

# SNOW WAR

An illustrated  
history of  
Rogers Pass  
Glacier National  
Park, B.C.

John G. Woods



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### Junction East Slide Path

*More than 100 avalanche paths streak down the mountains along the Rogers Pass route across the Selkirk Mountains. These slide paths are often of impressive dimensions. This dry snow avalanche descending Junction East avalanche path started at an elevation of 2320 m and came to rest on the valley floor 1200 m below. It travelled a distance of 2850 m at speeds up to 240 km/hr.*

## COVER

### Locomotive No. 30

*Like a ghost lurking in a darkened recess, locomotive No. 30 is shown here shrouded in snow, immobile and lifeless.*

*Although the exact history of this photograph is a mystery, it was probably taken inside the engine house at the first Rogers Pass Station circa 1887. Snow avalanches occasionally could reach this station. Likely, an avalanche had come down near the building and blasted it with the fine powder snow frequently blown in front of a snowslide.*

*In 1899, an avalanche destroyed the station. Dübs and Company of Glasgow, Scotland built this 4-4-0 configuration engine in 1882. The Canadian Pacific Railway never used No. 30 in Rogers Pass. The locomotive was probably in transit when it had this brush with disaster. Canadian Pacific Corporate Archives Photograph M1282.*

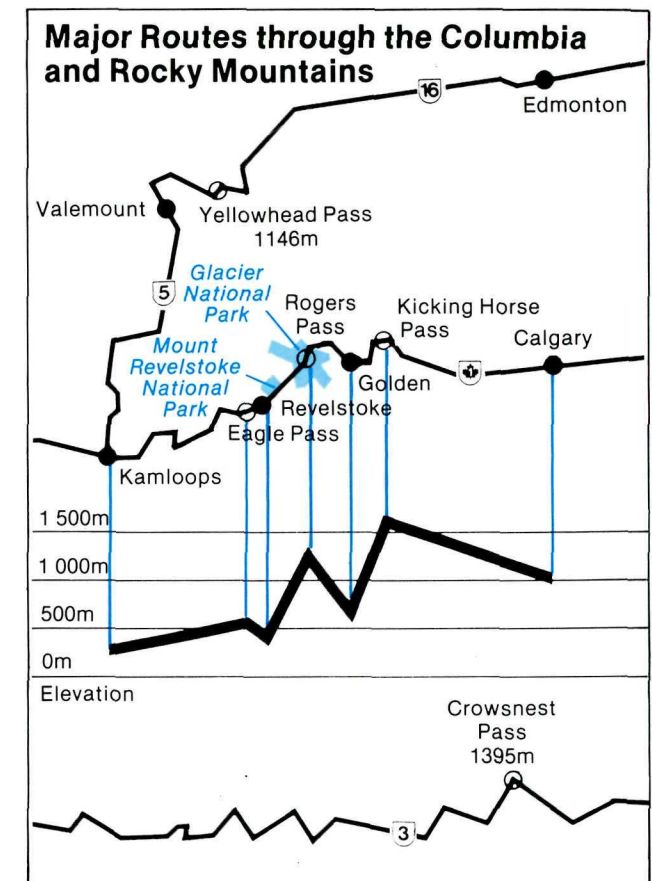




Photo Credit: John G. Woods, Parks Canada

February 1, 1899 was not a unique day in the history of Revelstoke, British Columbia. The Revelstoke Herald featured a front page story on a disaster which had struck Rogers Pass in the nearby Selkirk Mountains the day before:

*“A Terrible Accident — Seven Persons Killed, One Seriously Injured — A Most Shocking Affair — A Snowslide Sweeps Away The Station And Round House At Roger’s Pass and Buries Eight People Alive — All The Bodies Have Been Found Except One...”*

This was not the first time human life had been lost in the pass; it would not be the last.

Visitors view the raw wilderness of the Selkirk ranges in the Columbia Mountains with mixed emotions. On

one hand, the sheer mountain walls, snow-fed glaciers and dark rain forests represent some of the most striking mountain terrain in the world. On the other hand, the Selkirks form a nearly invincible barrier to transportation.

In a century of searching, surveyors have located only one likely route across the central Selkirks: Rogers Pass. Without this pass, all railways and highways would have to take a lengthy detour northward around the mountains by following the Big Bend of the Columbia River. Instead, men have accepted the Selkirks’ challenge and have pitched forces against the arsenal of avalanche, forest fire, tangled forest and steep terrain that guard Rogers Pass.

The story of transportation in Rogers Pass is a continuing saga of man against the mountains.

### No Man's Land

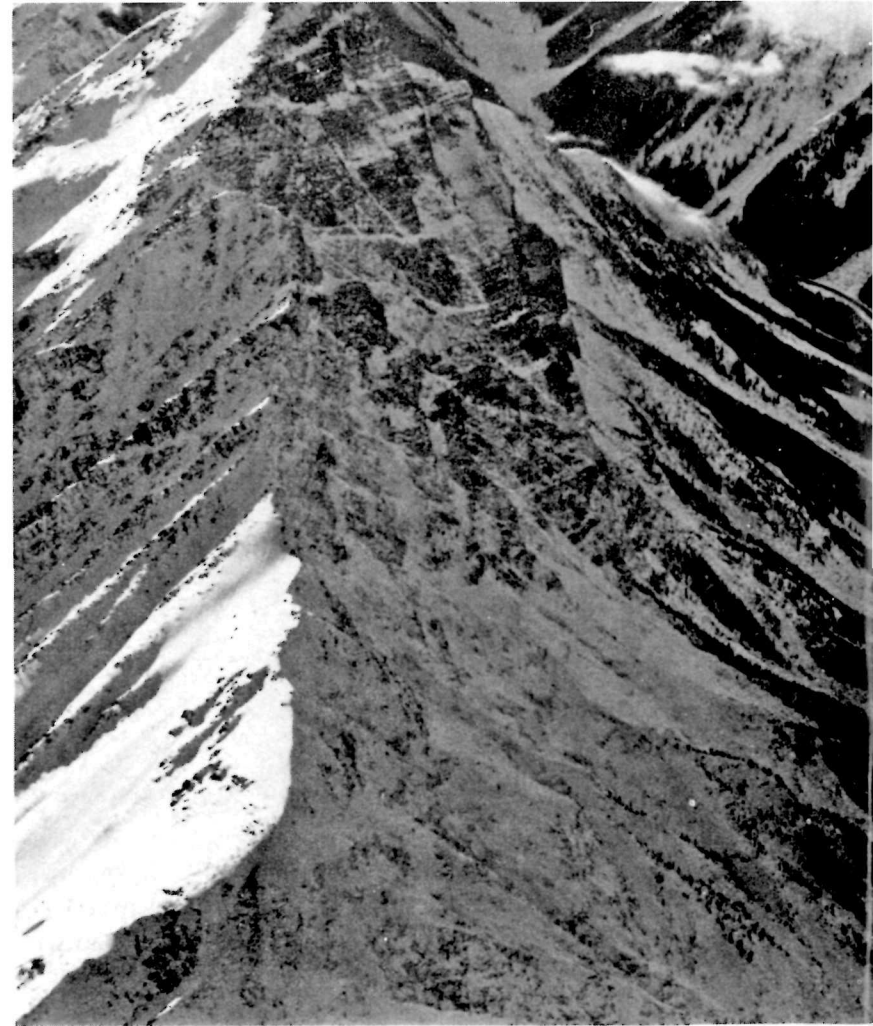
There is no evidence that prehistoric people ever lived in the central Selkirks. The rugged mountains and harsh climate made settlement impossible. Deep winter snows restrict populations of game animals so Indians could not rely on them for food. Avalanches were a threat to travellers much of the year. The prehistoric relationship between men and the land was a simple one: it was no man's land.

With the dream of tying Canada together in a confederation and the desire to build a transcontinental railway, a new relationship developed with this land. The mountains the Indians had wisely avoided now stood out as barriers to be conquered by the railway builders.

The 1860s, 70s and early 80s were times of feverish surveying activity in the western mountains. In 1871, British Columbia joined Canada with the understanding that a transcontinental railway would soon be constructed to link it to the east. Heated debate preceded the decision about where to locate the new line. If it was built too far north (perhaps through the Yellowhead Pass 250 km distant as shown on the map inside the front cover) would the United States dominate our southern boundary? If it was built to the south through the Kicking Horse Pass, how would the Selkirks be crossed? No feasible routes had been found.

The search for a pass which would open up the central Selkirk Mountains had intrigued surveyors for years. Unlike many other areas in the mountains, the Shuswaps and other Indians of the district had little knowledge of the Selkirks and explorers were truly in unknown territory. In 1865, Walter Moberly found a route through the adjacent Monashee Mountains he called Eagle Pass, and probed up the Illecillewaet River in the Selkirks. The next year his assistant, Albert Perry, pushed farther up the Illecillewaet and although optimistic at the possibility of locating a pass at the head of this valley, turned back before its existence could be confirmed.

It is difficult to imagine the hardships these early surveyors had to endure. Nearly two decades later Sir Sandford Fleming would travel this same territory explored by Moberly and Perry. His description of bush-wacking in the Illecillewaet Valley holds true to this day:



*"The walking is dreadful, we climb over and creep under fallen trees of great size and the men soon show that they feel the weight of their burdens. Their halts for rest are frequent. It is hot work for us all. The dripping rain from the bush and branches saturates us from above. Tall ferns sometimes reaching to the shoulder and Devil's Clubs through which we had to crush our way make us feel as if dragged through a horsepond and our perspiration is that of a Turkish bath. We meet with obstacles of every description.*





*The Devil's Clubs may be numbered by millions and they are perpetually wounding us with their spikes against which we strike. We halt frequently for rest. Our advance is varied by ascending rocky slopes and slippery masses, and again descending to a lower level. We wade through Alder swamps and tread down Skunk Cabbage and Prickly Aralias, and so we continue until half-past four, when the tired-out men are able to go no further..."*

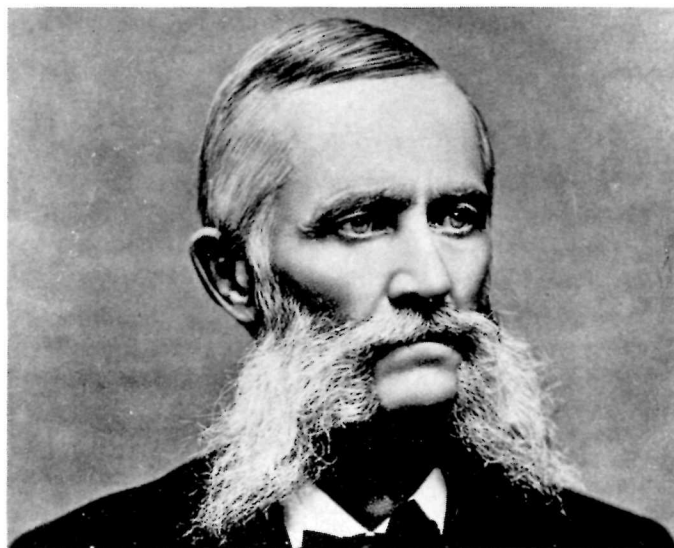
### **Rogers Pass, Eastern Entrance**

*As inhospitable as this terrain may seem, it is actually the tamest route across the Selkirks. The mountains on either side of the Rogers Pass are an impenetrable sea of barren ridges and glacier blocked valleys. Parks Canada Photograph 615-314-26*

### **The Railway Pathfinder**

#### **Major A.B. Rogers**

*This studio portrait does not do justice to the rough-hewn surveyor who discovered the pass that now bears his name. Glenbow-Alberta Institute Photograph NA-1949-1.*



The rails had stretched across the prairies and were aimed at the heart of the mountains awaiting a link between Calgary and Vancouver. At great risk the Canadian Pacific Railway made its choice. On the advice of one of their surveyors, a rough-edged character named Rogers, a line was laid out up the Bow River Valley and across the Continental Divide through the Kicking Horse Pass. Beyond lay the mysterious Selkirks.

