
Main Line Construction of the Canadian Pacific Railway

CRMS SPRING MEET JUNE 05, 2022

BY DOUGLAS R PHILLIPS

Main Line Construction Era on The Canadian Pacific Railway 1875 to 1886.

- I - Government Construction Progress 1875 to 1885.
- II - Company Construction Progress 1881 to 1886.
- III - Construction Standards.



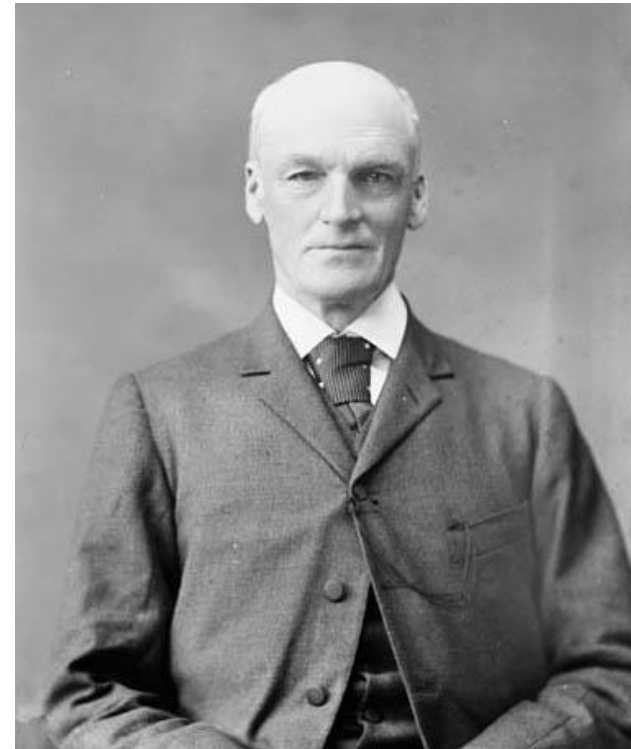
I- GOVERNMENT CONSTRUCTION -1875-1885

The Government Engineers

Sanford Fleming
CPR Chief Engineer 1871-1880



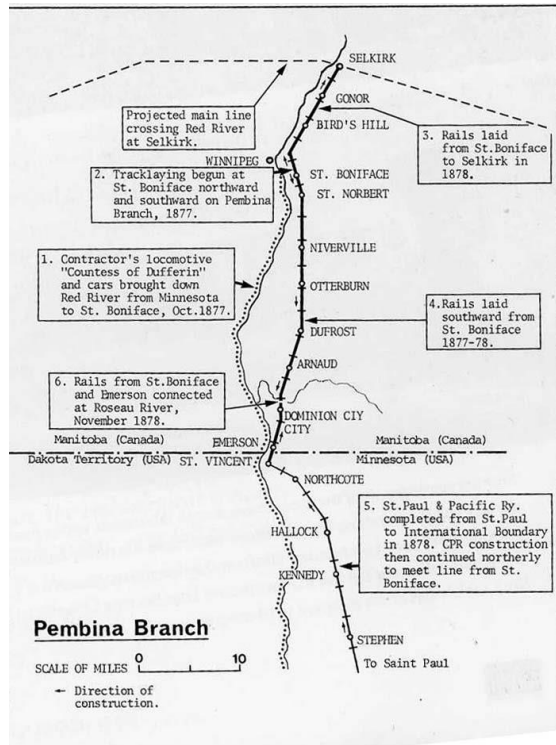
Collingwood Schreiber
Chief Engineer Dept. of Rlys & Canals



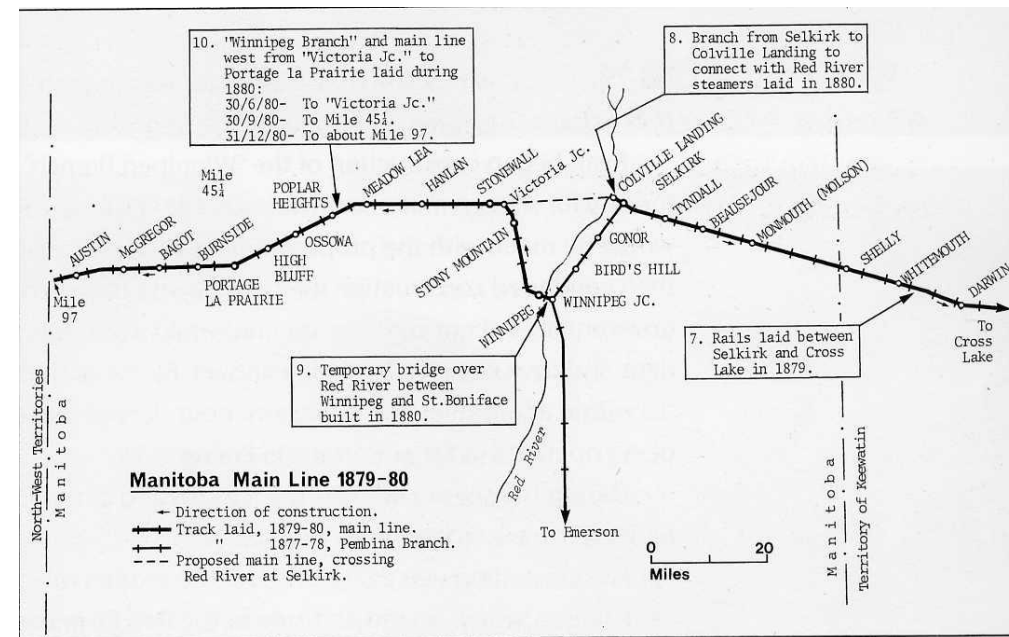
Government Construction in Manitoba.

1875 - 1881.

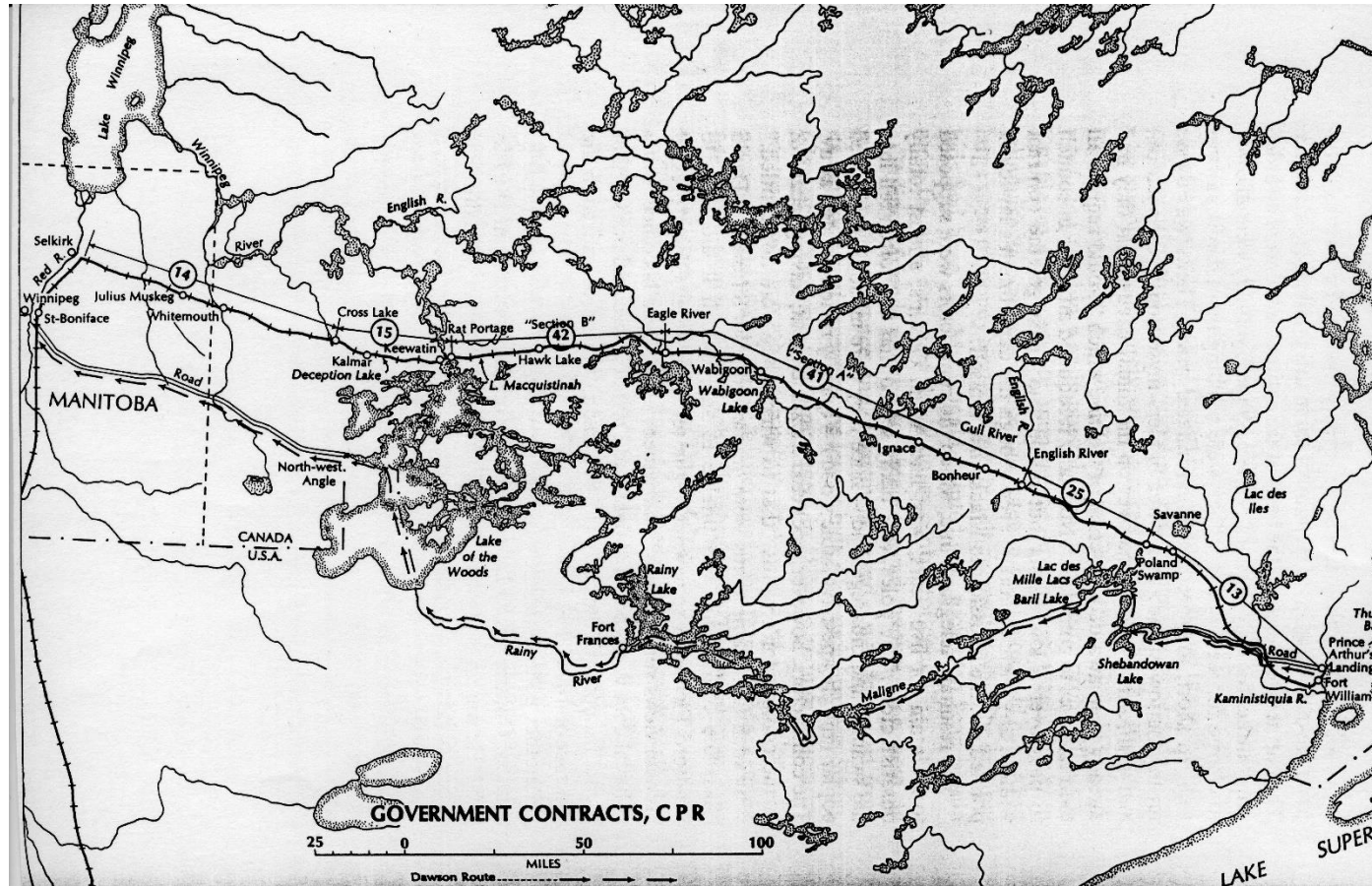
The Pembina Branch 1875-1879 Joseph Whitehead Contractor



