

CORKSCREW BRIDGE  
(Loop Bridge  
Under-Pass Bridge  
Spiral Bridge)  
Yellowstone National Park  
Yellowstone National Park Roads and Bridges  
Old East Entrance Road, Sylvan Pass  
Yellowstone National Park  
Park County  
Wyoming

HAER No. WY-86

HAER  
WY-86

PHOTOGRAPHS

WRITTEN HISTORICAL AND DESCRIPTIVE DATA

REDUCED COPIES OF MEASURED DRAWINGS

HISTORIC AMERICAN ENGINEERING RECORD  
National Park Service  
U.S. Department of the Interior  
1849 C St. NW  
Washington, DC 20240

# HISTORIC AMERICAN ENGINEERING RECORD

## CORKSCREW BRIDGE

(Loop Bridge)  
(Under-Pass Bridge)  
(Spiral Bridge)

HAER No. WY-86

Location: 3/4 mile east-southwest of Sylvan Pass on old East Entrance Road, Yellowstone National Park, Park County, Wyoming.  
UTM: Plenty Coups Peak, Wyoming, 7.5' quad.  
Zone 12 570260mE 4923160mN

Date of  
Construction: Original structure 1904; replaced 1916; current structure 1919

Type of  
Structure: Vehicular bridge

Use: Bypassed and closed, 1929

Designer/  
Engineer: National Park Service

Fabricator/  
Builder: Built by contract, Perham and Harris

Owner: Department of the Interior, National Park Service

Significance: The Corkscrew Bridge employed an unusual engineering technique to change elevation rapidly on a steep section of the East Entrance Road near Sylvan Pass. By 1929, when it was bypassed with a road constructed along the above slope, the increasing power and speed of automobiles had rendered it obsolete.

Project  
Information: Documentation of the Corkscrew Bridge is part of the second phase of the Yellowstone Roads and Bridges Recording Project, conducted during the summer of 1999 by the Historic American Engineering Record (HAER), under the co-sponsorship of the Federal Lands Highway Program of the U.S. Department of Transportation, the NPS Park Roads and Parkways Program, and Yellowstone National Park. HAER undertook phase one of the Yellowstone Roads and Bridges Recording Project in 1989.

The project was conducted under the direction of Todd Croteau, HAER Project Leader, and Tim Davis, HAER Historian. The field team included Jill Patricia

Caouette, Field Supervisor and Architect; Nancy M. McClure, Historian; Forrest Huisman, Architect; and Meredith Mitchell, Landscape Architect. Large-format photography was produced by Jet Lowe. Justine Christianson, HAER Historian, prepared the documentation for transmittal to the Library of Congress.

FOR THE HISTORY OF THE EAST ENTRANCE ROAD, SEE HAER No. WY-25, "CUB CREEK BRIDGE"

FOR PREVIOUS DOCUMENTATION ON YELLOWSTONE ROADS AND BRIDGES, SEE:

HAER No. WY-24	YELLOWSTONE ROADS AND BRIDGES
HAER No. WY-3	GOLDEN GATE VIADUCT (see also WY-46)
HAER No. WY-7	GARDNER RIVER BRIDGE
HAER No. WY-9	FISHING BRIDGE
HAER No. WY-10	OBSIDIAN CREEK BRIDGE
HAER No. WY-12	LAMAR RIVER BRIDGE
HAER No. WY-25	CUB CREEK BRIDGE
HAER No. WY-26	CRAWFISH CREEK BRIDGE
HAER No. WY-27	FIREHOLE RIVER BRIDGE, Fountain Freight Road
HAER No. WY-28	SEVEN MILE BRIDGE
HAER No. WY-29	GIBBON RIVER BRIDGE I
HAER No. WY-30	GIBBON RIVER BRIDGE II
HAER No. WY-31	ISA LAKE BRIDGE
HAER No. WY-32	OTTER CREEK BRIDGE
HAER No. WY-33	TOWER CREEK BRIDGE
HAER No. WY-34	LAVA CREEK BRIDGE
HAER No. WY-35	SEDGE CREEK BRIDGE
HAER No. WY-36	TLF CREEK BRIDGE
HAER No. WY-37	RWC CREEK BRIDGE
HAER No. WY-38	FHWA CREEK BRIDGE
HAER No. WY-39	SODA BUTTE CREEK BRIDGE I
HAER No. WY-40	PEBBLE CREEK BRIDGE
HAER No. WY-44	FIREHOLE RIVER BRIDGE, Grand Loop Road
HAER No. WY-46	GOLDEN GATE VIADUCT (see also WY-3)
HAER No. WY-47	OTTER CREEK BRIDGE II
HAER No. WY-48	NEZ PERCE BRIDGE
HAER No. WY-49	PELICAN CREEK BRIDGE
HAER No. WY-50	SODA BUTTE CREEK BRIDGE II
HAER No. WY-87	CANYON BRIDGE
HAER No. WY-88	CHITTENDEN MEMORIAL BRIDGE

## DESCRIPTION

The Corkscrew Bridge, historically referred to by several different names including the Loop Bridge, the Under-Pass Bridge, and the Spiral Bridge, lies on a bypassed alignment of the East Entrance Road that enters Yellowstone National Park from Cody, Wyoming.<sup>1</sup> A U.S. Geological Survey benchmark installed with the foundation of the bridge identifies the elevation of the site as 8,162'. The elevation of nearby Sylvan Pass, about three-quarters of a mile to the west, is 8,541'. The purpose of the Corkscrew Bridge was to achieve a rapid descent from Sylvan Pass in a relatively short distance in order to keep the grade of the road at or below 10 percent. The extant structure consists of a reinforced concrete arch and wingwalls that form a short tunnel, together with the remnants of the earthen berms designed to carry the spiraling roadway up and around from the tunnel to the top of the bridge and to the roadway beyond.<sup>2</sup>

It appears that the fabricators of the Corkscrew Bridge constructed the concrete arch in three pours; the impression of the wooden forms used for the pours are visible inside the arch. The arch is edged with stone on either end of the tunnel. The flat faces of the tunnel above the arch are also veneered with stone, as are wing walls that extend outward at a slight angle. The top of the wing walls, sloping down from the top of the bridge to the ends of the walls, are edged with stone.

The tunnel under the arch, including the wing walls, is approximately 55' long. The maximum width of the tunnel at road-grade level is 16', and the wing walls, which angle outward from the ends of the tunnel, are 20'-10" apart at their outermost limits. The spring line of the arch begins about 8' above the ground inside the tunnel and the center point of the arch is 19' above the ground. The top of the face walls above the arch measure 23' above ground level. The 1' thick wing walls extend out from the ends of the tunnel approximately 32'. The road bed that passes over the bridge is about 24'-6" above the road that passes underneath the bridge.<sup>3</sup>

Date stones are located above the arch on either end of the tunnel and read "N.P.S. 1919," identifying the Corkscrew Bridge as a National Park Service structure built in 1919. The bridge is visible from the current alignment of the East Entrance Road, which runs above it along the slope of Sylvan Pass. Constructed during the first few years of automobile traffic in the park, the extant Corkscrew Bridge, with its sharp curve and narrow width, was soon rendered obsolete by the increasing speed of travel. Though it exhibited more substantial construction than its two

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<sup>1</sup> In this report, for consistency, the bridge is referred to as Corkscrew Bridge.