Railway surveyor, Major A.B. Rogers, was a determined man. He had studied Moberly's reports and he knew his chances of discovering a pass through the Selkirks were good. If he found the pass the C.P.R. would name it after him and give him a bonus of \$5,000.

The reward of immortality on the map was a great incentive.

In 1881, Rogers's crew struggled up the Illecillewaet Valley past the point where Albert Perry had turned back 15 years before. Above the headwaters of the Illecillewaet River he glimpsed a narrow pass at the summit of the Selkirks. By that time he was out of food and had to retreat quickly back to the Columbia River. But he knew the long-sought pass had been found and the next year completed his explorations from the east.

Thus, by 1882, the battle lines were drawn. The "Railway Pathfinder" had discovered Rogers Pass and within three years steel rails crossed no man's land.

### **"The Men Are Frightened"**

The construction of Canada's first railway across the Rocky and Columbia mountains was a bold move requiring courageous leaders. William Cornelius Van Horne, who joined the enterprise in 1882 as General Manager of the C.P.R., was a tower of strength during this period. Van Horne had decided that the railway must cross the Selkirks by the shortest route and he was prepared to back up his decision with action.

In 1883, James Ross became the C.P.R.'s Manager of Construction in the West. By the autumn of 1884 the track had crossed the Rockies and he wintered on the doorstep of the Columbias. Early in 1885, ascending the Beaver Valley on the east flank of the Selkirk Mountains, the steel approached Rogers Pass.

Construction of a railway to and across Rogers Pass was a formidable undertaking. Roaring mountain streams had carved deep notches into the side of the Beaver Valley. These streams had to be spanned by major bridges at Mountain, Surprise, Stoney and Cascade creeks. These high bridges became favourites with photographers of the day.

At Mountain Creek, Ross's forces built a trestle which stretched across a gap in the valley wall for 331 metres and stood 50 metres above the mountain torrent. A few kilometres farther up the line, a bridge was constructed which towered 64 metres above its footings. The Stoney Creek Bridge was heralded by the engineers of the day as

the highest such structure in the world.

Forest fires plagued work crews as they marched up the slopes of the Beaver Valley. Then, later in the year, the weather became excessively wet, changing mud to quagmire and creeks to torrents that ate away at the newly-placed bridge foundations. Ross's efforts to speed up the work became bogged down and several times he despaired.

To compound his problems a new and unfamiliar force struck the work crews. Each year a prodigious quantity of snow falls on the Selkirks. In many places this load rests uneasily on the steep inclines and at intervals becomes unstable and careens down the mountain walls in sudden avalanches. An avalanche or snow slide is an awesome natural force able to snap trees like matchsticks as it speeds down slopes at velocities up to 325 kilometres an hour. The Indians had respected these snow spirits of the Selkirks and stayed clear. James Ross and his men challenged the elements...and the "white death" struck his camps!

*"The men are frightened"*, wrote Ross on February 19, 1885 to Van Horne. *"I find the snowslides on the Selkirks are much more serious than I anticipated, and I think are quite beyond your ideas of their magnitude and danger to the line"*. Already seven men had been buried in slides and two killed.

Ross gained the summit of Rogers Pass on August 17, 1885 after six months of trial by avalanche, forest fire and rainstorm. But his problems were not over; there still remained the troublesome descent of the west side of the pass to the Columbia River.

Laying out a good line down the Illecillewaet Valley was complicated by avalanche paths and steep grades. The line entered the head of the valley on the north wall but had it continued down the valley on that wall it would have traversed several dangerous avalanche slopes. Crossing to the south wall of the valley was the answer but that crossing involved so steep a descent in so short a distance that the grade itself would be a danger to human life.

Ross solved the problem by constructing an intricate series of loops in the track, lengthening it by five kilometres and carrying the railway safely down the south



side of the valley.

From Rogers Pass, Ross pushed the line to the Columbia River and out of the Selkirks. Crossing the Columbia River at what would become the site of Revelstoke, the line entered Eagle Pass and crossed the Monashee Mountains. On November 7, 1885, Ross's forces met the end of steel from the Pacific. Canada's first transcontinental railway became a reality with the driving of the last spike 48 kilometres west of Revelstoke at Craigellachie. The Selkirks had been crossed and the Rogers Pass subdued — or had it?

No sooner had the railway line been completed than it had to be abandoned to the overpowering forces of

winter. Throughout the winter metres of snow buried the line and avalanches tore sections of newly-laid track from the grade. In one place snow 12 metres deep was measured on the track after a slide. An elaborate and costly defence was clearly required to protect the line from snow and its devastating effects.

The next year construction started on 31 snowsheds to protect the line from the worst slide paths known. These sheds were constructed of heavy timbers and the sides were sloped with rocks and earth so that a slide would pass over them without damage to the track. The total length of the sheds was over 6.5 kilometres and they cost the railway a fortune to build and maintain.



#### **William Van Horne**

*Staring directly at the camera, William Van Horne confidently stands in the centre of a group of C.P.R. officials photographed at Stoney Creek in 1894. A big man with a confident air, Van Horne looked and acted like a leader. Glenbow-Alberta Institute Photograph NA-1023-1.*



### **Construction Train, Rogers Pass Summit**

*Laden with ties, this work train is shown at the summit of Rogers Pass. Construction of the C.P.R. across the Selkirks took place at a furious pace throughout 1885. Although the line was completed that summer, snowslides closed the line during the winter of 1885-1886. Snowsheds were constructed in 1886 and the line began normal*

*operations. The C.P.R. built 17 Shed where the work train is shown in this photograph. Grizzly Mountain (L) and Mount Rogers (R) of Hermit Range dominate the northern skyline. Locomotive No. 132 had a 4-4-0 wheel configuration and was built by the Rogers Locomotive Company of Paterson, New Jersey in 1883. The C.P.R. scrapped the engine in 1930. CPCA Photograph A4224*





### **Construction Camp, Rogers Pass Summit**

*For a short time in 1885, the Rogers Pass summit had all the character and bustle of a frontier town. The excitement was not to last. The buildings were within striking range of several snow avalanche paths. Those spared by snowslides, collapsed easily*

*under the weight of more than 10 m of snowfall. Within two years, the summit had become a ghost town and soon even the ruins had disappeared. Vancouver City Archives Photograph P197N159*



### **Pacific Express at the Rogers Pass Station**

*On June 28, 1886 the inaugural Pacific Express passenger train left Montreal. One hundred and thirty-nine hours later, on July 4, it arrived at Port Moody on the Pacific coast. Every day except Sunday, the train passed by the station at Rogers Pass. In this photograph the Pacific Express is stopped at the first Rogers Pass station*

*in the eastern section of the pass. The 2893 m summit of Mount Macdonald towers above the station. Note the avalanche path behind the station house. The station was destroyed by an avalanche in 1899. An engine house stands on the left. The cover photograph of this book was probably taken within this structure. CPCA Photograph A11383*





### **First Rogers Pass Station**

*From 1886 until 1899, the Rogers Pass Station was located about 3 km northeast of the pass summit. This photograph taken during the summer of 1898, shows the station house, a water tank, an unidentified building, and in the background, 15 Shed. Mount Cheops rises to the southwest. On the platform two women, three men, and a family group including two children pose for the photographer. The men were*

*probably C.P.R. employees at the station. Note the avalanche path to the right of the water tank. Seven months after this picture was taken, an avalanche destroyed the station house and killed seven people. The dead included night operator Frank Carson, wiper James Ridley, a Chinese cook, and day operator W. Cator, his wife and two children. After the tragedy the C.P.R. abandoned this dangerous site and built a new station closer to the summit of Rogers Pass. Parks Canada Photograph 615-0286*



### **Second Rogers Pass Station**

*From 1899 to 1916, the Rogers Pass Station was located about 1.6 km north of the pass summit. History has proven this to be the only sizeable area in the pass safe from avalanches. When the C.P.R. completed the Connaught Tunnel in 1916, this station was abandoned. The Trans Canada Highway opened in 1962 and this site became park headquarters and a visitor service centre. The Trans Canada Highway now runs*

*directly over the original location of the tracks. The park works compound is now located to the right. Note the engine house to the left. The Rogers Pass Centre now occupies this site. Along the skyline are the many peaks of Mt. Rogers to the left, Hermit Mountain behind the glacier in the centre of the photograph, and Mount Tupper to the right. Archives of the Canadian Rockies Photograph NA-71-1368*





### **Surprise Creek Bridge**

*As the C.P.R. line approaches the eastern entrance to Rogers Pass, it crosses a series of deep creek gorges. Several spectacular bridges carry the line high above the cascading waters. This photograph shows the original wooden bridge across Surprise*

*Creek. The C.P.R. built the bridge in 1885 and later replaced it with a steel structure. A Danforth-built 2-6-0 type locomotive is shown crossing the bridge. Fifty-one metres below and hidden from view, the creek relentlessly deepens the gorge. CPCA Photograph A4217*



### **Mountain Creek Bridge**

*The original bridge over Mountain Creek was the largest structure on the original C.P.R. line. This mammoth towered 50 m above the creek and stretched for 331 m*

*across the valley. This 1885 photograph shows the bridge under construction. Glenbow-Alberta Institute Photograph NA-782-12*





### **Locomotive No. 403 at Mountain Creek**

*Locomotive No. 403 is shown here heading north across the Mountain Creek Bridge circa 1887. Note the fire devastated forest of the Beaver River valley in the background. Sparks from steam locomotives were a constant threat to both forests and wooden bridges in the early days of Glacier National Park. No. 403 had a 2-8-0*

