present in this group is from 25-30. Several of these trees observed to have numerous cones. In order to obtain a clue as to when these trees became established, an increment boring was taken from one of the largest, and by this technique, the age of the tree was estimated to be approximately 100 years. The diameter of the trunk at breast height was 34.6 inches. (Increment boring is a technique whereby a core is removed from the trunk of a tree by means of a hollow drill. From this core, the annual rings can be counted and the approximate age of the tree determined.) An increment boring was taken from a smaller tree with a diameter at breast height of 21.1 inches. The age of this tree was estimated to be from 23-25 years.

Other species of plants in this area are: California black oak (*Quercus kellogii*), canyon live oak (*Q. chrysolepis*), buckbrush (*Ceanothus cuneatus*).

Mariposa manzanita (*Arctostaphylos mariposa*), and hard tack (*Cercocarpus betuloides*). The buckbrush, manzanita, and hard tack were abundant. Also present in the area are pines which exhibit characteristics of both ponderosa (*Pinus ponderosa*) and Jeffrey (*P. jeffreyi*). These trees are probably hybrids, since hybridization is known to take place between these two species.

These digger pines are scattered among the ponderosa-Jeffrey pines and brush. A few hundred feet below this group is another scattering of diggers. Scattered stands of digger pines can be seen on the opposite side of the canyon of the South Fork of the Merced River.

Cole (ibed) states that digger pines are growing at 6000 feet in the Hetch Hetchy region. A detailed study of the ecology of these regions would undoubtedly reveal many interesting facts. It is hoped that such a study may be made in the not too far distant future.

CONSERVATION QUOTES

I earnestly recommend the establishment of a Bureau of National Parks. Such legislation is essential to the proper management of those wondrous manifestations of Nature, so startling and so beautiful that everyone recognizes the obligations of the government to preserve them for the edification and recreation of the people . . . every consideration of patriotism and love of nature and of beauty and of art requires us to expend money enough to bring all of these natural wonders within easy reach of our people. The first step in that direction is the establishment of a responsible bureau, which shall take upon itself the burden of supervising the parks and of making recommendations as to the best method of improving their accessibility and usefulness.

—William Howard Taft

—*Anderson, NPS*

For every far-seeing conservationist there have been scores or hundreds of short-sighted practical persons who thought that we should be satisfied with a small number of areas which in narrow boundaries preserved specific scenes of wonders of nature. They lost sight of the need for spacious areas, if the wilderness, with its endowment of plant and animal life, is really to be preserved as more than a museum piece.

HORACE M. ALBRIGHT
DIRECTOR, 1929-1933
NATIONAL PARK SERVICE

A CEDAR GROWS BESIDE A BRIDGE

Mary V. Hood

—Photo Copy by A. William Hood

Sentinel Bridge, circa 1865

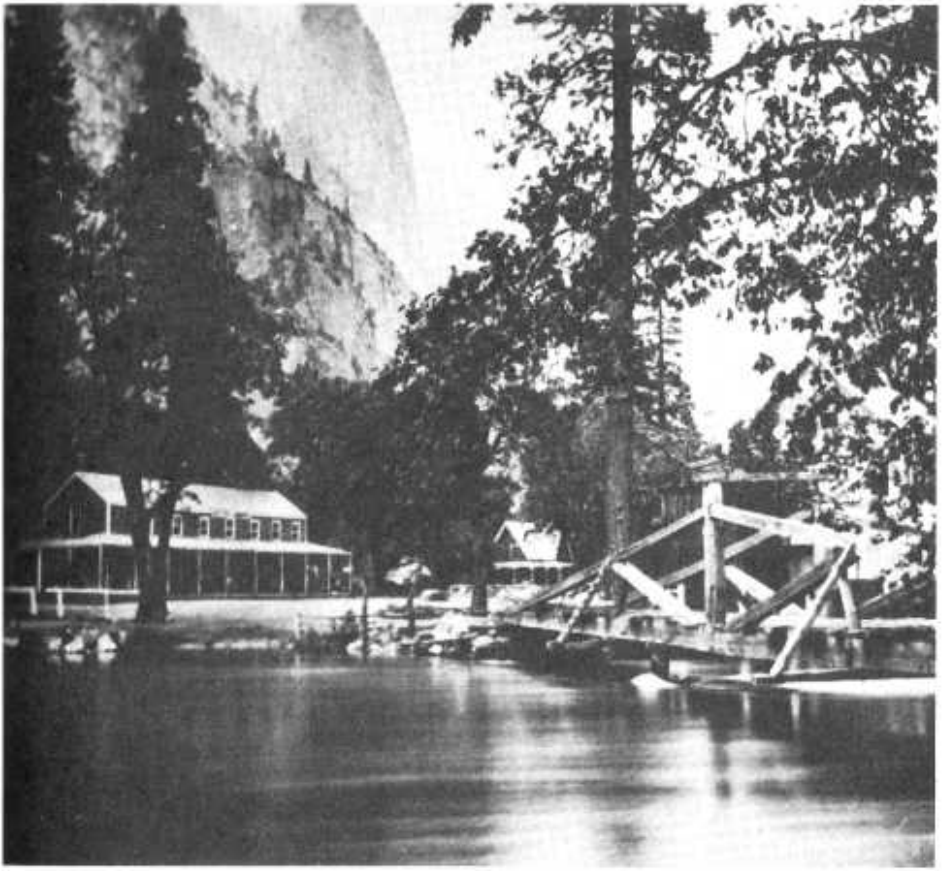
The Upper Hotel shows little change from 1859 except that window frames have been added. Later accounts refer to this building as the Cedar Cottage.