<sup>2</sup> U.S. Department of the Interior, Geological Survey, *Yellowstone National Park, Wyo-Mont-Idaho, 15 Minute Series* (Reston, VA: Geological Survey, 1986), based on 1961 version.

<sup>3</sup> Description of the Corkscrew Bridge based on personal observation and on written description by James Thompson, "Summary of the Corkscrew Bridge - 48YE734," September 1995, Corkscrew Bridge file, Yellowstone Center for Resources, Yellowstone National Park, Mammoth Hot Springs, Wyoming.



predecessors in the same location, the loop had been designed for the slower pace of stagecoach traffic and the tight curves were considered too dangerous for automobiles.

### **“A LOOP IN THE LINE”**

Congress approved an appropriation for the addition of an East Entrance Road to Yellowstone National Park in 1900. During the survey done to determine the best possible route, Capt. Hiram M. Chittenden, officer of the U.S. Army Corps of Engineers in charge of road construction for the park, reported that a route through either of the probable locations, Jones Pass or Sylvan Pass, would be “excessively difficult” to construct. Although Sylvan Pass had many obstacles, it was 1,000' lower in elevation than Jones Pass. Chittenden selected Sylvan Pass as the most practicable alternative.<sup>4</sup>

By August 1900, Chittenden had located the route more specifically and begun construction. From the eastern edge of the park boundary, the road was to follow Middle Creek up to Sylvan Pass and then proceed to the outlet of Yellowstone Lake, connecting with the Grand Loop road system on the west side of the Yellowstone River. Chittenden realized that the construction of the road east of Sylvan Pass would be particularly challenging. “The descent from the pass on the east to the valley of the North Fork of Middle Creek is excessively steep,” he noted, “and it will be a matter of great difficulty to carry the road down with a grade even as small as 10 per cent.” As officer in charge of road construction, Chittenden recommended that the gradient of all roads within the park be kept below that figure.<sup>5</sup>

Chittenden fine-tuned the route during the 1901 season. The concern for finding the best possible location for the road led him to remark that the East Entrance Road was “one of the most carefully located in the park.” All the grades on the road were light, except for the rapid descent on the east side of Sylvan Pass that he had discussed earlier. In order to mediate the steep grade, Chittenden devised an unusual design. He planned to introduce “a loop in the line” that would carry the road down the slope, keeping it within the maximum allowed grade of 10 percent.<sup>6</sup>

Later the same year, Chittenden's Assistant Engineer, S. F. Crecelius, made further surveys for the loop. Crecelius endorsed the use of such a design, commenting, “This can be made a very

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<sup>4</sup> Mary Shivers Culpin, “Cub Creek Bridge,” HAER No. WY-25, Historic American Engineering Record (HAER), National Park Service, U.S. Department of the Interior, 1989, 2.

<sup>5</sup> “Improvement of the Yellowstone National Park, Including the Construction, Repair, and Maintenance of Roads and Bridges,” Extract from the *Annual Report of the Chief of Engineers to the Secretary of War*, 1900, 5442-43; 1901, 3781-82 (hereafter cited as “Improvement,” *ARCE*).

<sup>6</sup> “Improvement,” *ARCE*, 1902, 3036.

attractive and useful feature and is earnestly recommended.” Although construction of a wooden trestle needed to complete the loop would take time, it would be possible to build a temporary bypass so as not to delay the opening of the road. Crecelius planned to build this bypass on a 16 percent grade to connect the road segments above and below the loop and facilitate the movement of traffic during construction. While this steep grade greatly exceeded Chittenden’s maximum of 10 percent, it would be used only temporarily, until the trestle was completed.<sup>7</sup>

Work continued on the East Entrance Road through 1902. The passable but still uncompleted road opened to traffic on 10 July 1903. The entire road, including that portion in the forest reserve east of the park, was nearly sixty miles long. Improvements such as widening and “general repairs” continued for the next few years. Chittenden reported that “a considerable portion of the distance was through the roughest and most difficult country on the [park] road system.” Early travelers on the route used the steep bypass segment, since the “loop in the line” had not yet been built.<sup>8</sup>

By August 1904, the road had been completed with the exception of the loop and trestle. The Corkscrew Bridge was completed by 1905, for a total cost of \$1,410.40.<sup>9</sup> The original structure employed a curved timber trestle built of unmilled logs.<sup>10</sup> The main support poles angled up from the ground to the road bed. These supports then had smaller poles crossed between them for intermediate support, with two rows of cross braces stacked on top of each other. The trestle had six distinct bays in its main structure, with smaller, partial bays filling in the space near the stone and cribbing abutments. The deck of the bridge was made of main beams overlaid with cross-plank slabs. Along with several S-curves on the road alignment, Chittenden’s Corkscrew Bridge carried the road down the slope, and was an important component of the East Entrance Road, opening up the fourth major access road to Yellowstone National Park.<sup>11</sup>

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<sup>7</sup> “Improvement,” *ARCE*, 1902, 3047.

<sup>8</sup> *Annual Report of the Acting Superintendent of the Yellowstone National Park to the Secretary of the Interior*, 1902, 14; 1903, 7; 1904, 11 (hereafter cited as *Superintendent’s Annual Report*; all military superintendents of Yellowstone were known officially as Acting Superintendents).

<sup>9</sup> There is some uncertainty about the exact completion date. A list of park bridges, compiled ca. 1916-1917 lists the date of the bridge as 1904; reports of the Chief of Engineers for 1905 and 1906 both report its completion, but list it as work done under appropriations from 1904 and 1905; “Improvement,” *ARCE*, 1904, 4177; 1905, IV, 2811; 1906, IV, 2255; Bridge list, Yellowstone National Park, File 1 A1922-1923: Bridges; Dates of Construction, Sizes, Costs, Locations; Blueprints, Estimates, Box D-15, Yellowstone National Park Archives, Mammoth Hot Springs, Wyoming (hereafter cited as YNP Archives).

<sup>10</sup> See Figure 1, Appendix A.

<sup>11</sup> See Figures 2 and 3, Appendix A.