*wheel arrangement and was built in 1886 at the Canadian Pacific, New Shops, in Montreal. It was scrapped in 1909. A modern steel and concrete bridge now spans Mountain Creek. The bridge can be easily viewed by hiking Trestle Trail or stopping at the north boundary viewpoint along the Trans Canada Highway. CPCA Photograph A341*



### Testing the Stoney Creek Bridge

*Rising 64 m above its footings, the original wooden bridge built in 1885 over Stoney Creek was heralded by the engineers of the day as the highest such structure in the world. In 1893 a steel bridge replaced the wood span. In this photograph locomotives No. 406, No. 409, and four unidentified engines are testing the new bridge. In 1929, a*

*second metal arch was added to reinforce the structure. Locomotive No. 406 was built in 1888 as one of six 2-8-0s designed for mountain use. It was sold in 1927. Locomotive No. 409 was a 2-6-0 wheel arrangement built in 1888 at the Canadian Pacific, New Shops, in Montreal. Glenbow-Alberta Institute Photograph NA-1493-3*





### **Surprise Creek Wreck**

*In January 1929, the northern section of the Surprise Creek bridge collapsed and sent this 2-10-0 type locomotive and its tender into the gorge below. Engineer Bert Woodland and fireman Jeff Griffith were both killed. Provincial Archives of British Columbia Photograph 77640*

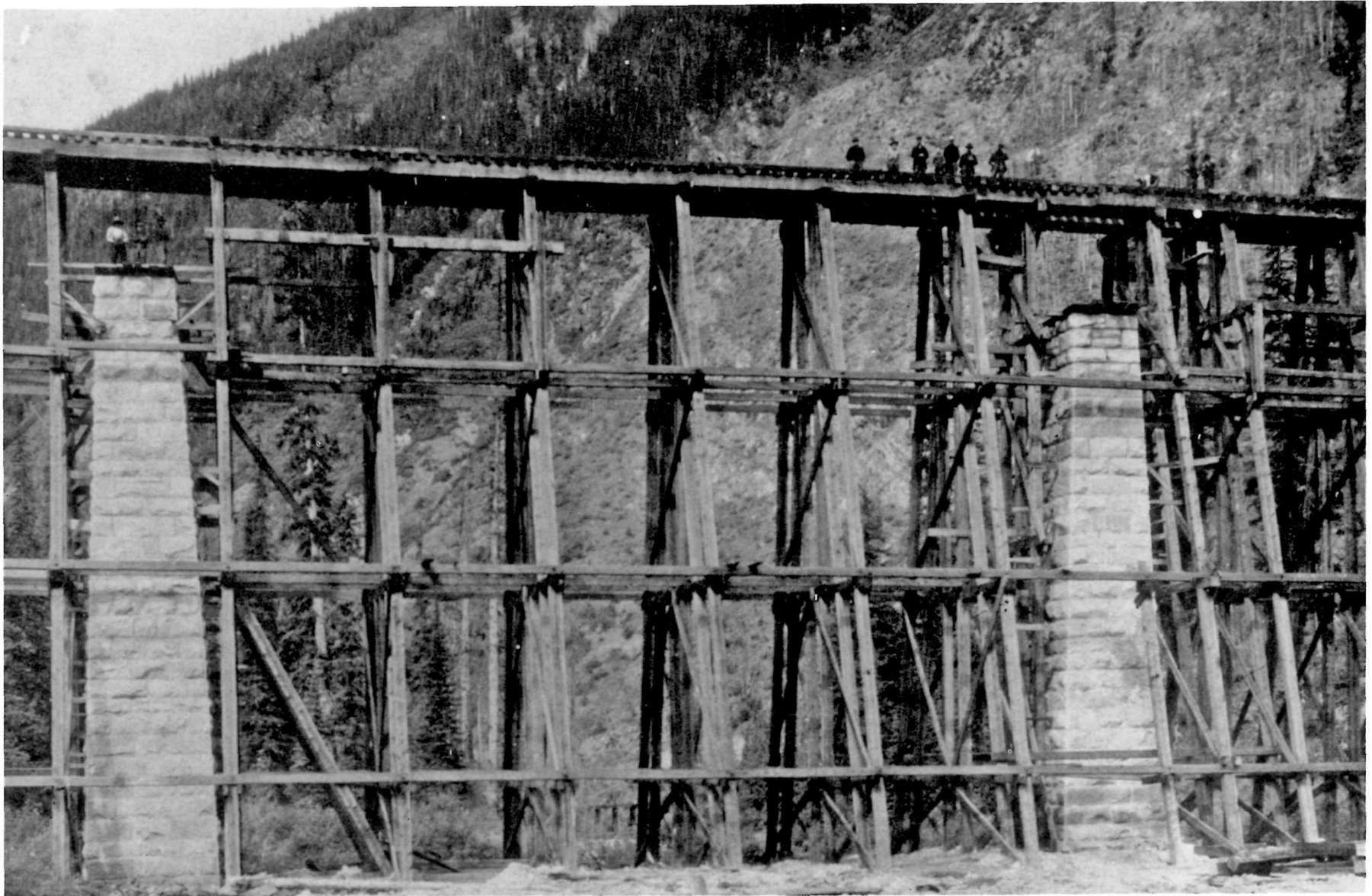


### **The Loops**

*The original railway was forced to loop its way from the summit down the western section of Rogers Pass. In this photograph, an eastbound freight train is shown on its way to the Pass. It is temporarily heading directly away from its destination. After crossing this bridge over Loop Brook the train curved uphill and crossed Loop Brook again. It then steamed on the upper track towards the Sir Donald Range*

*shown in the background. It entered Rogers Pass at the head of the valley and to the left. This photograph was taken circa 1910. In 1916, with the opening of the Connaught Tunnel, this section of the railway was abandoned. Loop Trail now allows summer visitors to hike a portion of the original Loops. Archives of the Canadian Rockies Photograph NA-71-1636*





### **Replacing Wooden Bridges**

*Fire constantly threatened the wooden bridges on the original Rogers Pass line. The C.P.R. had an active program of replacing them with stone and metal structures. In this 1901 photograph, stone pillars approximately 21 m high are shown under construction within a wooden trestle at the second crossing of Loop Brook. Metal deck plate girders 30 m long and 3.5 m thick were laid between the pillars and the*

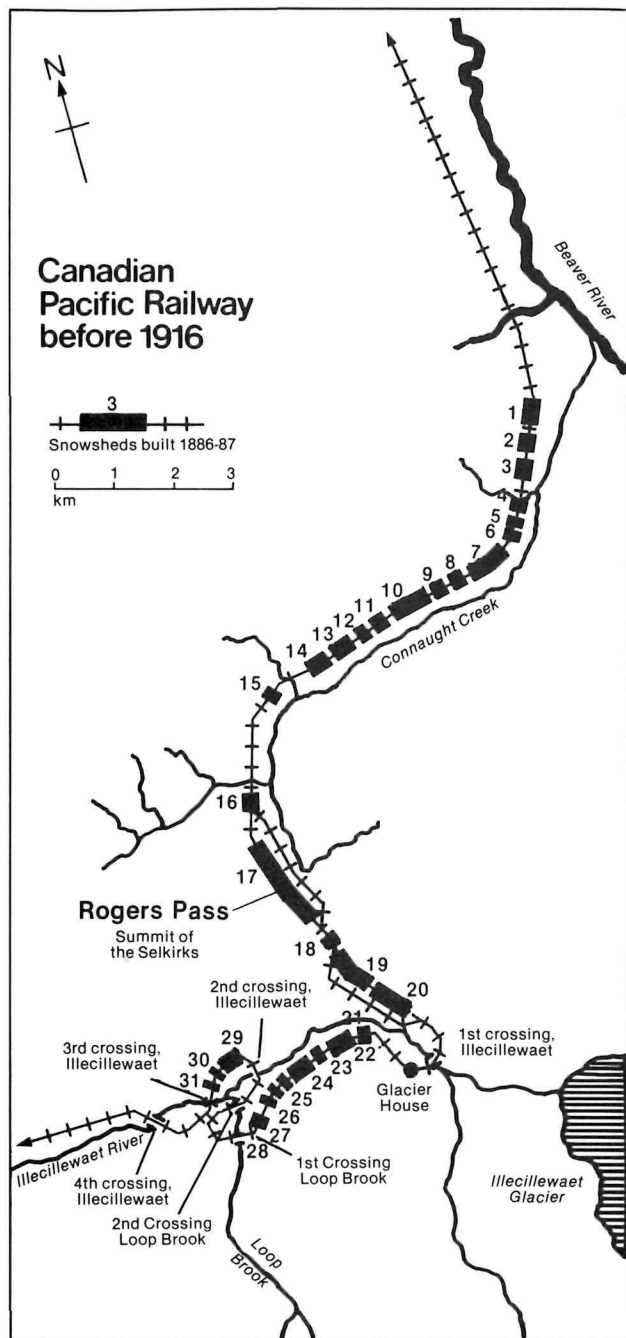
*wooden structure removed. The replacement of this one bridge cost the C.P.R. \$76,762.68. The cost included almost \$30,000 for the deck girders, and \$31,000 for masonry work. In 1916, the bridge was abandoned and the deck plate girders removed. The pillars remain to this day and can be readily seen beside the Trans-Canada Highway at Loop Viewpoint. Provincial Archives of British Columbia Photograph 77685*



### **Snowshed Construction**

*In 1886, the C.P.R. started construction of numerous snowsheds along the Rogers Pass route across the Selkirks. These sheds were built to protect the line in areas of frequent avalanche activity. By 1904, there were 53 sheds with a combined length of*

*9.4 km. The high cost of snowshed maintenance was a factor favoring the abandonment of the railway over the pass. Numerous ruins of snowsheds exist in the pass. They can be seen along Abandoned Rails and Loop Trails. CPCA Photograph 16938*



### 17 Shed, Rogers Pass

*This photograph shows 17 Shed under construction in 1887. Located at the actual summit of the pass, the snowshed was a typical valley shed — one designed to protect the railway from snow avalanches coming down both sides of a valley. Note the track to the left. This track provided summer visitors with open views of the Asulkan (R) and Illecillewaet (L) Glaciers. Few avalanches hit this shed in early years of railway operation. In 1900, it was abandoned and the railway moved the line to the left of the summer track. Ironically, in March 1910, a huge snowslide killed 62 men outside the disused shed. Today visitors to Glacier National Park can explore the ruins of 17 Shed on Abandoned Rails Trail. Notman Photographic Archives Photograph 1686*





### **19 Shed, Rogers Pass**

*Located a short distance south of the Rogers Pass summit, 19 Shed protected part of the railway line from snowslides coming down Avalanche Crest. Note the summer*