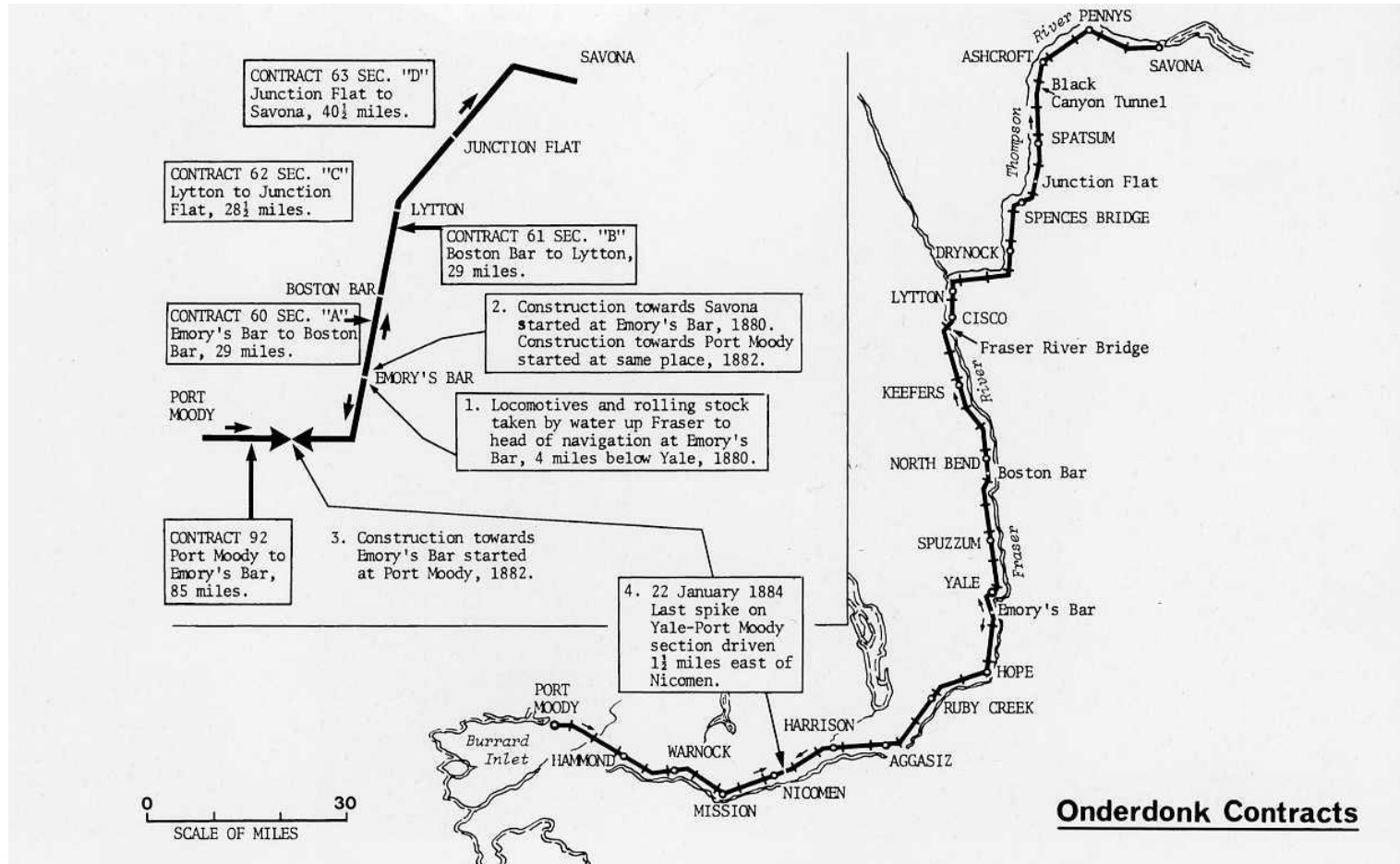
The First 100 Miles West 1880-1881 John Ryan Contractor



Government Construction – Thunder Bay Section. Contractors – Manning, Shields, McDonald & Co. 1881-1883.



Government Construction - British Columbia Section. Contractor - Andrew Onderdonk 1880-1885.



II. The government turned over 231 miles of completed operating railway lines in Manitoba.

Order in Council April 09, 1881.

- Thunder Bay Section Selkirk to Cross Lake 75 miles
- Pembina Branch Selkirk to Emerson 86 miles
- Prairie section St. Boniface to Portage La Prairie 68 miles (+30)
- Colville Branch Selkirk to Colville Landing 2 miles

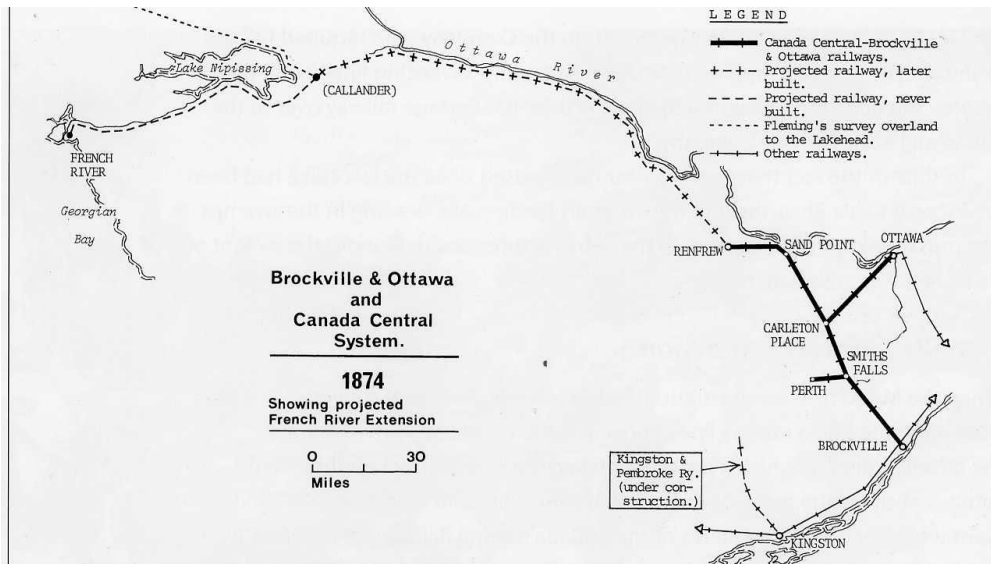
Active Company Operations Got Underway on May 1, 1881,

- **Company laid its 'First Rail' May 2, 1881 near mile 97, West of Winnipeg. (Near Austin, Man.)**

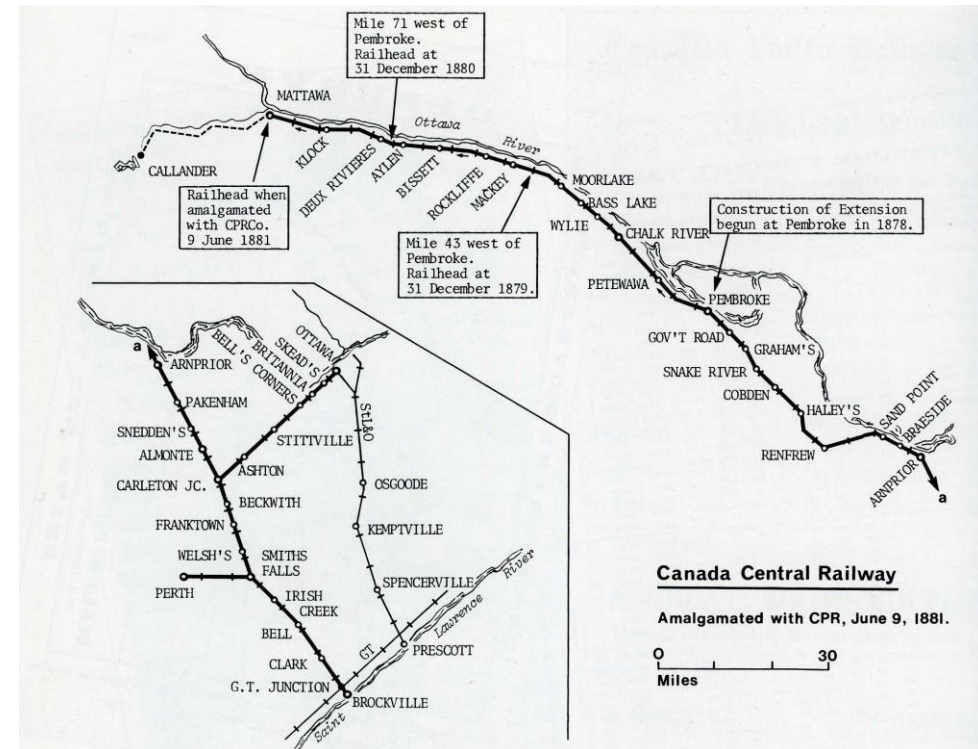
Eastern Amalgamation and 'Mile Zero'.

Callander, Ont. Now called Bonfield.

Railway to the west 1874.



Canada Central Rly June 1881.



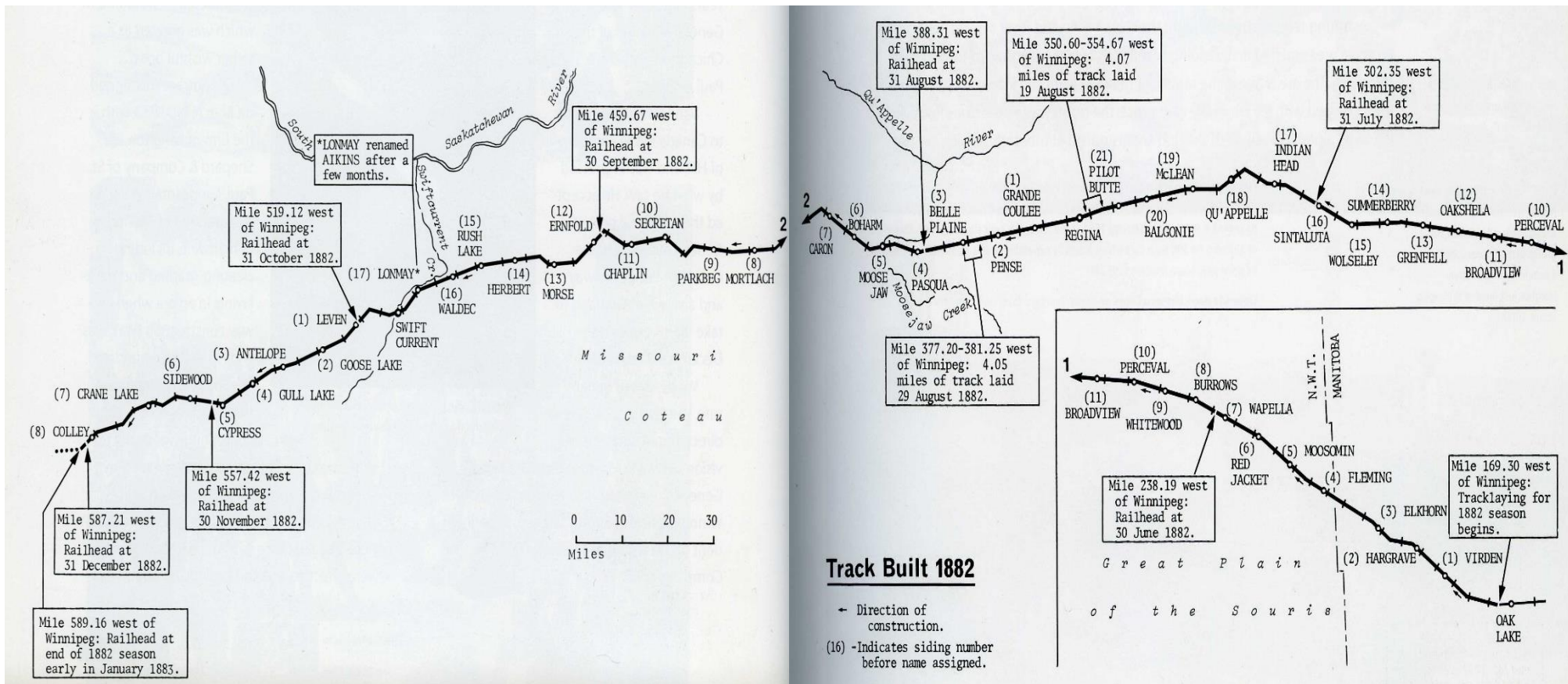
Van Horne Joins the CPR January 1, 1882.
As General Manager, with HQ at first in Winnipeg.



