Going-to-the-Sun Road
Glacier National Park
West Glacier
Flathead County
Montana

HAER No. MT-67

HAER
MONT,
15-WEGLA,
5-

PHOTOGRAPHS
REDUCED COPIES OF MEASURED DRAWINGS
WRITTEN HISTORICAL AND DESCRIPTIVE DATA

ADDENDUM
FOLLOWS...

Historic American Engineering Record
National Park Service
Department of the Interior
Washington, DC 20013-7127

HAER
MONT,
15-WEGLA,
5-

HISTORIC AMERICAN ENGINEERING RECORD

GOING-TO-THE-SUN ROAD
HAER No. MT-67

Location: Running diagonally across the central portion of Glacier National Park, connecting the town of West Glacier in Flathead County with the town of St. Mary in Glacier County, Montana

West Entrance UTM: West Glacier Quad. 12/279550/5375700
Logan Pass UTM: Logan Pass Quad. 12/300050/5397050
East Entrance UTM: St. Mary 12/321300/5401620

Dates of Construction:

1911	West Glacier to Apgar (2 miles) completed
1921-1924	19 miles on west side; 8 miles on east side completed
1925-1928	West side to Logan Pass completed
1931-1932	East side to Logan Pass completed
1933	Dedication
1933-1937	Major reconstruction of pre-1925 road
1937-1952	Pavement completed

Principal Engineers: George E. Goodwin, Frank A. Kittredge, W.G. Peters and A.V. Emery

Owner: Glacier National Park

Use: Scenic vehicular park road

Significance: Going-to-the-Sun Road is a 51-mile stretch of scenic mountain road in Glacier National Park. The road is significant as a unique engineering accomplishment of the early twentieth century, in that approximately twelve miles of its total length was literally carved out of the precipitous mountainside, with a minimum of powered equipment. The road is also significant as the first product of a 1925 cooperative agreement between the National Park Service and the Bureau of Public Roads. The road set a precedent for the location, design and construction of roads in the National Park system, and demonstrated the principles of successfully integrating man-made features into the natural landscape.

Project Information: Documentation of Going-to-the-Sun Road was conducted during the summer of 1990 under the co-sponsorship of HABS/HAER and Glacier National Park. Researched and written by Kathryn Steen, HAER Historian, 1990. Edited and transmitted by Lola Bennett, HAER Historian, 1992.

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Significance

Going-to-the-Sun Road is a 51-mile stretch of scenic mountain road in Glacier National Park in northwestern Montana. The road is significant as an outstanding and unique engineering accomplishment of the early twentieth century, in that approximately twelve miles of its total length was literally carved out of the precipitous mountainside with a minimum of powered equipment.

Begun in 1911, construction on a road through Glacier National Park progressed sporadically until 1921 when Congressional appropriations boosted the likelihood of a transmountain road. Between 1924 and 1925, the National Park Service (NPS) and the Bureau of Public Roads (BPR) established an agreement that continues today for the cooperative construction of roads in the National Parks. Going-to-the-Sun Road is historically significant as the first product of this interagency cooperation. Its construction set a precedent for the location, design and construction of other roads in the National Park System, and demonstrated the principles of successfully integrating man-made features into the natural landscape.

In 1933, the dedication of Going-to-the-Sun Road marked the completion of the route over the mountains. In subsequent years, reconstruction upgraded the standards of the road, and in 1952 the road reached another milestone when pavement was finished.

Description

Going-to-the-Sun Road has been called one of the most scenic mountain roads in the world. Its fifty-one miles wind across the central portion of Glacier National Park and provide motorists with grand vistas of alpine lakes, deep forests, and rugged mountain peaks that rise thousands of feet above the valley floors. If starting at the west end of the road at West Glacier (called Belton until 1949), the bridge over the Middle Fork of the Flathead River, just off U.S. Highway 2, marks the entrance to Glacier National Park. (Prior to 1938, the road crossed the river via a concrete arch bridge about a half mile upstream.) From that point, the first two miles of the Going-to-the-Sun Road cut through a heavily-forested area until a fork in the road allows motorists to turn left to visit Apgar, or turn right to proceed along the eastern shore of Lake McDonald. These first two miles have had three different alignments, and clearings in the trees from past alignments are visible from the current route.

The road runs the entire ten-mile length of Lake McDonald with relatively gentle curves and level grades. At the head of the lake, the road begins to follow McDonald Creek and numerous turnouts overlook the creek's waterfalls. Masonry-faced concrete bridges and culverts carry the road over major creeks such as Sprague, Snyder, Avalanche and Logan, in addition to numerous smaller rivulets. Just beyond Logan Creek, the road begins its 6-percent climb up to the pass through the mountains. The road ascends along the side of Haystack Butte, passing through the west side tunnel, and continuing toward the Loop, a sharp switchback that sends the road back toward the pass and across the face of Haystack Butte at a higher elevation. The

road follows the contours of the mountainside, and more masonry-faced structures hold the road to the mountain and guide it over cascading streams. The road moves from Haystack Butte to Pollock Mountain, whose western side has such a memorably-steep slope that the mountainside has acquired its own name, the Garden Wall.

Just a curve and a switchback past the Garden Wall, the visitor reaches Logan Pass (elevation 6,690 feet), a break in the Continental Divide. The road descends along Piegan Mountain, passes through the East Side Tunnel, once again following the contours of the mountainside. The road leaves Piegan Mountain when it crosses over Siyeh Creek on a large curved embankment and culvert. Then for several miles the road winds around Going-to-the-Sun Mountain, until it picks up the north shore of St. Mary Lake. Less than a mile later, the road crosses Baring Creek at a point between Baring Falls on the south and Sunrift Gorge on the north.

Going-to-the-Sun Road then continues along the lakeshore, running by Going-to-the-Sun Point, Dead Horse Point, Wild Goose Island, and then to the Narrows in St. Mary Lake. Just past the Narrows, at the Golden Stairs, a massive masonry retaining wall rises up from the lake and carries the road directly above the lakeshore. The road then moves into a relatively open, flat area for a few miles before crossing the St. Mary River on a three-span masonry-faced bridge. About a mile later, the road ends where it crosses Divide Creek, exits the eastern side of the park, and intersects with U.S. Highway 89.

Establishment of Glacier National Park

Situated in northwestern Montana, Glacier National Park embraces over 1,400 square miles of the Rocky Mountain region. The park is divided north to south by the Continental Divide, and is bordered by Canada on the north, the Flathead River on the west and south, and the Blackfeet Indian Reservation on the east. The park is known for its many natural splendors--including snow-capped mountains, glacial lakes and alpine meadows--and is one of the most-visited national parks in the United States.

In the early part of the century, the site of Glacier National Park was still little more than rugged wilderness. The area had been discovered by trappers in the eighteenth century, but it was not until the mid-nineteenth century that promises of oil and mineral deposits lured white men in any numbers to the area. These ventures were never highly successful however, and the area remained largely unsettled until 1893, when the Great Northern Railroad laid tracks across the Continental Divide, thus opening the area to homesteaders. Some of these early settlers saw the possibility of attracting tourists to the scenic valley, and began offering services such as lodging, meals, horses, boats and guided tours.

The first attempt to preserve the area occurred in 1885, when a bill was introduced in Washington to establish a forest reserve in the region of western Montana. Although the bill died in the Senate, it started a movement to set aside and preserve forested lands. Six years later, Congress authorized the establishment of forest reserves, to be administered by the Department of the Interior, a section of western Montana being one of them.

In 1897, largely through the initiative of the U.S. Forest Commission, the Lewis and Clark Forest Reserve was formed, including all of what is now Glacier National Park. The concept of setting aside wilderness areas as national parks began in earnest at about this same time. Yellowstone, the first national park, was created by act of Congress in 1872. Other parks were gradually added and by 1900, included Yosemite, General Grant, Mt. Rainier, and Sequoia. A rapid expansion of the national parks system followed in succeeding years.

During this time, George Bird Grinnell, editor of Forest and Stream magazine, had made numerous trips to Montana and began promoting the idea of forming a national park in the vicinity of St. Mary Lake. In 1901, Grinnell wrote an article for Century Magazine, entitled "The Crown of the Continent," in which he espoused this idea of a national park. He also invited the noted writer Emerson Hough to visit the area and write a series of articles for Forest and Stream. These articles sparked public interest, and local newspapers began to promote the idea. Finally, through pressure exerted by Grinnell and the public, the necessary legislation was drawn up and the Congressional mill began to grind.

On December 11, 1907, Senator T.H. Carter of Montana introduced a bill to the Senate to set aside land for a national park in his home state, but it took several rewritings and resubmissions before the bill was finally passed. On May 11, 1910, President Taft signed the legislation which created Glacier National Park. Ten days later, the Senate approved an appropriation of $50,000 "For improvement of Glacier National Park, Montana, for construction of trails and roads."

Marshall Reconnaissance in Glacier--1910

Within a few months after the creation of Glacier Park, the U.S. Geological Survey's Chief Topographer, Robert Marshall, visited Glacier and outlined a plan for developing the park. The U.S.G.S. was a bureau within the Department of the Interior whose duties included surveying and classifying public lands. The recommendations in Marshall's report reflected one strain of Progressive era thought about the conservation of natural resources. One side argued to preserve the park in as pristine a state as possible, while Marshall and the other side advocated relatively extensive development of the park to accommodate and encourage more use of the park. Building a road system was the most crucial step to increasing park attendence. Marshall felt that the most influential factor in locating park roads should be easy tourist accessibility to all the major scenic points in the park. As a result, his report called for a park road system of 213 miles.[1]

First, Marshall suggested, the park should make the unsatisfactory wagon road between Belton and the foot of Lake McDonald into a "first-class" roadway 20' wide and a drain-to-drain right-of-way 60' wide. Next, the road should run up the west side of Lake McDonald, follow McDonald Creek and continue north to Waterton Lake. After this primary corridor road was constructed, spur roads could be connected to other points in the park including St. Mary, and Bowman and Kintla Lakes. All of the roads should be built to high standards because--he stated with some degree of foresight--in a park "the

roads themselves must be one of the attractions." However, the standards Marshall had in mind were still relatively primitive--up to 8 to 10 percent grades in some cases.[2]

At the time he wrote his report, Marshall was familiar with the road system in Yellowstone Park and its administration by the Army Corps of Engineers. This system was to provide a model of sorts for appropriate development in Glacier. Marshall insisted that roads in Glacier Park be constructed under the supervision of the Department of the Interior, the government department in charge of managing the national parks, rather than the Army Corps. Marshall was concerned that the division of authority over park roads would lead to grey areas where it was not evident who should have the final word.[3]

Marshall's report remained more of an unrealistic wish list than a guideline for development because very little money was appropriated for Glacier Park in its first decade of existence. However, the first superintendent of Glacier National Park, William Logan, also placed a high priority on the development of the park and park roads. Originally given the title of Superintendent of Roads and Trails, Logan presided over the major improvement of the 2½-mile road between Belton and Lake McDonald, now the westernmost section of the Going-to-the-Sun Road.[4]

Obtaining legal permission for the road's right-of-way was Logan's first task. There were several private landholders within the confines of the park and many of them were located between Belton and Lake McDonald. All but forty acres between the two points was privately owned. Logan managed that duty and, as Marshall suggested, procured a 60-foot right-of-way.[5]

During the summer of 1911, Logan supervised the construction of the road. Removing trees that ranged in diameter from 1' to 5' proved to be one of the most difficult tasks--second only to blasting all the stumps out. Once the trees and brush were out, the laborers were faced with excavating up to 5' of earth to allow a good fill to be laid for the subgrade. The next layer above the subgrade was a "cushion"--probably sand or another similar material. The surfacing consisted of 6" of crushed rock and gravel, topped by another 3" of small rock to keep the dust down. The roadway was 24' wide with an additional 8' of border on each side that Logan eventually planned to plant with grass.[6]

In the Superintendent's Report of 1911, Logan could tell his superiors that the road was essentially completed by September 30, 1911. The entire project cost $17,178.50 or $7,634.89 per mile, which was $797.70 under budget, as Logan pointed out. In the same report, Logan requested money for additional road construction projects, such as replacing the old log bridge over the Middle Fork of the Flathead River at Belton. The larger agenda, however, included construction of a road around Lake McDonald.[7]

Keyes Survey--1911

Logan's recommendation for a road around Lake McDonald was probably influenced by a survey done by Edward A. Keyes, a Department of the Interior Special Investigator from Spokane, Washington, who was sent to Glacier in 1911. Secretary of the Interior Warren L. Fisher wanted Keyes to work with

Logan to develop a road plan for the park. Keyes' report, dated more than a year after his visit, recommended a route around Lake McDonald. The entire project would be twenty-one miles, but Keyes suggested the road construction proceed along the western shore first. The western shore, he argued, had less rock to remove, fewer drainage problems since the snow left sooner, and was generally more scenic than the eastern shore. He envisioned a road running close to the west side of the lake, up to the head of the lake where it would cross McDonald Creek near McDonald Falls, and then down part of the east side to get to John Lewis' Glacier Hotel. He estimated the project would cost $33,520 ($2793.33 per mile). If the east side road was also constructed, that would be an additional $24,940 ($2,771.11 per mile).[8]

While Logan and Keyes were primarily involved in road construction on the western side of the park, the Great Northern Railroad, whose tracks formed the southern boundary of the park, was busy building roads on the east side of the park. Sensing the potential for increased rail passenger traffic, Railroad President Louis H. Hill had lobbied for the creation of Glacier Park. After the park became a reality, Hill constructed hotels, roads, and trails to entice more visitors to the park via his railroad. Most of his chalets were built between 1910 and 1915. By 1923 Hill had invested $1.5 million in the park and created a subsidiary, the Glacier Park Hotel Company, to manage his interests. The Great Northern's massive hotel at Glacier Park Station (also called Midvale and East Glacier), just outside the park, provided the primary point of disembarkment for passengers on the train. A second large hotel, the Many Glacier Hotel on Lake McDermott (now called Swiftcurrent Lake) enticed visitors to go north and enter the interior of the park. In addition to the two large hotels, there were smaller chalets and camps scattered about the park--including those at Two Medicine Lake, St. Mary, and the upper narrows of St. Mary Lake (now Going-to-the-Sun Point).[9]

Simultaneously with the development of their accommodations, the Great Northern built roads to reach the various rest stops. In a report of 1912, a Great Northern assistant engineer, M.A. Butler, explained the current status of their road construction. The Great Northern's primary road was outside the park, running from Glacier Park Station to St. Mary, with spurs to Two Medicine and Cut Bank. The roads within the park were funded by Glacier Park, even when the Great Northern handled the contract. The road to Many Glacier formed the majority of the railroad's road mileage inside the park. Butler recommended improving an existing rough road that ran along part of St. Mary's north shore and reached Rose Creek in 1912, which is about halfway along the length of the lake. Butler recommended that this road be improved and lengthened as far as the Great Northern camp at the upper narrows of the lake (Going-to-the-Sun Point). He expected the construction between Rose Creek and the narrows to be difficult, but "entirely feasible." Butler even went so far as to suggest the St. Mary road could eventually be extended along

> [the] North Fork of the St. Mary River up through the pass between Mt. Oberlin and Piegan Mountains, thence down the side of Pollock Mountain onto McDonald Creek to and along the east side of Lake McDonald to connect with [the] Government road at the foot of the lake.

