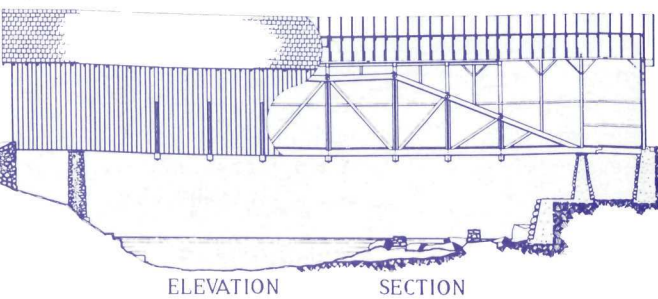


Yosemite's Bridges

A variety of vehicular bridges span the main streams and lesser tributaries in the park. The oldest is the covered bridge at Wawona, built as an open-deck structure in 1868 by Galen Clark, the first settler and state-appointed Guardian of the Yosemite Grant. In the 1870s it was converted to a covered bridge by the Washburn brothers, natives of Vermont, who supposedly had it altered to remind them of their home state. Rehabilitated by the Park Service in 1956, it can be seen today at the Pioneer Yosemite History Center.



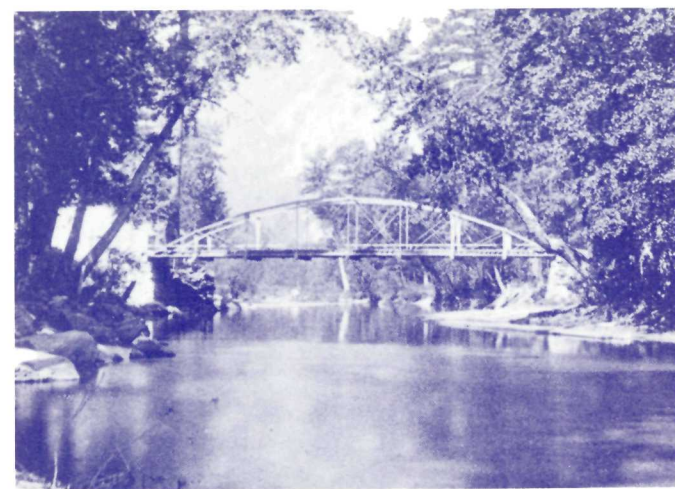
WAWONA COVERED BRIDGE, 1868  
Drawn by Dione DeMartelaere, HAER, 1991

Over the ensuing years more timber and iron trusses were built, but these eventually gave way to reinforced concrete structures; of the latter type, Sentinel Bridge (1919) and old Happy Isles Bridge (1921) remain. Many of the park bridges appear to be of solid stone-masonry construction. Actually, these arch bridges are concrete and merely faced with stone in the characteristic Rustic Style of architecture employed by the National Park Service.

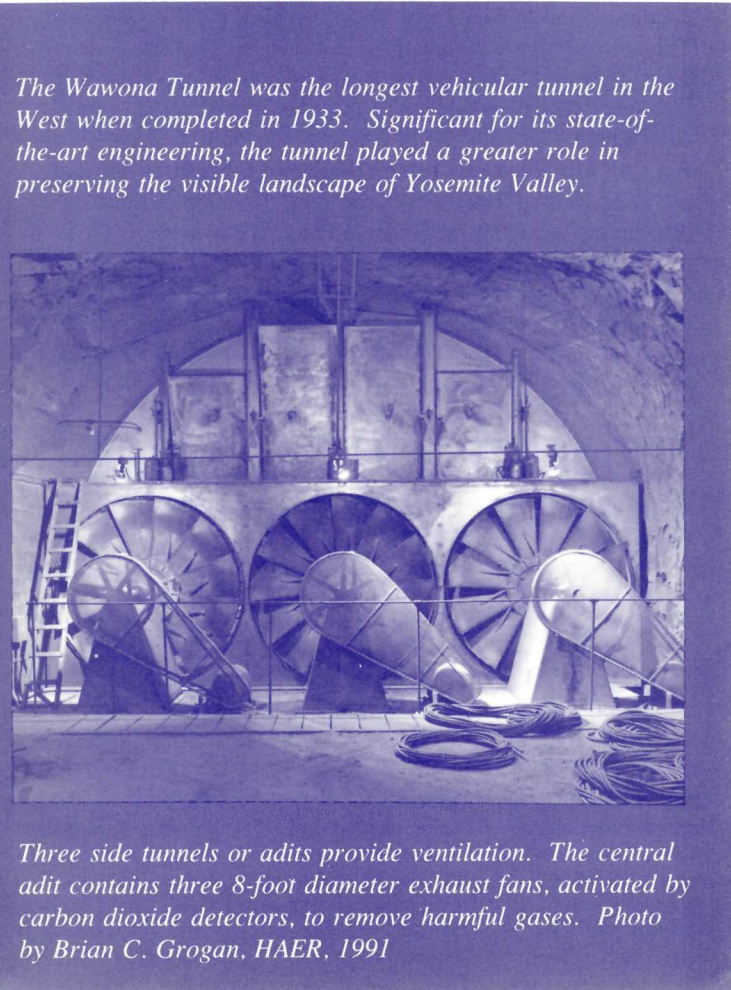
Three park bridges built in the 1930s appear to be constructed of large logs, but are in fact built of steel and concrete. Native log siding conceals the modern structure from the visitor's view. Most noticeable of these spans is El Capitan Bridge, built in 1933; other examples are found on Glacier Point Road and in Yosemite Creek Campground.