The original wooden trestle loop bridge served travelers for about ten years, when the Corps of Engineers recommended replacing it. Although not stated in the reports, it is possible that the increased load of automobiles, which were allowed in the park beginning in August 1915, necessitated a sturdier structure. In 1915, Acting Superintendent Amos Fries reported that the bridge, which he called a viaduct because it did not actually cross a waterway, needed replacement. This project was begun, but would not be completed until the following year.<sup>12</sup>

The planned replacement called for a short, 25'-span bridge with a rock fill at the west abutment. When completed in late 1916, the new loop bridge instead consisted of a 60' trestle with only two distinct bays and one layer of cross bracing. Earth-filled rock and log cribs buttressed the earthen causeway constructed to reduce the span on the north end of the bridge. The significantly shorter 1916 version of the loop bridge lacked the symmetry and rustic appeal of the earlier wooden trestle.<sup>13</sup>

The elevation and topography that made the East Entrance Road difficult to construct also restricted the length of the season that tourists could make use of the road. Snow melted late in the spring, and crews had a hard time opening the road each year and keeping it passable through early summer snow and June flooding. On 2 July 1918, the first automobile travelers of the season attempted the East Entrance, but "had to be dragged across two huge snowbanks in Sylvan Pass with ropes." The road was not considered safe for travel until the thirteenth of July that year.<sup>14</sup>

## THE NEW UNDERPASS BRIDGE

In 1919, only three years after the completion of the wood and rock fill Corkscrew Bridge, the National Park Service drew up plans for a new structure. Park engineers supervised the work at that time, preparing specifications and putting many projects out for bid by contractors. Horace Albright, superintendent of Yellowstone National Park from 1919 to 1929, approved specifications for a reinforced concrete "under-pass" bridge on 3 May 1919.<sup>15</sup>

Retaining Chittenden's method of reducing the grade of the descent by means of a loop in the road, the plans called for a new bridge on the same site, utilizing the same line of approach. Specifications instructed the successful bidder to assure continued tourist travel on the road that

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<sup>12</sup> *Superintendent's Annual Report*, 1915, 15.

<sup>13</sup> *Superintendent's Annual Report*, 1916, 24, "Improvement," *ARCE*, 1916, 1840; 1917, 1947, 3752. See Figure 4, Appendix A.

<sup>14</sup> *Superintendent's Annual Report*, 1918, 6.

<sup>15</sup> "Proposal and Specifications for Construction of a Reinforced Concrete Under-Pass Bridge Near Sylvan Pass, Yellowstone National Park, Wyoming," 1919, File 14, Box D-14, YNP Archives.

passed over and under the bridge throughout the construction period. The engineers had designed the new bridge so that it could be built beneath the existing wooden bridge, with minimal alteration to the bracing of the old structure. While aware that construction would probably require the removal of part of the log cribbing on the old fill, the park service expected the contractor to ensure safe travel over the old bridge “at all times” and for “all classes of vehicles that use the park roads.” Once the new bridge was completed, the old structure would be removed.<sup>16</sup>

The bids for the project was reviewed on 5 June 1919. The successful bidder, Perham and Harris, began making preparations at the site in July and completed 60 percent of the work by September 1919. Severe weather at the beginning of October hindered construction efforts throughout the park, and Perham and Harris released their crew, leaving the bridge unfinished for the duration of the winter.<sup>17</sup>

Sylvan Pass remained buried in snow well into June 1920, forcing the contractor to apply for an extension to complete the new Corkscrew Bridge. Work resumed in July, and when Albright inspected the site on July 31, Perham and Harris were nearly ready to pour the concrete for the arch. The rock facing had almost been completed, and concrete date stones bearing the inscription “N.P.S. 1919” had been finished, despite the fact that the structure itself remained incomplete; the work had been funded under the 1919 appropriation. The contractor completed the bridge and site cleanup in August and Yellowstone National Park crews finished off the structure with fill, which had not been included in the contract.<sup>18</sup>

### “VERY STRIKING ENGINEERING”

The East Entrance Road quickly became a popular route into the park. Travelers commented on both the unusual structure and the steep grade of Sylvan Pass that had made the loop necessary. In September 1919, Francis Goodale traveled through Yellowstone with his Uncle Charles. Their journey included a side trip out the East Entrance to Shoshone Dam near Cody, Wyoming.<sup>19</sup> Although the timing of his trip probably coincided with construction of the reinforced concrete arch bridge, Goodale did not mention the work, though he observed that “after crossing the Shoshone [Absaroka] range through Sylvan Pass, the road goes down a narrow rocky canyon where it is so steep that it follows a spiral course, with many curves.”

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<sup>16</sup> “Proposal and Specifications...Concrete Under-pass Bridge.”

<sup>17</sup> “Proposal and Specifications...Concrete Under-Pass Bridge”; *Monthly Report*, Yellowstone National Park, July 1919, 7; September 1919, 6; October 1919, 7, Yellowstone National Park Research Library, Mammoth Hot Springs, Wyoming.

<sup>18</sup> For completed bridge, see Figure 5, Appendix A.

<sup>19</sup> Francis Goodale to “Father and Mother,” 7 September 1919, Folder 1, Francis Goodale Papers, SC 1456, Montana Historical Society Archives, Helena, Montana.

Goodale noted that the entire twenty-six mile road from the Lake to the East Entrance passed through “splendid mountain scenery.”<sup>20</sup>

The Corkscrew Bridge has also been pictured on numerous postcards through the years. While most postcards of Yellowstone feature natural and scenic wonders, a few reproduce photographs of park structures such as bridges, viaducts, and particularly impressive road segments, along with the stone arch at the North Entrance to the park. The caption of one of several cards depicting various incarnations of the bridge called attention to the structure’s unusual design, stating: “A point on the Cody road grade where scant room makes this spiral, or loop, a necessity. Very striking road engineering.”<sup>21</sup>

## EAST ENTRANCE ROAD REROUTE

By the mid-1920s, the increasing use of automobiles had begun to have significant impacts throughout the National Park System, so that widening and resurfacing of park roads became a priority in road improvement plans. In 1926, the National Park Service signed a memorandum of agreement with the Bureau of Public Roads. The Bureau’s civil engineers assumed responsibility for road construction, but worked with the National Park Service’s landscape engineers in designing roads to lessen their impact on the landscape. One of the Bureau of Public Roads first projects in Yellowstone was the reconstruction of the East Entrance Road.<sup>22</sup>

Surveys of the road done in 1926 and 1927 focused attention on the east slope of Sylvan Pass, which was still considered the most challenging section. Bureau of Public Roads Highway Engineer C. F. Capes reported that “the four mile section descending from Sylvan Pass toward the East Entrance is the most difficult and heaviest piece of construction work in the Park, estimated at \$50,000 per mile.” Capes was concerned about the existing grades, some of which reached 10, 12, and even 16 percent. At the preliminary survey stage, Capes advised that it would be necessary to either construct several spiral curves with under-pass bridges or develop distance by constructing several very expensive switchbacks.”<sup>23</sup>

In addition to the expense of excavating and constructing such a serpentine routing, the proposed location would create deep snow drifts, requiring park crews to expend inordinate effort to meet the targeted June 20 opening date for the East Entrance Road. An alternate location was

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<sup>20</sup> Goodale letter, 7 September 1919.

<sup>21</sup> Bloom Brothers Company, publisher, “Spiral Bridge on the Cody Road, Yellowstone Park” postcard, Catalog number YELL 142504, Yellowstone National Park Museum Collection, Mammoth Hot Springs, Wyoming.

<sup>22</sup> Culpin, “Cub Creek Bridge,” 3-4.