Because the park bore responsibility for funding, the projected road would not materialize for nearly twelve years, but when it did, the route ultimately chosen was amazingly similar to the one suggested by Butler.[10]

Allen Survey--1914

In 1914, the Department of the Interior arranged to have yet another set of comprehensive plans drawn up for the development of Glacier's roads. That spring, the Department of the Interior and the Office of Public Roads (OPR) in the Department of Agriculture agreed to a cooperative arrangement for constructing and maintaining national park roads. The Office of Public Roads was on its way to becoming the country's foremost expert in road construction. Under the agreement, the Secretary of the Interior would request from the Secretary of Agriculture an engineer as the need arose. The engineer was required to conform to park rules and regulations, but the OPR was the technical supervisor. The OPR was obligated to pay the engineer's salary, but the park or Department of the Interior paid the engineer's expenses.[11]

As a result of this agreement, T. Warren Allen, Chief of the Division of Parks and Forest Roads in the OPR, came to Glacier during the summer of 1914 to examine the possibilities for roads in the park. Allen subsequently explained his philosophy on road building in national parks and forests in a paper given at the National Parks Conference of 1915. He felt roads were a good way to democratize access to the parks--they would serve equally rich and poor. In the process of locating a road, there were several criteria Allen considered. First, the park or forest should not hinder the flow of traffic. The engineer should envision where the road would logically run if there were no park or forest. This utilitarian maxim was modified by other utilitarian criteria: the road should run by potential sites for fire lookouts and for the harvesting of merchantable mature timber. The locating engineer would also want to consider hotel and camping locations. Finally, the aesthetics of scenery should be a factor. Allen was confident that the engineers could execute a "harmonious blending of the handiwork of man with that of God." On certain branch roads, Allen was even willing to locate a road through a bare area for ease of construction, and later build a lake or plant trees to beautify the surroundings.[12]

During 1914 and 1915, Allen surveyed and began to draw up plans for Yosemite, Sequoia, Rainier, and Glacier Parks. From June 25 to July 7, Allen looked at a variety of passes in Glacier Park, including Ahern, Swiftcurrent, Trapper Greek (Logan Pass), Kootenai, and Brown's. In Allen's report on his reconnaissance, he stated that he had come to the park with the intention to find a pass for an east-west road; however, after examining the park, he felt that the east side of the park was adequately served by the Great Northern interests. Allen suggested that providing accessibility to the northern part of the park was a more immediate necessity. Consequently, Allen called for a route along Lake McDonald, up McDonald Creek, up Continental Creek, through Flattop Pass, down the Kootenai Valley, and on to Waterton Lake--very similar to Marshall's proposal. This route should receive the first attention, Allen insisted, but there ought to be other roads as well. Improving the North Fork

road was Allen's second priority. A road from the west side over to the Great Northern developments in the east side of the park should eventually be constructed, too. Allen thought Ahern, Swiftcurrent, and Gunsight Passes were not particularly suitable for such a road east, but Trapper Creek (Logan) Pass would work. Allen described a route leading from the junction of McDonald and Avalanche Creeks, up Mt. Cannon to the pass. From there, one road could follow the north shore of St. Mary Lake, while another could go over Piegan Pass, and down Cataract Creek to the Many Glacier Hotel. A fourth road project would connect Waterton Lake with the North Fork through either the Kintla or Bowman Lakes. At the end of the summer, a survey party arrived and completed a survey of the five-mile Fish Creek Road and progressed three miles up the west side of Lake McDonald before winter stopped their work. It is unclear whether the survey resumed the following year or how much of Allen's plan was eventually surveyed.[13]

Glacier Superintendent James L. Galen accompanied Allen on most of his trek through the park. While Allen filed a report with his supervisors in the OPR, Galen was submitting his recommendations to his superiors in the Department of the Interior. Galen believed Allen's route to Waterton was quite possible, although he suggested staying high on the mountainsides to have a more scenic view. In addition, Galen favored the route over Swiftcurrent Pass if it was at all possible. The route would get visitors relatively far north in the park, and the route could be connected to the existing Glacier Park Highway, the road that ran from Many Glacier to the eastern border of the park. If Trapper Creek Pass was chosen, Galen preferred a road over Piegan Pass to Many Glacier, rather than down St. Mary's River. Galen, like Allen, disapproved the use of Gunsight Pass.[14]

Sperry's Opinion--1915

Gunsight Pass was the route of choice for Professor Lyman B. Sperry, the man who spent several summers exploring in Glacier and shared his name with a glacier. In 1915, P.N. Bernard of the Kalispell Chamber of Commerce requested Sperry's opinion on a location for a potential road across the park. Sperry responded that he was convinced that the road would go wherever Louis Hill decided it should go, which the professor guessed would be through Swiftcurrent Pass, but if the park wanted the most scenic route, Gunsight Pass was the best choice. The road should follow the west side of Lake McDonald and cross McDonald Creek about one-half mile above the head of the lake near McDonald Falls. Then the road would go near the base of Mt. Brown and up Snyder Creek, and then a series of switchbacks would take the road up Mt. Edwards. From there the road would skirt along the Sperry Glacier basin, passing near the Great Northern's Sperry Chalet, Gunsight Lake, and Mt. Jackson before descending along the St. Mary River. Not only would this route be scenic, it could provide the opportunity for engineers to incorporate a few engineering feats in their work. Sperry, known as somewhat of a showman, wrote:

> A national park highway should have not only fine natural scenery, but exhibitions of engineering skill. It should have at least a

few tunnels, galleries, terraces, bridges, "hairpin" turns, and all that sort of thing, to produce the surprises, thrills and joys that tourists seek.[15]

Shortly after Sperry's suggestions were in the local newspaper, Mark Daniels, the General Superintendent of National Parks in the Department of Interior, received a letter from P.N. Bernard and W.H. Griffin of the Kalispell Chamber of Commerce endorsing a route through Glacier Park via Gunsight Pass. The letter came from only one of several commercial interests who had a stake in the park's development. Through much of the 1910's and into the early 1920's, the Department of Interior or National Park Service were the recipients of numerous letters concerning a road. The communities on the western side of the park were somewhat cut off from the eastern side of the Continental Divide. Motorists had to drive 250 miles south to Helena to cross over. Shipping one's car across the mountains on a Great Northern flatbed car was an expensive $10-$15 alternative. The communities' businessmen knew that a local road that ran east over the mountains would bring benefits--for their own ease of transportation and the tourist revenue that would flow from increased visitation. In the early years after the park's creation, there was some debate over whether a park road was a foolish waste of money since a route could be built following the Great Northern tracks south of the park. This route (now Highway 2) would be more practical as far as ease of construction, winter use and vehicle speed. However, in the late 1910s and early 1920s, the park road was encouraged by the Columbia Falls, Kalispell, and Missoula Chambers of Commerce, the Kiwanis, the Interstate Wonderland Trail Association, the Flathead Motor Club Association, and the Montana State Highway Commission. The local businesses perceived the potential tourist revenue and in 1923, Glacier Superintendent J.R. Eakin could report that there was no more local opposition to the road.[16]

Roads and the Economic Justification for Parks

There was significance in the fact the local business organizations began to see the economic potential in the park. In the 1910s, the national parks led a rather precarious existence. In an era that favored economic efficiency and scientific management, those people who supported maintaining parks in a nearly pristine state with a minimum of use had difficulty winning advocates. The classic case of their ineffectiveness was the creation of a reservoir in scenic Hetch Hetchy Valley in Yosemite Park in 1910. Defenders of the valley's scenic beauty used an aesthetic appeal to the public in an attempt to save the valley from the reservoir, but they lost out to the people who argued against the inefficiency of a useless scenic valley. After Hetch Hetchy, many park supporters began to resort to economic arguments to protect the parks. During the National Park Conference of 1915, the General Superintendent and Landscape Engineer of the National Parks, Mark Daniels, spoke about the economic value of parks. In addition to the intangible "dividends" in health and happiness enjoyed by park visitors, there were more serious economic arguments for the parks. Daniels estimated American tourists spent an incredible $500 million each year in Europe. This was hard currency

flowing out of the United States, flooding the European market and depressing the dollar's value. Since the western world still operated on the gold standard, the United States incurred a decrease in its gold reserves. The way to solve this serious economic dilemma was to encourage Americans to "See America First." Daniels advocated a development program that included more accommodations and roads in the parks to attract more visitors, but this led to a predicament. The parks needed money for development to attract visitors, but had difficulty justifying Congressional appropriations when so few people visited the parks. One solution to the problem lay in encouraging railroads like the Great Northern to engage in "enlightened selfishness" and promote park use. In the case of Glacier Park, the alliance with Louis Hill probably worked to the economic benefit of both parties.[17]

Daniels' statements reflected those of the most influential personality in the early development of the National Park Service: Stephen Mather. Mather, the first director of the National Park Service, was perhaps one of the most successful people in arguing the economic justification for the national parks. When the National Park Service was created in 1916, Mather was already involved in park administration within the Department of the Interior. Prior to that, Mather had become a millionaire in the mining and borax industries. In his 1915 article, "The National Parks on a Business Basis," Mather wrote that he intended to "develop to the highest possible degree of efficiency the resources of the national parks both for the pleasure and profit of their owners, the people." The parks and park concessionaires needed to keep their prices low to attract more visitors, which would permit a higher volume of tourists to utilize the parks.[18]

On the subject of park roads, Mather adapted the prevailing sentiments of the national "Good Roads Movement". He believed the park ought to provide adequate accessibility to allow visitors to at least glimpse wilderness, but, in a desire to protect the landscape, the number of roads should be kept to a minimum. In fact, Mather became associated with the notion that there should be just one good road through a park. The rest of the park could be seen on foot or horseback.[19]

Until the Department of the Interior created the National Park Service in 1916, management of the parks was disorganized and ineffective at lobbying for funding. For this reason, the Glacier road surveys in the 1910s never came to fruition. Coming out of World War I, however, there was more hope to receive adequate financing and Mather aggressively pursued the transmountain road project.[20]

Goodwin Survey--1918

After Mather assumed the directorship of the National Park Service, he began to acquire the personnel to carry out his plans for the national parks. One of his key acquisitions was civil engineer George E. Goodwin. Goodwin had previously been employed by the Reclamation Service where he had worked on the Blackfeet Irrigation Project near Glacier and more recently had been employed by the Army Corps of Engineers. Mather and his assistant, Horace Albright, met Goodwin when the Corps was building the road around the crater rim in Crater Lake National Park. Mather and Albright had been impressed with

Goodwin not only for his engineering ability, which was readily apparent to them, but also because the Crater Lake road demonstrated his ability to display the scenery. Besides, Goodwin built the road for $60,000 less than the estimate, and the idea of saving money appealed to the poorly-funded National Park Service.[21]

Early in 1917, Goodwin was hired by the park service for his civil engineering abilities. However, when Glacier Superintendent S.F. Ralston resigned rather suddenly at the end of May, Mather sent Goodwin to Glacier as the temporary superintendent. Albright thought Goodwin was the right person for the job--not only could he supervise the construction of buildings and roads and begin plans for a transmountain survey, but his proven skills at fiscal management would be a benefit to the park as a whole. Goodwin served as Glacier's superintendent in the summer of 1917 and then again in 1920.[22]

While he was the acting superintendent in 1917, Goodwin examined Logan Pass as a possible location for an east-west route through the park. The following year, Goodwin returned to Glacier and did the preliminary surveying work for his proposed route. Goodwin's route ran along the eastern side of Lake McDonald and up McDonald Greek about eight miles. From there the road would climb 5 to 8 percent around the western and northern base of Mt. Cannon. Next, the road switchbacked up Logan Greek and then made a loop back to ascend Haystack Butte and Pollock Mountain to Logan Pass. On the way down the east side, the road switchbacked three times and then ran along the West Fork of Reynolds Creek. The road went acrosa the sides of Piegan and Going-to-the-Sun Mountains and then along the north shore of St. Mary's Lake. Goodwin planned a 17-foot road surface with an extra 3' for drainage; earth side slopes of 1:1, and rock slopes at ¼:1; a maximum grade of 8 percent; and a minimum radius on curves of 50'. He recommended "rustic" log bridges and culverts for the larger drainage requirements and 18-inch or 24-inch corrugated iron culverts for the smaller drainage projects. Goodwin expected all of this to cost $400,000 to $600,000.[23]

Like the other Glacier surveyors, Goodwin kept in mind a list of criteria he considered important while designing the road. He believed his route was "safe and easy to travel, economical in construction and maintenance, as free from snow conditions as possible," and scenic. Although the funding for Glacier had improved to some extent in 1916 and 1917, World War I expenditures deprived the park of much of its development money. Goodwin's was one more survey that seemed to have no immediate realization.[24]

Goodwin's second term as Glacier's acting superintendent was in 1920. From that position, he could supervise the construction of the new concrete arch bridge at Belton. The old log bridge had come close to collapsing more than once in the previous decade, but the shortage of funding always prevented its replacement. When Flathead Gounty condemned the bridge in 1918, the park was forced into action, although another two years passed before the new bridge was completed. Gharles A. McGlung of Spokane, Washington built the arch bridge for $10,200. The arch was about 100' long and spanned the Middle Fork of the Flathead River near the eventual site of park headquarters. Once again Goodwin paid close attention to the financial aspect of the construction--close enough to really irritate McGlung--and although the bridge was not under budget, neither was it over budget. This was still somewhat of

a bargain considering post-war inflation and shortages, and the fact Goodwin at an earlier date had estimated that the cost of a similar bridge might exceed $12,000.[25]

First Special Congressional Appropriation

After 1920 Glacier's financial outlook improved. All through the 1910s, the park had prepared various surveys but had no money to construct the roads outlined in the surveys. In 1921, however, the National Park Service requested and received an appropriation of $100,000 specifically for the Transmountain Road, as the proposed east-west route was labelled. For that sum, the park could let a contract and get a sizable portion of the road constructed. First, however, the park service administrators had to resolve a conflict over the location of the road at the foot of Lake McDonald.[26]

Goodwin's survey of 1918 called for a road starting from the foot of Lake McDonald where the existing Belton-Lake McDonald road ended. From there, the road would follow the lake shore around the east side. However, two property owners at the foot of the lake, Charles Howe and Harvey Apgar, refused to grant a right-of-way for the road through their property. In a sense, their obstinance mattered little when the park had no money for roads. However, John Lewis, the owner of the Glacier Hotel on the east shore near the head of the lake did not want to wait for the government. Until the road was built, boats that left from the foot of the lake were the only means of transportation to his hotel. Lewis very much desired a road to his establishment. As early as 1911, Glacier Park superintendents had asked for money to build a road along Lake McDonald. After seven or eight years of little accomplishment on the part of the government, Lewis began to organize his own right-of-way. Both Howe and Apgar owned resort cabins, so neither was inclined to help Lewis for economic reasons. Consequently, Lewis went to the difficulty to secure a right-of-way that went around Howe's and Apgar's property and connected to the Belton-Lake McDonald road a little closer to Belton. Once Lewis actually had his right-of-way, and had begun to clear trees, Howe and Apgar began to have second thoughts--they were not so sure they wanted to be by-passed. In March the appropriations bill passed and by April, Howe and Apgar were more willing to grant a right-of-way to protect their businesses. Since Goodwin and Mather still preferred the originally planned route by the foot of the lake, they were willing to overlook Apgar's and Howe's earlier refusals and obtained the right-of-way. Lewis was upset that the government chose to place the road through the Howe and Apgar properties; he preferred to see them by-passed as a punishment for their opposition. As much as Goodwin sympathized with Lewis' bitterness, he believed the incredibly scenic view from the foot of the lake would form an integral part of the visitor's experience. In addition, Mather thought the tourist ought to see the lake and then have the option whether to drive or take the boat up to Lewis' hotel.[27]