*track to the left. The slopes above this 1897 scene show evidence of forest fires. The prominent peak on the left is Cheops Mountain. The rocky summit of Grizzly Mountain can be seen on the right. Notman Photographic Archives Photograph 3115*

### **20 Shed, Rogers Pass**

*20 Shed is shown here under construction circa 1886. This snowshed protected the original C.P.R. line from snowslides coming down Avalanche Crest. 20 Shed was originally 814 m long. By 1904, it had been extended to 1125 m making it the longest of the 53 sheds in the Selkirks. This view of 20 Shed illustrates a typical design for a side hill shed. A cedar retaining crib anchors the shed to the mountain. Douglas Fir rafters measuring 30x38 cm support the roof. Vertical plumb posts and transverse bent timbers made of tough fir support the downhill side of the shed. Struts add strength. Notman Photograph Archives Photograph 1725*



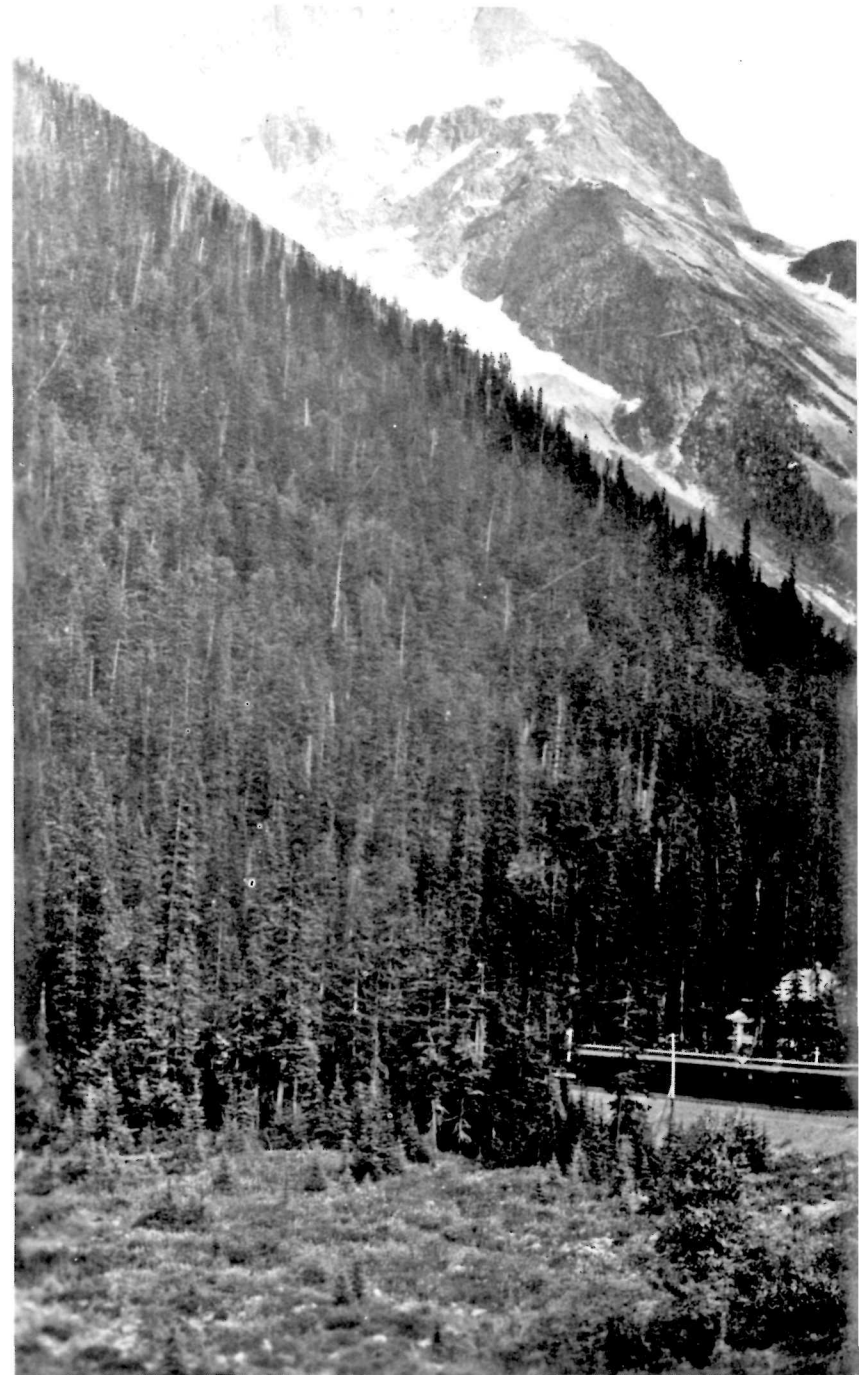
### **“The Climax Of Mountain Scenery”**

The mountains that battled the C.P.R. all winter were tremendous assets in summer. The first scheduled passenger train service started in June, 1886. The magnificently rugged mountain landscape was now open to anyone with enough money for a ticket.

Van Horne was quick to capitalize on the glacier-studded scenery and ordered special track to be constructed outside the dark snowsheds from the summit of the pass to the Illecillewaet River. In summer, when avalanche dangers had passed, the trains could travel outside the sheds and the passengers could enjoy a view featuring the giant tongue of the “Great Glacier” protruding from the skyline.

Below the Great Glacier (later called the Illecillewaet) and on the main line, the C.P.R. constructed Glacier House — a traditional C.P.R. hotel. Originally, the hotel was built to eliminate the need to haul heavy dining cars over the pass. Trains were conveniently scheduled so that passengers could lunch at the hotel. Glacier House quickly became a popular tourist attraction and facilities were eventually expanded to include 90 rooms and related services. The C.P.R. brought mountain climbing guides from Switzerland and the hotel became a focal point for mountaineering in the Selkirks and North America.

In the same year that the first passenger trains ran through the pass, the Canadian Government took steps to preserve the area for all time. Canada’s first national park had been declared around the hot springs at Banff in 1885. In 1886, Yoho National Park in the Rockies and the embryonic Glacier National Park in the Columbias were established — an area Van Horne described as “the climax of mountain scenery”.







### **Glacier House**

*From 1887 to 1925, Glacier House provided an elegant outpost of civilization in the heart of the rugged Selkirks. The giant tongue of the Illecillewaet Glacier provided a magnificent backdrop within easy hiking distance for hotel guests. The mountains around the hotel challenged climbers from all over the world. Here in 1899, the C.P.R. stationed the first Swiss mountain guides to work in Canada. With the help of men such as Christian Hasler and Edward Feuz Sr., even novice climbers could attempt the peaks. In this 1910 photograph a westbound transcontinental passenger train is shown with Glacier House in the background. CPCA Photograph 1930*



### **Interior of Glacier House**

*At its height, Glacier House provided a holiday home for thousands of visitors to Glacier National Park. In 1912, it had a capacity to accommodate 150 and the hotel registered 5,419 people. The furnishings were simple, yet naturally comfortable. Mounted animals, geological specimens, and pressed plants decorated the walls. Note*

*the glass case containing White-tailed Ptarmigan. When Glacier House closed in 1925, it caused one visitor to reflect: "the chief charm of the hotel was its homelike atmosphere and the informal hospitality that led to a fine feeling of comradeship and good fellowship." Provincial Archives of British Columbia Photograph A9589*



### **Snow Sawing at Glacier House**

*In this 1925 scene, three men are clearing snow from the hotel roof. Note their technique. One person would saw while the other two skidded the blocks to the roof*

*edge. Snowfall often exceeded ten metres. Often two to three metres of packed snow would have to be removed from the roof. Archives of the Canadian Rockies  
Photograph NA-71-1360*

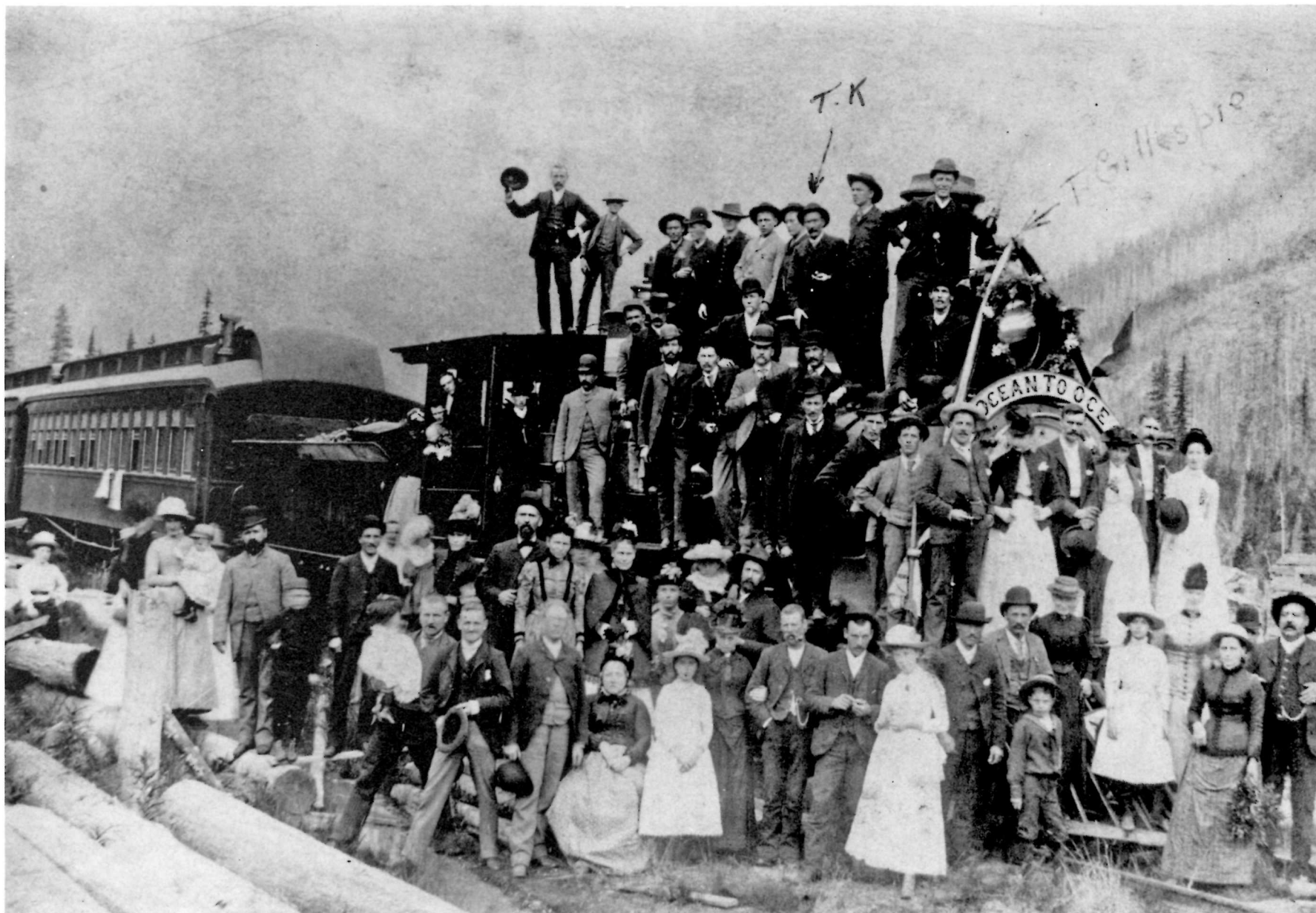




### **Finlander Snow Service Gang**

*Rogers Pass is famous for its snowfall — more than 10 m per year. In addition, avalanches can pile snow to depths of 15 m. This photograph of 46 Finlanders and a dog illustrates the most basic style of snow clearing — human strength and a shovel.*

*The gang was gathered in front of the first C.P.R. station in Rogers Pass sometime during the years 1885-1899. Provincial Archives of British Columbia Photograph 34454*



### C.P.R. Picnic

The country which threatened people all winter became a place of easy recreation during the brief summer. In 1895, this festive group travelled from Donald to the Rogers Pass summit for a picnic. Dancing on the roof of the 17 Shed provided the highlight of the day. Note the figure indicated with an arrow and the letters T. K.