<sup>23</sup> [C. F. Capes], Notes, “1927 Road File: Appropriations and Allotments, Projects, Oiling, Road Assessments and Surfacing Plans, Estimates,” Box D-2, YNP Archives.

surveyed to avoid the snow conditions through the gulch. This “upper line” would follow along the south exposed slope of the hillside above, providing a more practical and economical route in terms of snow removal and perhaps scenery as well. The alternate route would bypass the Corkscrew Bridge as the road was laid out in such a way that it gained elevation more gradually over a distance of several miles along the slope well above the original location.<sup>24</sup>

By the time the contract for the reconstruction of the East Entrance Road was awarded to the Morrison-Knudson Company of Boise, Idaho, in 1928, Park Service and Bureau of Public Roads officials had decided to take this more gradual route and abandon the loop bridge and its sharply curving approaches. Work soon began on a four-mile section of the new road. Care was taken to ensure that the construction project did not interfere with tourist traffic. The older alignment would be used until the new section could be completed from the East Entrance to Sylvan Pass. Work continued the following year, but Albright predicted that it would be another year before the new segment could be used by traffic.<sup>25</sup>

As work proceeded, the road was cut into the side of the mountain along a relatively gentle grade, rendering the old S-curves and loop bridge unnecessary.<sup>26</sup> Although the new alignment was considered more economical and practical than the old road through the valley, construction proved difficult due to the steep incline and the presence of the old road just below. The park had to implement traffic controls, closing the road completely between 7:00 p.m. and 7:00 a.m. Construction also had to be shut down periodically during the day to allow passage of tourist traffic. Work was further frustrated by tourists who simply broke through the barriers and proceeded on when the road was closed.<sup>27</sup>

By October, work on the East Entrance Road, including that through Sylvan Pass, was deemed “practically complete.” C. F. Capes reported that the new alignment would “supplant the present far-famed Sylvan Pass road,” likely referring to the renowned S-curves and Corkscrew Bridge. Although the road through the pass still needed final grading and surfacing, Capes was

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<sup>24</sup> “Preliminary Report for Development of Park Highway System, Yellowstone National Park, Wyoming,” 18 January 1927, File “1927-1928: Construction Reports, Preliminary Report on Development of Highway System, Photo Survey of Work in Progress,” Box D-12, YNP Archives.

<sup>25</sup> *Superintendent's Annual Report*, 1928, 7, 1929, 15.

<sup>26</sup> Figure 6, Appendix A shows the new road in relation to the old.

<sup>27</sup> *Monthly Report*, Yellowstone National Park, July 1929, 7; Thompson, “Summary of the Corkscrew Bridge.”

confident that when it reopened the following season, traffic would have little trouble negotiating the new section bypassing the historic bridge.<sup>28</sup>

## CURRENT CONDITION AND MANAGEMENT ISSUES

In 1995, Elaine Hale and James Thompson of Yellowstone's Branch of Cultural Resources made a reconnaissance survey of the bridge, which was Yellowstone National Park Cultural Resources staff then referred to as the Corkscrew Bridge. Hale and Thompson field-measured the structure and assessed its condition. They determined that the bridge was "in good but deteriorating condition." The 1999 HAER recording team also visited the site. The bridge was found to still be in good structural condition, though continuing to deteriorate.<sup>29</sup>

The concrete vault remained in good condition in 1999, but the wing walls appeared to be unstable. The mortared joints of the stonework were deteriorating and several of the stones that edge the wing walls had fallen off, exposing the concrete structure beneath them. Re-bar protruded from the top of the exposed wing walls on the east side of the bridge. Some of the dressing stones from the top, flat edge above the arch had also fallen to the ground.

The old roadbed approaching the bridge from Sylvan Pass was still visible, although trees had encroached upon it and in places were growing along the grade. Traces of the old road could be found from the bridge to a point very near the East Entrance of the park, where the old and new alignments merged. On the loop of the road descending to the bridge, a corrugated metal culvert with a stone headwall survived.<sup>30</sup>

Yellowstone road construction projects scheduled for 2002 included the reconstruction of the East Entrance Road. By summer 1999 work had already begun on segments of the road, which were to be widened to provide a 30' road surface. The current alignment of the road on the slope above was to be widened on the hill side, necessitating considerable blasting of the talus slope to produce the required width. Although major work on the section of road directly above the bridge was not scheduled to begin until 2002, some blasting was slated to occur in the fall of 1999. Related roadwork in the Mary Bay area of the East Entrance Road road required stone, which could be quarried from the hill side by the current road just down-slope, or east, of the old bridge. While quarrying building materials within the park was no longer a common practice,

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<sup>28</sup> *Monthly Report*, Yellowstone National Park, October 1929, 4; C. F. Capes, "Annual Progress Report, Bureau of Public Roads Operations, Yellowstone National Park, Wyoming, 1929," File "1929: Annual Progress Report; Bureau of Public Roads; Surveys, Construction, Engineering, Photos, Summary, Map," Box D-12, YNP Archives.

<sup>29</sup> See Figure 7, Appendix A.

<sup>30</sup> Condition assessment based on personal observation and on Thompson, "Summary of the Corkscrew Bridge."

this procedure was approved on the grounds that the upcoming roadwork would require blasting in the area anyway.<sup>31</sup>

The mountain slopes of the Sylvan Pass area are made up of talus slopes that are prone to rock slides. The Corkscrew Bridge lies below the current East Entrance Road, and there is evidence that rock debris from the road and the talus slope above frequently impacts the bridge. There was concern on the part of cultural resources staff over the effects of blasting and of the upcoming road construction on the slope, and therefore on the Corkscrew Bridge. While the contractor would be informed of the historic bridge's significance and required to follow park regulations to minimize damage to the structure, there was no guarantee that the blasting and debris would not impact the bridge.<sup>32</sup>

## SIGNIFICANCE

The Corkscrew Bridge is a significant structure relating to the construction and development of the road system of Yellowstone National Park. Hiram Chittenden's engineering solution for the rapid descent east of Sylvan Pass was an innovative design approach. Although a grade of 16 percent was possible, as evidenced by the temporary passage road used while the bridge was under construction, Chittenden designed the loop in order to keep the gradient under his maximum grade requirement of 10 percent.

The bridge is also an extant structure from the early years of the National Park Service's administration of Yellowstone and an example of the engineering division's early achievements in bridge design. While the structure itself dates to 1919, the traces of the old road preserve a historic road alignment first constructed by the U.S. Army Corps of Engineers during their earlier tenure in charge of road construction in Yellowstone. As an unusual and charismatic structure, the loopover bridge clearly made a strong impression on park visitors. The numerous postcard renditions of the various incarnations of the structure attest to its status as a prominent and popular element of the park's cultural landscape.

Ironically, the rerouting of the East Entrance Road in 1929 that bypassed the Corkscrew Bridge aided the preservation of the structure as a historic remnant, first of the stagecoach era and then of the early years of automobile traffic in Yellowstone National Park. Although deteriorating,

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<sup>31</sup> Personal communication with Elaine Hale, 28 July 1999.

<sup>32</sup> Thompson, "Summary of the Corkscrew Bridge"; personal communication with Hale, 28 July 1999.



the bridge retained much of its integrity, both in design and setting, when inspected by the HAER documentation team in 1999.<sup>33</sup>

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<sup>33</sup> Following their reconnaissance survey of the site, Hale and Thompson completed an IMACS site form that included justification for nomination to the National Register of Historic Places under criteria A, association with a significant event, and criteria C, architectural significance; IMACS Site Form, Corkscrew Bridge file, Yellowstone Center for Resources, Yellowstone National Park, Mammoth Hot Springs, Wyoming.