In 1921 the Sundry Civil Bill granted $100,000 for the Transmountain Road. The seemingly large sum of money raised the hope the road could be finished in three years. The ten-mile section along the east shore of Lake McDonald was cleared by the park using force account labor (labor hired

directly by the park instead of letting bids through a contractor). Park forces also installed small bridges and drainage culverts along the route. Park crews cut timber, burned brush, and blasted stumps, to clear the way for the road. A local newspaper reported the stump-blasting required 800 lbs. of explosives.[28]

During the summer, the park notified contractors that they would be opening bids August 16, 1921 for grading the road section. The park was not entirely sure what they could expect for their money. The official notice of the bid announced a contract for "grading and grubbing of a road having a length of about ten or twelve miles, or such part of that distanca as the funds will permit." The Carlson-Norman Company of Spokane, Washington was the low bidder. The contractors worked through the fall, wera stopped by the onset of winter November 1, and picked up work again May 1, 1922. At the time of the letting, the park superintendent expected Carlson-Norman to be as far as Lewis' Glacier Hotel by July 1, 1922 and completed to the head of the lake by August 15. On August 15, Lewis L. Hill, assistant engineer to Goodwin, reported that Garlson-Norman had just made it to Lewis' hotel, and expected traffic to make it to the hotel within a few days. The delay was caused, at least in part, by a shortage of labor. Since the last week in July, the contractors had been operating with only half of their usual manpower. In May, Garlson-Norman started with sixty-five men and eighteen teams of horses; in June they had seventy men--but in August the contractors were down to forty-two.[29]

When the next fiscal year arrived, proponents of the Transmountain Road were disappointed when Gongress allotted $65,000; down from 1921. While thinking they would get another $100,000, Glacier and Goodwin had planned to let contracts for work on both the east and west ends of the road. With only $65,000 in the budget, Goodwin and the Washington office decided to continue on the west side and save the east side work for another year.[30]

During June of 1922, the park service's engineering office advertised for six to eight miles of road starting at the head of Lake McDonald where Carlson-Norman's contract ended. To advertise the contract, Goodwin sent the notices to newspapers in Kalispell, Missoula, Great Falls, and Helena in Montana, and also Spokane, Washington, and Portland, Oregon. When Goodwin opened the bids in mid-July, there were three proposals. Carlson-Norman bid $73,200. Originally Goodwin thought the park would benefit from the bidding of Carlson-Norman. Since they were already on site, they would have fewer expenses, could offer a lower bid, and force other potential bidders to keep their price low. Perhaps that strategy worked: both of the other bids were less than Carlson-Norman. Thomas McGovern of Browning, Montana, bid $60,852, and Laux and Gardner of Kalispell won the contract with the low bid of $57,468. The Laux and Gardner contract followed McDonald Greek. About one month into the project, the contractors had three small work camps established with a total of sixteen men and two teams. Laux and Gardner subcontracted out most of the "slashing." A small part of the burning and cut and fill was completed. By the end of August, Laux and Gardner were employing twenty-two men and three teams. Through the fall, Laux and Gardner suffered from a shortage of labor, the same ailment that had plagued Garlson-Norman. The park was forced to raise the daily wage for their laborers from $3.00 to $3.36 and

even had a strike over wages in June (which was solved by firing the stikers). Laux and Gardner paid their labor $4.00 per day and still had difficulty attracting employees. In October, the contractors closed down their camp, partly because of the approaching winter season and partly because of the labor problem.[31]

Laux and Gardner resumed their work on a small scale the following March. A crew of six men were working on the road but had to stop temporarily when the ice on Lake McDonald thawed enough to prevent crossing on foot with supplies. The crew had to wait until the supplies could come by boat or road. More of the contractor's forces arrived in April and their work progressed well through the summer of 1923 until they closed down November 28. Laux and Gardner came back for a third season and finished July 20, 1924.[32]

During the spring of 1924 and through 1925, the park employed A.L. Saunders as a temporary assistant engineer. Saunders lived at a construction camp on site (including the recently built Trapper (Logan) Creek cabin) and acted as a liason between the contractors and park supervisors, in addition to doing some surveying. Saunders is a relatively insignificant person in the construction of the road, but he did keep an official diary while he was employed. His daily entries were brief, but regular. He generally documented the weather, the contractor's progress, and the number of employees and teams. In addition, Saunders would keep track of visiting park officials such as Mather and Vint, bear raids on supplies stored at Avalanche Greek, and the difficulty in retaining a good cook (his wife came to cook when the crew failed to get anyone else). Saunders also documented an event that would be repeated numerous times during the road construction: a fire in early July required all of Laux and Gardner's men, except the blacksmith, to stop road construction and fight the fire.[33]

In the early 1920s, road work on the west side progressed rapidly despite the labor shortages. Work on the east side of the Transmountain Road started to benefit from the larger appropriations in 1923. The Congressional appropriation in 1923 increased to $100,000 after the 1922 budget of $65,000. During June, Assistant Engineer Lewis Hill took an engineering crew over to the vicinity of St. Mary Lake, to make a final survey from the lake to the Golden Stairway. Notice was given and bids were opened June 28, 1923. Stevens Brothers Gonstruction of St. Paul, Minnesota, was the low bidder at $79,999. Through 1923 and 1924, the park superintendents commented favorably on the contractor's progress. In February 1924, Superintendent Kraebel reported the contractors had worked through the winter on the steel bridge near the lake's outlet. Stevens Brothers worked on their section until they used up the available funding, which was before the segment was finished.[34]

Two more sections of the road were let out when the park received another $100,000 for the 1924-25 fiscal year. On the west side, the Mount Gannon section from near Avalanche Creek (where the Laux and Gardner contract ended) to Logan Creek, was given to Stevens Brothers, the same firm which had just ended work on the east side. The contractors subcontracted the clearing and grubbing work. On the east side, Thomas McGovern of Browning won the contract with a low bid of $44,500 when the bids were opened September 30, 1924. McGovern's contract was an eight-mile segment of road that began where the Stevens Brothers' ended and ran to a point about two miles east of Going-

to-the-Sun Point.[35]

Bureau of Public Roads

Nineteen-twenty-four was a significant year for the Transmountain Road. For several years, superintendents had requested larger appropriations for the road. Superintendent Kraebel was convinced the larger appropriations were necessary to attract a "high class of contractor." In 1924, the National Park Service succeeded in securing a $1,000,000 appropriation for Glacier Park--about $410,000 earmarked for the Transmountain Road. The larger appropriation raised expectations for the quality of road the park could construct. Mather himself wanted a top quality and scenic road. Goodwin's proposed route of 1918 was typical of the engineer's endeavors: generally scenic, but direct, and above all--economical. Goodwin's route made several switchbacks on the way up and down the Continental Divide. As was Mather's custom, he had Goodwin's plans examined by the National Park Service's Assistant Landscape Engineer Thomas Vint. Vint later remembered the route having fifteen switchbacks, "looking like miners had been in there." He asked Mather to reconsider, and was eventually able to convince him to look over the site with himself and Goodwin. As Vint recalled the meeting, he suggested to Mather a less direct route with one switchback. Goodwin responded with a defense of his professional integrity by stating "there is nobody in the United States that knows as much about road-building in mountains as I do." Perhaps Mather's mind was made up that day, because shortly afterward he arranged for Bureau of Public Roads' engineer Bill Austin to look over the situation. Mather had just met Austin in Jackson Hole, Wyoming and was impressed with the work he and the Bureau had done there.[36]

Introducing Mather to the work of the Bureau of Public Roads (BPR) was Austin's primary contribution. Late in the summer of 1924, Mather arranged with Thomas MacDonald, Chief of the BPR, to have a BPR engineer run a location survey through Logan Pass. Frank A. Kittredge was the engineer chosen for the task. Kittredge had received a degree in civil engineering from the University of Washington in 1912, in addition to subsequent degrees of Civil Engineer and Masters of Science. He first worked for the Alaska Central Railway and the Washington and Oregon state highway commissions. Kittredge joined the BPR in 1917 where he remained for ten years with the exception of a stint in World War I as a captain in the Road and Bridge Engineers.[37]

Kittredge's title in the BPR was Senior Highway Engineer when Laurence I. Hewes, the BPR's Western Regional Director, assigned him to work in Glacier Park. The Park Service wanted to let out bids for the Transmountain Highway work early in 1925 and therefore required a survey as soon as possible. The administrative arrangements for the survey were complete September 6, which left only a few short weeks to do the survey before winter closed in. Kittredge arrived in the park September 11 to begin the survey documenting the route over Logan Pass. As in most surveys contemporary with the Transmountain Road, Kittredge's survey was done in steps: 1) reconnaissance, 2) preliminary survey, and 3) location survey. While his crew gathered and moved their equipment, Kittredge and a few men took a few days to make a reconnaissance through the pass. In this stage of the survey, Kittredge developed a fairly

clear conception of the route location. He surveyed a 21-mile route from a point along McDonald Creek west of Logan Creek, over Logan Pass to Going-to-the-Sun Point. Starting in the west, the route followed McDonald Creek past the junction with Logan Creek (elevation 3565 feet). Just past this junction, the proposed road began to climb, all the while still following McDonald Creek as it curved back in a westerly direction. The route would continue up to the elevation of 4300. At this point, Kittredge planned one of the few switchbacks in his route. The switchback turned on a 100-foot radius and began the road on its steady 6 percent climb to the pass. The sheer sides of the mountains provided ample opportunity for the park or contractors to insert half tunnels. Kittredge believed the dramatic overhanging rock in the half tunnels would "be a great scenic feature in itself" and would "harmonize" with the spectacular natural environment. The road followed the contours of Haystack Butte and Pollock Mountain, crossing several rapidly-flowing creeks. The road descended from Logan Pass along Piegan and Going-to-the-Sun Mountains, but on a higher line than Goodwin's survey. More tunnelling and half-tunnelling would bring the road down to St. Mary Lake.[38]

After the reconnaissance, Kittredge set up two base camps for the preliminary and location surveys. The base camp on the west side was at Trapper (Logan) Creek in the recently completed engineers cabin, and the east side base camp was at Baring Creek. Typically, however, the men spent their time in temporary camps close to the survey site. Each camp employed about fifteen men. Each morning the surveyors walked 1200-3000' to reach the site. Often the walk entailed climbing along narrow ledge or axing a path through underbrush. During the fifty-four days of the survey, the labor turnover exceeded 300 percent. One hundred-five men worked at some point as part of the thirty-person survey crew. In addition, very few of the employees were experienced in surveying. Kittredge's group did both preliminary and location surveying that fall. In a preliminary survey, the engineer collected measurements and information to assist in the subsequent location survey. In the third, more precise step, the route was actually staked out on the ground. At the end of September, Kittredge's team had five miles of preliminary surveying completed and two miles of the location work done. When winter forced Kittredge to stop November 5, he and his employees had completed the preliminary survey for all twenty-one miles. The location survey, which started at Logan Pass and descended each direction, was complete for 7 of 8½ miles on the east side and 3 of 12½ miles on the west. After coming down from the mountains, Kittredge spent a few days at the park headquarters organizing his information before retreating back to the Portland BPR office where he completed a survey map and report on the road the following spring.[39]

Kittredge's report to the BPR and NPS was eighty pages long--consisting of twenty pages of text and sixty of photographs and maps. He carefully described his route and justified much of it for its many scenic advantages. As mentioned above, Kittredge planned the route on a 6 percent grade. The curves turned on a minimum of a 100-foot radius, unless it was a blind curve, in which case the maximum radius was increased to 200'. Kittredge was less committed to a specific road width. He recommended a driving surface of 16' with 3' of shoulder and ditch on each side for a total width of 22'. One advantage to his route, Kittredge believed, was that its location permitted

subsequent widening of the road, should that prove desirable. A road full of switchbacks such as Goodwin's could not be improved and had to be abandoned if obsolete, Kittredge stated. Kittredge included estimates for three widths of road: 22', 24', and 28'. For the twenty-one miles Kittredge surveyed, the 22-foot roadway would cost $1,156,000. The 24-foot width he estimated at $1,312,000, and the 28-foot at $1,684,000. Kittredge also had a section discussing the various ways the cost of the road could be decreased. If the park so chose, they could make the curves sharper, or use timber structures instead of masonry, or ignore the numerous landscape considerations. Measures such as these could bring the total cost down at least as far as $643,000.[40]

On his survey map, Kittredge marked distances by 100-foot intervals known in surveying as stations. Logan Pass had the designation "zero" and the station numbers increased in separate series down each side of the Continental Divide. On the east side, the tunnel ran from station 61 to 65, Piegan Creek was about 148, and Going-to-the-Sun Point at the end of the survey was marked station 436. On the west side, Triple Arches was at station 102, the Loop at 410, Logan Creek Camp at 588 and the end of the survey along McDonald Creek was station 653. These numbers that Kittredge measured and marked served as reference points for subsequent construction.[41]

Glacier Park Superintendent Kraebel was perhaps one of Kittredge's most enthusiastic supporters through 1924-25. Already in early October, Kraebel wrote to Mather to encourage the Director to adhere to the high standards of Kittredge's work. Kraebel was willing to spend all of the park's road allotment on the Transmountain Road because he felt the road was the key to developing Glacier Park. The superintendent was particularly impressed with the high elevation of the road. He believed the higher elevation would make the road easier to maintain because the snow would leave earlier. Kraebel also thought the route was the most scenic option available.[42]

In many ways, Kittredge's plan conformed to the best contemporary highway standards. In 1921, civil engineer Wilson G. Harger of the progressive New York State Department of Highways, published a textbook entitled The Location, Grading and Drainage of Highways. Later in the 1920s, Harger was involved with the publication of a book of standards, Highway Engineers Handbook. Since Harger was informed on current best practice, it is illuminating to compare his standards with the work Kittredge accomplished in Glacier Park. In discussing grades, Harger considered the vehicles that would use the proposed road. When going uphill, most cars needed to shift down to second gear when the grade reached 7 percent. Since "drivers dislike to be forced into second or low gear," Harger recommended maintaining a grade of 6 percent or less--a recommendation that was not too important, except on scenic routes. In choosing grades, the engineer needed to balance the steepness of grade with the increased construction costs of a longer, less steep route. As a senior BPR engineer, Kittredge was probably quite familiar with Harger's work. Besides the fact Kittredge laid out his route at a steady 6 percent grade, in his report he criticized the route of 1918 as a "second-gear road." There is one final clue suggesting an association between Kittredge and Harger's work. Harger's Location, Grading and Drainage of Highways was added to the Glacier Park Library eleven days after Kittredge left the park following his survey.[43]

After Kittredge's report and recommendations were complete, Mather sent the proposal to Landscape Engineer Thomas Vint. Vint was pleased with the minimal number of switchbacks--Kittredge's route lay much more lightly on the landscape.[44] While on Goodwin's route, the visitor's eye would be drawn to other parts of the road, on Kittredge's route, the road "performs its work more silently." The only change Vint recommended was in the vicinity of the Going-to-the-Sun Chalet on the upper narrows of St. Mary Lake. Kittredge planned the road so it would hug the north shore, but Vint suggested placing the road away from the lake to preserve that stretch of exceptionally beautiful shore line.[45]