The first bridge has been replaced by a more substantial structure. The man in the boat may be James M. Hutchings, who purchased the hotel in 1864.

On the far bank a fair size bush is growing, and to the left, a magnifying glass reveals a small incense cedar.

The photographer was Eadweard Muybridge, who is known to have visited Yosemite Valley several times.

—Courtesy of California Historical Society



—Photo Copy by A. William Hood

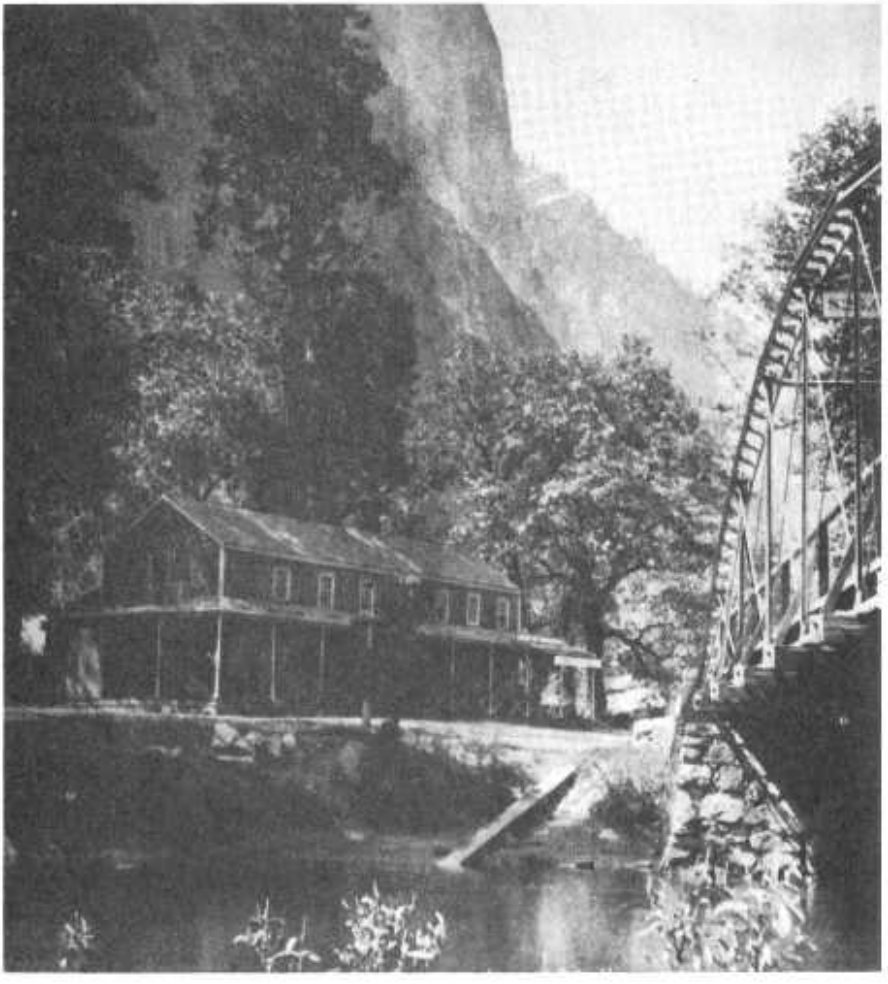
Sentinel Bridge between 1876 and 1878

Here the hotel is freshly painted and a porch has been added. River Cottage and Sentinel Hotel appear in the center and right background. The latter was built in 1876.