On Big Oak Flat Road three open-spandrel concrete arch bridges were constructed in the late 1930s over Cascade, Wildcat and Tamarack creeks, marking a departure from earlier Rustic Style designs.

Two recent structures, Cascade Creek Bridge on El Portal Road (1984) and a new Sentinel Bridge (1994), represent an attempt to revive the earlier rustic stone-faced designs.

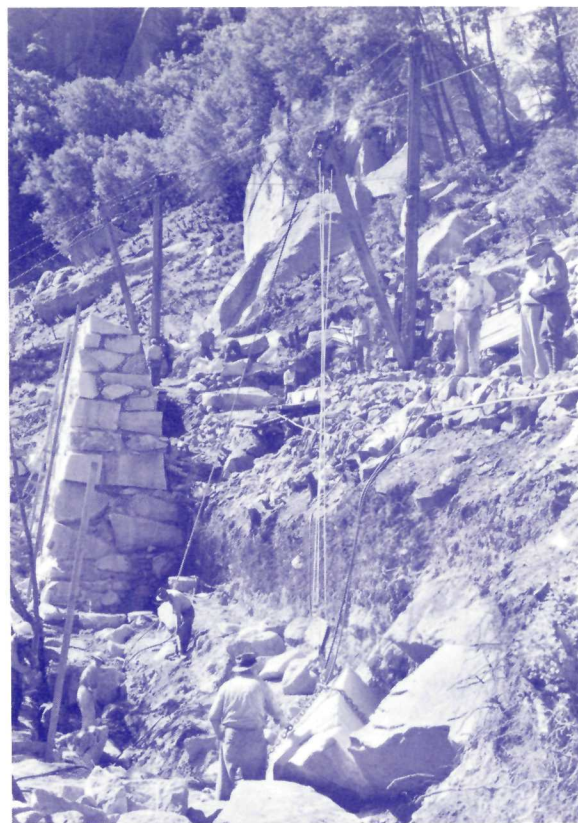


Early bridges were wood and metal trusses. The previous Sentinel Bridge was an uncommon iron bowstring-arch truss. YRL



The Wawona Tunnel was the longest vehicular tunnel in the West when completed in 1933. Significant for its state-of-the-art engineering, the tunnel played a greater role in preserving the visible landscape of Yosemite Valley.