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Figure 1: Original wooden trestle Corkscrew Bridge. Photo number YELL 30078, courtesy Yellowstone National Park Photo Archives.



Figure 2: Road approaching Corkscrew Bridge as seen from a stagecoach. From C. C. Kreska scrapbook, "The Wonders of Geyserland." Catalog number YELL-1809, courtesy Yellowstone National Park Museum Collection.



Figure 3: S-curves between summit of Sylvan Pass and the Corkscrew Bridge, showing measures necessary to reduce the grade on the steep descent. Photo number YELL 39697, courtesy Yellowstone National Park Photo Archives.



Figure 4: 1916 version of the Corkscrew Bridge, looking east of downslope. Photo courtesy Yellowstone National Park Archives, from "Proposal and Specifications for Construction of a Reinforced Concrete Under-pass Bridge Near Sylvan Pass."

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Figure 5: Cars on 1919 version of the Corkscrew Bridge. Photo number 8020, courtesy Pioneer Museum/Gallatin County Historical Society Photo Archives, Bozeman, Montana.



Figure 6: Looking down on Corkscrew Bridge in the valley and the newly rerouted East Entrance Road, 1935. Photo courtesy Yellowstone National Park Archives, from C. F. Capes, "Progress report on Bureau of Public Roads Activities on Yellowstone National Park Highway System."