Spring 1882

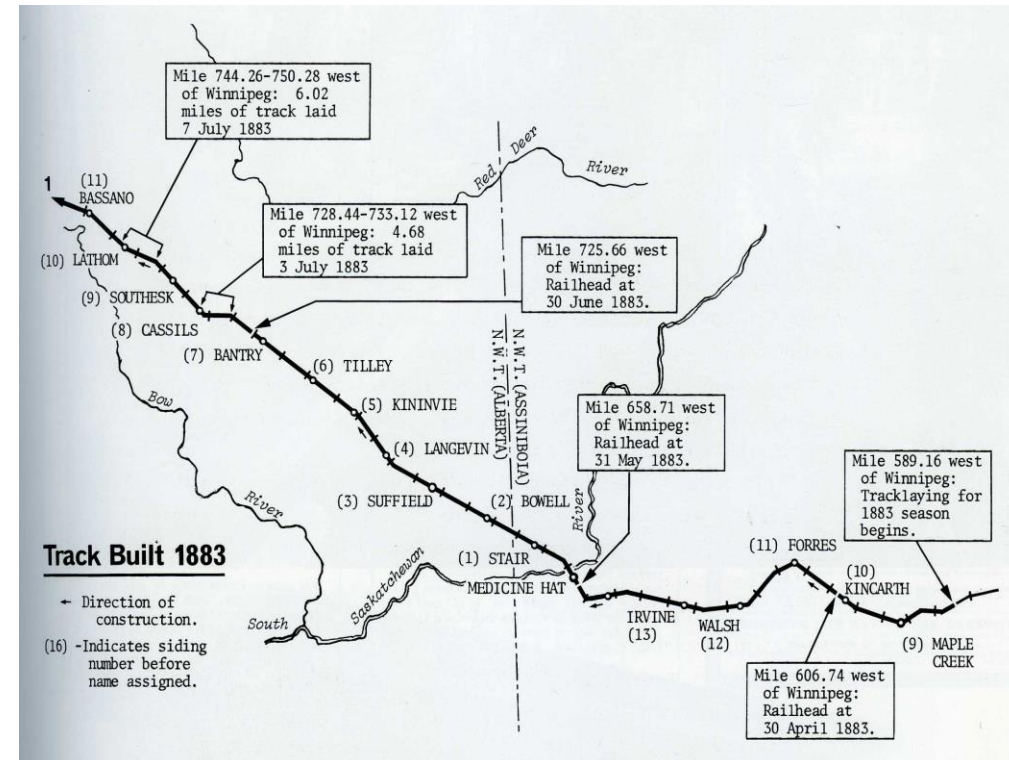
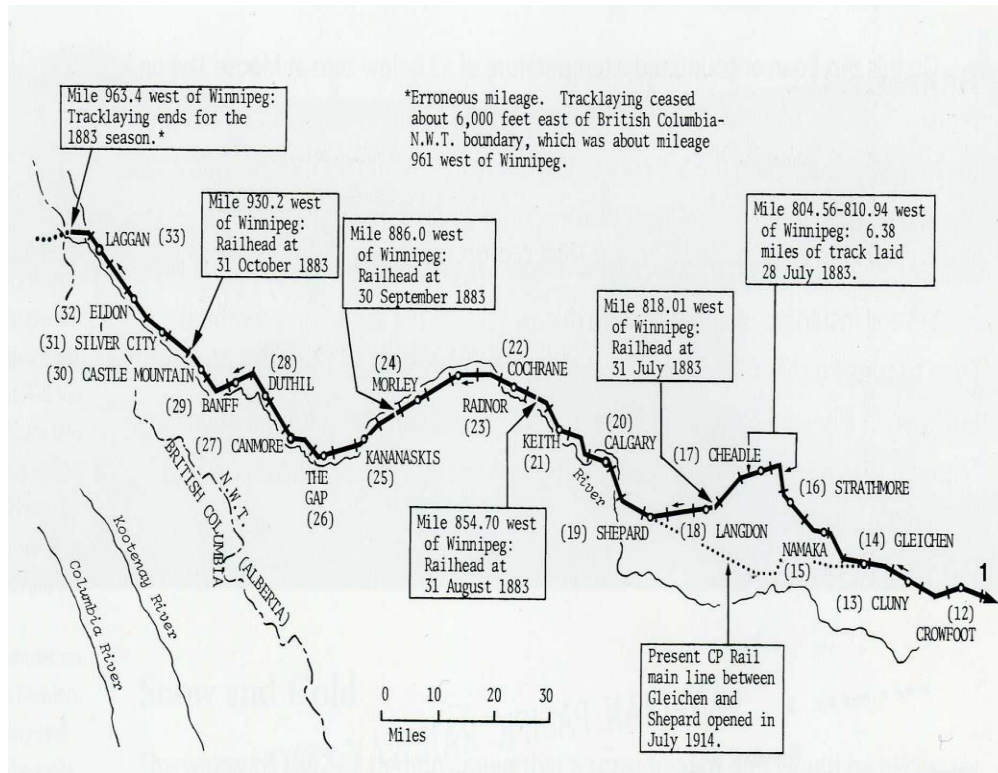
- Van Horne announces that 500 miles of track would be laid on the Main Line that Summer.
- He succeeds in laying 480 miles by using 5,000 men and 1,700 teams.
- Rail ends just east of present-day Maple Creek.
- Grading had ended 25 miles east of Medicine Hat.

Track Construction on the Prairies 1882.

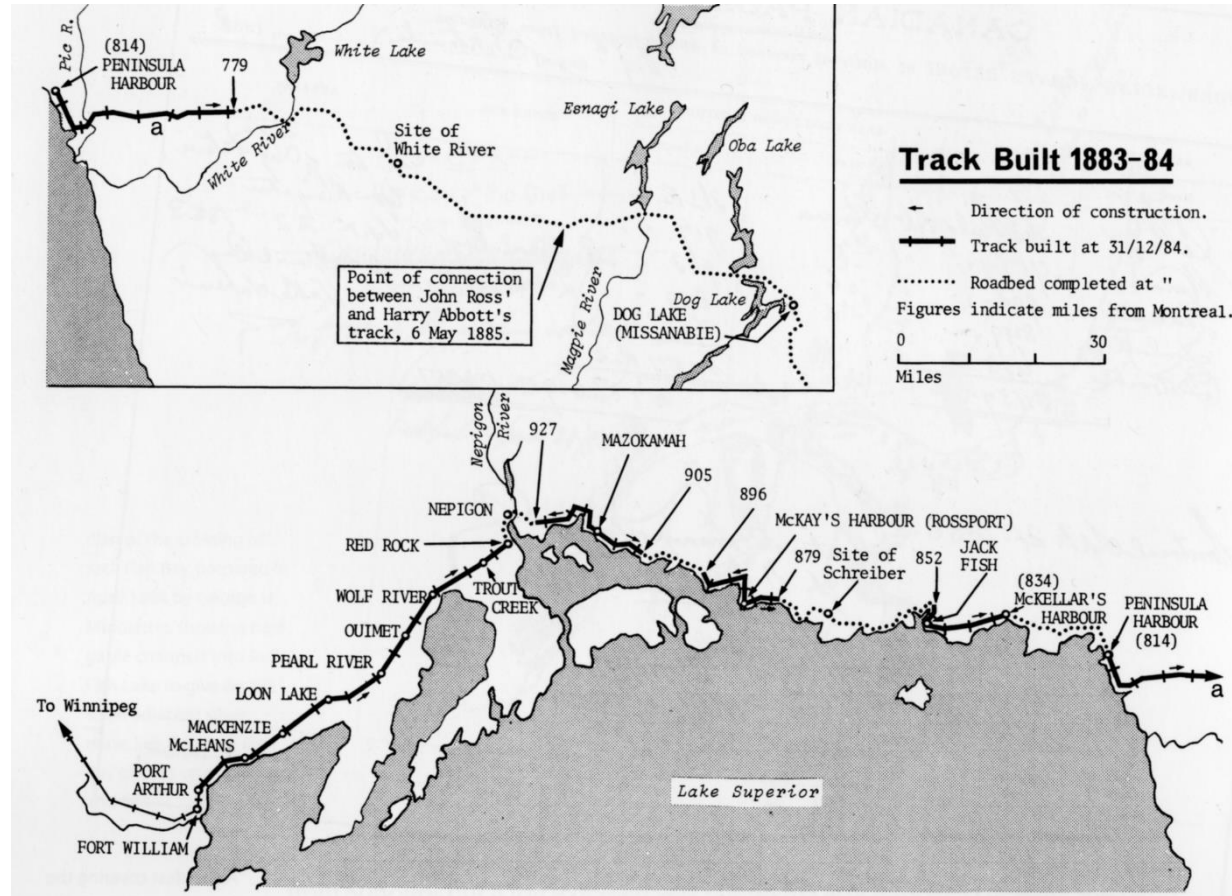


Track Construction on The Prairies 1883.

Rails reached Calgary on Saturday, August 11, 1883.

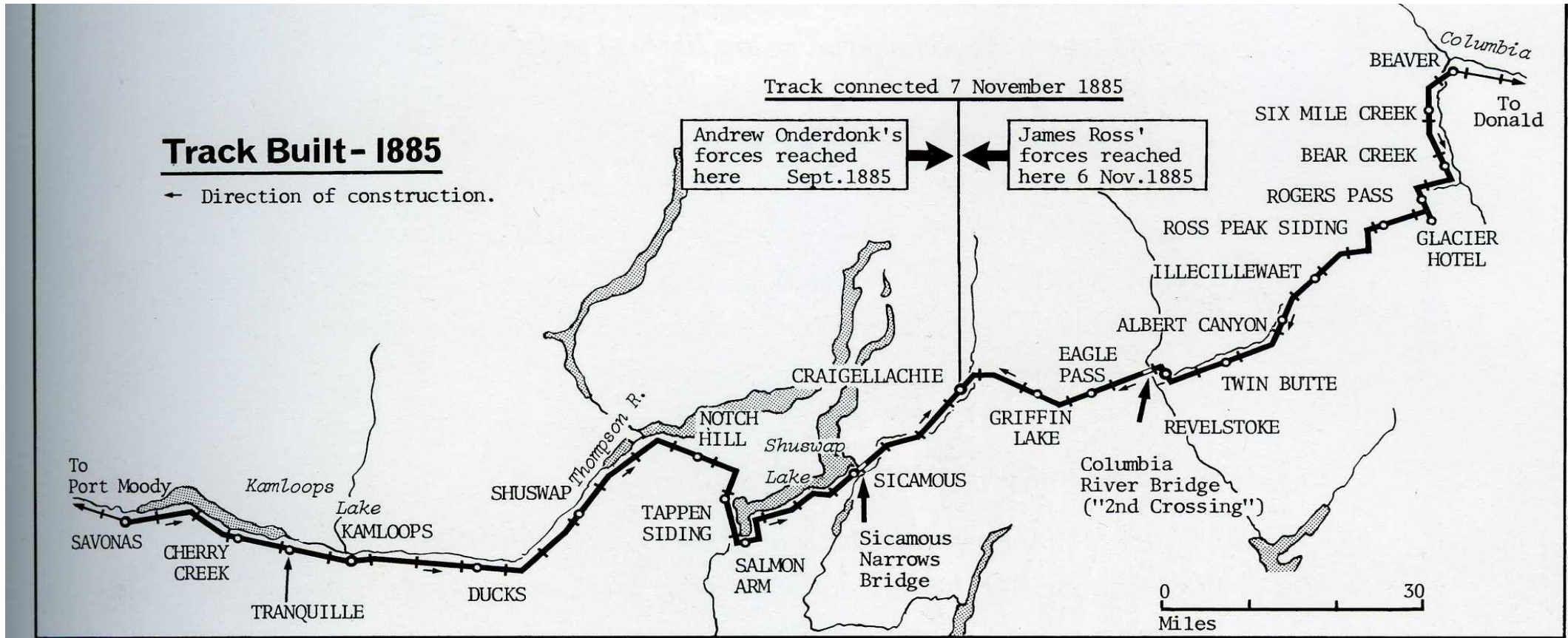


Track Construction - Lake Superior Section



CPR Track Construction 1885.