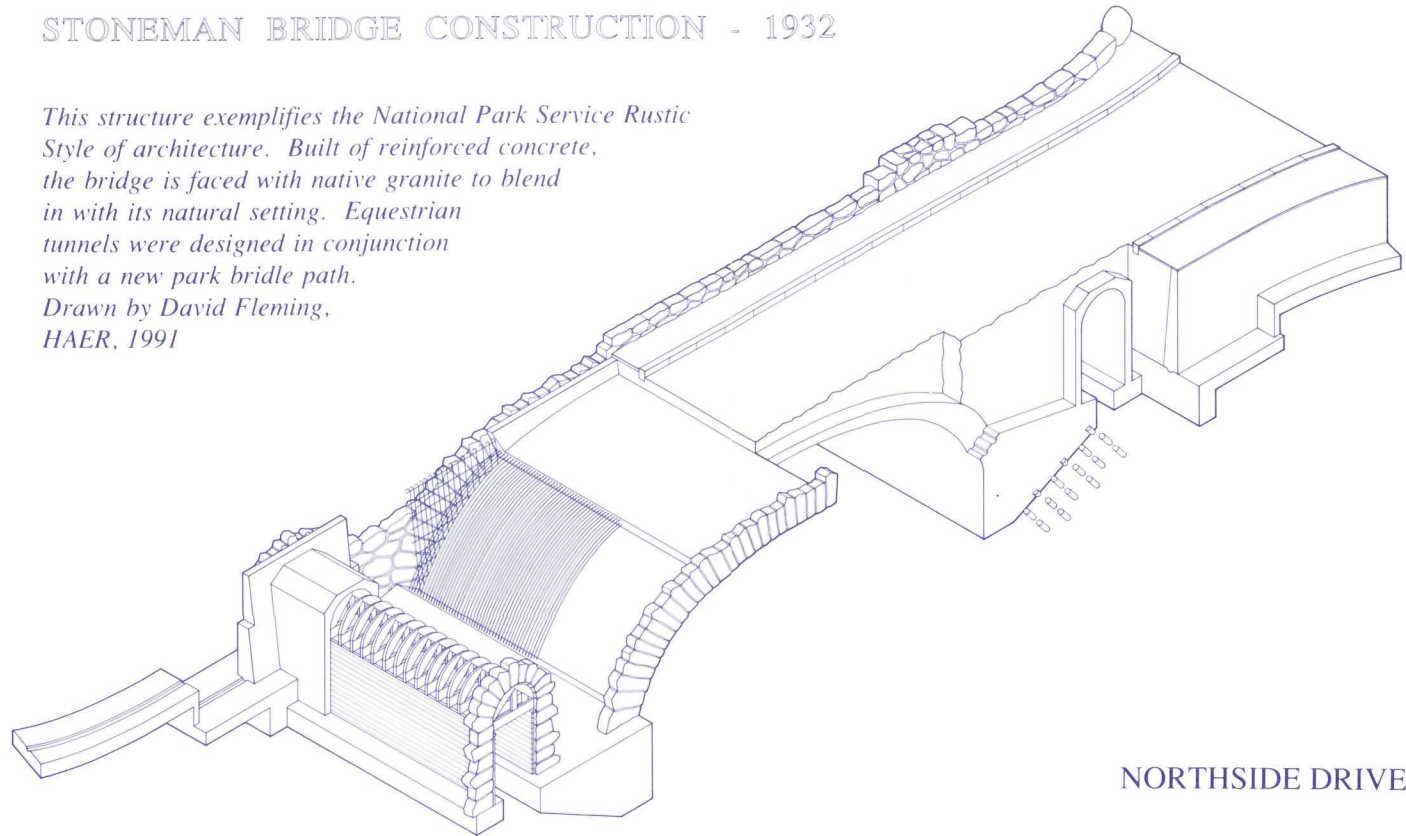
Three side tunnels or adits provide ventilation. The central adit contains three 8-foot diameter exhaust fans, activated by carbon dioxide detectors, to remove harmful gases. Photo by Brian C. Grogan, HAER, 1991