Vint would get a chance to impress his mark on the development of the road. Mather and Albright were more than satisfied with Kittredge's work and sought a more permanent relationship with the Bureau of Public Roads. By 1924, the Bureau of Public Roads under Chief Thomas MacDonald, was in its "golden age." As a result of testing, research and experience, the BPR engineers were the unquestioned experts in roadbuilding in the 1920s. In addition to its technical superiority, the BPR had a successful administrative network. Bruce Seely, the historian of the BPR, writes that the Bureau, and particularly MacDonald, operated in a cooperative manner with state highway departments. The BPR built few roads on its own, and most commonly worked closely with state engineers to develop road programs. MacDonald urged his engineers to approach this federalistic cooperation with a sense of "shared mission." The engineers needed to consider the priorities of the state highway departments and could compromise their standards if it were necessary for a "consensus" decision. In this way, MacDonald and the BPR earned the trust and respect of the roadbuilding community.[46]

Not only did the BPR cooperate with state highway departments, but they also had agreements with other federal agencies. In 1916, the BPR and the Forest Service worked out a procedure for the BPR to construct roads in the National Forests. In November 1924, when Mather and MacDonald were in the preliminary stages in forming an agreement between the National Park Service and the BPR, Mather had his administrative assistant, A.E. Demaray investigate the Forest Service/BPR agreement. In general, the BPR supervised all the proposed roads that had an estimated cost of $5000 or more per mile, and the Forest Service constructed the less expensive roads. In talking with Forest Service personnel, Demaray found that they generally approved of the arragement, but there were cases that caused conflict that had to be brought before the Secretary of Agriculture for resolution. One Forest Service official, upon hearing about the proposed BPR/NPS agreement, advised Demaray that "the Park Service should retain absolute and final control over the standards on which park roads should be built."[47]

The plans for cooperation continued and on April 21 and 22, 1925, Thomas Vint and Superintendent Kraebel of the National Park Service met with C.H. Purcell, J.A. Elliott, and Frank Kittredge of the BPR in Spokane, Washington. The meeting was to address specifically the cooperation on the Transmountain Road, but the conferees were also determined to codify the procedure for other joint projects. The five men developed an eighteen-step "Suggested Procedure for Cooperation Between the National Park Service and the Bureau of Public Roads in Major Traffic-Way Projects Within the National Parks." To start a

cooperative project, the Director of the NPS requests the use of a BPR district engineer from the BPR Chief to make a preliminary examination of the project. The Director then sends an NPS landscape engineer and the park superintendent with the BPR district engineer. Each of the three representatives files a report with the Director and then the Director makes the final decision whether to pursue the project any further. If the project is approved, the Director asks the BPR Chief for the final location survey. From this information, the BPR district engineer and NPS landscape engineer prepare the plans and specifications--which require each of their signatures and that of the park superintendent. After the Director approves the plans, the superintendent advertises the contract. The BPR district engineer and superintendent look at the bids and their recommendations to the Director, who notifies the BPR Chief upon the bid's approval. During construction, the resident BPR engineer is required to submit a monthly progress report to his supervisor, who forwards it to the superintendent. The superintendent keeps the NPS landscape engineer up-to-date, and the landscape engineer checks the project periodically. When the project is finished, the BPR formally turns it over to the superintendent for acceptance. It is clear that throughout this entire procedure, the Director of the National Park Service has the ultimate control. The Director's power was reinforced by the fact that all the park road money was appropriated to the Department of the Interior and not the BPR or its parent organization, the Department of Agriculture.[48]

During this conference, and in the process of developing specifications for subsequent Transmountain Highway contracts, Thomas Vint was able to assert the policies of the Landscape Engineering Division, which reflected the National Park Service's stated mission to "conserve the scenery." A few weeks earlier, while commenting on Kittredge's report, Vint gave the landscape engineer's view with regard to the Transmountain Road. The primary function of the road is to provide tourists access to park scenery, he wrote. The structures along the road should be "native" and conform with the surrounding environment. Any signs of construction such as stumps, broken rock, and pits should not be visible. In sum, "the finished road should minimize the effects of the work of the hand of man that the effects of the work of nature will predominate in the picture."[49]

Following the conference in Spokane, Superintendent Kraebel informed Mather of the topics covered in the discussion besides that of the cooperative arrangement. Both the Bureau and Park Service representatives felt a much better road would be built if the money in hand was concentrated on the western side of the road. The park had the $410,000 from the $1,000,000 appropriation for the fiscal year 1925 and were authorized to spend an additional $500,000 from the following year's appropriation. Kraebel was concerned the park would get a road of low standards that would bring bad publicity to the park if the $910,000 was allotted over the full twenty-one miles. Also, construction of the west side would allow ample time for the Park Service to decide which route the road should follow in the vicinity of Going-to-the-Sun Point.[50]

West Side Construction

The contract for twelve miles of road from about Logan Creek to Logan Pass was advertised during May. In every set of specifications after the NPS-BPR agreement, the contractors were required to respect the National Park Service's desire to protect the landscape. One section, Item 4, stipulated the contractor should use no power shovels, although bids would be accepted that included power shovels. This section was partly based on a paragraph in Kittredge's report suggesting steamshovels would be inappropriate on the project for both environmental and economic reasons. There were also special requirements for blasting and excavation. A certain type of blasting using "coyote" or "gopher" holes, which were used with bigger charges, tended to break and scatter rocks more widely and were not permitted. In general, the specifications obligated the contractor to use less destructive blasting methods--such as detonating several light charges instead of one larger blast. In excavation, the contract forbid the contractor to side cast--or dump down the mountainside--the excavated material, and required the contractor to dump in areas designated by park officials.[51]

The park and the BPR knew they were advertising for an unusual job and in order to more accurately inform potential bidders, the government representatives arranged for the bidders to take a trip over the route in June. W.G. Peters, the BPR's resident engineer in Glacier for the westside project, arrived in the park just in time to assist the thirty-five or so bidders on their trek. The potential contractors climbed mountains and snowslides and endured two days of rain so the park and the BPR could be sure the bidders understood the special parts of the plans and specifications.[52]

The BPR opened the bids in their Portland office on June 10, 1925. There were twelve bidders--all from the Pacific Northwest. D.A. Williams and A.R. Douglas of Tacoma, Washington were the low bidders at $869,145. The BPR engineers estimated Williams and Douglas would be faced with close to 400,000 cubic yards of excavation, in addition to the construction of a tunnel and several masonry structures along the road. Williams and Douglas' bid opted to reject Item 4 that forbid the use of power shovels. The BPR and NPS decided to accept the Williams and Douglas bid because the lowest bid without power shovels was significantly more expensive. Morrison-Knudsen of Boise, Idaho, was the lowest bid abiding by Item 4 at $955,665. When the Portland Oregon Daily Journal reported the bid opening, the newspaper noted the BPR-NPS cooperation as a "peculiar feature" and suggested it was part of "a policy to centralize all federal roadbuilding" in the BPR. The same article stated that the contract was also exceptional for the size of the award: BPR engineer Peters noted that the contract was the BPR's largest thus far.[53]

At the time of the Williams and Douglas contract, earlier contractors had built twenty-nine of the eventual fifty-one miles. The twenty-two miles that remained carried the road up and over the Continental Divide. On the west side, the Stevens Brothers were still working on the Mt. Cannon section of the road--the section adjoining Williams and Douglas'. Williams and Douglas started to move in June 22, but were slowed because the Stevens Brothers were several weeks behind, much to the irritation of park officials. The Mt. Cannon contract stipulated a completion date of July 31, 1925. As

early as 1924, the park service engineers warned Stevens Brothers they were not moving quickly enough. On July 3, 1925, Goodwin ordered Stevens Brothers to increase their labor force from forty-two to at least seventy. Goodwin and his successor Bert Burrell felt obligated, as members of the Park Service engineering staff, to have a passable road through to the Williams and Douglas contract by August 1. The park service officials did not want to be faulted by the BPR for delaying the Williams and Douglas contract. During July, the Glacier Park engineer, Lewis Hill, employed forty additional men under park control and force account budget to work on the last ¾ mile of the Mt. Cannon section. William and Douglas informed the park they needed only a road width of 12' to get their heavy equipment through, and that much was available August 1. Prior to August 1, the big contractors used pack horses to get their supplies to the start of their contract. Stevens Brothers' work continued into the fall and they finished seven weeks late. Because the parks had to resort to hiring additional labor, they deducted $5786.59 from payment to the Stevens Brothers. After the contract was complete, Stevens Brothers sued for the remainder. The Secretary of the Interior offered to settle out of court for $2000 in 1933.[54]

Once Williams and Douglas could get their heavy equipment through the Mt. Cannon section, the construction on the west side contract moved more quickly. W.G. Peters, the BPR resident engineer on the Williams and Douglas contract, wrote numerous monthly progress reports between 1925 and 1928 that help to reconstruct the events of the four-year project. Peters earned a B.S. degree in civil engineering in 1909 from the University of Washington. Then he was a civil engineer with the Oregon and Washington Railway, the Alaska Pacific Railway and Terminal Company, the Washington State Highway Commission, and for two cities and a county in Washington. Peters worked briefly with the Bureau of Reclamation before joining the BPR in 1919. Prior to his work on the Transmountain Highway, Peters had been involved with other BPR projects including the Wind River Road, Wyoming; McKenzie River Highway, Oregon; Oregon Caves Highway; and the Mount Hood Loop Highway in Oregon.[55]

On the Transmountain Highway project, Peters was the BPR's liason with the contractor and local park officials. Part of his job included leading an engineering crew of ten across Kittredge's route, staking out the line for clearing and excavation. This was necessary since Kittredge ran out of time during his survey and essentially drew the route while in his Portland office. Peters discovered an error in Kittredge's plan near the switchback--which seems to explain why the Loop was built on a 75-foot radius instead of the prescribed 100-foot radius in Kittredge's report. Peters and his crew always stayed at least one step ahead of the construction work. Even more than Kittredge's team, the crew under Peters was working with the sheer cliffs and often resorted to ropes to get their surveys and cross-sections.[56]

At the end of the 1925 season, Peters reported that Williams and Douglas had not progressed too far into their project before winter closed in. Primarily, the contractors began to set up construction camps along the road. Williams and Douglas eventually had seven camps on their twelve miles of road--ranging from Logan Creek up to Logan Pass. Camp One, at Logan Creek (station 588), was the headquarters camp for both Peter's engineering crew and the construction firm. A.R. Douglas of Williams and Douglas was the on-site

supervisor and was stationed at the Logan Creek Camp. The contractors built an office/supply cabin, a mess house and enough tents to sleep fifty to sixty men. Camp Two (station 410) was set up at the Loop, the major switchback just before Cascade Creek. The laborers at Camp Two were primarily working on the rock cliffs about one-eighth of a mile toward Logan Pass from the Loop, but also had responsibility for all the area from 1000' west of Granite Creek to the western end of the project. Camp Two was established early because the blasting at the rock cliffs needed to be finished before the road below could begin safely. During 1925, Williams and Douglas built just tha two camps, but in the next three seasons, five more camps went up. About 700' east of Cranite Craek, the contractors set up Camp Three (station 306) to accommodate the labor working along a 1½ mile section from 1000' west of Granite Creek to about 1000' west of the South Culch of Haystack Butte. Camp Four's (station 267) section overlapped with Camp Three's, but extended another 1250' closer to Logan Pass. Camp Five (station 98) covered the territory from Logan Pass to about 200' east of the South Gulch of Haystack Butte where Camp Four's section ended. Camp Six (station 20) was responsible for working on the Carden Wall. The tunnel laborers were stationed at Camp Seven (station 450).[57]

After 1925, Williams and Douglas made steady progress. At the end of September 1926, Peters estimated the project was 50 percent complete. The contractors were 66 percent finished at the end of July, 1927, and on their way out of the park in October 1928. The contract had originally called for completion after the 1927 season, but the deadline was extended after the park requested Williams and Douglas to include some additional work on the Mount Cannon section.[58]

Although not all camps were necessarily functioning at the same time, the contractors generally tackled the whole twelve miles at once from several different locations. Consequently, workers on the upper sections of the road did not have the luxury of a completed road below them to facilitate transportation of their supplies. The contractors relied on about fifteen miles of construction trails and a tote road to haul supplies around incomplete sections of the road. The west side tunnel provided a major obstacle during the first two seasons. To get around the tunnel area (stations 442-444), the contractors sent their supplies up the Waterton Trail--which followed McDonald Creek and lay in between the Creek and the road. The contractors built a tote road from the Loop to a point on the trail downhill from the Loop. They placed a supply cabin below the Loop on the trail, and even parked a steam shovel there the winter of 1925-26 before it made the steep ascent the following spring.[59]

In their bid, Williams and Douglas had refused to do the project without their power shovels. Most of the twelve miles was constructed with the aid of three power shovels: two steam shovels and one gas shovel--all with ¾-yard buckets, in addition to pneumatic jack hammers, and 490,000 lbs. of explosives. Typically the construction at a particular site would occur in stages. First, Peters and his engineering crew marked the way and they were followed by laborers who cleared the trees and did the "grubbing"--removing the stumps and roots, if that was necessary. Then the explosives men moved in. Sometimes these crews would need to cut small ledges or benches to stand

on before they could drill holes to place their TNT. After the explosion broke up the rock, the power shovels cleared and loaded the debris on trucks or small "dinky" railroads. The little trains, powered by a small gas locomotive, generally had about twelve dump cars and ran on tracks several hundred feet to dump the rock in a designated location. Peters was less clear about subsequent stages, but it appears that once the rock debris was removed from most sections of the road, the remaining rock bed was essentially complete except for surfacing and any necessary masonry work. Most of the masonry work--bridges, culverts, retaining walls, and guardrails--was done by subcontracting "station gangs." Station gangs, typically groups of eight to ten laborers, were particularly useful in places where the power shovels were not. Much of the work without power shovels occurred along the Garden Wall. Williams and Douglas utilized over thirty subcontractors in the course of four years.[60]

The Williams and Douglas contract tested the cooperation between the National Park Service and the Bureau of Public Roads. The relationship was essentially successful, but not always smooth. NPS Chief Engineer George Goodwin was the first casualty. The difficulty was not so much the Williams and Douglas contract specifically, but the loss of authority Goodwin felt when some of the most important park engineering projects were turned over to the BPR. Even while the Kittredge survey was underway, Goodwin arranged the initial clearing for a survey of a revised version of his 1918 route. At that point, it was not entirely clear whether Mather would opt to use the BPR in the future. Kittredge's survey was a test of sorts and, in the meantime, Goodwin continued to revise his plans. He had two possible revised routes--both at the same standards that Kittredge used: 6 percent grades and a 100-foot radius on curves. The two revised routes both ascended Trapper (Logan) Creek as in his previous survey, but they had many fewer switchbacks than before and cut a route midway between the earlier survey and Kittredge's survey. According to Kittredge's report, plans for this route never got beyond the very earliest stages. The revised surveys were Goodwin's last attempts to regain control of a project he had overseen for eight years. Unfortunately for Goodwin, Mather was determined to utilize Kittredge's survey and the BPR's expertise. Mather's biographer suggests that Goodwin was trained in an earlier school that "seemed to take inadequate account of the automobile"--an assertion that explains Goodwin's excessive use of switchbacks. Just after Williams and Douglas moved in during the summer of 1925--an event that may have forced Goodwin to realize he was no longer in charge--Goodwin and Mather exchanged an intensely worded series of telegrams. On July 6, Goodwin stated his case clearly: "I consider you taking [the] west side survey away an unwarranted reflection upon my professional work and damaging my professional reputation..." and threatened to address his complaint to the Secretary of the Interior, or even the public. He also vaguely asked whether he should carry on as planned or "be relieved...of further duty." Although Goodwin later denied this constituted a resignation, Mather interpreted it as such and replaced Goodwin with Bert Burrell.[61]

The Goodwin episode demonstrated that Mather was clearly willing to go to great lengths to make the BPR cooperation work. There was some indication that the BPR officials were also committed to the cooperation. In the fall of

1925, at the National Park Conference at Mesa Verde, Colorado, BPR regional engineer Laurence I. Hewes told the park service that his bureau was only recently learning the importance of landscape engineering in their work. He was familiar with the work of Daniel Hull and Thomas Vint--two NPS landscape engineers who had impressed upon Hewes the need for "beautifying of highways." Hewes admitted that the landscape had not been a concern of his or the Bureau's a few years earlier, but that the cooperation with the Forest Service (where many mistakes had been made) and the National Park Service had forced them to treat the landscape seriously--not only in the forests and parks but in all their projects.[62]

Although officials in the highest reaches of the BPR and NPS adapted to the agreement with relative ease, the westside project witnessed a skirmish in the lower personnel ranks which would have reverberstions at the top. Early in 1926, Glacier Park hired their own resident engineer, Charles E. Randels, to oversee general park construction. He had no authority over the BPR work, but Superintendent Kraebel used Randels as an advisor on the progress of the road. J.A. Elliott was the BPR engineer in charge of the cooperation with the park service. Randels had previously worked for the Bureau and there was deep personal animosity between Randels and Elliott. Elliott had little respect for Randel's engineering abilities and resented any inspection Randels might make on the road. Complaints went up the BPR hierarchy and L.I. Hewes contacted the NPS Director's office in Washington. At first, Arno Cammerer, operating as acting director in Mather's absence, ordered Superintendent Kraebel to keep Randels away from the construction project. However, both Kraebel and Assistant Director Albright disagreed with Cammerer's actions. They felt the NPS had every right to check on the BPR--inspection did not mean interference. Albright and Kraebel recognized this particular conflict was the result of a personal feud, but as a matter of principle, they had to insist on the Park Service's final authority, and the park superintendent's right to advice from an engineer outside the BPR. As Kraebel explained,

> [o]ur friends of the Bureau are essentially road builders, dirt movers, rock blasters, [and] surfacing experts. They are only beginning to learn what the Park roads require in the way of landscape protection. ... We are not safe in giving them too free a hand.