Savona's Ferry to Craigellachie - Beaver to Craigellachie.



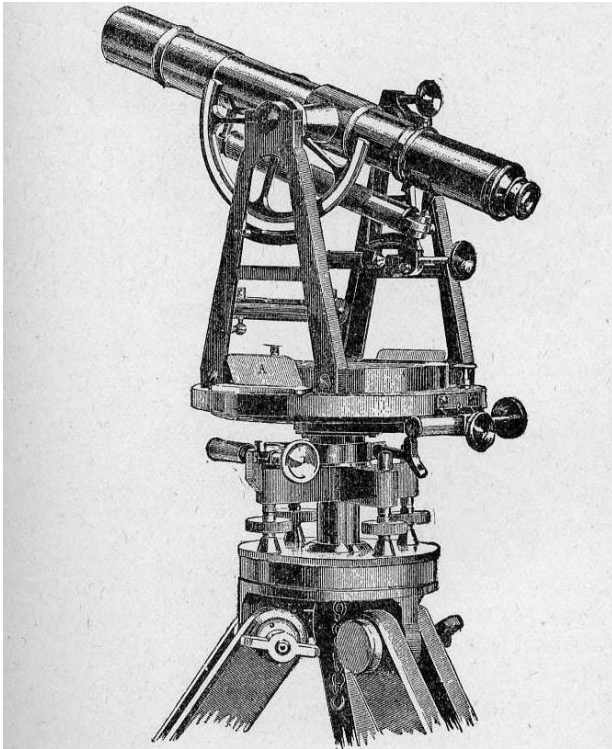
III – Construction Standards.

Steps in Railway Construction.

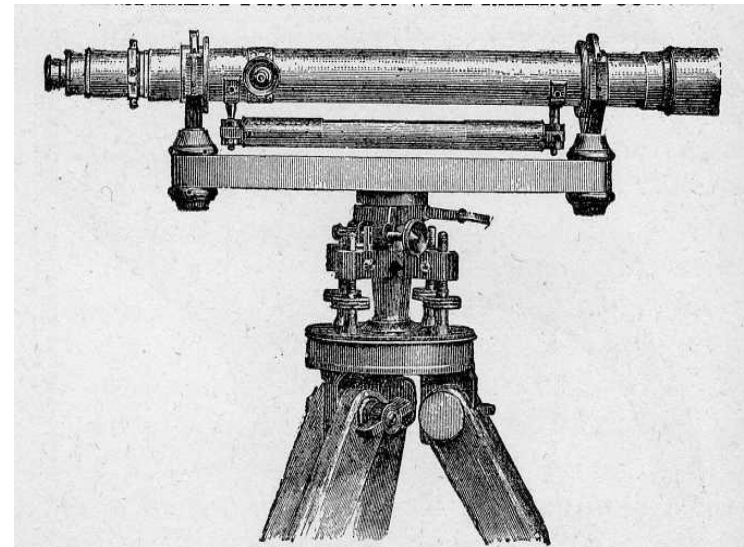
- Step 1 – The Reconnaissance Survey.
- Step 2 – The Preliminary Survey.
- Step 3 – The Location Survey.
- Step 4 – Grade Construction.
- Step 5 – Track Construction.

High Tech Tools of the Engineer Surveyor.

Engineers Transit

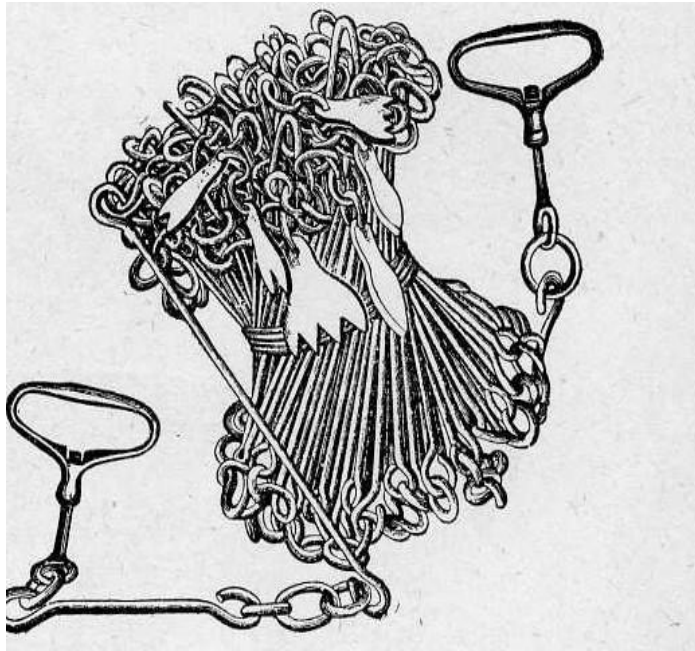


Engineers Level

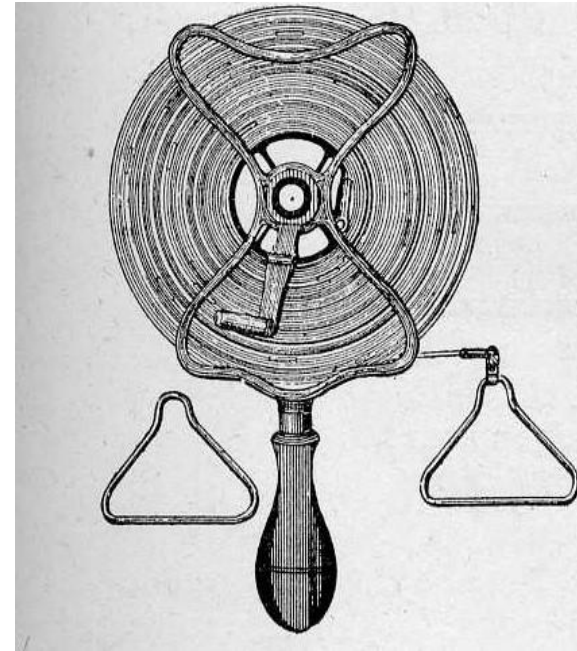


Low Tech tools of the Engineer Surveyor.

100 foot Chain - 100 Links.

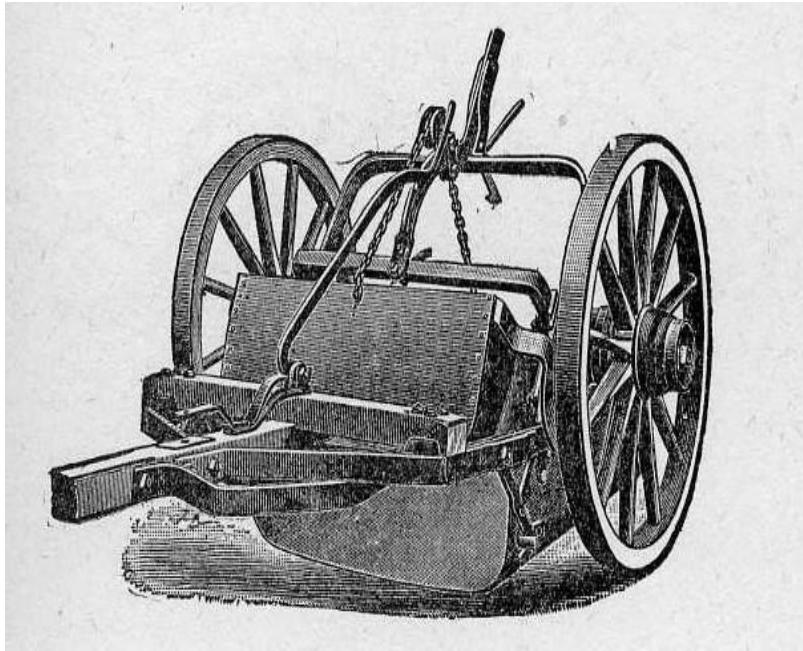


Engineers Steel Tape Chain.

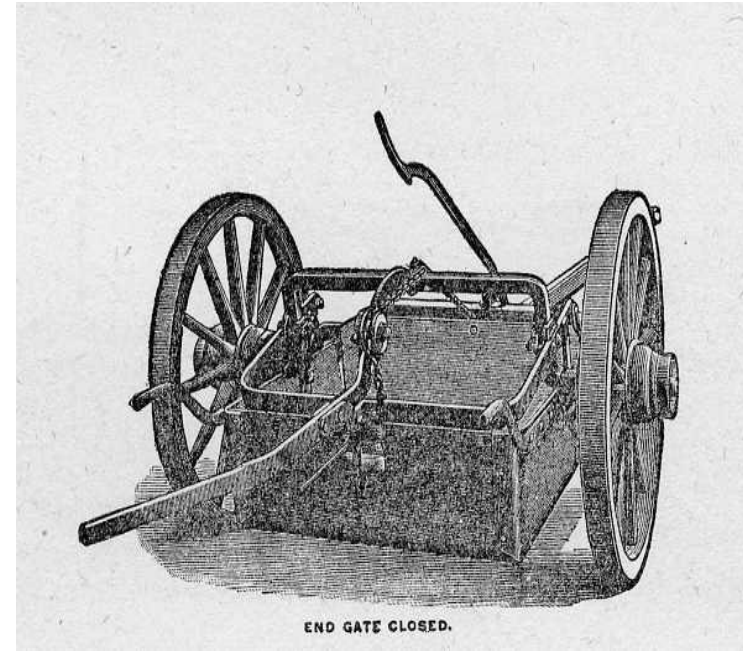


Grading Scrapers (called Fresno's).

Scraper – end gate open.



Scraper – end gate closed.



Two Wheel Mule Hauled Scraper.

Found at Mortlach, Sask.



Track Standards

Based in 1873 on the Union Pacific Railroad Standards.