Construction of retaining wall on Big Oak Flat Road, 1939. YRL

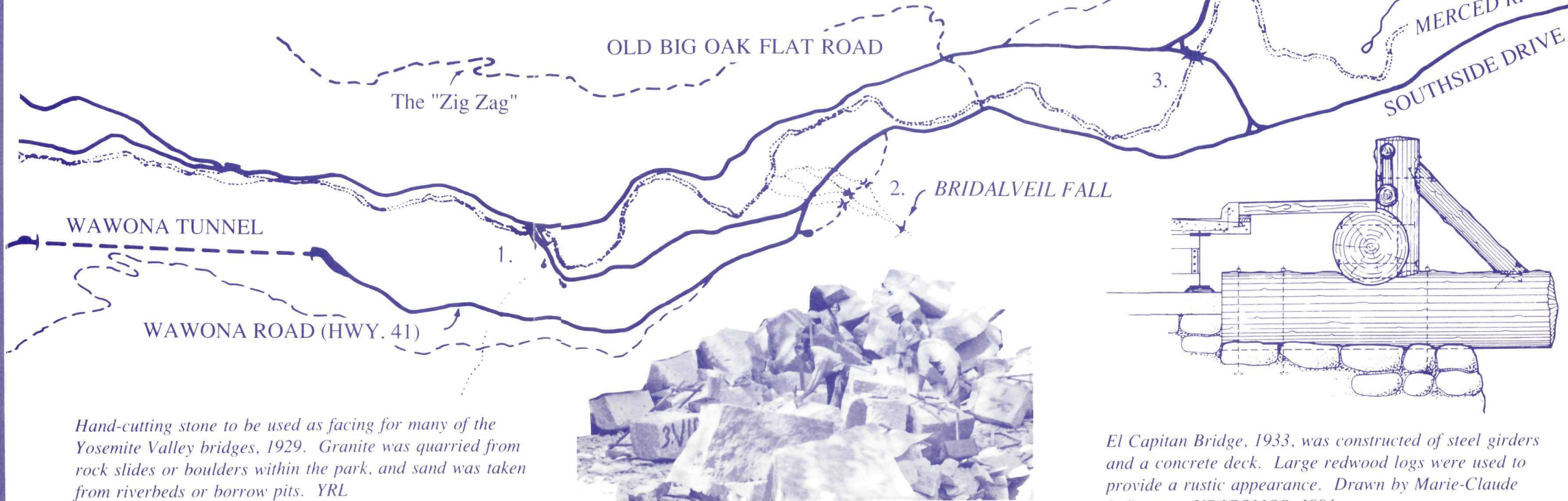
STONEMAN BRIDGE CONSTRUCTION - 1932

This structure exemplifies the National Park Service Rustic Style of architecture. Built of reinforced concrete, the bridge is faced with native granite to blend in with its natural setting. Equestrian tunnels were designed in conjunction with a new park bridle path. Drawn by David Fleming, HAER, 1991