This was Thomas Kilpatrick, superintendent of the subdivision for many years. Locomotive No. 401 had a 2-8-0 wheel arrangement and was built in 1886 by the Canadian Pacific, New Shops, in Montreal. It served until 1922. Provincial Archives of British Columbia Photograph 77650



### **Locomotive No. 73**

*No. 73 is shown here circa 1886 leading a westbound freight train at the first Rogers Pass Station. The Danforth Locomotive Works of Paterson, New Jersey built this 2-6-0 type engine in 1882. Designations such as 2-6-0 relate to the number and arrangement of wheels. The first number indicates that there are two leading truck*

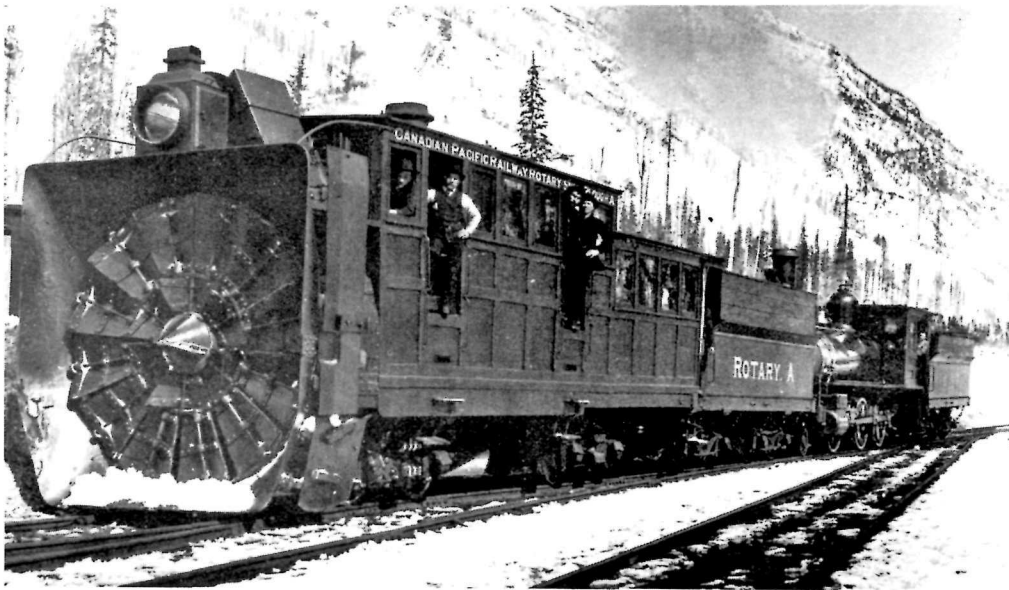
*axle wheels. The middle figure gives the number of large driving wheels. In this case six wheels on three higher axles. The last number indicates trailing axle wheels. These are smaller wheels often located under the cab. In this case there are none. Note the primitive snowplow on the engine front. CPCA Photograph 141*





**Locomotive No. 402**

*Locomotive No. 402 is shown here at the first Rogers Pass Station circa 1886. This 2-8-0 locomotive was built in 1886 by the Canadian Pacific, New Shops, in Montreal. It was scrapped in 1907. Note the snowplow. CPCA Photograph 124.*



### Rotary Snowplows

The sight of a rotary plow whirling its way through giant snowslides was a common scene in Rogers Pass. A locomotive would push this Canadian invention into a snowslide. Rotary blades powered by a steam motor within the plow ate into the slide and discharged the snow to one side through an upper chute. The C.P.R. had eight rotary plows built beginning in 1888. On the earlier rotaries, the cabs were of wood

construction on a steel frame. The plows stretched 14.7 m. The tender storing coal for the engine powering the rotary blade added another 7.2 m to the unit's length. These photographs illustrate rotaries at work in the pass area between 1888 and 1922. Canadian Pacific Corporate Archives Photograph A11495 (UL) Glenbow-Alberta Institute Photograph NA-1248-32 (LL) Archives of the Canadian Rockies Photograph NA-71-1653 (R)



### **Wedge Plow**

*This photograph shows a wedge plow being used to clear a Rogers Pass snowslide in the late 1880s. Wedge plows were bucked into the slide debris by locomotives. They are in use in the mountain subdivision to this day. Glenbow-Alberta Institute Photograph NA-2216-7*





## Defeat

The night of March 4, 1910, began like most other nights for the men working in Rogers Pass. The crew was at the summit clearing a big slide that had come down Cheops Mountain on the west side of the pass and had blocked the tracks. A rotary snow plow had cut a path across the piled snow on the line and men were working in the cut shovelling snow and clearing away trees swept down by the avalanche. The events which followed were to change the course of history in Rogers Pass.

A half hour before midnight, some of the men outside the cut heard a deep rumbling, then timbers cracking. An unexpected avalanche swept down Avalanche Mountain on the side of the pass opposite the first slide. Trapped within their snow-walled tomb, most of the men never even heard the slide approach. Sixty-two died.

Huge wing plows, rotary plows, snowsheds and an army of men could not keep safe the railway line through Rogers Pass. Between 1885 and 1911 deaths caused by avalanches totalled over 200. Faced with this kind of peril to employees and passengers, crippling costs and steep grades, the C.P.R. acknowledged defeat and prepared to retreat from the summit of the pass.

If trains could not go safely over the pass then they would run under it through a eight-kilometre tunnel piercing the roots of Mount Macdonald. In 1913 construction started on the longest railway tunnel in Canada. When completed it eliminated 16 kilometres of some of the most hazardous railway line in the world. Operation of the eight-kilometre Connaught Tunnel commenced on December 13, 1916. Rogers Pass was abandoned.

### Searching for Victims

*These workmen are shown searching for victims of the March 4, 1910 avalanche in Rogers Pass. The majority of workers appear to be of East Indian origin. Many of the 62 men killed by the snowslide were Japanese. Chinese workers never figured*

*largely in the history of the pass. In contrast, Chinese railway men played a significant role in the history of the C.P.R.'s Pacific subdivision. Archives of the Canadian Rockies Photograph NA-71-1659*



### **Recovering Bodies**

*The shrouded figure on the toboggan tells a grim but real tale of Rogers Pass. He was one of 62 to die in the March 4, 1910 slide. More than 200 workers were killed by snowslides in the pass area from 1885 to 1916. Parks Canada Photograph 615-288-113*



### **Night of the White Death**

*Near midnight on March 4, 1910, a huge avalanche killed 62 men at the summit of Rogers Pass. The men had been sent out earlier to clear a snowslide that had blocked the main line. A rotary plow sliced a cut through the slide, backed away, and men entered to clear trees and debris. While they worked in the cut a second slide came*

*down from the opposite side of the pass and buried them as they worked. This south oriented photograph was taken shortly after the incident. It shows a search party digging out victims and the wrecked rotary plow to the right. Mount Abbott stands in the background. Archives of the Canadian Rockies Photograph 71-6124*



### **Clearing the March 4th, Slide**

*A rotary plow is shown penetrating the incredible snow mass deposited by the March 4, 1910 snowslide. The view is to the north with the Hermit Range shown indistinctly in the background. Archives of the Canadian Rockies Photograph NA-71-1658*





### **Snowslides of 1886**

*1886 was an eventful year for the C.P.R. in Rogers Pass. At one time, avalanches blocked the line both east and west of the summit. A passenger train was trapped between the slides for some weeks. This locomotive apparently was hit by one of the*

*avalanches. Locomotive No. 365 was a 4-4-0 type built in July 1886 at the Canadian Locomotive Works in Kingston. It served until 1926. Vancouver City Archives Photograph P199N161*