**Road Bed – min. 2ft
above ground level.**

**Curves – max 6
degrees.**

Max grade - prairies 1%

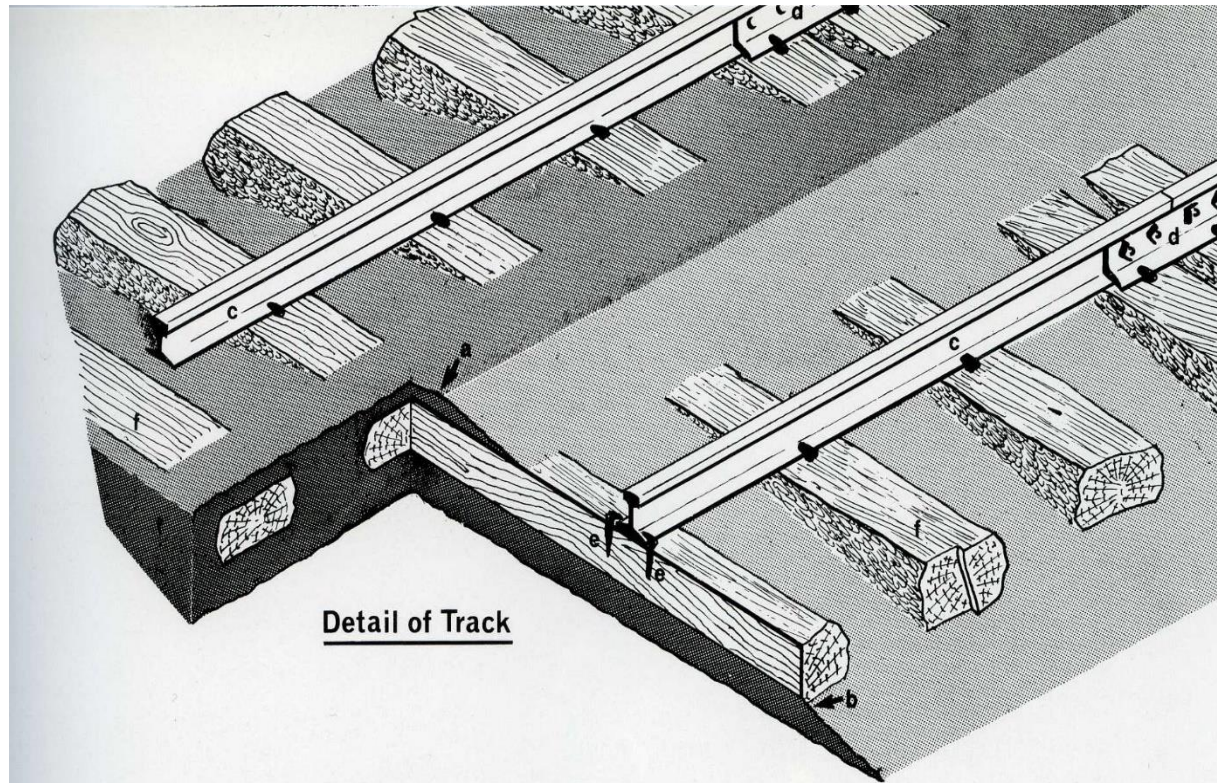
40 ft per mile - .75%

**Fill work, but
minimum cut work, to
be avoided on the
Prairies.**

**Max grade in Mtns.
2.2%**

A rise of 2.2 ft in 100 ft. Or
116 feet in a mile.

Detail on Track – ‘Mud’ Ballast Section.



Rail – 57 1/4 lbs. per yard. 30 ft. lg.

Was it 56 lb. or 60 lb.

Cross rail joints.

4- hole splice bars -1877

4-hole angle bars -1878

Rudimentary sawn or hand hewed cross ties – Adzed top and bottom.

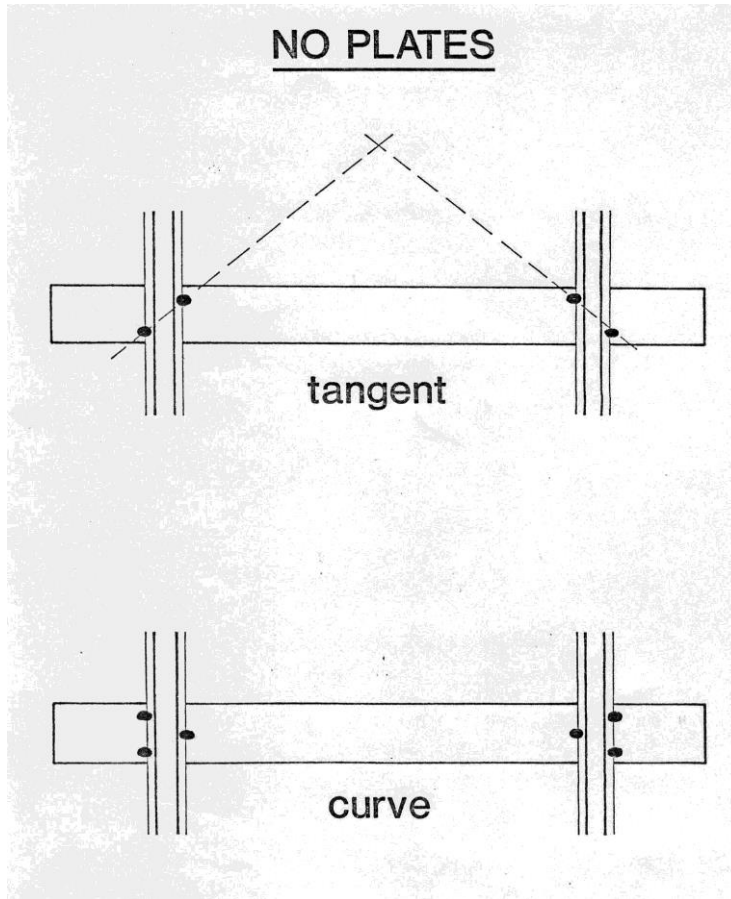
24- inch tie spacing except under joints.

5 1/2 inch track spikes. Std spiking pattern.

Standard Spiking Pattern.

Ballast – local gravel. 2 inch high at center.

Spiking Pattern where there were “NO” Tie Plates.

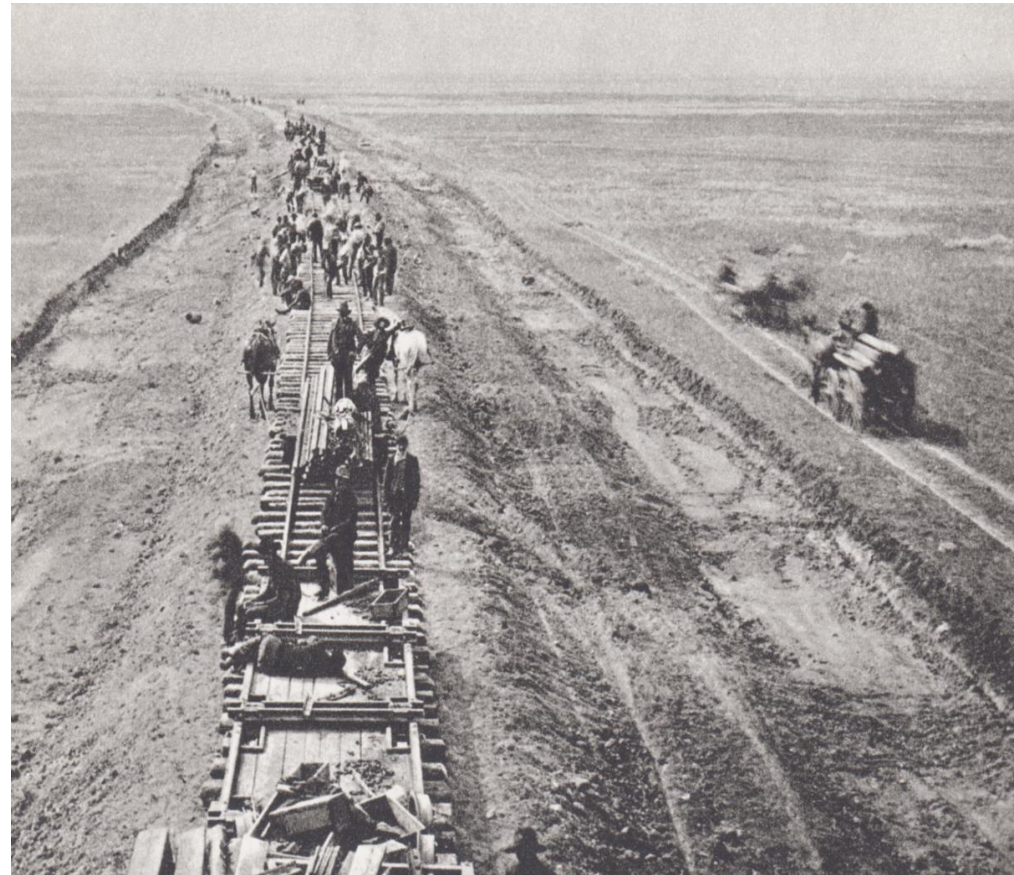


Pattern pointed in the direction of increasing mileage.

On curves 2 track spikes on outside of rail base.

Tie plates not used until ca/1902 and with the introduction of 80 LBS rail.

Grade Constructed Before Track is Laid.
Sometimes days or weeks ahead of 'End of Track.'



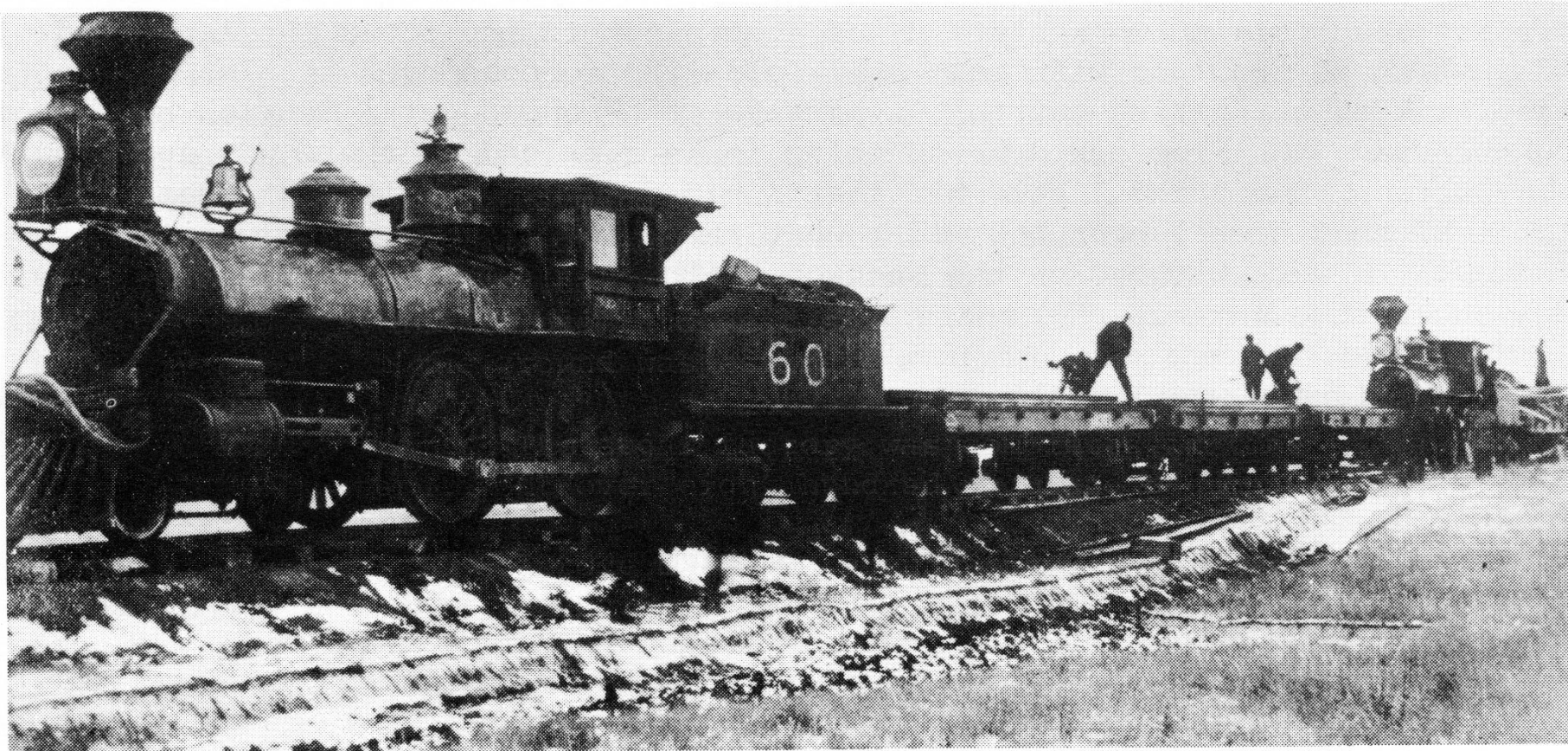
Unloading Ties from the “Front Train” at ‘End of Track’ 1882.