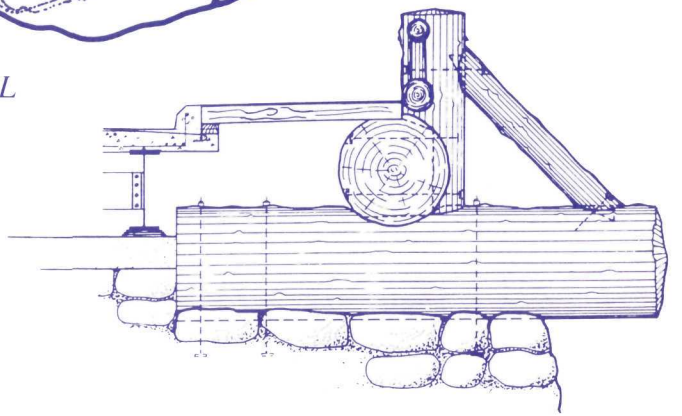


NORTHSIDE DRIVE

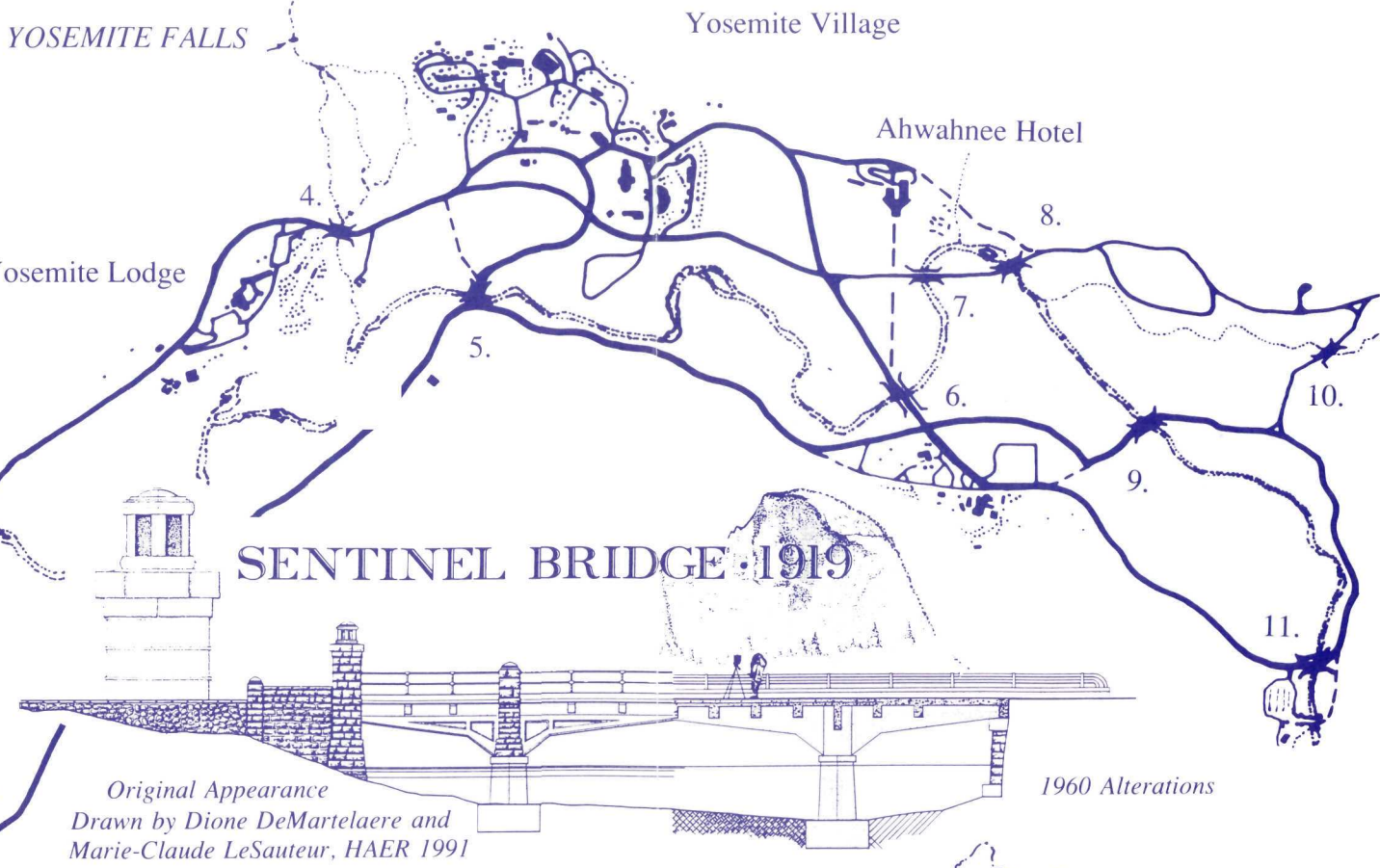
MERCED RIVER  
SOUTHSIDE DRIVE



Hand-cutting stone to be used as facing for many of the Yosemite Valley bridges, 1929. Granite was quarried from rock slides or boulders within the park, and sand was taken from riverbeds or borrow pits. YRL



El Capitan Bridge, 1933, was constructed of steel girders and a concrete deck. Large redwood logs were used to provide a rustic appearance. Drawn by Marie-Claude LeSauter, US/ICOMOS, 1991.

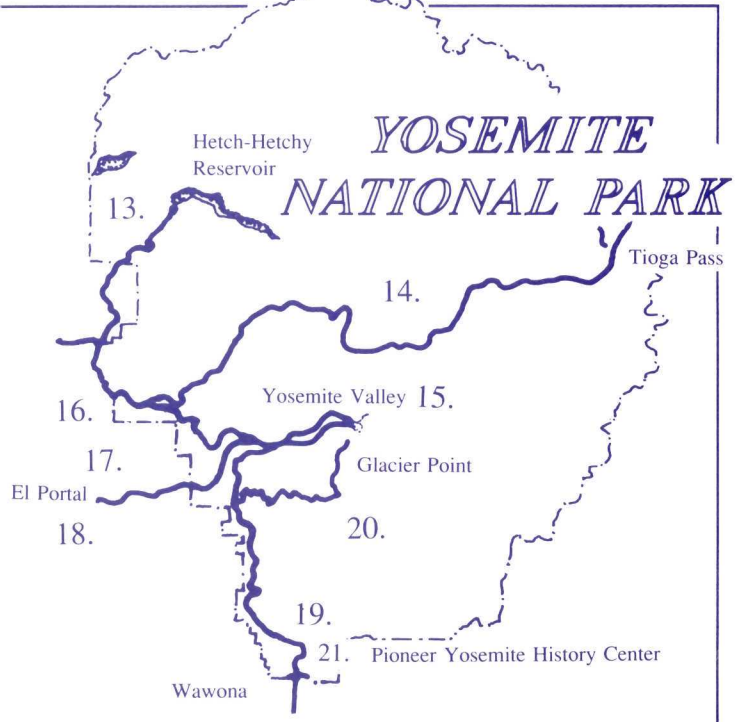


SENTINEL BRIDGE 1919

Original Appearance  
Drawn by Dione DeMartelaere and Marie-Claude LeSauter, HAER 1991

1960 Alterations

1. POHONO BRIDGE (1928)
2. BRIDALVEIL FALL BRIDGES (1913)
3. EL CAPITAN BRIDGE (1933)
4. YOSEMITE CREEK BRIDGE (1922)
5. SENTINEL BRIDGE (1919)
6. STONEMAN BRIDGE (1932)
7. AHWAHNEE BRIDGE (1929)
8. SUGAR PINE BRIDGE (1929)
9. CLARK'S BRIDGE (1928)
10. TENAYA CREEK BRIDGE (1928)
11. HAPPY ISLES BRIDGE (1929)
12. OLD HAPPY ISLES BRIDGE (1921)
13. HETCH HETCHY ROAD
14. TIOGA ROAD/HWY 120
15. VALLEY ROADS
16. BIG OAK FLAT ROAD
17. COULTERVILLE ROAD
18. ALL-YEAR HIGHWAY/HWY 140
19. WAWONA ROAD/HWY 41
20. GLACIER POINT ROAD
21. WAWONA COVERED BRIDGE (1868/1956)



HIGHWAYS IN HARMONY

Yosemite  
Roads and Bridges  
Yosemite National Park, California



Motor stage on the El Portal Road passes through Arch Rock Entrance, 1920. Yosemite Research Library (YRL)