Unfortunately, Kraebel's warning proved well-founded.[63]

When Williams and Douglas finished in the fall of 1928, the Park Service was generally pleased with the results. However, they did not overlook the damsge to the landscape. Already at the end of 1925, Peters had to report that blasted rock caused "considerable damage to the forest growth" below, but he was convinced this was unavoidable. During the fall of 1927, Kittredge, who had been hired away from the BPR to become the NPS Chief Engineer, had an audience with BPR Chief Thomas MacDonald and spelled out two specific complaints about the construction of the Transmountain Highway. First, Kittredge expressed his disappointment with the amount of excavated material cast over the side and the resulting destruction of the vegitation below. There had been a clause in the contract requiring the contractor to haul the

rock debris to specific gulches where the damage would be minimal. Kittrege was somewhat upset this clause was not obeyed. Kittredge's second complaint was related to his first. Since the contractors had tossed material over the side, they were short of material when it came to filling in the embankment at the specified gulches. Instead of creating the embankment, the contractor erected more masonry walls--which were more expensive and more noticeable.[64] To illustrate Kittredge's point: the original estimate and bid called for Williams and Douglas to excavate 390,000 cubic yards of rock and other material and erect 9200 cubic yards of masonry for a price of $869,145. When Williams and Douglas completed the project, they had excavated 540,750 cubic yards and utilized 10,749 cubic yards of masonry for $967,771.[65] Kittredge pointed out that in addition to violating park policies, the contractors were now cheating on landscape clauses which had caused other bidders to allow for extra expense in their bids for the project. Kittredge did not document MacDonald's response.[66]

After the Williams and Douglas contract was complete, NPS Assistant Landscape Architect Ernest A. Davidson filed a report with the Chief of the Division of Landscape Architecture. Davidson discussed and included photographs documenting the destruction caused during the road building. He described how "hundreds of trees" were destroyed when boulders weighing several tons rolled down the hill to the denser forests. The only way this could have been avoided, Davidson suggested in a rather unprovocative way, was to require the contractor to use slower, more expensive, but less destructive construction methods. Since the damage was done, Davidson took solace in the fact that time would cover some of the evidence.[67]

Davidson also commented on the masonry work along the road. For the most part, he believed the masonry construction lived up to the park policy to make construction blend into the natural environment. The contractor did have difficulty acquiring enough good masons and the landscape architecture division inspected the work very closely--and occasionally required certain sections to be rebuilt in order to meet the contract standards. Davidson complained that the masons from cities generally had to be taught concern for "appearance." There was basically three types of rocks used by the masons in construction: buff limestone, red argillite and green argillite. Davidson reported he often had to prevent the men from placing the colored rock in "bizarre" arrangements such as arched stripes and instead he had to insist the rock be placed "as they occur in nature."[68]

During the next two seasons, 1929 and 1930, no new construction on the Transmountain Road occurred. The park widened a section of road near the foot of Lake McDonald and cleaned up after perennial slides, but there were no major construction projects. Not only was President Hoover asking government agencies to curtail their spending, but the Park Service itself was slowing up construction for quite another reason. Ever since the park was established, there had been several owners of private property within park boundaries. Over the years, the park had made sporadic attempts to buy these various pieces of property, but by 1929 there were still significant numbers of inholders. The park owned the right-of-way for the entire road, so obtaining the private land was not a necessity before construction. However, park officials were afraid that the private property values would increase

significantly when the road was complete, causing even more difficulty in purchasing the land. By the end of July, 1930, Horace Albright, the new director of the National Park Service, reported that the agency had spent $200,000 acquiring the most important properies--including businesses and a Methodist church camp. There were, however, several stubborn owners of summer houses unwilling to sell, and Albright thought any condemnation proceedings would be long and painful, with no guarantee of success.[69] In addition, other parks had pressing projects at hand, and as Albright saw it, the initial Congressional largesse for park road building had seen a disproportionate percentage of available funds go to the Transmountain Highway project. Other parks were demanding their share of the pie.

Albright recommended that the park go ahead and begin constructing the last link in the road. The Roosevelt Highway along the Great Northern route south of the park had just opened and Albright suspected the influx of visitors from that route was already affecting the private property values in the park. In addition, the Great Northern was urging the park to get the road through at least as far as its chalet on Going-to-the-Sun Point. Albright did not think the situation would get any better by waiting.[70]

East Side Construction

During 1929 and 1930, A.V. Emery, the new BPR resident engineer began to resurvey the east side section. At the end of July, J.R. Eakin, who returned to the park in 1927 for his second term as superintendent, complained to Director Albright that Emery's survey was duplicating work that Kittredge had already done. Emery started at the beginning with the preliminary survey and measuring topography as well as staking out the location for the road. Eakin believed Emery was needlessly wasting park money, but errors in Kittredge's work had convinced Emery that the new survey was necessary.[71]

In early August, the park advertised for a contract to do the preliminary clearing of the 10½-mile stretch running east from Logan Pass. The only time it was safe to burn the cleared trees and brush was in the fall or early winter and the season was getting too late for a major contractor to get moved in and accomplish the clearing before winter. Consequently, the contract at the end of 1930 was strictly for the clearing. The letting of this contract did not go as smoothly as for those in the past. J.A. Gudgel was the low bidder at $10,350 but refused to sign the contract at that price; the contractor claimed the park had enlarged the scope of work since his bid. The engineer's estimate for the work was $22,000 and the next lowest bid was $26,400 by Sutherland & Burns Construction Company. Since Gudgel refused to sign the contract, the Bureau of Public Roads requested the forfeiture of Gudgel's bond by his surety company, the National Surety Company, a sum amounting to 5 percent of the bid. In early October, the BPR informed Sutherland and Burns that they had won the bid for the clearing contract.[72]

Through the winter of 1930-31, Emery and his supervisor in the BPR, J.A. Elliott, drew up the estimate for the remaining east side link. They divided the link into two contracts. The first ran 5¾ miles from Logan Pass east to a point (station 302) about 1½ miles west of St. Mary's western shore, a section the engineer's estimated would cost $450,211. The second section, estimated

at $267,502.50 at the time of bidding, started where the first left off and ran 4½ miles further east to station 523, about two miles east of Going-to-the-Sun Point where the Stevens Brothers contract had ended in 1924. After these two contracts, the BPR and NPS had plans for surfacing the new sections, reconstructing the existing east side road and reconstructing the Belton-Avalanche section on the west.[73]

The BPR contracted out the 4½-mile piece of road first. Notices went out in early May and when the bids were opened May 22, 1931, there were three bidders: A. Guthrie & Company, Douglas & Lawler, and Siems Spokane Company. Guthrie won the contract with a low bid of $200,178.70--more than $67,000 less that the engineering estimate. Bids for the larger contract were opened less than a month later and the Colonial Building Company of Spokane, Washington, was the low bidder at $385,365.50, a sum also substantially less than the engineering estimate. Several of the same companies bid on both contracts and in this case the unsuccesssful bidders were Douglas & Lawler, Siems Spokane Company, A. Guthrie & Company, Morrison Knudsen Company, and the Clark & Henry Construction Company.[74]

Colonial Building Company, under the general supervision of Sam Bergstrom, spent the middle part of the summer of 1931 moving to Glacier and getting their camp and equipment set up. Bergstrom attempted to build a temporary camp at Logan Pass on July 4, but was snowed out. Colonial built their permanent camp at Lunch Creek (about station 42) and this headquarters accommodated about sixty employees. Building a trail about 200' above the road from Logan Pass to the Lunch Creek Camp was another early chore for the contractors. Many of Colonial's supplies came over that trail until the road was near completion.[75]

Colonial's section included the 405-foot east side tunnel. In order to finish on schedule, they needed to begin tunnel construction before the road from the pass would be complete. On the trail above the road, the contractors placed two compressors to power the jackhammers down in the tunnel. Colonial kept full shifts running around the clock blasting and removing material from the tunnel. An observer in the fall of 1931 reported that material excavated from the tunnel was loaded by hand into small carts, which were then pushed outside where the debris was dumped over the edge of the cliff. Supplies--especially explosives--were carried along the trail to a point above the road. From there, laborers carried their load down a steep 300-foot trail and then down two long vertical ladders to the road surface. The tunnel was nearly complete when winter shut down operations October 24.[76]

Colonial Building Company subcontracted more than half of their total road length to A.R. Douglas, now of Kalispell. This was the same Douglas that was a partner in the Williams & Douglas firm on the west side contract, and a bidder on subsequent east side projects. Douglas had developed a reputation among park and BPR officials as an effective "dirt mover" and they expected his section to go quickly, especially since there was less heavy rock work than many other parts of the road. By the end of July, 1931, Douglas had two power shovels--including a new one with a 1¼-yard bucket--at work on his nearly two-mile section of road. Douglas built a temporary 150-foot log trestle around one particularly heavy rock grouping in order to move his shovels to another part of his subcontract.[77]

Douglas' camp was too far from Logan Pass to utilize Colonial's supply trail, so Douglas had his supplies come in from the east side of the park. Since the road on the east side was not complete up to Douglas' section, he bought a barge on pontoons to float supplies up St. Mary Lake. From the shore, Caterpillars ascending grades up to 22 percent delivered supplies the last 1000' to camp. Douglas made extensive use of the Caterpillars to navigate the mud that prevented the passage of trucks.[78]

The second major east side contract, A.R. Guthrie's 4.5 miles adjoining Douglas' subcontract, continued east to connect with the existing road just east of the Going-to-the-Sun Chalet. Guthrie, like Colonial, was hindered by snowfall on July 4, 1931 while setting up camp on Going-to-the-Sun Point. The Baring Creek Bridge and the spur road into Going-to-the-Sun Point were two parts of Guthrie's contract. In addition, Guthrie's contract included some of the heaviest rock work on the east side, making progress relatively slow. The workmen commonly hung down over the road by ropes to trim back the slopes.[79]

Construction Life

The Guthrie laborers were only the latest employees to face the unusual hazards of road construction in the mountains. The contracts over the Continental Divide--Williams & Douglas, Colonial, Guthrie--covered many sheer cliffs and often left little room for error. The construction firms did not seem to suffer from the same high rate of labor turnover as had Kittredge's engineering crew in 1924, but the hard work forced the contractors to pay a wage that was above average. Ira Stinson, Glacier Park's engineer from 1932 to 1951, later recalled that the contractors never hired too many employees--they preferred to hire fewer, more skilled workers over cheaper and more plentiful unskilled labor. "This was a job for experts from the ground up," Stinson relates. Other people involved with the road had memories of the labor force. Many people recalled the group of Russian immigrants who formed Camp Six on the Williams & Douglas contract. The Russians set up their own cook tent and their own cook. They were subcontractors on the Garden Wall section--one packer recalled hearing the Russians blasting rock in the middle of the night. There were other nationalities as well. Italians were involved with many of the masonry guardrails. Another employee recalled A.R. Douglas' tendency to hire his fellow Irish from Butte.[80]

Gordon LaVerne Harrison, part of the BPR's supervisory staff on the Williams and Douglas contract, described in an article how many of the firms hired their labor. As Harrison recalled, there were many small employment agencies established in the shadier parts of larger cities. The agencies, nicknamed the "slave market," were typically a tiny office consisting of a telephone and a board listing available jobs.[81]

Harrison also tells about one particular Williams and Douglas blast on the heavy cliffs just east of the Loop on the upper portion of the road. Once the blasting crew cut out a narrow ledge to stand on, they drilled holes--two "coyote" holes large enough to hold a man and several more 5-inch "gopher" holes, which were both illegal under the terms of the contract--and for a week packed in 12½ tons of black powder and eighty boxes of dynamite. The blasting crew put wool socks over their boots in attempting to avoid a spark that might

set the charge off prematurely. When the charge was ignited, Harrison "saw, or had the impression of seeing ... what looked to be a half of a mountain slowly rise, crumble, move out, and drop over the edge of the cliff. ... The ten thousand yards that went over left a horrendous scar on the mountainside."[82]

Other memories focused on problems that were somewhat unique to Glacier Park and other wilderness areas. On Cuthrie's contract, a deer got its hooves tangled in some blasting wires and prevented the blast--a blast that would have killed the deer. Russell Smith, another BPR engineer, said it was not unusual to see up to twenty black bears in areas where they were fed. W.C. Peters reported the employees had to watch their lunches--the men who cleared trees often hung saws on the trees in which they kept their lunches. At food supply stations, contractors resorted to pounding nails in the walls with the points on the outside. One meathouse was on stilts and had a drawbridge. At the west side tunnel camp, a black bear set up a permanent post at the back door of the kitchen. Crizzlies were cause for alarm, however, and when one visited the Russians in Camp Six, the contractors called in the park rangers to protect their labor.[83]

Three men died in the course of building the road. In 1926, Charles Rudberg of the Williams & Douglas firm was hanging from a rope to check the safety of an overhanging rock and slipped and fell to the roadbed. The Colonial Building Company lost two men. In 1931, Carl Rosenquist was hit in the head by a falling rock, and the following summer, mason Gus Swanson was killed in a rock slide.[84]