The bridge is still of wood but has been rebuilt and strengthened.

The small incense cedar continues to survive, or has been replaced by a sturdier seedling.

—Courtesy of Francis P. Farquhar



—Photo Copy by A. William Hood

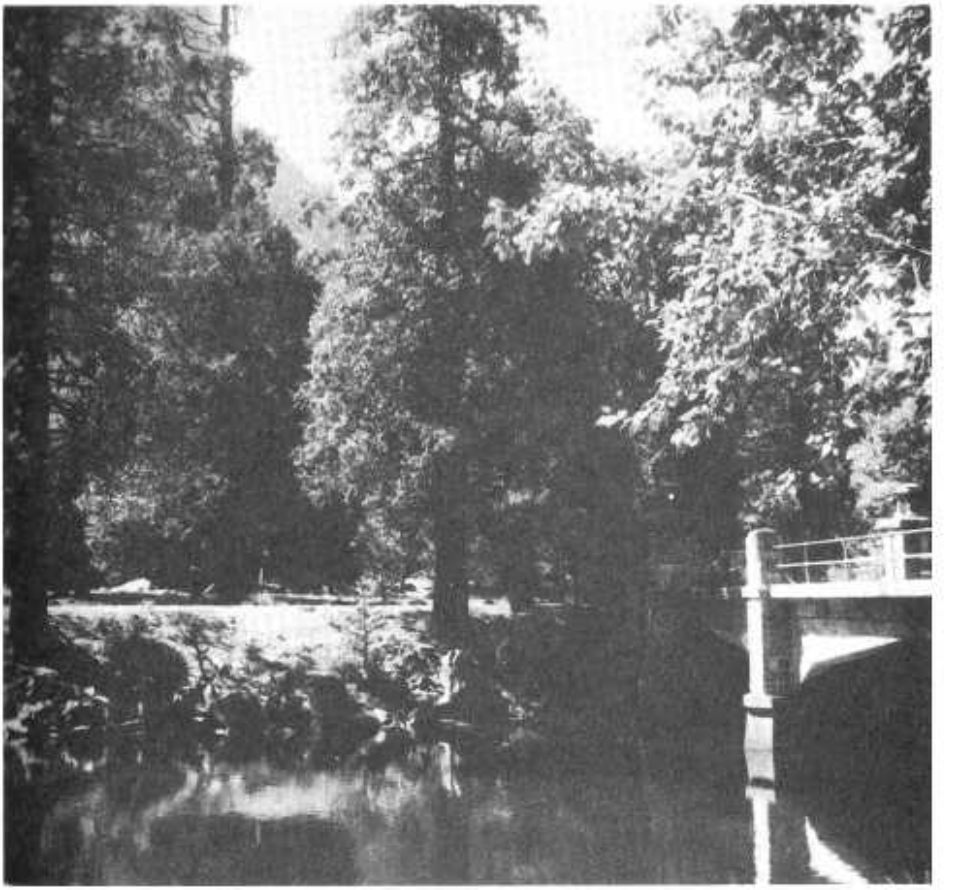
Sentinel Bridge between 1878 and 1918

Cedar Cottage remains much the same. Immediately behind can be seen the large incense cedar that was enclosed in a room while Mr. Hutchings operated the hotel. This was known as the Big Tree Room. The rooms at the right end of the porch were at this time a photographic studio.

The wooden bridge has been replaced by an all-metal structure which records state was built in 1878.

The incense cedar is now about twelve feet high.

—Photo by George Fiske



—A. William Hood

Sentinel Bridge, September 9th, 1958

In 1941 Cedar Cottage was razed. The incense cedar of the Big Tree Room can be seen, left-center rear. The upper foliage is quite sparce. The small incense cedar on the river bank has grown prodigiously and today measures three feet six inches in diameter at chest height.

The concrete bridge, seen here, was built by the Gutleben brothers, who also built the hotel at Glacier Point.

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BY IRENE PADEN AND MARGARET SCHLICHTMANN

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