### A Difficult Trek to Reach the Valley

*"Ten days is the minimum a traveler should allow for the journey from San Francisco, and of this three days could be spent in the valley, one in the Big Trees, the remaining six being spent in transit."*

*-early visitor to Yosemite Valley*

In 1864 the federal government established the Yosemite Grant, a natural preserve administered by the State of California; the area became a national park in 1890. Since the 1850s people had been visiting Yosemite Valley to see its "scenes of wonder and curiosity." The journey was extremely difficult, however, as no roads yet existed. Early visitors had to endure many miles of travel over primitive trails, and often arrived too exhausted to enjoy the glorious landscapes awaiting them.

### The Great Road Race

Hoping to capitalize on tourism, citizens of Mariposa and Tuolumne counties sought to entice Yosemite-bound visitors by constructing toll roads through their jurisdictions to the Valley. In the early 1870s construction began on toll roads from Coulterville, Mariposa and Big Oak Flat.

A road-building race ensued, with each community hoping to finish its road first, and thereby capture the main part of the tourist trade. Dr. John Taylor McLean completed his Coulterville Road ahead of the others, and the first carriage entered the Valley on June 17, 1874.

*The "Zig Zag" on the old Big Oak Flat Road, built in 1874. YRL*

Only 29 days later, the Chinese Camp and Yo Semite Turnpike was completed from Big Oak Flat, running slightly north of the Coulterville Road. Due to the proximity of the two roads, neither generated a profit. The Big Oak Flat Road managed to break even, but the Coulterville Road proved a financial disaster.

To the south, Albert Henry Washburn and his partners pushed a road forward from Mariposa to Big Tree Station (now Wawona) and on to Yosemite Valley in 1875. The Washburn group did well, running their own stage line on the route and attracting visitors to the Mariposa Grove of Giant Sequoias near Wawona.

These roads were all built by hand labor across extremely mountainous terrain, the only tools being picks, shovels and blasting powder. The construction of the early Yosemite road system ranks as a major engineering feat of the 1870s.

### Early Stage Travel

The new roads invited an increasing number of visitors, particularly after connecting railway lines began operations. Stage coach lines soon began regular service between the rail termini and the Yosemite Valley. These coaches carried travelers along the precipitous roads, up and down the narrow grades with blind curves, rough stone surfaces and unguarded edges. Most passengers noticed the dust more than anything else. Hoteliers met stage passengers with whisk brooms to brush them clean. One visitor complained about her visit, "Everything [about Yosemite] has been exaggerated, except the dust."

### Tioga Road Built and Abandoned

North of Yosemite Valley, the Great Sierra Consolidated Silver Mining Company began construction of a road to serve its mines on the Sierra crest in 1882. The Great Sierra Wagon Road left Big Oak Flat Road outside the park's present western boundary for Tioga Pass on the present eastern boundary. The road was intended to haul supplies for the gold and silver mines on the Sierra divide; however, soon after the road was completed in September 1883, mining activity ceased. The road quickly fell into a state of disrepair, and little or no maintenance was done until it was acquired for the park in 1915.

### Yosemite Valley Rail Road

The Merced River canyon had seemed a logical entrance to the park and Yosemite Valley, but the difficult terrain in the raging river gorge inhibited construction. It was not until 1907 that the Yosemite Valley Rail Road was constructed along the river from Merced to El Portal, from which a new stage road was extended to the Valley. Tourism again increased significantly, with most visitors arriving by rail. The old toll roads suffered a sharp decline in profits, and maintenance suffered. By the early twentieth century the toll roads came under government control.

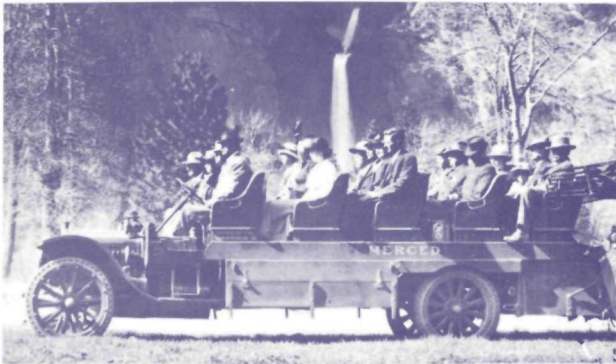
### Automobiles and Yosemite

In 1900 Oliver Lippincott drove his new steam-powered Locomobile into the park along the Wawona Road, heralding a new form of transportation within the park. Over the next several years, a number of other automobiles endured the rough roads and steep grades in order to reach the Valley and nearby attractions.