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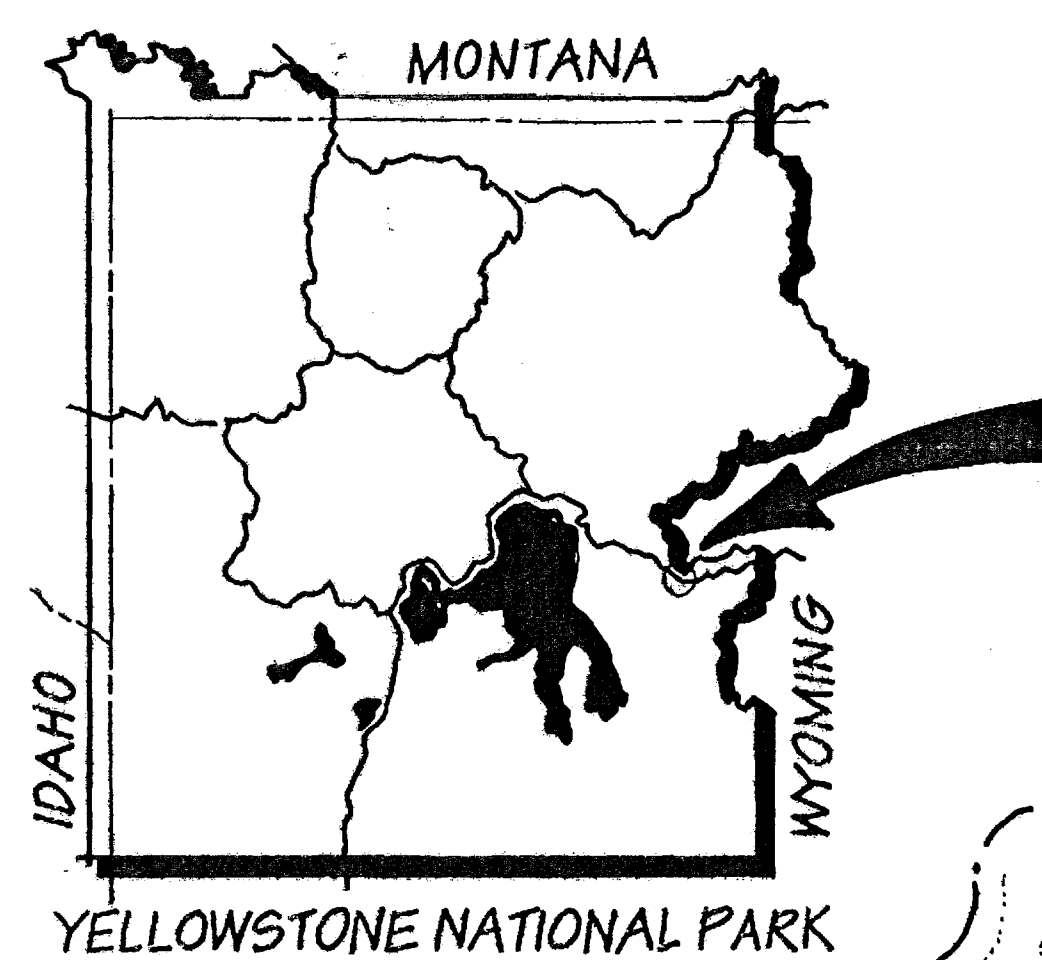
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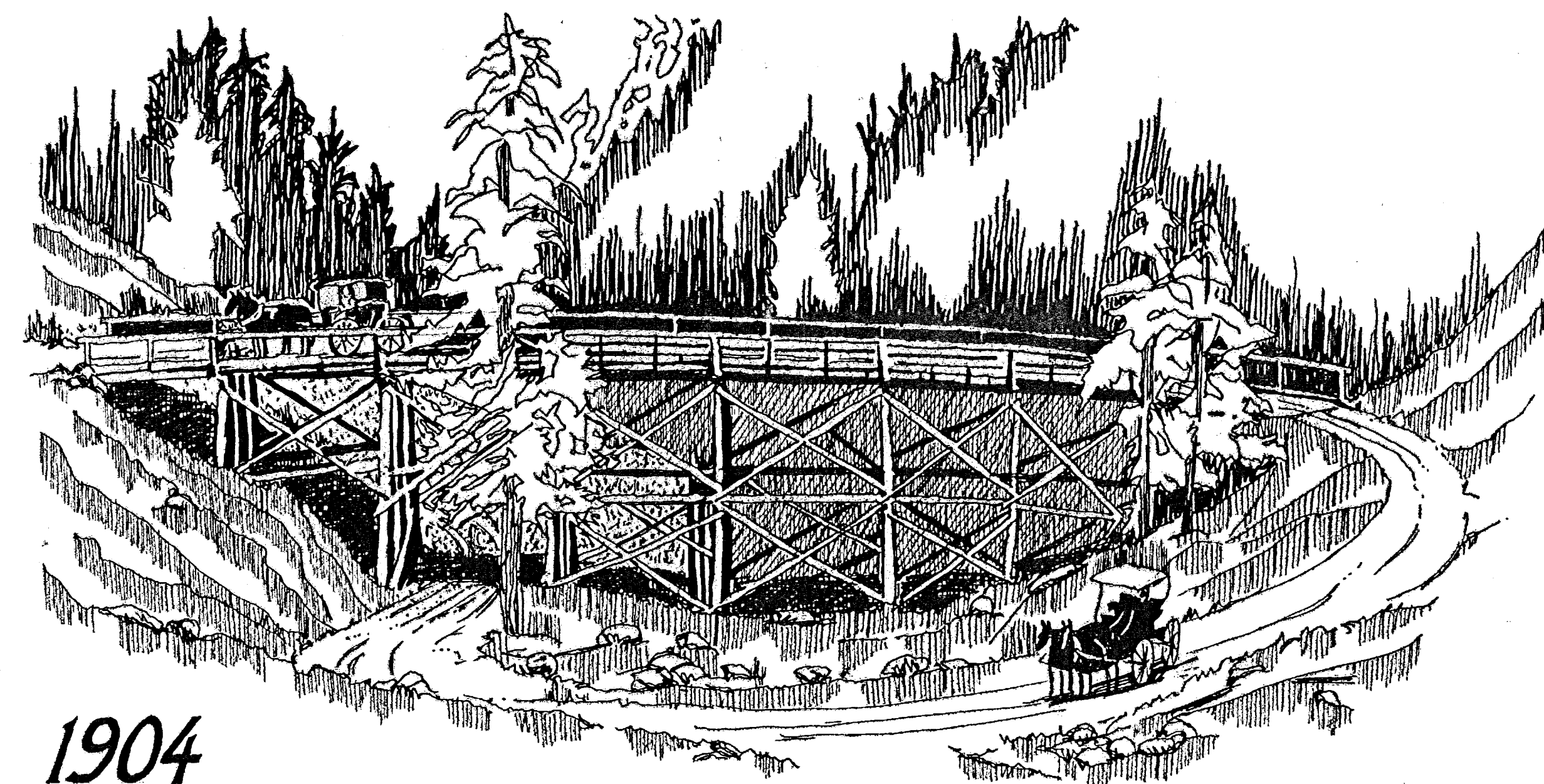
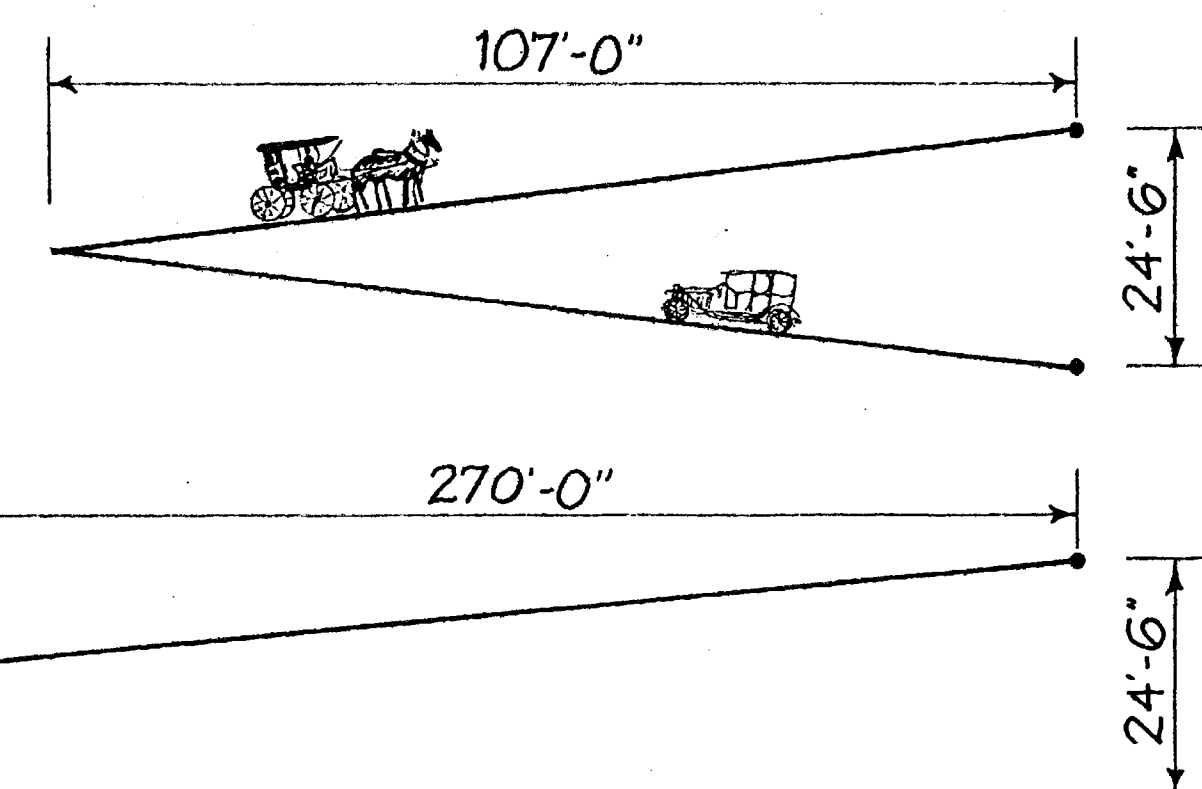