UNLOADING TIES, END OF TRACK

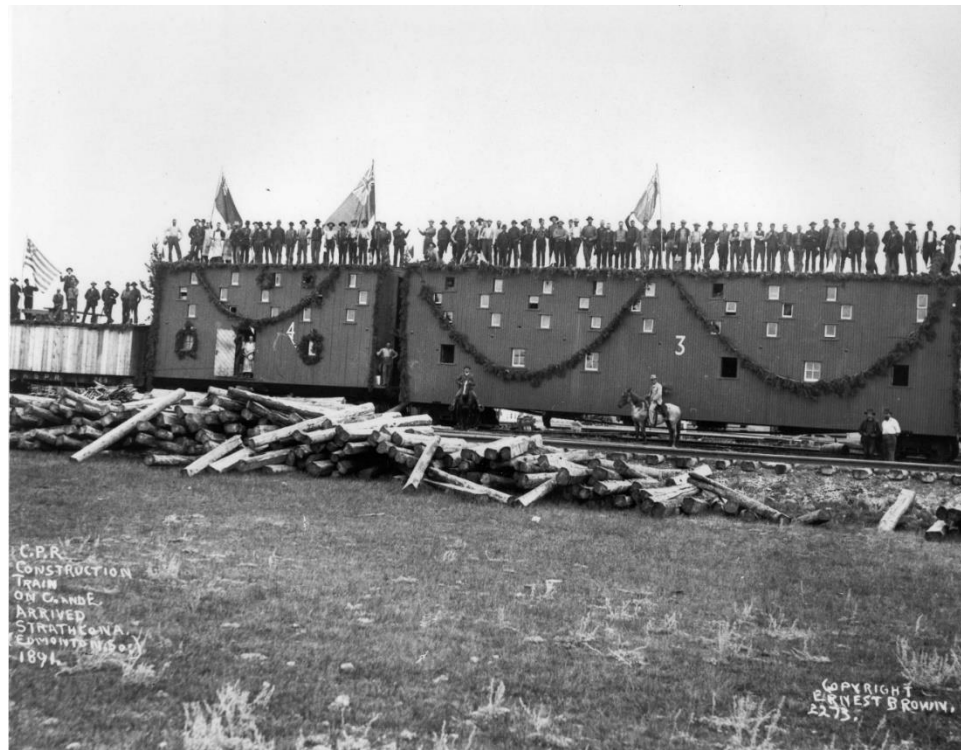
Front Train

Supply trains rolled to the construction front, each carrying enough rails, cross ties & hardware for 1 mile of track.

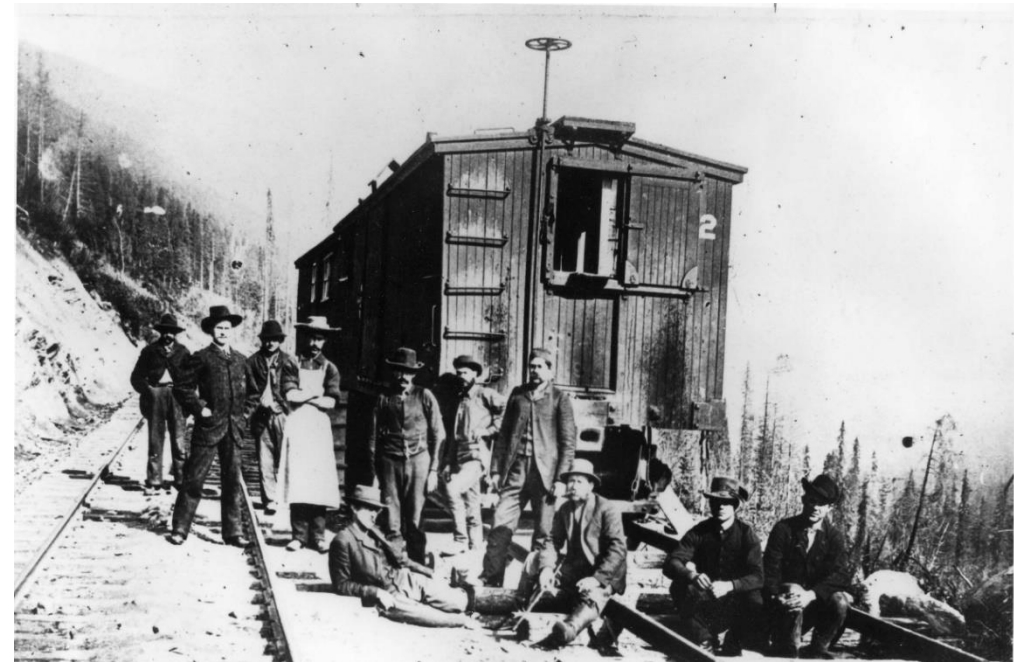


Boarding Cars Were Built in Winnipeg. These moved with the 'Front Train'.

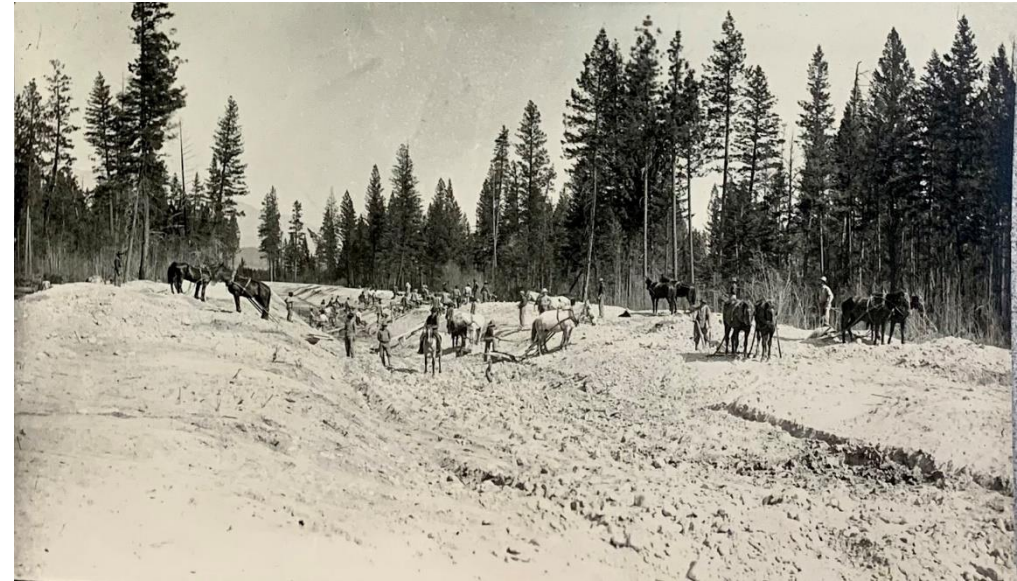
Triple Decks



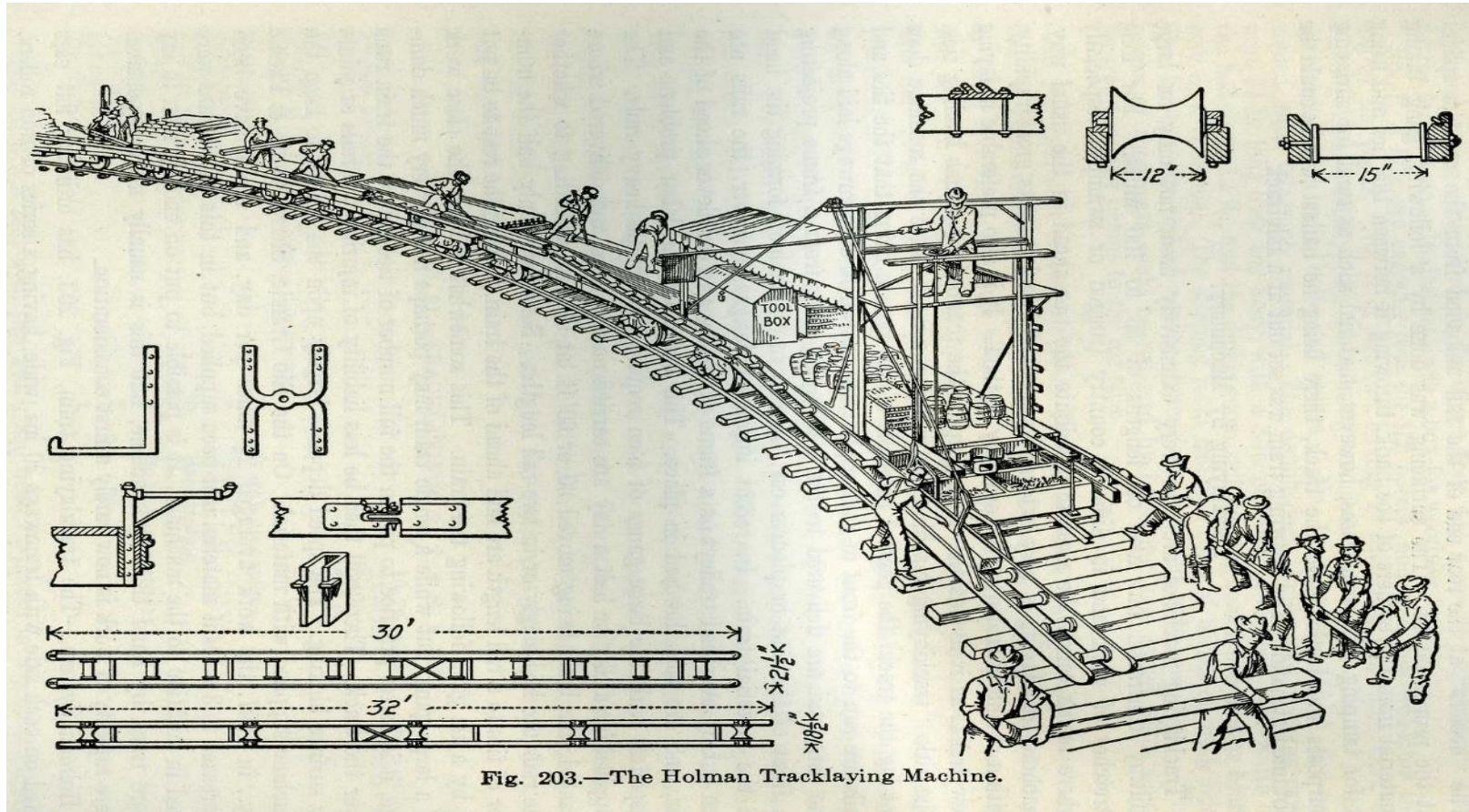
Single Decks



Government Contractor Building Eastward in Fraser Valley 1883.