Park officials felt, however, that automobiles and motorcycles were incompatible with horse-drawn conveyances still in general use, and to allow them to use park roads would result in accidents. Accordingly, acting superintendent H.C. Benson banned motor vehicles from the park in 1907.

Outraged motorists and the California Automobile Association soon convinced the Department of the Interior to reverse the decision. Even conservationist John Muir initially supported allowing vehicles into the park. In April 1913, the Secretary of the Interior announced that cars once more could enter Yosemite National Park.

*"This form of transportation has come to stay, and to close the park to automobiles would be as absurd as the fight for many years made by old naval men against the adoption of steam in the navy. Before we know it, they will be dropping into Yosemite Valley by airship."*  
*-Secretary of the Interior, Franklin K. Lane, 1913*

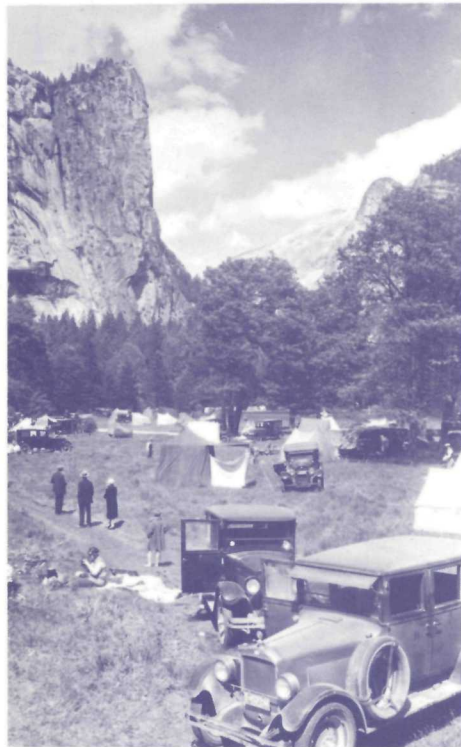


*First auto stage in Yosemite Valley. YRL*

### National Park Service

Yosemite became a national park in 1890, although the Yosemite Valley and the Mariposa Grove of Giant Sequoias were operated under state jurisdiction until 1906. The Department of the Interior was entrusted with responsibility for the park, but had no personnel to manage Yosemite and asked the U.S. Army to take charge of the park's administration. Cavalry units performed admirable service in Yosemite until 1914.

Two years later the National Park Service (NPS) was created. Its first director, Stephen Tyng Mather, was a California native deeply interested in Yosemite National Park. During his administration (1916-29), Mather was personally involved in many of the decisions that affected the park, including the reconstruction of its road system. In 1915, while he was still Assistant Secretary of the Interior, Mather and some business associates purchased the abandoned Tioga Road and deeded it to the park. As Director, he brought in the Bureau of Public Roads (BPR) to help design and construct what he called "the finest mountain road system that money and scientific technology can provide."



*Car campers in Stoneman Meadow, 1927. An increasing number of automobiles created the need for improvements to the park road system.*

### All-Year Highway

In 1924 the California Highway Commission began construction of a new highway into the park. The All-Year Highway (California Highway 140) was built along the south bank of the Merced River as far as El Portal, where it crossed to the north side to follow the route of the old carriage road built by the Yosemite Valley Rail Road. The highway was constructed largely by prison laborers. Inside the park, the new concrete road was flanked by a nearly continuous band of stone retaining walls and guard walls. The road entered the park through Arch Rock, a natural tunnel through immense boulders, a fitting portal for the magnificent landscape. The park was now accessible in all seasons, and new emphasis was given to winter sports activities, especially after the Badger Pass Ski Area opened in 1935.



### Modern Roads for Modern Times

In 1925 the National Park Service signed an agreement with the Bureau of Public Roads, U.S. Department of Agriculture, under which the BPR (later, the Public Roads Administration) would be responsible for upgrading and reconstructing roads within the National Park System. The BPR immediately commenced road work in Yosemite National Park, beginning with the paving of the Valley road system in 1926 to eliminate the choking dust that irritated so many visitors.

The BPR then planned a new "high gear" highway to replace the 1875 Wawona Road between the park's south entrance and Yosemite Valley. Construction began in 1932. The Park Service insisted that the new road should not adversely affect the park's scenic qualities. To preserve the beauty of the Valley landscape, a 4,230' tunnel was bored below Turtleback Dome. The new \$2 million Wawona Road was completed in 1933, and in 1934-35 the spur road to Glacier Point was rebuilt. Motorists could now enjoy some of the park's most outstanding views.