Dedication--1933

As the road neared completion, the park and Park Service prepared for a day of dedication. Before that could happen, however, they needed a name for the road. Since the late 1910s, the east-west route had been labeled the Transmountain Highway. When the Williams and Douglas contract was underway, Glacier superintendent J.R. Eakin, among others, was searching for a name worthy of the park's scenery and the engineering of the road. Congressman Louis C. Cramton, who had taken a particular interest in the park and had helped obtain the appropriation of 1924, recommended "Coing-to-the-Sun Highway" to Eakin. It is unknown whether the congressman came up with this idea on his own, but Eakin liked the name because "it gives the impression that in driving this road autoists will ascend to extreme heights and view sublime panoramas."[85]

Back in 1916, three members from the Blackfeet tribe near Clacier went to Washington to ask Stephen Mather to use Blackfeet names for features in the park as much as possible. Local legend, and a 1933 press release issued by the Department of the Interior, told the story of the god Sour Spirit who came down from the Sun to teach Blackfeet braves the rudiments of the hunt. On his way back to the sun, Sour Spirit had his image reproduced on the top of the mountain as a "perpetual source of inspiration." In fact, the press release noted, Going-to-the-Sun was a contraction of the original name for the mountain, "The Face of Sour Spirit Who Went Back to the Sun After his Work was Done" Mountain. In his book on Glacier place names, however, Jack Holterman

suggests James Willard Schultz, an explorer in the 1880s, concocted the name and there is no original Blackfeet legend.[86]

On July 15, 1933, the park held a formal ceremony at Logan Pass to dedicate the Going-to-the-Sun Highway. Local dignitaries in attendence included Montana Governor Frank A. Cooney, O.S. Warden of the Montana State Highway Commission, as well as Glacier Superintendent Eivind T. Scoyen. Although Horace Albright, Thomas McDonald and Secretary of the Interior Harold L. Ickes were invited, none could make it, but all sent messages of congratulations that were read aloud. Other parts of the program included speeches by politicians from Montana and Alberta, and W.H. Lynch of the BPR. The Civilian Conservation Corps and the Blackfeet Tribal Band provided the music. The afternoon ended with a peace ceremony among the Blackfeet, Flathead, and Kootenai tribes.[87]

Reconstruction

Although the Going-to-the-Sun Road was officially opened in 1933, it would be many years before it was finally completed. Before the highway was dedicated, even as early as 1927, the BPR and NPS had plans for major reconstruction to bring the entire road up to 1933 standards. The eastern and western end sections--the parts of the road built before the BPR became involved--were the sections of the road most in need of improvement. They were often narrow, full of tight curves, and built with short-lived wooden culverts and bridges. The reconstruction was primarily a product of the 1930s, although some work continued into 1941 and even after World War II. Most of the reconstruction is documented in "Final Construction Reports" filled out by the BPRs resident engineer, who was A.V. Emery for most of the period. The reports contained much detailed information, but only partly made up for the contextual information lost in the diminishing amount of correspondence.[88]

The Glacier Park road program in the 1930s was heavily influenced by the New Deal relief money. Building better highways was one of the most politically popular methods to distribute financial aid to the nation's unemployed work force. Highway construction was the largest federal works project--utilizing some 35 to 45 percent of all relief workers. Many of these funds naturally flowed through the federal government's premiere roadbuilding agency: the Bureau of Public Roads. Chief Thomas MacDonald agreed with the spirit of the New Deal and enforced regulations such as minimum wages, maximum hours, and labor-intensive construction methods to employ as many unemployed workers as possible. After 1933, the New Deal legislation directed over $1,000,000 to the Going-to-the-Sun Road.[89]

The Depression made its presence known in Glacier Park before the relief money was available. One of its first victims was A.R. Douglas. On October 7, 1932, Douglas was the low bidder for a contract to improve 7.1 miles on the east side--from Dead Horse Point to about 1,000 feet west of the current St. Mary's Bridge. Because of the lateness of the season, Douglas was forced to wait until spring to begin. The contractor began by setting up camp at Rose (often called Roes or Roe) Creek, near the Golden Stairs. The large retaining wall at the Golden Stairs was an early priority in order to maintain the flow

of traffic.[90]

The rock blasted near the Golden Stairs was used in the masonry parts of Douglas' contract--particularly the Rose Creek Bridge and the small 6'x4' box culvert over Two Dog Creek (station 743). The Rose Creek Bridge was a 42-foot long concrete slab deck bridge. Like other bridges on the route, it was reinforced concrete with a masonry facing. Masonry was also used in the retaining walls and guardrails that were part of Douglas' contract. Installing the requisite drainage pipes and grading were other parts of Douglas' contract.[91]

In early September 1933, Douglas' work force reached a peak of eighty men and they made good progress, but winter closed down operations in mid-October when there was still work remaining on the project. In December, A.R. Douglas declared bankruptcy and for a short time, the park did not know who would complete the project. J.G. Edmiston of Kalispell, the "Trustee of the estate of the Contractor," completed the remainder of Douglas' contract on June 28, 1934. In addition to the poor economic condition, most of Douglas' difficulties may have stemmed from his bid of $80,468.86--the project engineer had estimated the cost at $122,700.[92]

At the end of 1933, the park let a contract for the surfacing of the east side from Logan Pass to St. Mary, including the parking areas at Logan Pass and Going-to-the-Sun Point and the 1,000-foot spur road into Sun Point, but excluding the St. Mary and Divide Creek bridge areas. The Lawler Corporation of Butte, Montana, was the low bidder on this contract, and early in 1934 they had their 125-man camp set up at Rose Creek. The surfacing consisted of two layers of crushed rock. The bottom course was four inches of 2½-inch rock and the top course was two inches of 1-inch rock. The contractor also did some finishing work on the shoulders and ditches, as well as installing guardrail.[93]

Since the surfacing was primarily rock, a large part of the contractor's job entailed setting up crushing plants to produce stockpiles of the properly sized aggregates. Prior to construction, the engineers estimated the surfacing would require 50,000 tons of the bottom course material and 30,000 for the top. The contractors set up their crushing plants at sites along the road conducive to quarrying. Lawler's first crushing plant (station 513) and quarry (station 507) was about midway between Sun Point and Rose Creek. As a result of the material taken from this quarry, the road gained a thirty-foot parking area and the curve on which the quarry was placed decreased from a 12 degree curve to 7½ degrees. The contractor had additional crushing plants near Two Dog Creek (station 734) and on Going-to-the-Sun Mountain (station 284) near a talus slope. Lawler was popular with BPR engineer Emery because he pushed hard to get the project done on time, but the hard driving was rough on the contractor's equipment. Emery estimated the contractor's shovels and crushers were in a state of disrepair about 20 percent of the summer.[94]

The Lawler Corporation was the low bidder for another east side contract opened May 23, 1934. At its very eastern end, the Going-to-the-Sun Road crossed the St. Mary River and Divide Creek within a distance of 1½ miles. The contract called for a three-span reinforced concrete slab bridge with a masonry facing over the St. Mary River and a smaller version of the same over Divide Creek. Lawler built camp near the St. Mary Bridge (station 929).

Progress on this contract was delayed because a special authorization was necessary before the parts of the contract location outside the park boundary--half of Divide Creek Bridge and the road up to Blackfeet Highway--could be constructed. In addition to the bridges, Lawler installed drainage pipes and log guardrails and finished the crushed rock surfacing from existing stockpiles from the previous contract.[95]

Reconstruction and improvement got underway on the west side of the road with a contract let in December 1933 to Chris Yonlick of Seattle. Yonlick's bid of $471,250 obligated him to construct masonry retaining walls and guardrails from a point about one mile west of Logan Creek up to Logan Pass. These structures supplemented those constructed by Williams & Douglas in 1925-1928. Yonlick set up camp just above the Loop (at station 400) and began work in the spring of 1934. Yonlick opened up a quarry near Haystack Creek (station 252) in the spring and shifted to another 400' west (station 260) at the end of 1934. The rock produced at the two quarries was brittle and difficult to work, but little else was available near the park.[96]

Yonlick, more than most of the contractors in the 1930s suffered from the restrictions placed on labor by the New Deal relief agencies. No laborers could work for more than forty hours per week. This restriction only exacerbated the difficulty in procuring experienced masons for the retaining walls and guardrails. At peak season, Yonlick employed thirty-six masons, but Emery stated the contractor had a need for an additional twenty masons. Yonlick appealed to the New Deal's National Reemployment Service to send more masons, but there were just too few available to meet the demand. Consequently, the contractor was forced to use the service of inexperienced masons and had to rebuild many parts of his work. During the winter of 1934-35, Yonlick's financial situation deteriorated into insolvency and his bonding company, United States Fidelity & Guaranty Company, took over the operations as the contractor's agent. The financial difficulties caused a late start the summer of 1935, and because of the continuing shortage of masons, nearly 40 percent of the work was incomplete when the contract time expired September 2. The job extended into a third season and was completed July 2, 1936.[97]

Another contract was signed in December 1934 for the reconstruction and grading from Avalanche Creek east 5.6 miles. The contract was the first of several that improved the standards of the road between Belton and Logan Pass. Grading and drainage were better, the road was widened and several tight curves and troublesome sections realigned. Surveys for most of the contracts were completed in 1934 and 1935. The west side roads were reconstructed with higher standards: 24-foot roadway, a maximum of 12 degrees on curves, and 5-foot ditches.[98]

Tomlinson-Arkwright Construction Company and J.L. McLaughlin of Great Falls, Montana were the low bidders with an offer of $77,976.40. The contractors began work in the spring of 1935 by moving into the same camp at Logan Creek that Williams & Douglas had occupied nearly a decade earlier. In mid-July, Tomlinson-Arkwright & McLaughlin completed the clearing and grubbing and began the grading. Several hundred linear feet of pipe culvert went in to provide drainage, and the contractor was responsible for roadside slopes and ditches and "obliterating" the old road when the alignment was changed.[99]

The contractors excavated heavy material along McDonald Creek near the

western end of the contract, but used such destructive blasting methods that a ranger in the field felt compelled to send a memo to the chief ranger recommending the contractor be reprimanded. Many trees were damaged and some even flew into McDonald Creek and caused log jams. The ranger suggested the contractor be reminded of the landscape clauses that were in all the contracts since 1925. BPR engineer Emery commented that the rock under excavation was very difficult to remove and much of the tree damage unavoidable.[100]

Tomlinson-Arkwright & McLaughlin surfaced the road with the two layers of crushed rock. Since the section was relatively wet, the bottom layer of surface rock was increased to 8". The top layer of rock consisted of 2" of rock no larger than ¾" and required 5 to 10 percent of the material to pass through a screen of 200 mesh. The contractors established a crushing plant in a gravel pit 500' south of the road about 2000' west of Avalanche Creek. A small portion of the grading, some finishing work on the ditches and slopes, and landscaped work at the gravel pit were carried over into 1936 for two weeks worth of work. From September 1935 through the end of the project, A.R. Douglas was hired as the contractor's supervisor. Douglas had earned the respect of the BPR and engineer Emery was glad to cooperate with him.[101]

Douglas was back in business with his first partner, D.A. Williams, in a second west side contract. On May 22, 1936, Williams & Douglas won the contract for eleven miles of road from Belton up to and including the Lake McDonald Hotel area. The contractor's camp was near Apgar in an unused building. Like most of the other reconstruction contractors, Williams and Douglas had to cope with the relatively heavy tourist traffic that drove the road. Even in the depths of the Depression, the Going-to-the-Sun Road was a popular destination. However, most of the west side reconstruction projects included some parts of the road that were realigned. Generally the contractors tried to build these sections during the heaviest season of tourist travel and save for fall the sections in which the construction competed with traffic. One of the new alignments Williams & Douglas created was the new western entrance at the Flathead River. Landslides along the entrance road bordering the Flathead River near the 1920 Belton Bridge had caused perennial maintenance problems since 1910. In 1936 the Great Northern Railroad built the new underpass at Belton (West Glacier) and on the other side of town, the Montana State Highway Commission put in a new bridge over the Middle Fork of the Flathead River. Williams & Douglas' contract began with the north approach of the new bridge and made a direct route to the eastern shore of Lake McDonald without passing through Apgar. This two-mile section of road was complete in August 1936, although it was not in use until the Montana State Highway Commission completed the new bridge over the Flathead River in 1938.[102]

Another major realignment on the Williams & Douglas contract was at the eastern end of their job--the Lake McDonald Hotel. The road was moved farther away from the lodge and Lake McDonald. Most of this work was done in late 1936 and early 1937, before the new season began. The contractors put in thousands of linear feet of pipe for drainage and subcontracted out two box culverts to W.K. Trippet of Whitefish. They graded and surfaced the road with crushed rock and were finished September 15, 1937.[103]

The Williams & Douglas contract saw a decrease in the amount of relief

labor employed. In most of his final construction reports, A.V. Emery included a table showing the hours of relief labor compared to the hours of non-relief labor. Less than one-quarter of the work hours were provided by relief labor. The decrease was most likely a result of President Roosevelt's dramatic cuts in relief employment funds in 1937.[104]

The contract for the neighboring section of road from Lake McDonald Hotel to Avalanche occurred simultaneously with Williams & Douglas' contract. The bids were opened May 21, 1936 and Martin Wunderlich of Jefferson City, Missouri, won the contract for the 5.5-mile stretch with a low bid of $136,582.50. The contractor set up camp along McDonald Creek (station 955). Like the neighboring contracts of Tomlinson-Arkwright & McLaughlin and Williams & Douglas, Wunderlich's contract covered terrain that was not as dramatic as the steep cliffs flanking Logan Pass, but the rock formations on the three contracts provided some of the most difficult excavation on the road. There might be boulders up to 25 cubic yards or ledge rock--neither of which exploded in a predictable manner. The rock was extremely hard, however, so the contractor was forced to make his explosive charges strong enough to break the rock, but not so strong as to throw debris widely and damage the landscape. As mentioned above regarding the Tomlinson-Arkwright & McLaughlin contract, the contractors were not always successful in guarding the landscape. In addition to protecting trees, the landscape requirements of the contract included rock embankments on slopes to prevent erosion.[105]

Wunderlich had as much difficulty obtaining masons as Chris Yonlick had on his earlier contract. The contractor not only requested more masons from the National Reemployment Service in Montana, but also contacted the agency's offices in Idaho, Utah, Washington, and Wyoming for additional masons. For all his canvassing of the Pacific Northwest, Wunderlich obtained only three more masons. The contractor requested, and was granted, permission from the BPR and the Reemployment Service to work his masons forty-eight hours per week instead of forty because the mason shortage was threatening to delay the work. Emery commented that Wunderlich was also having difficulties in organization and the contractor lost money in excessive sweeps over the road.[106]

Wunderlich realigned about 1¾ miles of road in eight different locations over the course of the 5½-mile section. As in the other west side contracts, part of Wunderlich's job included "obliterating" the old road alignments. Occasionally, the contractor borrowed excavated material from the old alignment for fill on the new. In addition to the realignment, Wunderlich's contract included the usual: drainage pipes, several sections of masonry retaining walls and guardrails, and crushed rock surfacing; and the unusual: a horse trail underpass, about one mile east of Lake McDonald Hotel.[107]

Williams and Douglas and Wunderlich had each subcontracted out their large culverts to W.K. Trippet of Whitefish, Montana. Trippet also had his own contract for the Avalance Creek Bridge and two culverts over Snyder Creek, one on the Going-to-the-Sun Road and one on the Lake McDonald Hotel Spur. Trippet won the contract August 30, 1935 with a low bid of $48,134 and set up camp--which consisted of an office, a bunkhouse, a cookhouse, a blacksmith shed and several warehouses--near the Avalanche Creek Bridge. Stone came from the quarry near Haystack Creek (station 260) and Trippet bought sand and gravel in the towns outside the park. The Avalanche Creek Bridge was a 60-

foot concrete slab bridge with three spans and the Snyder Creek Bridge on the main road was constructed in the same style, although with only one 20-foot span.[108]