Track Work on the Eastern Section (in Northern Ont.) used
the new
Holman Track Laying Machine.



Spiking the Rail Behind the 'Front Train'.

One Mile -352 rails, 2640 cross tie, 5289 track spikes, 794 angle bars, 1408 nuts and track bolts.

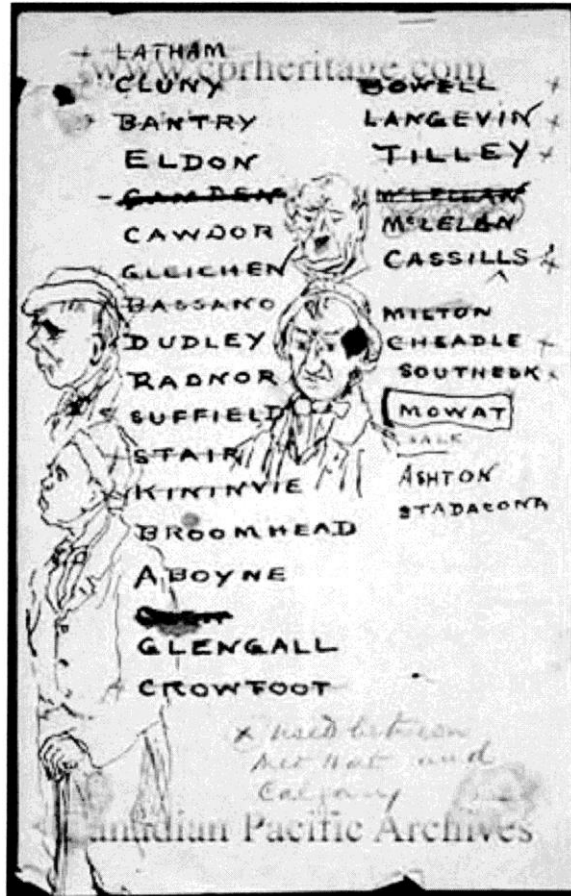


Unloading Ballast by Shovel.





Van Horne Named Many of the Stations (Town sites) on the New Line including Gleichen.

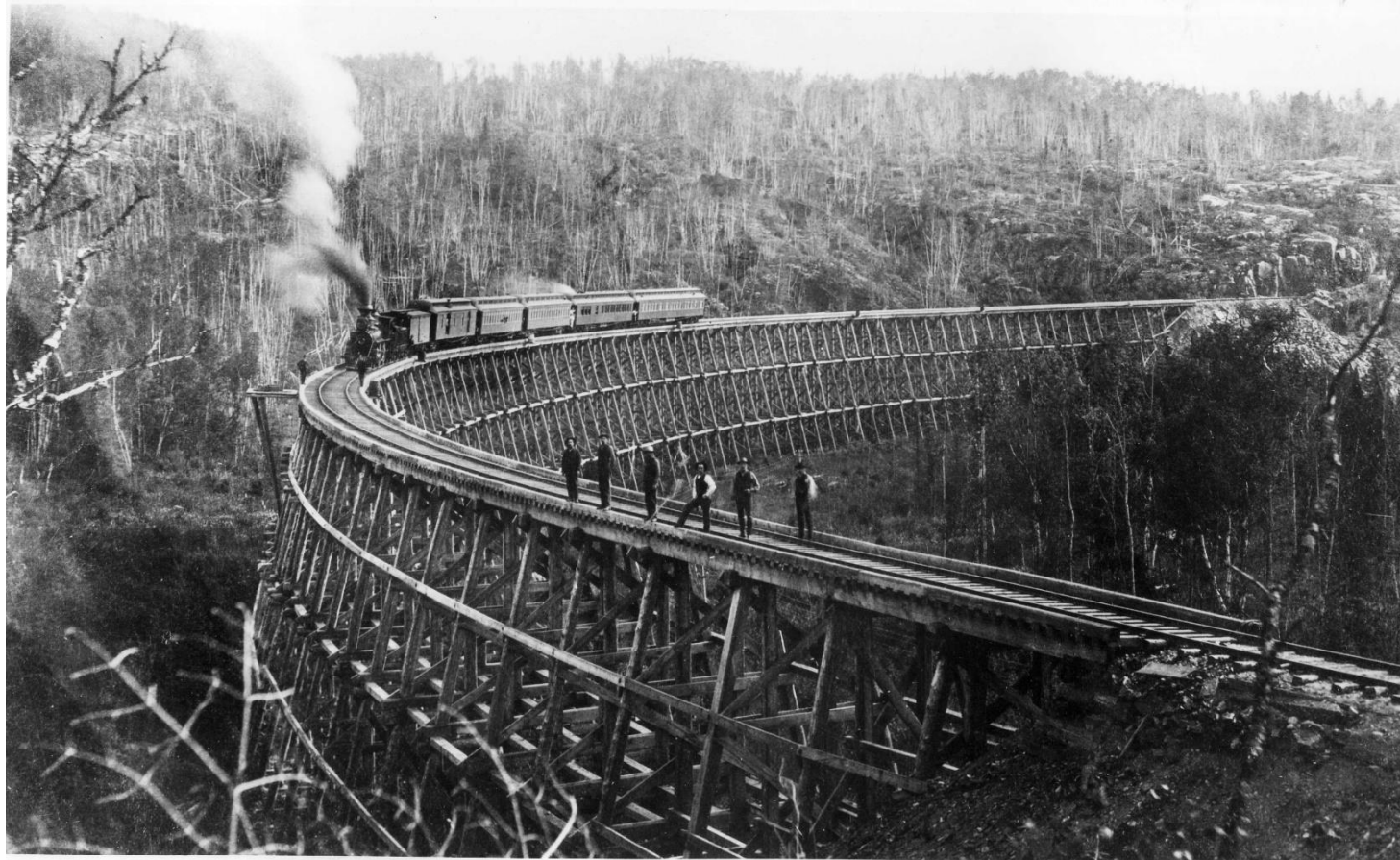


Timber Bridges

'Front Train' with 3 loco's Crosses South Saskatchewan at Leopold, N.W.T. This timber & frame trestle was temporary.

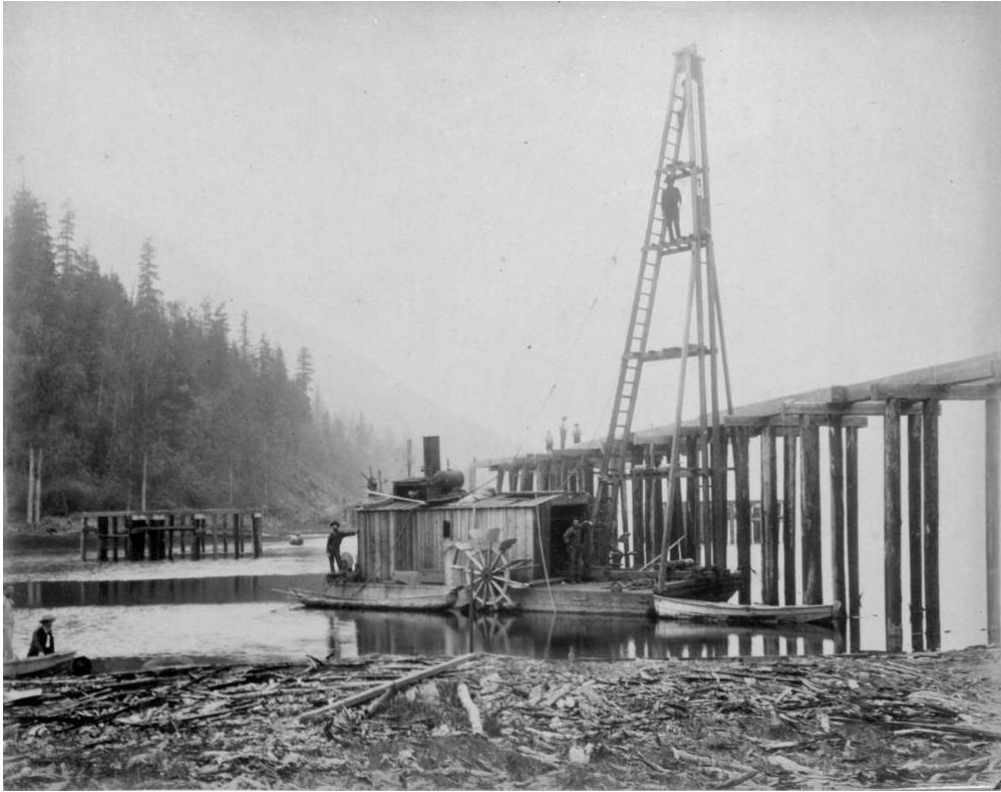


Most All Trestles Were of Timber Construction.
This one was later replaced with culvert and fill.



Wood Trestle Types

Pile Trestles and Timber Framed Trestles



The Infamous Grasshopper Trestle. Found on the Government Work in BC.



Wooden Deck Truss Trestles (Balloon Truss)



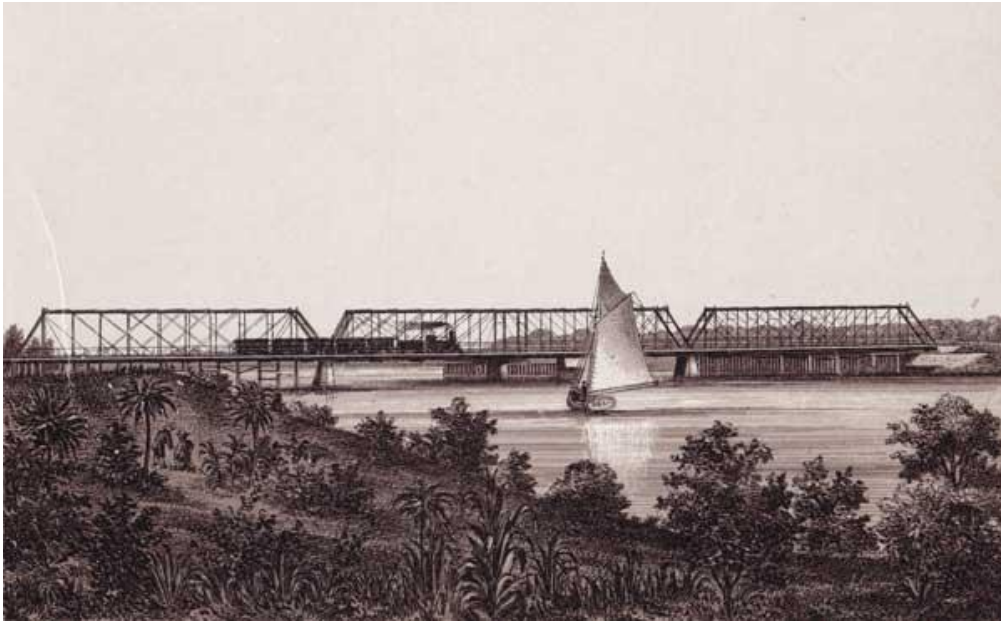
Wooden Through Truss Span



Only Five Steel Structures Built. Winnipeg River Bridge, The Fraser River Bridge near Cisco, BC and