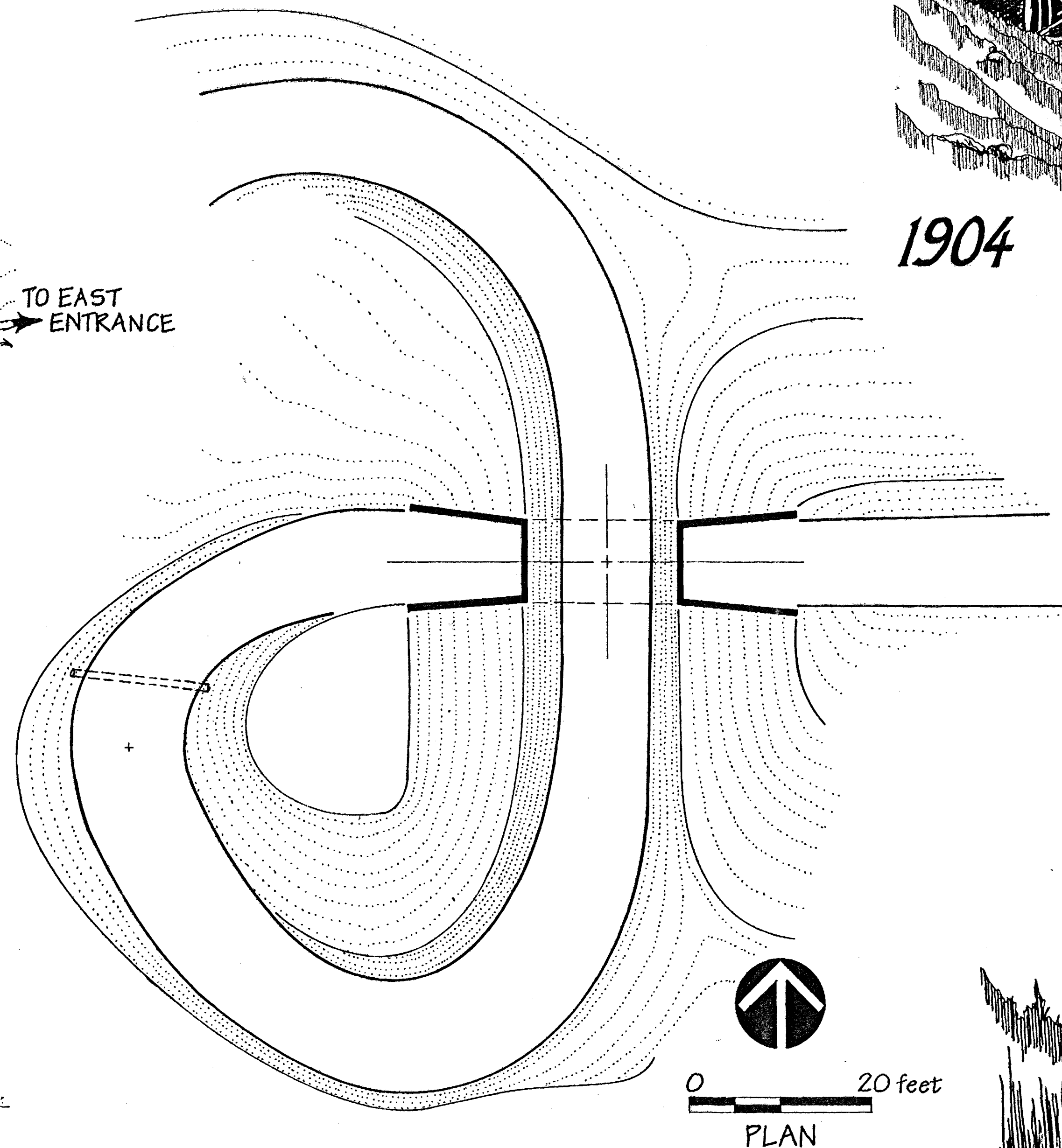
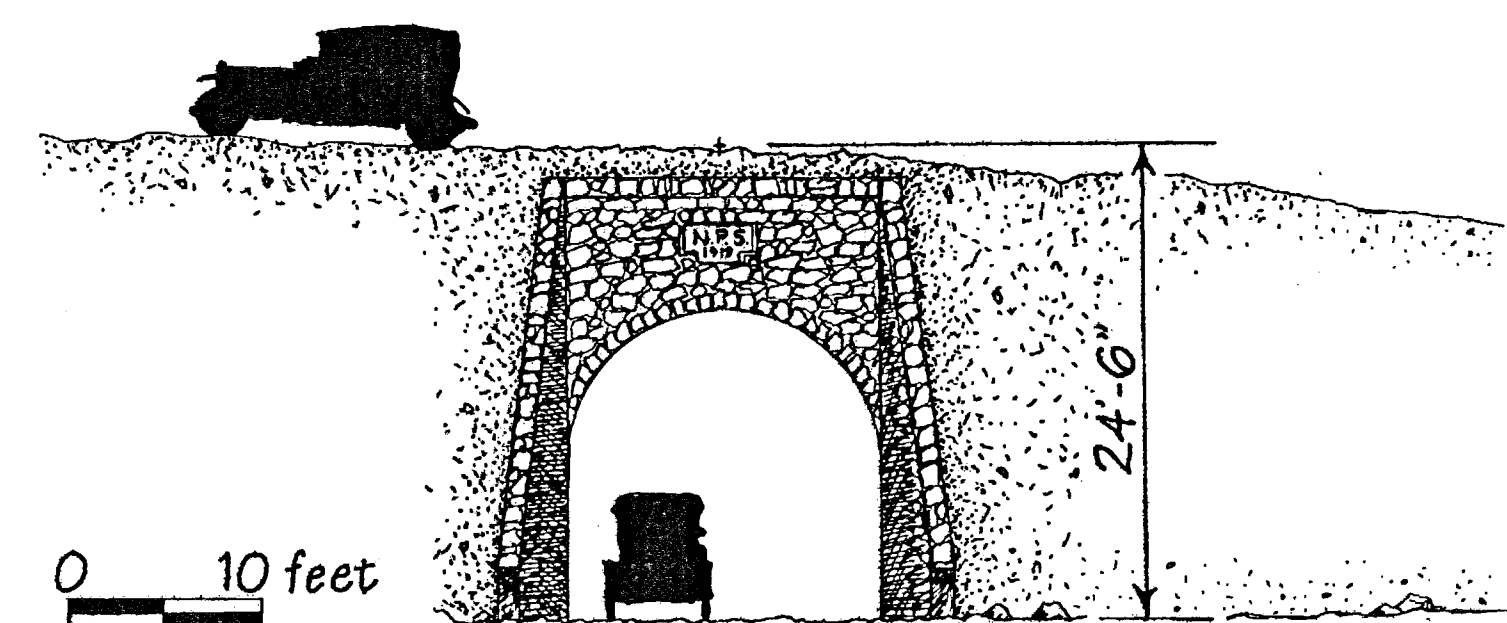
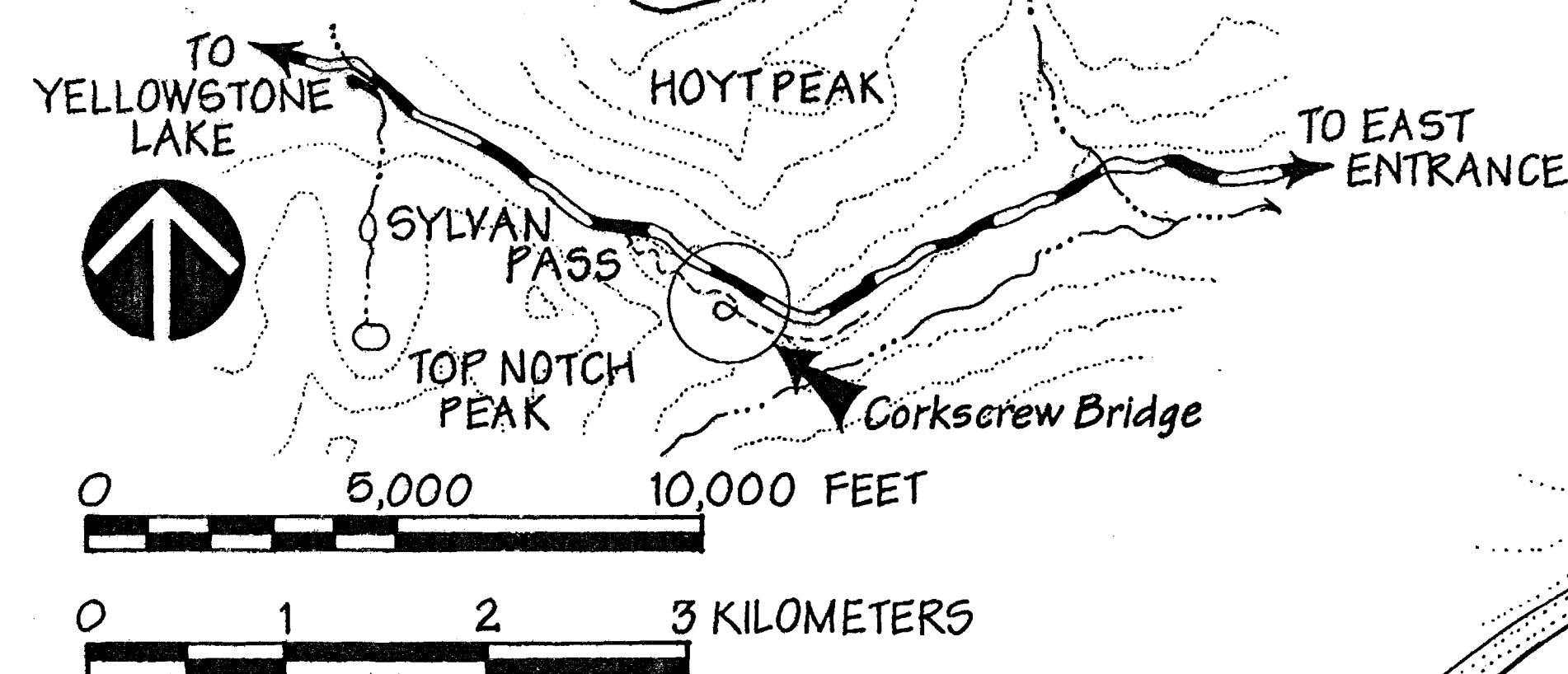
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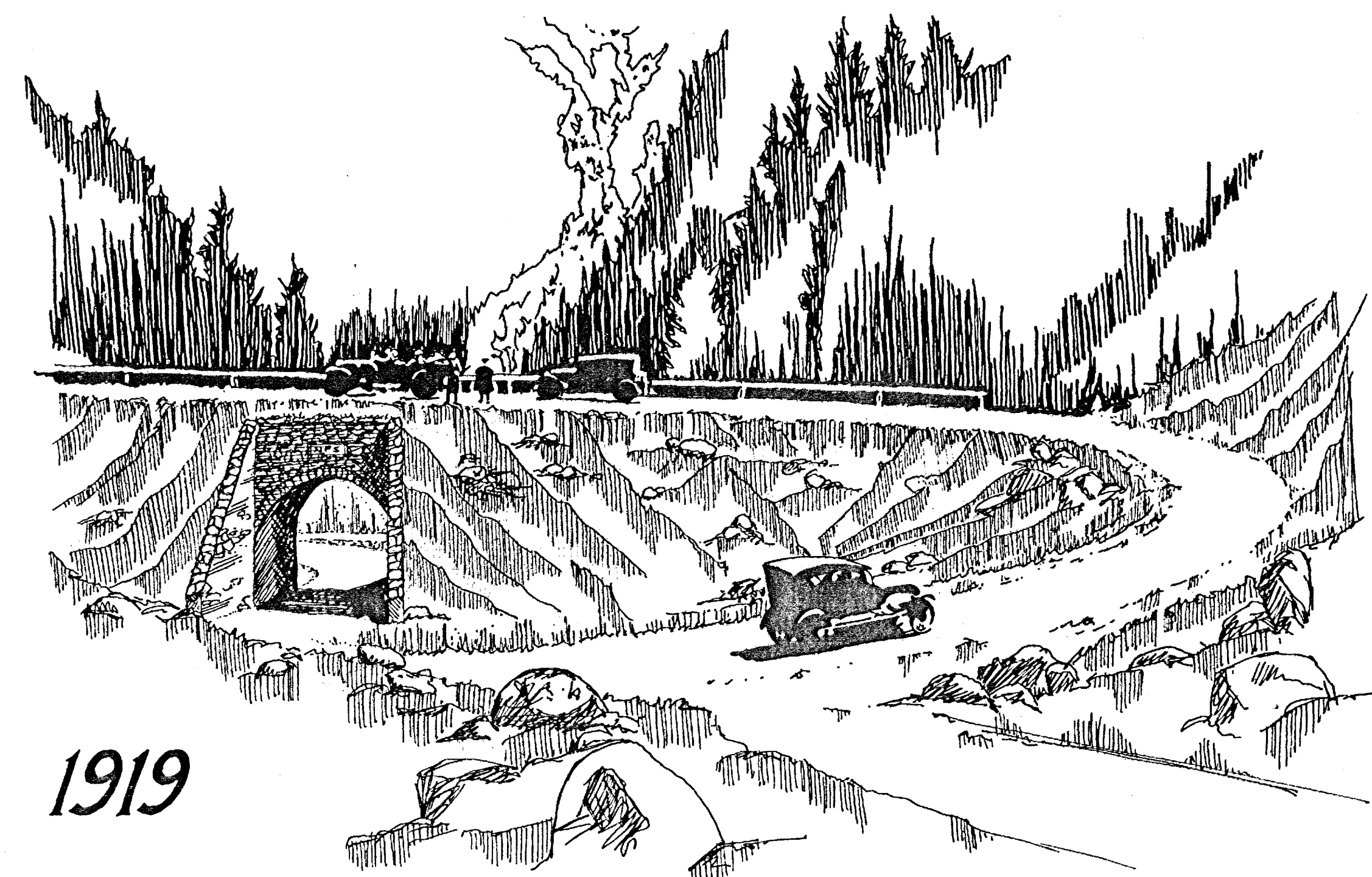
# CORKSCREW BRIDGE