Pavement

By the end of the 1937 construction season, the entire road had been constructed or reconstructed by the Bureau of Public Roads and had a crushed rock surfacing and minimum roadbed of 22' on all parts of the road except the ten-mile section west of Logan Pass. The next step in road improvement involved a series of contracts to pave the Going-to-the-Sun Road. As with the rest of the road's construction, this project was done in several phases beginning in 1938 and ending in 1952, with a long period of idle time during World War II. The paving was completed in three contracts--one for 22.2 miles from Belton to the foot of the grade, another of 18.1 miles from Logan Pass to St. Mary, and finally, a third covering the road from the foot of the grade up to Logan Pass.[109]

Carl Nyberg of Spokane won the west side contract October 22, 1937 with a low bid of $185,933. The contract called for improvement in drainage, slope stabilization, some additional crushed rock surfacing, and bituminous or asphalt surfacing. Nyberg subcontracted the paving to the Diesel Oil Sales Company of Seattle. The subcontractors paved the road in layers beginning with a thin layer of hot liquid asphalt. Then Diesel Oil laid down a level of small crushed roack, which after setting a week, was covered with another light cover of hot liquid asphalt as a seal. This in turn received a layer of ½-inch chips, and the subcontractors rolled the whole mixture flat to a thickness of ¾". The pavement, "chip and seal," applied in 1938 and 1939, was generally a minimum of 22' wide.[110]

On the east side, S. Birch & Sons Construction Company put down a 20-foot wide bituminous covering on the 18½ miles from Logan Pass to St. Mary. Birch won the contract December 2, 1938 and executed the contract in 1939 and 1940.[111]

World War II shut down many of the operations in the park, and the incomplete road surfacing project was delayed for the duration of the war. Following the war, in 1950, the BPR let a contract for surfacing the ten-mile segment of road from the base of the grade west of Logan Pass up to the pass. The Morrison-Knudsen Company of Seattle won the bid with their offer of $4,370,741 and began construction June 6, 1950 and finished August 21, 1952--two weeks ahead of schedule. In addition to the bituminous surfacing, the Seattle contractors installed sheet metal culvert pipes for drainage, built and rebuilt retaining walls and guardrails, and laid wire mesh for slope protection.[112]

Conclusion

The completion of pavement in 1952 marked another milestone in the construction of the road. Since then, additional construction has occurred, notably the concrete lining of the West Side Tunnel and another realignment between Belton and Apgar. The Going-to-the Sun Road remains a very popular

tourist attraction, and most visitors to Glacier National Park rarely wander too far from the road. As in the other national parks, visitation to Glacier has risen dramatically over the years, due primarily to the increased access afforded by park roads and bridges. In 1911, for example, 4000 people visited Glacier National Park. The number steadily climbed through the 1910s and 1920s: 22,500 in 1920, 40,000 in 1925, and 76,000 in 1933. In 1934, the first full season after the park formally opened the Going-to-the-Sun Road, the attendence jumped to 116,965. After a drop in visitors during World War II, the numbers rose to 201,000 in 1946 and 485,000 in 1950.[113] Although Stephen Mather may have been disappointed to learn so few Americans utilized the horse and hiking facilities, he would have been pleased to note that his goal to democratize the national parks by providing increased public access to them, and within them, had been reached.

ENDNOTES

1. R.B. Marshall, "Report on the Glacier National Park in Montana, Its Improvement and Administration," December 28, 1910, pp. 16, 33. Many of the reports, correspondence, and sundry records, including this one, belong to the Glacier National Park Library Historical Files (hereafter abbreviated GNPLHF) at the park in West Glacier, Montana.

2. Marshall, pp.9, 15, 18-19.

3. Marshall, pp.7-8.

4. William R. Logan, "A National Park in the Formative Stage," a paper given at the Conference of National Park Superintendents held at Yellowstone National Park, September 11-16, 1911 (GNPLHF).

5. Logan, p.6.

6. Much of the sand and gravel came from the right-of-way granted by John Lewis, a hotel operator and large landholder. In compensation, the park gave Lewis the logs cut from government land in the course of construction. The holes left by creating gravel pits along the road for the construction subsequently caused erosion and cave-ins along the roadside, prompting the superintendent in 1912 to suggest these pits be filled in as soon as funds would allow. Logan, pp.6-7; Logan to Walter L. Fisher, Secretary of the Interior, January 24, 1912; Superintendent R.H. Chapman to Fisher, August 15, 1912 (GNPLHF).

7. Annual Report of the Superintendent of Glacier National Park, 1911 (GNPLHF). The following year, parts of the Belton-Lake McDonald road received "metalling" in a contract with Lenox P. Edge of Kalispell. Edge covered the road with one to two inches of rock; and the road had a six-inch crown. Lenox P. Edge contract, June 29, 1912 (GNPLHF).

8. E.A. Keyes, report on Lake McDonald shore line road, December 16, 1912 (GNPLHF).

9. Alfred Runte, Trains of Discovery: Western Railroads and the National Parks (Flagstaff, AR: Northland Press, 1984), pp. 43-44.

10. M.A. Butler, Great Northern Assistant Engineer, to A.H. Hogeland, Great Northern Chief Engineer, August 12, 1912 (GNPLHF).

11. Adolph C. Miller, Assistant to the Secretary of the Interior, to Logan Page, Director of Public Roads, April 1, 1914 (GNPLHF). Bruce Seely, Building the American Highway System: Engineers as Policy Makers (Philadelphia: Temple University Press, 1987), chapter two.

12. Proceedings of the National Park Conference Held at Berkeley, Cal., March 11, 12, and 13, 1915 (Washington, D.C.: Government Printing Office, 1915), pp.24-32.

13. T. Warren Allen to Director, OPR, no date (GNPLHF). Proceedings of the National Park Conference, 1915, pp.24-32.

14. James L. Galen to Franklin K. Lane, Secretary of the Interior, July 29, 1914 (GNPLHF).

15. "Professor Sperry Gives Views of Best Route Through Park," Kalispell Bee July 13, 1915, pp.1,6; Albert Sperry, Avalanche (Boston: The Christopher Publishing House, 1938), p.ix.

16. H.L. Myers, Senator to the Secretary of the Interior, September 25, 1914; P.N. Bernard to the Secretary of the Interior, November 4, 1914; P.N. Bernard and W.H. Griffin to Mark Daniels, October 2, 1915; W.M. Bettorf, Flathead Motor Club Association, to T.J. Walsh, Senator, March 23, 1916; J.R. Eakin to Stephen Mather, Director of the National Park Service, October 17, 1921; Eakin to Mather, October 26, 1921; Hubert Work, Secretary of the Interior, to A.C. Lefebvre, Great Falls Kiwanis Club, November 23, 1923. J.M. Hyde, "That Fairy Highway Through Glacier Park," Cut Bank Pioneer April 29, 1921 and an undated editorial response agreeing with Hyde; Secretary of the Interior Ray Lyman Wilbur to B.F. Camp, April 26, 1929. All of the above are in Record Group 79 in the National Archives, Washington, D.C. Eakin to A.B. Cammerer, National Park Service, March 17, 1923 (GNPLHF).

17. Proceedings of the National Park Conference, 1915, pp.16-20; Alfred Runte, National Parks: The American Experience, second edition (Lincoln: The University of Nebraska Press, 1987), chapter five; Runte, Trains, p.48.

18. Runte, National Parks, pp.78, 83, 89, 101; Stephen T. Mather, "The National Parks on a Business Basis," The American Review of Reviews vol.LI (April 1915), pp.429-430.

19. Another who concurred with Mather on this issue was Hiram M. Chittenden, the Army Corps of Engineers officer who had earlier overseen the construction of the Yellowstone Park road system. Robert Shankland, Steve Mather of the National Parks, third edition (New York: Alfred A. Knopf, 1970), p.152; Horace M. Albright as told to Robert Cahn, The Birth of the National Park Service: The Founding Years, 1913-33 (Salt Lake City: Howe Brothers, 1985), p.195.

20. Runte, National Parks, pp.103-05.

21. Horace Albright to Louis W. Hill, May 17, 1917; Albright and Cahn, pp.103-04 (GNPLHF).

22. Albright, memorandum for the Secretary of the Interior, May 4, 1917 (GNPLHF).

23. Goodwin to A.J. Breitenstein, Secretary-Treasurer, Yellowstone-Glacier B-Line, August 17, 1921 (GNPLHF).

24. Goodwin to Breitenstein, August 17, 1921.

25. See HAER Report MT-68, Belton Bridge; Goodwin to Payne November 8, 1919; Annual Report of the Superintendent, 1920 (GNPLHF).

26. Acting Forester to District Forester, February 12, 1921 (Record Group 79, National Archives).

27. Goodwin to H.C. Keith, April 11, 1921; Goodwin to Mather, April 11, 1921; Mather to Goodwin, April 28, 1921; Demaray to Cammerer, April 25, 1921.

28. Annual Report of the Superintendent, 1921; "Lake McDonald" column, (Kalispell) Daily Interlake (July 2, 1921), p.6; "Lake McDonald" column, (Kalispell) Daily Interlake (July 6, 1921), p.3.

29. Annual Report of the Superintendent, 1921; L.L. Hill to Goodwin, August 15, 1922 (GNPLHF).

30. A.B. Cammerer to Goodwin, May 2, 1922 (GNPLHF).

31. Goodwin to Director, July 19, 1922; L.L. Hill to Goodwin, August 15, 1922; L.L. Hill to Goodwin, June 24, 1922; Superintendent's Monthly Reports, August, September, October, 1922 and March, 1923 (GNPLHF).

32. Superintendent's Monthly Reports, March, April, and November 1923 and July 1924.

33. A.L. Saunders, Official Diary, Mt. Cannon Section, 1924-25 (GNPLHF).

34. "Another Link in Park Road," Columbian (Columbia Falls, Montana) (March 29, 1923), p.3; "Logan Pass Highway in Glacier Park Will Be Opened in July: Cost When Complete Exceeds Two Million," Great Falls Tribune (February 26, 1933), p.1 (GNPLHF). W.G. Peters, Monthly Construction Progress Report, August 1925 (National Archives).

35. Superintendent's Monthly Report, June, November, 1923 and February, June, July, August, September, 1924 (GNPLHF).

36. Thomas Vint, interviewed by Herb Evison, National Park Service, 1960 (GNPLHF); Shankland, pp.156-58; "Glacier Park Logan Pass Route One of America's Most Scenic Highways," Great Falls Tribune (October 18, 1925), Section 2, p.1.

37. "Frank Kittredge, Engineer, 71, Dies," New York Times (December 12, 1954), p.88; "Frank Alvah Kittredge, M. ASCE" Transactions of the American Society of Civil Engineers vol. 122 (1957), p.1245.

38. Frank A. Kittredge, "Transmountain Highway, Glacier National Park, Report to National Park Service," (February 5, 1925), pp.6-8 (Record Group 79, National Archives, Washington, DC); Arthur H. Blanchard and Roger L. Morrison, Elements of Engineering, second edition (New York: John Wiley and Sons, Inc., 1928), pp.69-77.

39. Frank Kittredge, "The Survey of the Going to the Sun Highway," Glacier National Park Driver's Manual, ninth edition (Glacier Park Transport Company, 1952), pp.85-89 (GNPL); Kraebel to Director, October 8, 1924; Kraebel to Director, November 18, 1924 (Record Group 79, National Archives, Washington, DC).

40. Kittredge, "Transmountain Highway," pp.3-4, 15-22.

41. Kittredge, "Transmountain Highway," pp.24-25.

42. Kraebel to Director, October 8, 1924; Kraebel to Director, November 18, 1924 (National Archives).

43. Wilson G. Harger, Location, Grading and Drainage of Highways (New York: McGraw-Hill Book Company, Inc., 1921), pp.77, 81; Kittredge, "Transmountain Highway," p.2.

44. Thomas Vint, Assistant Landscape Engineer, National Park Service to D.R. Hull, Chief Landscape Engineer, National Park Service, undated (c. spring 1925) memorandum (National Archives).

45. Vint to Hull, undated (c. spring 1925) memorandum (National Archives).

46. Seely, pp.53, 63, 84, 125.

47. A.E. Demaray to Director, memorandum, November 12, 1924 (National Archives).

48. C.H. Purcell, F.A. Kittredge, J.A. Elliott, T.C. Vint, and C.J. Kraebel, Suggested Procedure for Cooperation Between the National Park Service and the Bureau of Public Roads in Major Traffic-Way Projects Within the National Parks, April 22, 1925; Demaray, memo for files, April 8, 1925 (National Archives).

49. Vint to Hull, undated (c. spring 1925) memorandum (National Archives).

50. Kraebel to Director, April 30, 1925 (National Archives).

51. Williams and Douglas contract, 1925 (National Archives).

52. W.C. Peters, "The Transmountain Highway, Glacier National Park," Western Construction News (August 10, 1929), p.395.

53. "Bids Opened on $4,000,000 Road in Glacier Park," Oregon Daily Journal (June 11, 1925); Peters, "The Transmountain Highway," p.395; "Road Bids are Open," Oregonian June 11, 1925. The other bidders were J.F. Clarkson; A. Guthrie and Company; Pioneer Construction Company; Grant, Smith and Company; Hauser Construction Company; Sims and Carlson; and H.H. Boomer; Cuy F. Atkinson; Stevens Brothers; and J.S. Hailey.

54. Secretary of the Interior Harold Ickes to Attorney General, October 7, 1933; Bert Burrell to Director, July 29, 1925; Goodwin to Stevens Brothers, July 3, I925 (National Archives); Annual Report of the Superintendent, 1925 (GNPLHF).

55. Peters, "Transmountain Highway," editors note, p.394.

56. Peters, "Transmountain Highway," p.396.

57. Peters, "Transmountain Highway," p.396; Peters, "Construction Progress Report (1925) on Transmountain Highway;" Peters, monthly progress reports, June, August, 1925; September 1926; July 1927 (National Archives).

58. Peters, "Transmountain Highway," p.401; Peters, monthly progress reports, June and August 1925, September 1926, and July 1927 (National Archives).

59. Peters, "Transmountain Highway," p.397; Peters, "Construction Progress Report (1925)" (CNPLHF).

60. Peters, "Transmountain Highway," pp.394-401; Peters, "Contruction Progress Report (1925); Peters, monthly progress reports (National Archives).

61. Kittredge, "Transmountain Highway," pp.3, 24-25; Shankland, p.157; Secretary of the Interior Hubert Work to Civil Service Commission, October 20, 1925 (GNPLHF).

62. Minutes of the Eighth National Park Conference Held in Mesa Verde National Park, Colorado; October I to 5, 1925, Inclusive, p.25 (CNPLHF).

63. C.H. Purcell, BPR District Engineer to BPR Deputy Chief Engineer L.I. Hewes, May 20, 1926; Cammerer to Kraebel, May 26, 1926; AIbright to Cammerer, June 7, 1926; Cammerer to Albright, June 15, I926; Kraebel to Cammerer, June I7, 1926; Albright to Director, June 22, 1926 (National Archives).

64. Peters, "Construction Progress Report (1925)"; Kittredge, memo dated November 21, 1927 regarding conversation with Thomas MacDonald, October 23, 1927 (National Archives).