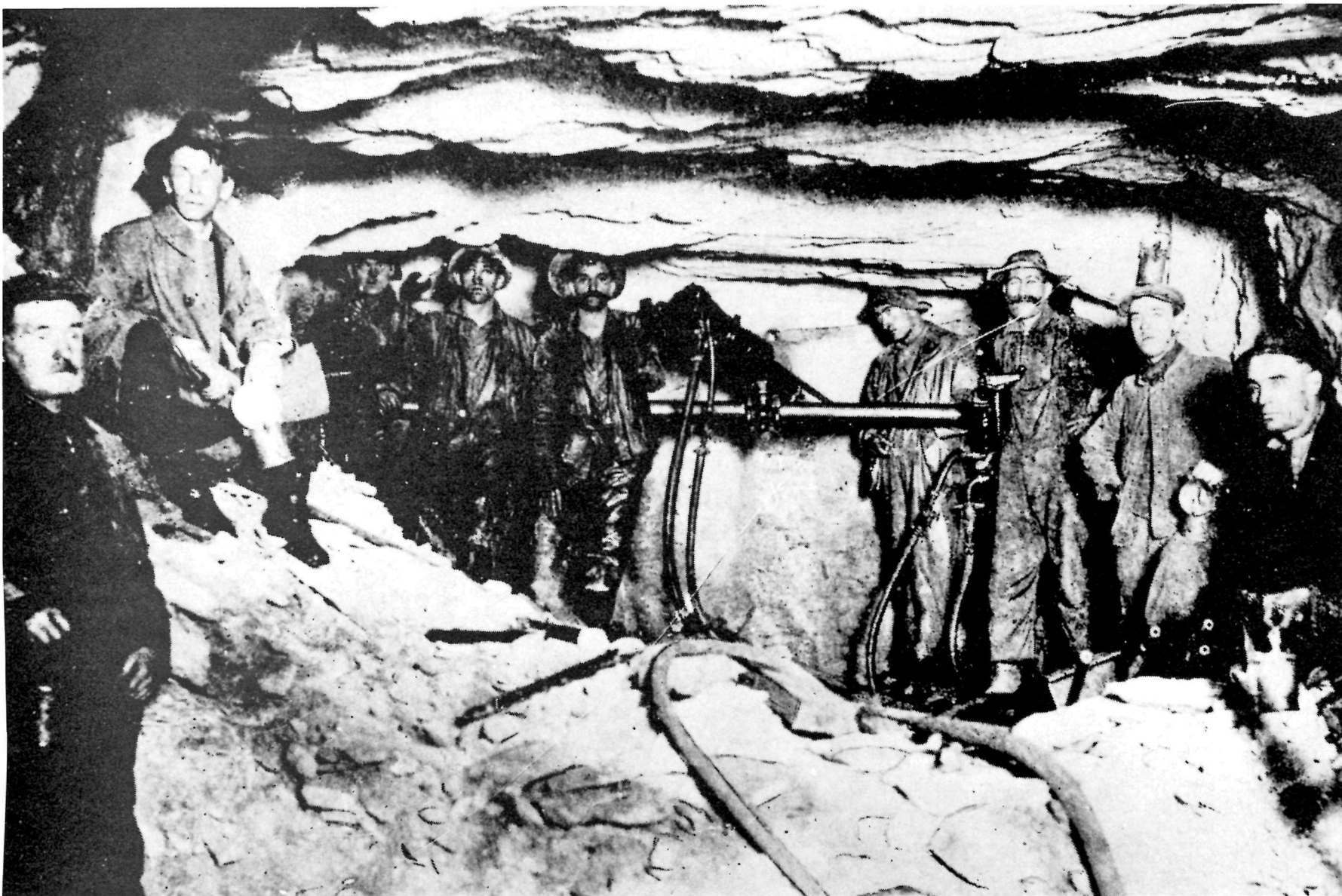


#### **Snowslide at 14 Shed, Rogers Pass**

*On the morning March 5, 1910 a large avalanche buried the C.P.R. line 2 km east of the Rogers Pass Station. No one was hurt, but the snowslide ripped away a section of the 14 Shed. The previous day, a snowslide at 17 Shed 2 km south of the station had killed 62 men. Westbound passenger train No. 97 with 400 people on board was stopped at the station when snowslides blocked it from both directions.*

*Photographers arriving on the scene took many pictures of the avalanches. Not surprisingly, pictures at 17 Shed and 14 Shed became mixed-up. In this photograph men are seen clearing away debris from the damaged 14 Shed. Photographs of 14 Shed are often incorrectly labelled as the site of the 1910 disaster. Archives of the Canadian Rockies Photograph NA-71-6123*





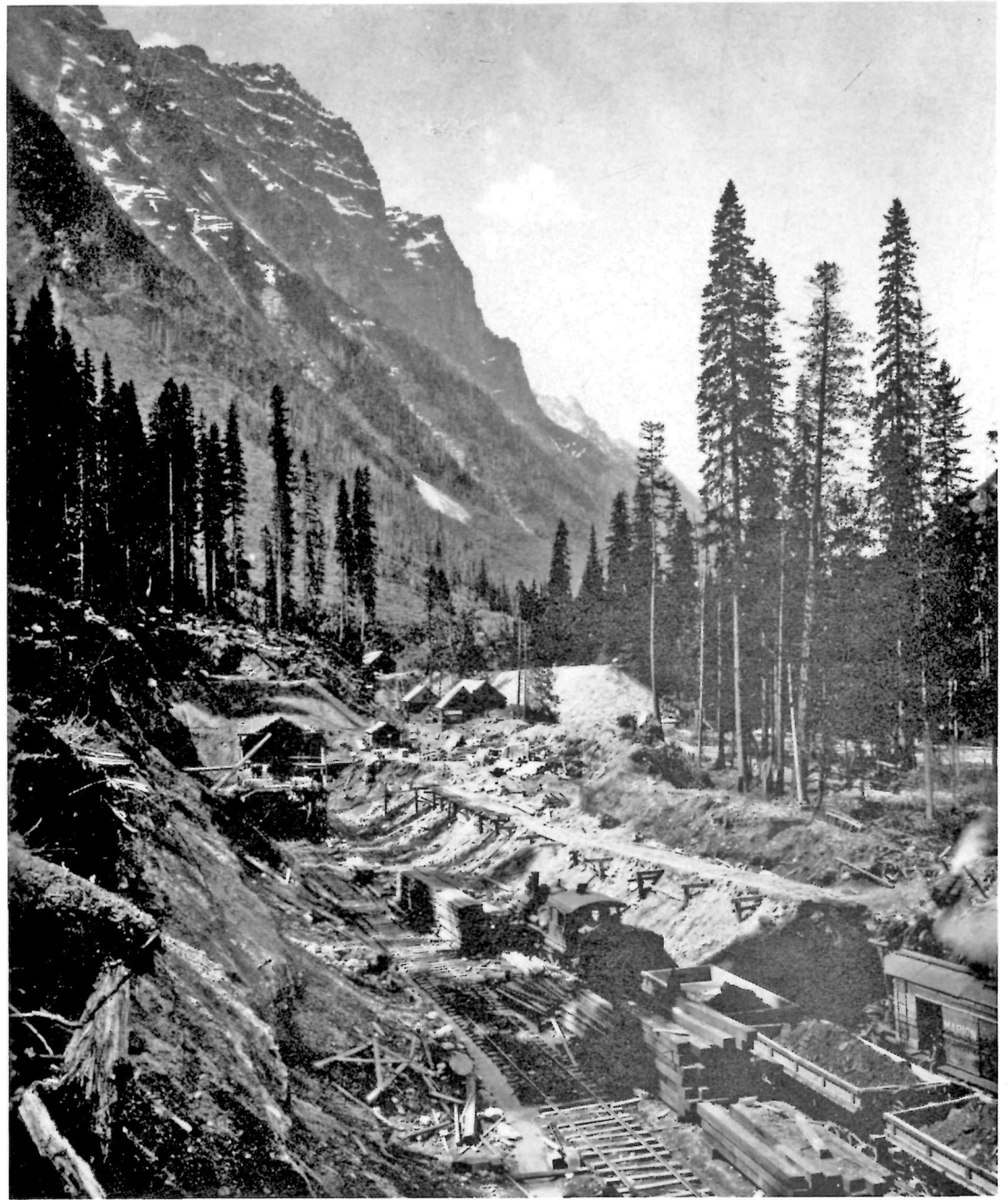
### **The C.P.R. Goes Underground**

*In terms of human life and operating expense, the route over Rogers Pass proved too costly. In August, 1913 construction started on a tunnel that would carry the main line beneath Rogers Pass. The principal feature of the construction method was the*

*use of a pioneer bore excavated to one side of the main tunnel. Crosscuts to the main heading allowed work to proceed on various fronts simultaneously. Progress was amazingly rapid and the railway journals of the day featured monthly progress reports on the construction. Glenbow-Alberta Institute Photograph NA-1263-36*

### East Portal Connaught Tunnel

*Mount Macdonald towers over the east portal of Connaught Tunnel. The 8 km tunnel reduced the grade by 168 m and shortened the line by 6.9 km. The total revision to the line including the tunnel cost \$8,451,639.45. The C.P.R. originally named the tunnel the "Selkirk Tunnel." Later, they renamed it in honour of Duke of Connaught, Governor General of Canada from 1911-1916. CPCA Photograph 1124*





### **Eastbound Express, Connaught Tunnel**

*The C.P.R. began operations through the Connaught Tunnel on December 9, 1916. In Rogers Pass, 35 km of original line and 7 km of snowsheds were abandoned. The worst area for snowslides in the central Selkirks reverted to a natural state — free from the whistle of steam and slice of the plow. Nearly 2 km beneath the summit of Mount Macdonald, trains rumbled in the shelter of the tunnel. In this photograph an eastbound express is shown emerging from the tunnel. Note the two tracks through the tunnel. Later, when train size became too large for double track operation, one track was removed and the other repositioned along the centre line up the tunnel. CPCA Photograph 75256*





### Selkirk Locomotive No. 5903

*These Selkirk type steam engines were the pride of the C.P.R.'s mountain subdivision for more than 25 years. Steep grades on the Rogers Pass route required tremendous pulling power. The Montreal Locomotive Works built 5903 in 1929. From the face of its front coupler to the back of the cab it stretched 18.7 m. The highest point on the engine was 5.1 m above the track. Selkirk type 2-10-4 locomotives weighed about*

*338,839 kg, held 54,552 L of water, and were fired by a stored capacity of 22,730 L of oil. In this photograph, 5903 is shown heading the "Dominion" transcontinental passenger train as it emerges from the west portal of the Connaught Tunnel circa 1935. In the 1950s, these huge Selkirks were scrapped and the C.P.R. entered the diesel era. CPCA Photograph 5463*

## **The Highway Battle**

In the 1950s, armed with determination and advanced technology, men again laid plans to cross the Selkirks. The forces which had driven the railway from Rogers Pass in 1916 were now challenged by the highway engineers.

Work started on the construction of the Trans-Canada Highway through Rogers Pass in 1956 and in 1962 the road was opened to the public. Once again avalanches were the major threat and elaborate defence systems were developed to protect motorists on the new road.

Everyone travelling across Rogers Pass must pass through several snowsheds that shield the highway from avalanches at particularly hazardous areas.

In addition, earth dams, dikes, mounds and catch basins placed in avalanche paths contain or regulate snow slides. These static defences are similar to those used by the C.P.R. to guard its original railway.