Work followed on rerouting the Big Oak Flat Road, again employing tunnels and stone retaining walls for concealment. The new road offered stunning views of the Big Meadow area and the Crane Creek valley. The section between Crane Flat and the Valley floor opened in 1940, and the remaining part from Crane Flat to the north entrance was built in 1969. While Big Oak Flat Road was being rebuilt, work began on the east and west ends of Tioga Road; the central section, blasted through the landscape at Olmsted Point, was completed in 1961.

[Visitors may still drive on a portion of the old Big Oak Flat Road through the Tuolumne Grove of Giant Sequoias; on Tioga Road along the access road to Yosemite Creek Campground and along a short section at the May Lake turnout.]

Another modern highway project, Hetch Hetchy Road, used a railroad right of way, built by the City of San Francisco in 1916 during the construction of Hetch Hetchy Reservoir. The City converted it into a park motor road in 1925.

*Wildcat Creek Bridge, 1939, marked a transition from the Rustic Style to a streamlined highway design. YRL*

### Caring for the Landscape

The National Park Service and the Bureau of Public Roads showed great care in constructing a modern road network through the incomparable scenery of Yosemite. Preservation of the park's natural beauty was the planners' chief concern, and every modification of the landscape was subjected to careful scrutiny. The roads were designed not only to carry heavy traffic loads, but to integrate into their natural settings.

To minimize the effect of roads through the landscape, tunnels were bored to avoid unsightly scarring of the granite cliffs. Stone retaining walls were employed to conceal road cuts, and bridges faced in natural materials were used at highly visible stream crossings. Telephone and power lines were located away from the roadside and out of the visitors' view. Road margins were reseeded with native plants by the park's landscape division, and in some cases by the Civilian Conservation Corps. The special Rustic Style designs and landscaping help the roads blend into their natural surroundings and make a drive through the park a wondrous experience.

*This brochure was produced by the Historic American Engineering Record (HAER), a division of the National Park Service, U.S. Department of the Interior. The Yosemite Roads and Bridges Recording Project, conducted in 1991, was cosponsored by Yosemite National Park, Michael Finley, Superintendent; Kevin Cann, Chief of Maintenance and Engineering; The NPS Roads and Bridges program, John Gingles, Manager; and the Historic American Buildings Survey/Historic American Engineering Record (HABS/HAER), Robert J. Kapsch, Chief.*

*The fieldwork, measured drawings, histories, photography and this brochure were completed under the direction of Eric N. DeLony, Chief and Principal Architect, HAER. The recording team consisted of Todd A. Croteau, field supervisor; architectural technicians Dione DeMartelaere, David R. Fleming and Marie-Claude LeSautour (US/ICOMOS); and photographer Brian C. Grogan.*

*This brochure was written by project historian, Richard H. Quin, designed by the HAER team, and edited by Lola Bennett.*

**10,000 to 1 Million Years Ago**  
Yosemite Valley carved by glaciers

**1850 B.C.**  
Earliest known human occupation of Yosemite Valley

**1851 A.D.**  
Mariposa Battalion invades Valley and names it "Yo Semite"

**1864**  
Yosemite Grant established by Federal government; administered by state of California

**1868**  
Wawona Bridge built by Galen Clark, first Gaurdian of the Yosemite Grant

**1874**  
Coulterville Road (toll) reaches Yosemite Valley on June 27; first road into Yosemite Valley

**1874**  
Big Oak Flat Road (toll) reaches Valley 29 days later

**1875**  
Washburn's Wawona Road (toll) enters Yosemite Valley from the south

**1883**  
Great Sierra Wagon Road completed to mines near Tioga Pass; abandoned three years later

**1890**  
Yosemite National Park established; U.S. Cavalry takes over administration next year

**1907**  
Yosemite Valley Railroad reaches El Portal; carriage road extended to Valley via new Arch Rock entrance

**1916**  
National Park Service established; all tolls abolished by 1917

**1925**  
National Park Service and Bureau of Public Roads sign agreement; BPR takes over construction of roads in all national parks

**1926**  
"All-Year Highway" reaches park through El Portal; connecting park entrance road upgraded

**1930s**  
Wawona, Big Oak Flat roads reconstructed by BPR using tunnels to preserve the landscape; Tioga road rebuilt

**1956**  
National Park Service initiates "Mission 66" program, including reconstruction of remaining section of Tioga Road

**1960s**  
Controversial Tioga Road segment through Olmsted Point dedicated 1961; new segment of Big Oak Flat Road opens 1969

**1970**  
One-way road system adopted in Yosemite Valley; east end of Valley closed to private cars; shuttle bus system established

**1980s**  
General Management Plan adopted to define future development; visitation passes 3 million; park roads nearing capacity

**1990**  
Yosemite National Park Centennial observed

**1991**  
Yosemite Park road system documented by NPS Historic American Engineering Record