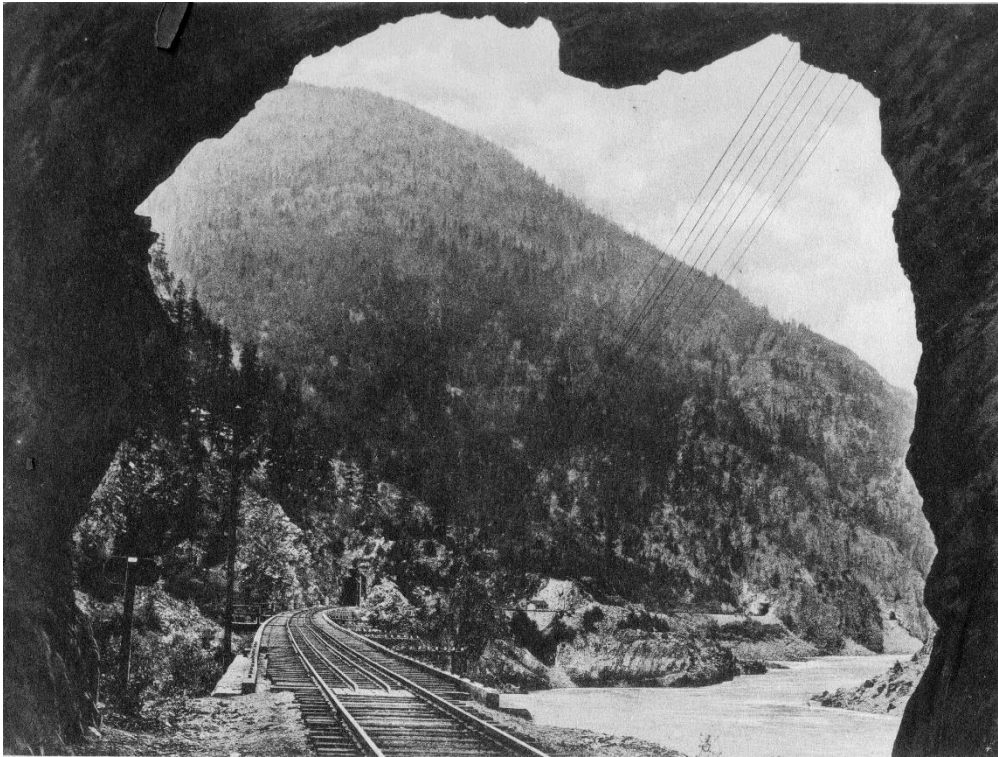


**The Louise Bridge over Red River, Winnipeg, Man.
Built by the City of Winnipeg, Man.**



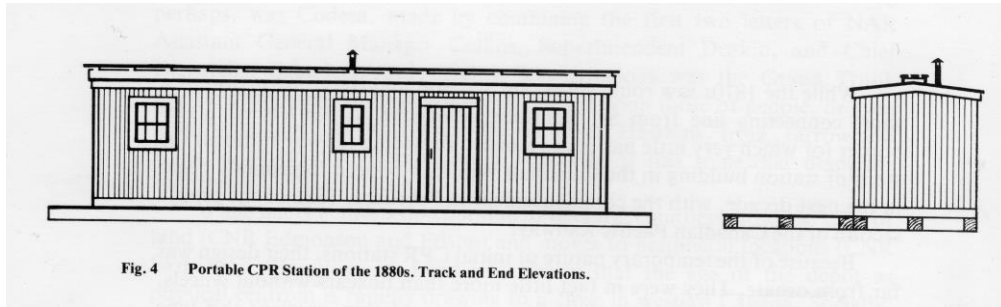
Tunnels

Some 44 were required between
Bonfield, Ont. & Port Moody, BC.

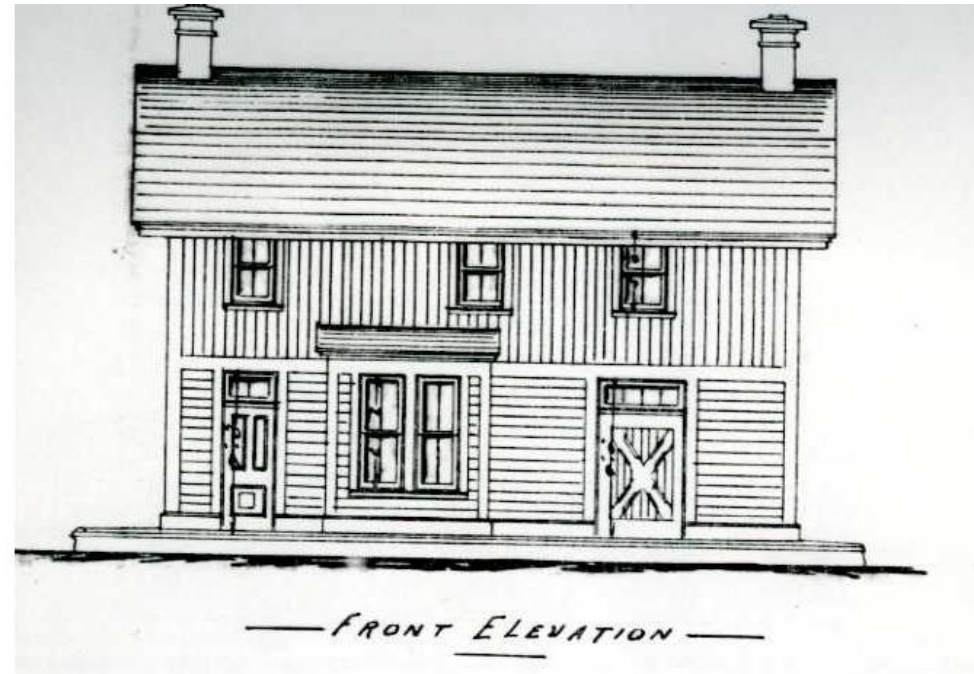
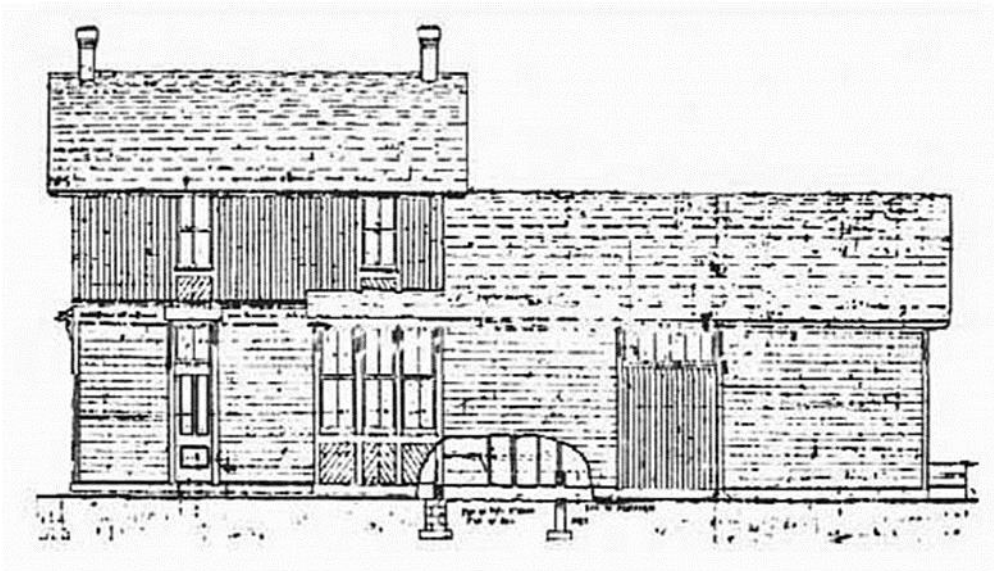


Small Structures and Stations.

One at each siding during construction between Oak Lake, Manitoba & Laggan, NWT.



Standard station structure of the Construction era.
Generic – Van Horne era station structures.



Two Types of Van Horne Era Station Structures. Chapleau, Ont. and Calgary, NWT.

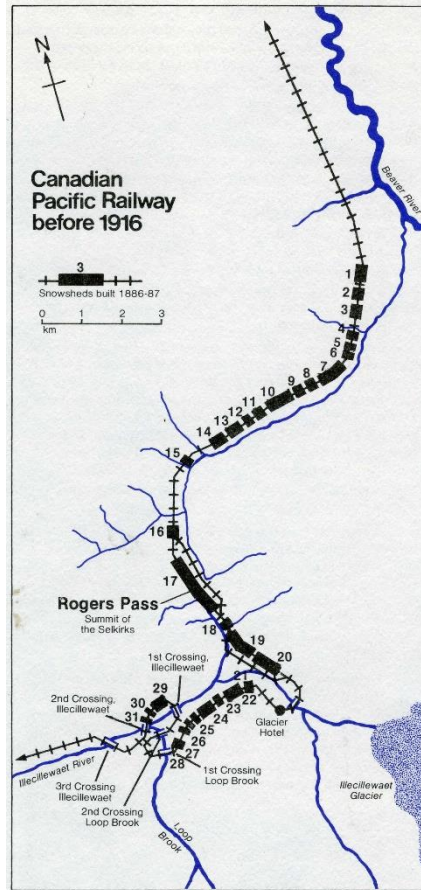


Engine Houses at Division Points

Donald, BC and Canmore, NWT – Typical.



Five Miles of Snow Sheds in Rogers Pass



6.38 Miles in One Day.

- July 28, 1883, between Namaka & (old) Strathmore.
- Plan was to do 9 miles of track; materials and supplies.
- 16,000 cross ties.
- 2,000 rails at 600 tons.
- 63,000 track spikes; in 14 hours at 8,400 blows per spiker.
- Fell short of the planned 9 miles. But set the record for one day in Canada.

SOME CONSTRUCTION COSTS

in 1885 Dollars.

- Cost by CP to construct and equip the railway - \$161.5 million.
- Cost by government to construct its 700 miles - \$35 million.

COMPLETED

- The completed line from Montreal to Port Moody was 2,873.1 miles.
- A **total network** of 4,325 miles was achieved on November 7, 1885 by amalgamation, purchase and lease, as well by construction.
- With a breakdown as follows:
 - 2,097 miles built by the Company;
 - 799 miles leased by the Company;
 - 744 miles built by the Dominion Government;
 - 375 miles purchased by the Company and
 - 310 miles acquired by amalgamation.



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Driving the Golden Spike, by Hon. D. A. Smith on U.P.R., Nov. 7, 1885, 9:30 a.m.

All Aboard for the Pacific.



NOTICE!

YALE, B. C., SEPT. 26, 1885.

AS OUR LAST RAIL FROM
THE PACIFIC
HAS BEEN LAID IN
Eagle Pass to-day,

And the balance of work undertaken by the CANADIAN PACIFIC RAIL-
WAY COMPANY between Savona and point of junction in Eagle Pass will
be Completed for the Season on WEDNESDAY,

**ALL EMPLOYEES
WILL BE DISCHARGED**

On the Evening of September Thirtieth.

Application for position in the Operation Department for the present may be
made to M. J. HANEY, but the above portion of line will not be operated until
Notice is given to that effect by the VICE PRESIDENT.

ALL ACCOUNTS

Should be liquidated before the TENTH PROXIMO, at Yale, as the books of the
Company should be closed on that day.

A. Onderdonk.

Next Presentation.