## 1904/1919



1904

Building a road through Sylvan Pass presented a formidable challenge. The steep descent on the east side of the Absaroka Range delayed the construction of the East Entrance Road until after the turn of the twentieth century. To carry the road safely down the slope at a maximum grade of 10 percent, U.S. Army Corps of Engineers Captain Hiram M. Chittenden introduced a spiral to quickly change elevation in a short distance. Completed in 1904, the timber trestle supported the road that then looped around to pass beneath it. The trestle was replaced by a shorter span in 1916. In 1919 Superintendent Horace M. Albright approved specifications for a reinforced concrete "underpass" bridge in the same location. By 1929, advances in road construction technology and the demands of automobile traffic rendered the narrow bridge obsolete. A new road cut into the hillside above gradually made the descent from Sylvan Pass over eight miles, and the Corkscrew Bridge was bypassed. To observant motorists, it is still visible in the valley below.



1919

DELINEATED BY: Jill Patricia Caouette, 1999

YELLOWSTONE ROADS  
RECORDING PROJECT  
NATIONAL PARK SERVICE  
UNITED STATES DEPARTMENT OF THE INTERIOR

CORKSCREW BRIDGE (LOOP BRIDGE) - 1904/1919  
OLD EAST ENTRANCE ROAD, SYLVAN PASS  
PARK COUNTY  
YELLOWSTONE NATIONAL PARK

WYOMING

SHEET  
1 of 1

HISTORIC AMERICAN  
ENGINEERING RECORD

WY-86

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# HISTORIC AMERICAN ENGINEERING RECORD

## INDEX TO PHOTOGRAPHS

### CORKSCREW BRIDGE

HAER NO. WY-86

Yellowstone National Park Roads and Bridges

Yellowstone National Park

Park County

Wyoming

Jet Lowe, Photographer, 2000

- WY-86-1      REMAINS OF CORKSCREW BRIDGE. LOOKING EAST.
- WY-86-2      WEST ELEVATION OF CORKSCREW BRIDGE, WITH 1919 TUNNEL AND ARCH.
- WY-86-3      STONework DETAIL OF WEST FACE OF CORKSCREW BRIDGE.
- WY-86-4      VIEW WEST ALONG ROADWAY TOWARD EAST FACE OF CORKSCREW BRIDGE.







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HAER NO WY-86-2

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