65. Peters, "Transmountain Highway," p.400; Portland Daily Record May 21, 1925.

66. Kittredge, memo dated November 21, 1927 regarding conversation with Thomas McDonald October 23, 1927 (National Archives).

67. Ernest A. Davidson, "Report to Chief of Division of Landscape Architecture Covering Features of Landscape Interest in Construction of Avalanche-Logan Pass Section of Transmountain Highway, Glacier National Park, 1925 to 1928," January 24, 1929 (National Archives). On this copy of Davidson's report, Thomas Vint reworded a sentence of Davidson's in the margin. Where Davidson mentioned the inevitability of destruction using the chosen construction methods, Vint wrote, in stronger terms, that parks must learn to use "longer construction periods and more expensive construction methods."

68. Davidson, p.6.

69. Annual Report of the Superintendent, 1930 (GNPLHF); Cammerer to B.F. Camp, April 25, 1929; Secretary of the Interior Ray Lyman Wilbur to B.F. Camp, April 26, 1929; Albright to Congressman Louis C. Cramton, July 25, 1930 (National Archives).

70. Albright to Cramton, July 25, 1930.

71. Eakin to Albright, July 27, 1930, Emery, "Final Report of Location Survey (1929-1930)," (National Archives).

72. Albright to Cramton, July 25, 1930; bid notice, August 11, 1930; H.K. Bishop, BPR to Demaray, November 11, 1930 (National Archives).

73. Demaray to Director, memo, February 26, 1931; Demaray to Howard Hays, President of the Glacier Park Transport Company, August 7, 1931 (National Archives).

74. H.K. Bishop, BPR to Albright, May 29, 1931; P. St. J. Wilson to Albright, June 23, 1931 (National Archives).

75. Walter A. Averill, "Benching the Transmountain Highway from Solid Rock Cliffs in Glacier National Park," Pacific Builder and Engineer (May 7, 1932), pp.24-25.

76. Averill, pp.24-25.

77. W.H. Lynch, BPR District Engineer to L.I. Hewes, July 31, 1931 (National Archives); Averill, p.26.

78. Averill, p.26.

79. Averill, p.27.

80. Russell Smith, BPR engineer, interviewed by Philip Iverson, July 26, 1977, Glacier National Park; Joe Opalka, packer, interviewed by Cynthia Mish, June 18, 1975, Glacier National Park; Ira S. Stinson, Glacier Park engineer, interviewed by Susan J. Buchel, August 4, 1975, Glacier National Park; Buck Martin, interviewed by Susan Beede, March 24, 1981, Glacier National Park (GNPLHF).

81. Gordon L. Harrison, "Looking Back on the Sun Road" c. 1989, p.67. The uncited article is in the Glacier Park Library.

82. Harrison, p.67.

83. Smith interview; Averill, p.28; Peters, p.399-400.

84. "Workman Killed By Fall From Cliff," Daily Inter Lake (Kalispell, Montana), June 25, 1926, p.1; "Highway Employee Fatally Injured By Falling Rock," Daily Inter Lake, August 27, 1931, p.1; "Mason Loses Life in Glacier Park," Daily Inter Lake, July 15, 1932, p.1.

85. Eakin to Glacier Park Hotel Company, October 8, 1928 (National Archives).

86. Albright and Cahn, p.21; Department of the Interior press release, March 26, 1933 (Great Northern Papers, Minnesota Historical Society, St. Paul, Minnesota); Jack Holterman, Place Names of Glacier/Waterton National Parks (West Glacier: Glacier Natural History Association, 1985), p.56.

87. Department of the Interior press release, July 15, 1933 (Great Northern Papers, Minnesota Historical Society).

88. W.G. Peters, "Reconnaissance Report on Transmountain Highway--Belton-Avalanche Section" 1927; all of the final construction reports used in this report used to be A.V. Emery's personal copies but now belong to the GNPLHF.

89. Seely, chap. 4; figure compiled from final construction reports (GNPLHF).

90. A.V. Emery, "Final Construction Report (1933-1934) on Transmountain Highway, East Side, Logan Pass-St. Mary Junction, Grading, Project No. "E"-1-E2," (GNPLHF).

91. Emery, "Final Construction Report, Project "E"-1-E2."

92. Emery, "Final Construction Report, Project "E"-1-E2." The other seven bidders on the project were Siems Spokane Company of Spokane, Washington ($83,368.50), Colonial Building Company of Spokane ($86,505.50), Guthrie-McDougall Company of Portland, Oregon ($91,078.50), Winston Brothers Company of Minneapolis ($98,564.68), Morrison-Knudsen Company of Boise, Idaho ($98,625), James Crick of Spokane ($99,721.50), and L.T. Lawler of Butte ($112,229.25).

93. A.V. Emery, "Final Construction Report (1934) on Transmountain Highway, East Side, Logan Pass-St. Mary Junction, Surfacing, Clacier National Park Project No. NR 1-D1, D2, E1, E2. The other bidders for the contract were S. Birch and Sons Contruction Company of Great Falls ($271,120.50) and H.C. Johnson of Portland, Oregon ($300,265.50).

94. Emery, "Final Construction Report, Project NR 1-D1, D2, E1, E2.

95. John Zoss, "Final Construction Report (1934-1935) on St. Mary's River and Divide Creek Bridges with Approaches, Blacier National Park, Project 1-E2." The other four bidders on the contract were Colonial Construction Company of Spokane ($97,759), Cuthrie-McDougall Company of Portland ($110,146), Ruckenberg-Wittman Company of Portland ($119,996), and Clifton and Applegate of Spokane ($128,224).

96. Emery, "Final Construction Report on Clacier National Park Highway Project NR 1-C Retaining Wall and Guard Rail, West Side Transmountian Highway, Clacier County, Montana," May 25, 1937. The other six bidders on the project were Colonial Building Company of Spokane ($77,500), Guthrie-McDougall Company of Portland ($78,750), Lawler Corporation of Butte ($84,250), Homer and Johnson of Portland ($86,600), Max J. Emery Company of Spokane ($95,000), and Morrison-Knudsen of Spokane ($95,500).

97. Emery, "Final Construction Report Project 1-C Retaining Wall and Cuard Rail."

98. Emery, "Final Construction Report (1934-1936) on Glacier National Park, Transmountain Highway, West Side Project NR-1B, 1C (portions), Reconstruction Grading and Surfacing," July 19, 1937.

99. Emery, "Final Construction Report, Project NR-1B, 1C." The other six bidders on this project were Kirkpatrick Brothers of Kalispell, Montana ($91,834.60), Frank Bass of Helena ($93,642), Poston Brothers of Kalispell ($94,328.80), Siems-Spokane Company of Spokane ($103,838), Colonial Construction Company of Spokane ($105,288.20), and Lawler Corporation of Butte ($109,103.50).

100. Emery, "Final Contruction Report, Project NR-1B,1C;" Ranger John F. Aiton to Chief Ranger, August 3, 1935 (CNPLHF).

101. Emery, "Final Construction Report, Project NR-1B, 1C (portions)."

102. Emery, "Final Construction Report (1936-1937) on Glacier National Park, Transmountain Highway, West Side Project RTEC 1-A, Unit 2, Reconstruction Grading." The other nine bidders were Colonial Construction Company of Spokane ($188,307), James Crick of Spokane ($193,385), Guthrie-McDougall Company of Portland ($193,960.90), Goodfellow Brothers of Wenatchee, Washington ($207,574.20), Martin Wunderlich Company of Jefferson City, Missouri ($214,815.20), Tomlinson-Arkwright Construction Company of Great Falls ($220,179.50), S. Birch and Sons Construction Company of Great Falls ($230,029.30), Poston Brothers of Kalispell ($238,331), P.L. Crooks and Company, Inc. of Portland ($238,789), and Lawler Corporation of Butte ($253,964).

103. Emery, "Final Construction Report, Project RTEC 1-A, Unit 2."

104. Emery, "Final Construction Report, Project RTEC 1-A, Unit 2."

105. "Improving the Transmountain Road, Glacier National Park," Pacific Builder and Engineer (April 3, 1937), p.39; A.V. Emery and John Zoss, "Final Construction Report on Glacier National Park, Transmountain Highway, West Side, Project NR 1-A, Unit 1, Reconstruciton, Grading and Draining; and Project 1-A, Unit 1, Bridges." The other nine bidders on this project were Colonial Construction Company of Spokane ($148,483.50), Guthrie-McDougall Company of Portland ($151,744.70), Williams and Douglas of Kalispell ($153,276), S. Birch and Sons Construction Company of Great Falls ($156,202), Goodfellow Brothers, Inc. of Wenatchee, Washington ($161,691.90), P.L. Crooks and Company, Inc. ($167,731.50), Tomlinson-Arkwright Construction Company of Great Falls ($171,411), Lawler Corporation of Butte ($173,309.50), and Barnard Curtiss Company of Minneapolis ($177,833.50).

106. Emery and Zoss, "Final Construction Report, Project NR 1-A, Unit 1 and Bridges."

107. Emery and Zoss, "Final Construction Report, Project NR 1-A, Unit 1 and Bridges."

108. Emery and Zoss, "Final Construction Report, Project NR 1-AS, Unit 1 and Bridges." The other three bidders on this contract were J.L. McLaughlin of Great Falls ($55,123), Colonial Construction Company of Spokane ($57,999.50), and Siems-Spokane Company of Spokane ($73,085.50).

109. Emery, "Final Construction Report, Transmountain Highway, Glacier National Park Highway Project 1-A, Units 1 & 2, Surfacing, Slope Stabilization and Bituminous Treatment, Glacier National Park Highway Project 1-B, 1-C (portions), Bituminous Treatment."

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111. Bureau of Public Roads final report on Birch contract. This is a truncated report consisting mostly of numbers.

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113. "Annual Travel Reports, 1911-1951," (GNPLHF).

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Addendum to
Going-to-the-Sun Road
Glacier National Park
West Glacier
Flathead County
Montana

HAER No. MT-67

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National Park Service
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HISTORIC AMERICAN ENGINEERING RECORD
GOING-TO-THE-SUN ROAD

I. INTRODUCTION

Location:	Glacier National Park Flathead County, Montana
Date of Construction:	1921 to 1933
Present Owner:	National Park Service Glacier National Park
Present Use:	Vehicular traffic to allow access by visitors to enjoy fully the natural and wild beauty of the park.

Significance: Going-to-the-Sun Road has State and local significance for its engineering and its role in the development of Glacier National Park. The highway's engineering features include a roadway bench carved on nearly vertical mountainsides, tunneling through sheer rock cliffs, arch bridges spanning streams, and stone guard rails. The road's importance to development of the park was expressed by the Director of the National Park Service in 1931, "It is one of the outstanding mountain roads in America. Although Glacier will always remain a trail Park, construction of this one highway to its inner wonders is meeting an obligation to the great mass of people who because of age, physical condition, or other reasons would never have an opportunity to enjoy, close at hand, this marvelous mountain park." 1

Historian: Mildred Harris, Intern
National Park Service
Rocky Mountain Regional Office
June 1988

II. HISTORY

Going-to-the-Sun Road has State and local significance as an engineering feat and for its role in Glacier National Park development. Since the early days of Glacier National Park, established in 1910, government officials, concessionaires and the local community envisioned a transmountain highway linking Glacier's west and east sides. Prior to 1921 differing views were held as to to the best route for this highway.

In order to determine the best route, the Nstional Park Service conducted a series of surveys, beginning as early as 1912. The Park Service eventually opted for a route along the east side of Lake McDonald and traversing Logan Pass.

On September 2, 1921 the Park Service opened bids for the first formal contracts for constructing what would become the Going-to-the-Sun Road. That year the road grade was cleared from the "T" junction at the foot of Lake McDonald for approximately 11 miles. By 1922, the road was completed as far as the Lewis Hotel, located on Lake McDonald. By 1924 the road was finished to the head of Lake McDonald and Avalanche Creek, approximately fifteen miles from where construction began. The Mt. Cannon section, located about five miles from Avalanche Creek was completed by 1925.

In 1925, the National Park Service and the Bureau of Public roads reached an agreement whereby the Bureau became responsible for the engineering and supervision of the remaining construction work. A codified procedural approach between the Park Service and the Bureau was adopted, and the decision was made to continue using funds for the western segment of the road. Between 1925 and 1928, construction continued, and the highway was completed as far as Logan Pass. Logan Pass is about 25 miles from the beginning of Going-to-the-Sun Road, and is a ten mile 6 percent grade to the Continental Divide. The final segment of Going-to-the-Sun Road, proved to be a tortuous stretch of road between the summit of Logan Pass and St. Mary. This segment required boring tunnels as well as grading and clearing of right-of-ways. As the project neared completion the Bureau of Public Roads provided a road maintenance work force.

In 1932 the first car traveled the entire length Going-to-the-Sun Road. On July 15, 1933 United States and Canadian dignitaries officially opened the road. In his annual report for 1933, National Park Superintendent E.T. Scoyen stated "Glacier National Park is becoming one of the most popular vacation resorts in the United States, with the Going-to-the-Sun Highway, as scenic as any in the world, connecting the west and east sides of the park, it is very probable that visitors will continue to increase in numbers."2

Within a year following the opening of the Highway, Park Service statistics indicated that a significant increase in travel had occurred. The significance of Going-to-the-Sun Road is found both

in the engineering expertise needed to build the road and the identification with auto tourists. Going-to-the-Sun Road drastically increased accessibility to the park. The increased auto traffic in the park contributed to a change in emphasis of lodging accommodations. Auto campgrounds and motor lodges were built for the auto travelers. In the 1940s and 1950s the large hotels and railroad chalets, such as Sperry Chalet, Lake McDonald Lodge and Lewis Glacier Hotel lost some of their emphasis in park plans for lodging.

III. DESCRIPTION:

Going-to-the-Sun Road is a transmountain road in Glacier National Park, Montana, that extends from the town of West Glacier at the park's western entrance to St. Mary on the eastern boundary. From West Glacier, the 48.7 mile road travels north for about 3 miles through a dense forest of hemlock, larch, red cedar, and white pine, where it reaches a "T" junction near the foot of Lake McDonald. At this junction the road turns east and follows the east side of Lake McDonald through McDonald Creek Valley following McDonald Creek to the base of Logan Pass. Here the road begins a 10 mile 6 percent grade to 6,649 feet Logan Pass. The two-lane road, carved out of the precipitous mountain, offers vistas of Livingstone Range and McDonald Valley as it climbs to the Continental Divide.

As the road descends from Logan Pass to St. Mary Lake, the road cuts through exposed argillite, the second oldest rock formation in Glacier National Park. The road skirts the north side of St. Mary Lake, which is 10 miles long and 1/4 to 1 mile wide. The paved road crosses a number of creeks spanned by stone bridges, passes through two tunnels, and travels between a series of stone retaining walls.

Over the years, snow slides and sections of rock wall have fallen causing damage to the rock retaining walls. The increased usage of recreational vehicles and trailers on the road has caused additional problems of the vehicles scraping the rock wall. Newer additions to the road include timber guard rails and built in foundations which stabilize the edge of the road. The road is closed from mid-October to early June because of heavy snow build up. The road has both concrete sections and bituminous surface. The road and bridges are in fair to good condition.

The section of the road for which this documentation applies is in the Triple Arch area, east of the turn at McDonald Creek before the road reaches Logan Pass.

Footnotes

1. Newell, Walter, and McDonald, Historical Research Associates, Historic Resource Study, Glacier National Park and Historic Structure Survey, (Denver, National Park Service, Rocky Mountain Regional Office.) 1980, p. 147.

2. Ibid p. 147.

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ADDENDUM TO:
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