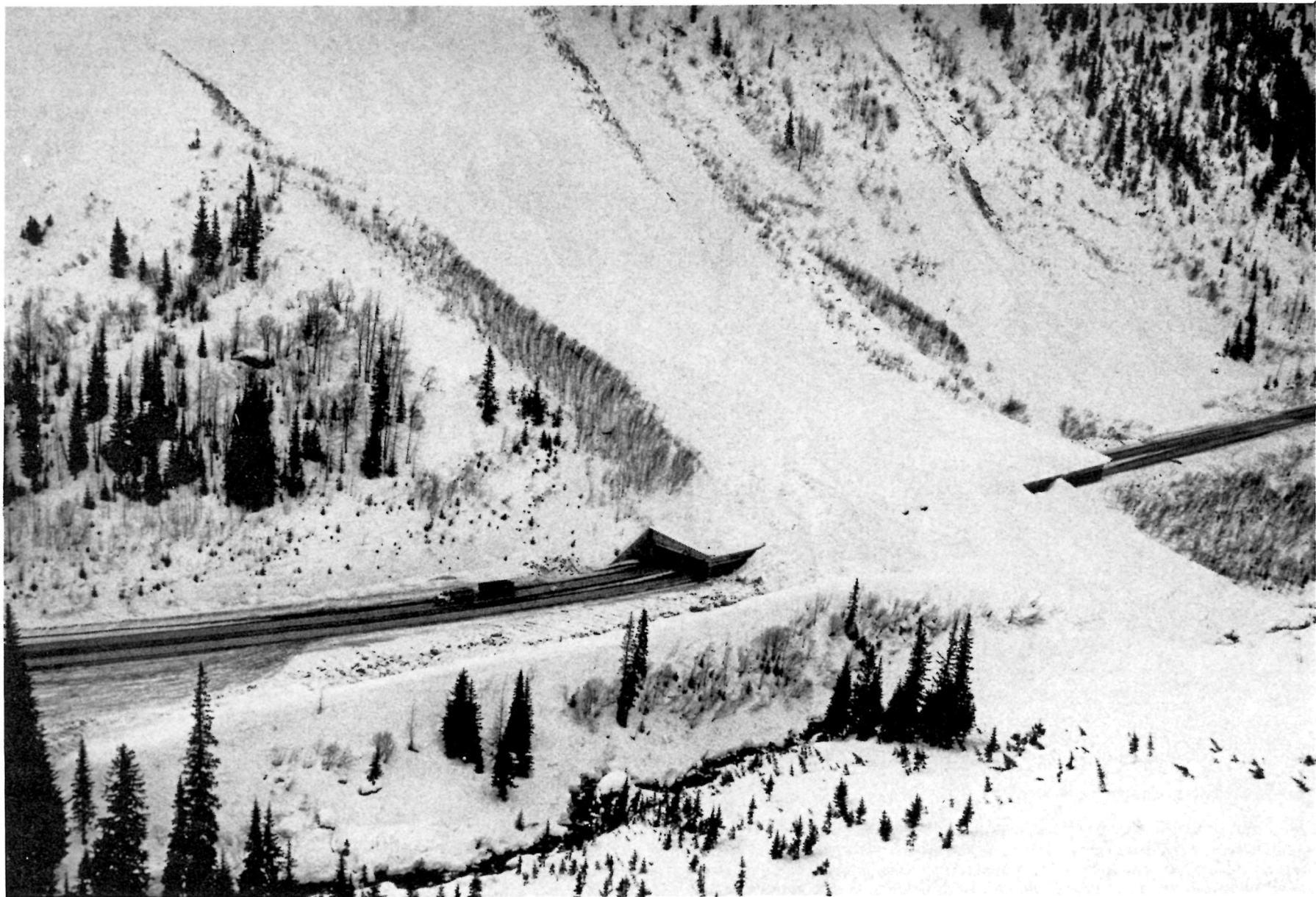
Unlike the original railway the highway is also guarded by a mobile system of defence. Men are employed year-round studying the climate. In winter they make detailed weather and snowpack observations. Sophisticated remote sensors in special study areas high in the mountains above the pass continually radio weather information to a central forecast headquarters. Avalanche forecasters use these data and their personal experience to predict when avalanches are likely to occur. Under the direction of these forecasters, gate attendants and park wardens warn motorists entering the park of possible avalanche activity on the highway. The

forecaster may decide to close the highway and attack the unstable slide areas with artillery.

Circular gun positions along the road shoulders are used to station a 105 mm howitzer manned by the Royal Canadian Horse Artillery. Under the direction of the forecaster, the army bombards known trigger zones high up the avalanche paths. The shock waves from exploding shells fired by heavy artillery will trigger avalanches when snow conditions are right. With the highway closed the slides can thunder harmlessly down the slopes.

The days of hand labour in clearing slide debris are over. While the railway had to send scores of men to clear the dangerous tracks, advanced heavy machinery such as highway snow plows, crawler tractors and loaders allows the highway to be cleared by four to six men. Better methods, heavier equipment and more experience in controlling avalanches continually improve safety in highway use and maintenance.

The new Trans-Canada Highway has had a major effect on Glacier National Park. Man is assaulting and modifying the natural environment along the highway. However, millions of people each year have the opportunity to see some of the earth's most rugged mountain wilderness. Glacier House is gone but with the highway came construction of campgrounds, picnic areas, viewpoints and trails now operated by the park's staff. A new hotel at the summit of the pass, the Glacier Park Lodge, provides food and shelter year-round for people travelling through the park.



### **The Trans Canada Highway crosses Rogers Pass**

*Forty years after C.P.R. abandoned the pass, Rogers Pass was selected as the route for the Trans Canada Highway. Prime Minister Diefenbaker officially opened the road on September 3, 1962. Snow avalanches remained a serious problem in the pass. In addition to a mobile defence system, the highway was protected by massive*

*concrete snowsheds. In 1981, there were five sheds in the pass with a combined length of 1513 m. Snowsheds protect the highway from slidepaths that cannot be stabilized by artillery fire. This winter photograph shows a truck climbing the eastern section of the pass. It has just passed through the 185 m long Lens Snowshed. Note the avalanche deposited snow over the shed. Parks Canada Photograph 615-288-123*





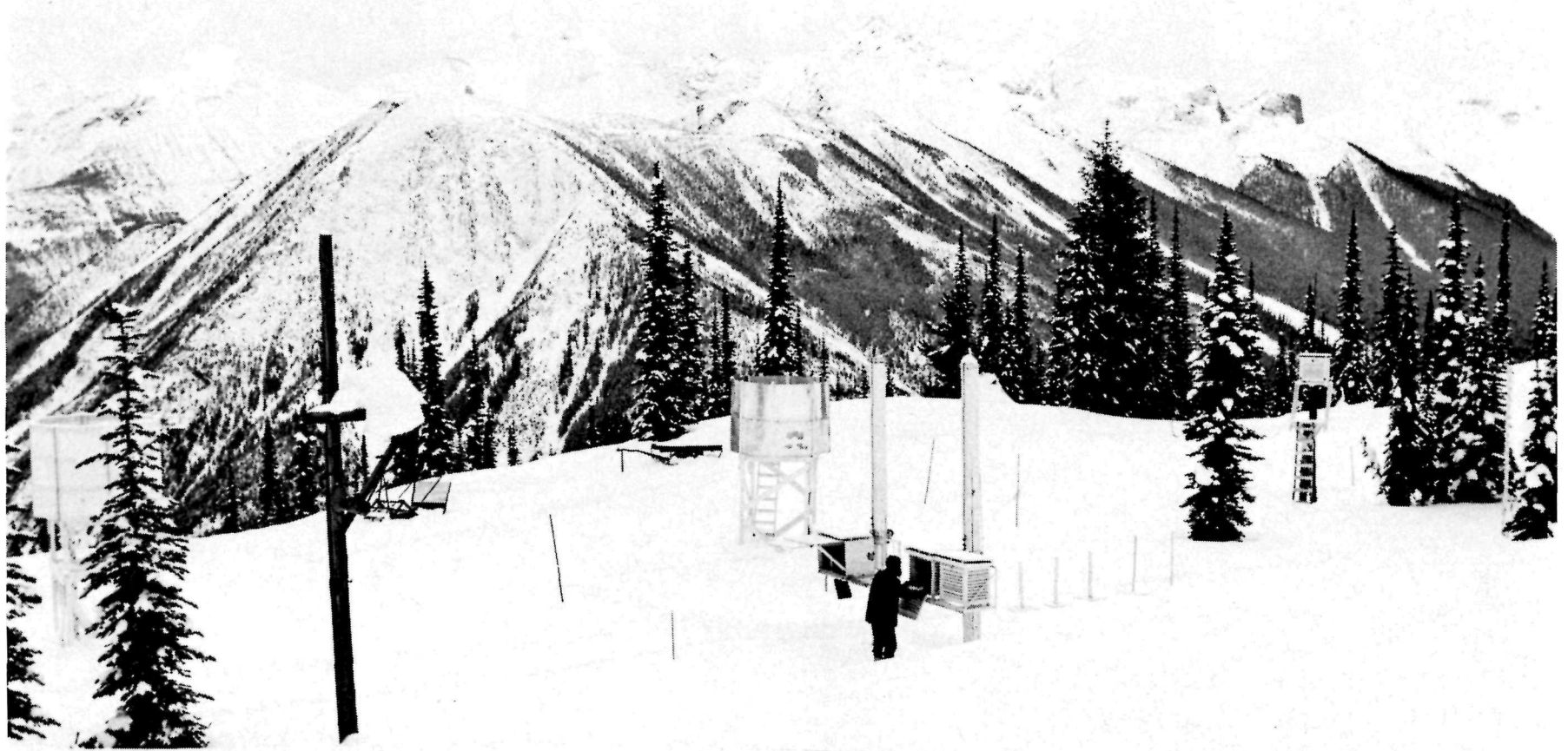
### **Fred Schleiss, Avalanche Forecaster**

*In 1959, Fred Schleiss became an avalanche forecaster in Rogers Pass. Fred's mountaineering and avalanche studies began in Austria in the 1940s. In 1955 he moved to Canada and by 1965 he had advanced to the senior position of the world's largest mobile avalanche control operation. Walter Schleiss, Fred's brother and co-forecaster, also joined the avalanche control section in 1959. Over the years, the Schleiss team has been responsible for the avalanche safety of millions of travellers on the Trans Canada Highway through Rogers Pass. Fred and Walter rank as the most experienced and involved avalanche workers in the history of the Pass. In this 1981 photograph, Fred is seen in a typical work setting — at the Mount Abbott Station high above Rogers Pass. Parks Canada Photograph 615-0288*



### **Macdonald West Shoulder Station**

*Macdonald West Shoulder is one of four automatic snow research stations feeding data from various locations above the pass to avalanche forecasters. Electronic sensors measure air temperature, humidity, wind speed and wind direction. Automatic radio transmitters beam this data into the avalanche control centre 518 m below. Parks Canada Photograph 615-288-82*



### **Mount Fidelity Observatory**

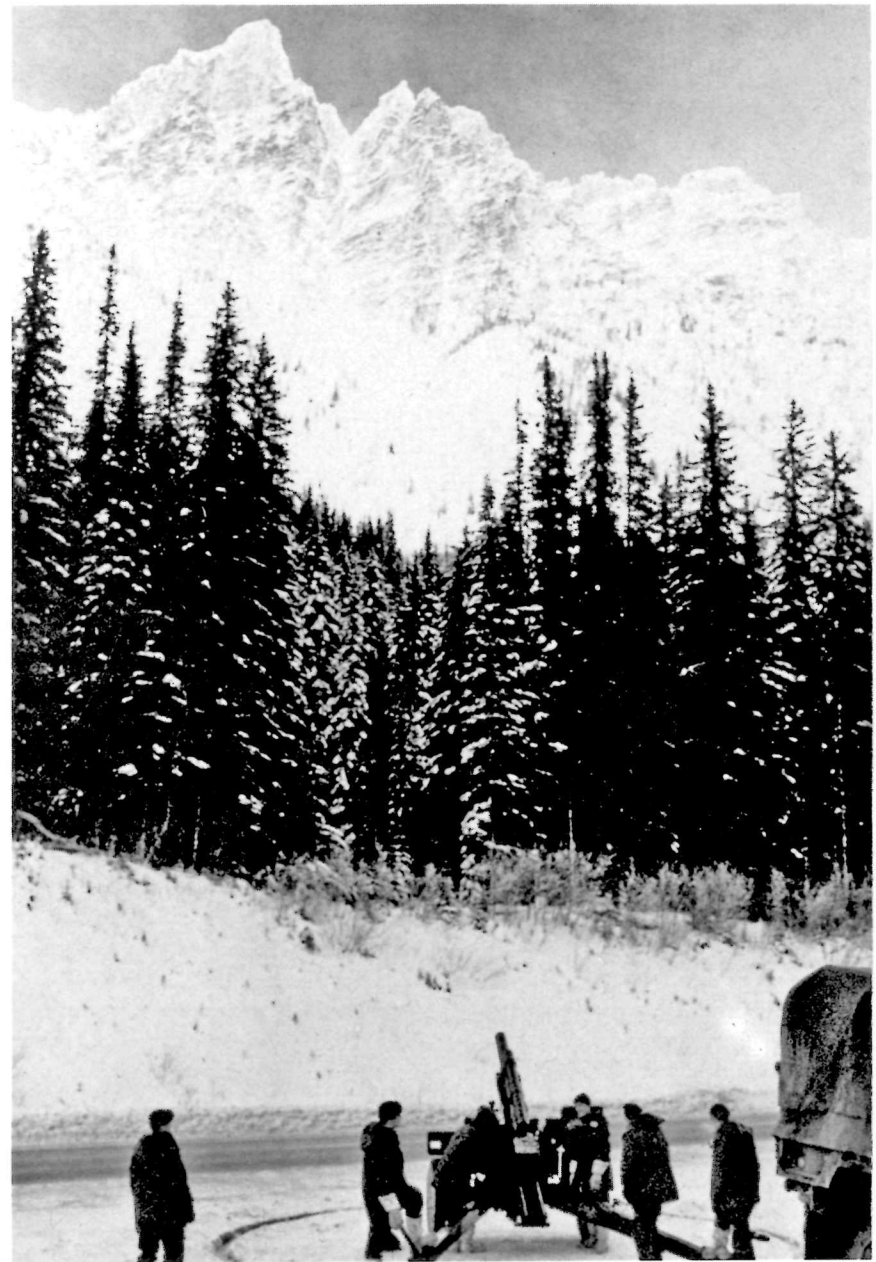
*Day and night throughout the avalanche season, observers man a research station at an elevation of 1905 m on Mount Fidelity. The station sits close to the trigger zone elevation of many slidepaths. Snow observers take frequent weather observations. They also make a variety of tests on the snowpack. For example, they measure its sheer strength and examine its crystalline structure. Test slopes are hand-bombed to study the snow's response. Mount Fidelity Observatory is in constant communication*

*with the avalanche forecaster and provides him with data vital to his avalanche analysis. In this photograph, an observer is reading weather instruments. The weather screen is on a pulley system to allow it to be moved up and down as the snowpack changes. Note the snow stakes behind the screen. The towers contain precipitation gauges. The small white box on a stand to the right houses telemetry equipment. Parks Canada Photograph 615-288-070*



### **105 mm howitzer**

*Under the direction of the park avalanche forecaster, a unit of the Royal Canadian Horse Artillery prepares to fire a 105 mm howitzer at an unstable slide path on the slopes of Mount Tupper. The target areas may be up to 8 km from the highway and*



*precision bombardment is required. Seventeen concrete gun positions along the highway provide fixed firing points. Forty or more rounds may be fired at a variety of slide paths during one control shoot. Parks Canada Photograph 615-288-77*





#### **Mobile Defense**

*A typical scene during a stabilization shoot involves heavy snowfall and high wind. At night and during snowstorms when the target zones are obscured, snowslides must be*

*stabilized by blind firing the howitzer from fixed positions along predetermined coordinates. Canada Forces Photograph IE-74-3-8*



### **Avalanche on Heather Hill**

*The Trans Canada Highway crosses the lower slopes of Heather Hill as the road approaches the eastern entrance of Rogers Pass. The hill seems innocent — just a large snowy field set on an incline rising 50 m above the highway. Compared with the high avalanche paths reaching to the skyline in Rogers Pass, Heather Hill looks harmless. In snow country, even small slopes such as this can avalanche when conditions are right. The park's Snow Research and Avalanche Warning Section*

*detected a danger to the highway at Heather Hill on March 8, 1979. They closed the Trans Canada and used hand charges to release the instable snow. The resulting avalanche ripped away the guardrail and buried 250 m of highway to an average depth of 1.5 m. A bulldozer teamed with two loaders had the 6750 m<sup>3</sup> of snow removed from the highway in three hours. Contrast this with the scores of men needed to clear avalanches from the railway in the early days of the C.P.R. in Rogers Pass. Parks Canada Photograph 615-288-94*

### **There Can Be No Peace**

It would be a mistake to think that Rogers Pass has been subdued. The battle is not over. Although only two people have been killed in avalanches during the first 20 years of highway operation, the hazard has only been reduced, not eliminated. Each winter men and equipment must be on guard day and night to keep the highway open. Tremendous sums of human energy and money are spent holding the highway's position in the pass; and every winter, the timeless forces of snowfall and avalanche batter away at the defences. Rogers Pass was, and is, hostile territory. There can be no peace. The Snow War goes on.





### **South Peak Station**

*At 2265 m, South Peak on Mount Fidelity is the highest research station regularly visited in the pass. The box-like structure is actually a chimney leading down to a hut*

*buried beneath the snow. To the left, the Trans Canada Highway and C.P. Railway can be seen weaving their way towards the western entrance of Rogers Pass. Parks Canada Photograph 615-0288-67*

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## Questions?????

If you have any specific questions on the history of Rogers Pass, you may write:

The Superintendent  
Mount Revelstoke and Glacier National Parks,  
P.O. Box 350, Revelstoke, B.C.  
V0E 2S0  
Attention: Park Naturalists

## Further Sources

We suggest that you start with one of the several excellent books available about Canadian railway history. These will lead you in turn to more detailed references.

For perspective on the importance of the first transcontinental railway to Canada, we suggest Pierre Berton's *The National Dream* and the *Last Spike* (1972).

For a well-illustrated account of the construction of the railway you will enjoy Omer Lavallée's *Van Horne's Road* (1974).

For an exciting account of the history of the Rogers Pass read Albert Rogers's *The Discovery of Rogers Pass*, in A. O. Wheeler's book *The Selkirk Range* (1905). It is out of print but should be available in most large public libraries.

A movie titled *Snow War* is available from National Film Board offices across Canada. It can be loaned as either a 16 mm film or a video cassette. *Snow War* portrays the story of modern avalanche control in Rogers Pass.

While in Glacier National Park you are invited to visit the Rogers Pass Centre. In the centre you will find working models of the railway at various times in its history. Other displays interpret the total human and natural history of the parks. Several viewpoints and trails in Glacier feature the history of transportation in the central Selkirk Mountains.

## Acknowledgements

The main text of this publication was developed by the Western Region of Parks Canada for use in the Glacier National Park publication *The Snow War: A Guide to the History of Rogers Pass*. The photographs and captions used in this printing were assembled using the archival files of Glacier National Park.

Canadian Pacific Limited has provided tremendous assistance in the preparation of material for this publication. Mr. Omer Lavallée, Corporate Archivist, kindly read the script and provided comment.

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*Archives of the Canadian Rockies, Banff, Alberta*  
*Canadian Armed Forces, Ottawa, Ontario*  
*Canadian Pacific Corporate Archives, Montreal, Quebec*  
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*Notman Photographic Archives, Montreal, Quebec*  
*Parks Canada, Glacier National Park, British Columbia*  
*Provincial Archives of British Columbia, Victoria, British Columbia*  
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Should you wish to join the Association, take part in the activities of a local chapter in Victoria, Calgary, Edmonton, Saskatoon, Toronto or Ottawa, subscribe to 'Park News', or obtain a publications list please contact:

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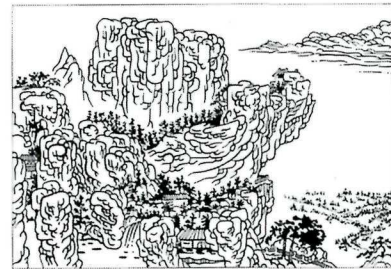
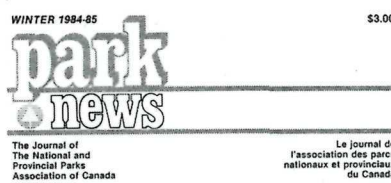
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- **MAN'S IMPACT ON POINT PEELE NATIONAL PARK** by J.G. Battin and J.G. Nelson. 1978, 175 pages, maps, photographs. (Available now only from the Friends of Point Pelee Cooperating Association.)
- **THE LAND SPEAKS: ORGANIZING AND RUNNING AN INTERPRETATION SYSTEM** by Y. Edwards, 1980, 85 pages, line drawings, \$8.50.
- **THE PARK BUFFALO** by S.C. Ogilvie and R.C. Scace. 1979, 69 pages, maps, black and white and colour photographs, \$5.00.
- **WILDERNESS NOW** by Algonquin Wildlands League. 1980, 72 pages, maps and photographs, \$5.00.
- **TRAGEDY IN OUR NATIONAL PARKS?** by W.A. Fuller. 1977, 15 pages, free.
- **SNOW WAR: AN ILLUSTRATED HISTORY OF ROGERS PASS, GLACIER NATIONAL PARK, B.C.** by J. Woods and J.S. Marsh. 1982, 52 pages, maps, numerous photographs.
- **PARK NEWS INDEX: VOLUMES 1-17, 1965-1981** compiled by Jean and James Soper, 1983, 48 pages, \$5.00.
- **WILDERNESS AND THE ARTS**, special theme issue of *Park News* edited by J.S. Marsh. 1982, 42 pages, black and white and colour photographs, \$2.00.
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