Forest History Association of BC (FHABC)

Publishers Note:

Logging Railways on the BC Coast in the 1920s

FHABC is pleased to publish this story by Allen Hopwood. A short teaser appeared in newsletter 115, September 2023, while the full article is hosted on our webpage.

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Logging Railways on the BC Coast in the 1920s

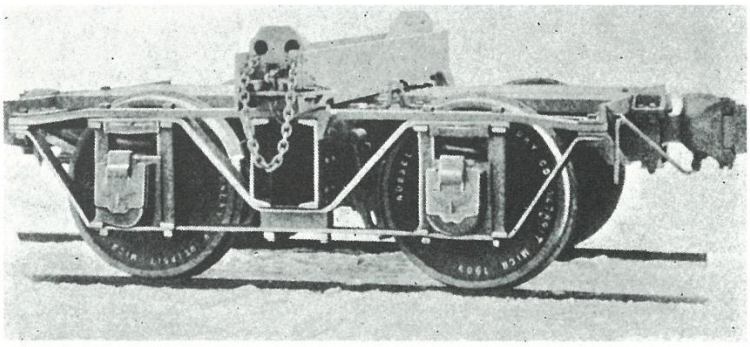
The varied and rugged terrain of Coastal BC presented great difficulties in getting timber to sawmills, which were usually located beside salt water. Initially, the seaside forests were felled or dragged directly into the saltchuck or into rivers which took logs to the sea. As the seaside forests were used up, timber which was a short distance from the sea was dragged there, usually over greased corduroy roads (skid roads) by horses, oxen or steam engines. For the farther out stands, railroads "were looked upon as the best means of taming the seemingly endless wilderness."

By 1920, a fairly standard and sophisticated system of railway logging was in place. Tracks would be laid to a "setting" of timber where a central spar tree would have been left standing. The trees around the spar tree would be felled and bucked to lengths specified by the destined sawmill. A skidder (steam donkey engine mounted on a flatcar) would be put in place beside the topped and rigged spar tree. The skidder would pull in the felled and bucked logs and a "hayrack" boom[1] or a "gin pole," attached to the spar tree and powered by the donkey, would load logs onto log cars. Other than the mainlines leading to log dumps and booming grounds, logging rail lines were designed to last only as long as the local timber supplies.

The engineering and surveying required to maintain alignment, climb steep grades, traverse rugged terrain, and reach remote stands of timber were nothing short of remarkable. For example, Comox Logging's railway system on the Bevan Sidehill west of Courtenay went from the seashore to 700 m ASL with twelve switchbacks. But Comox Logging's accomplishments on the Bevan Sidehill and elsewhere were by no means extraordinary.[2]

There were three basic types of log cars:

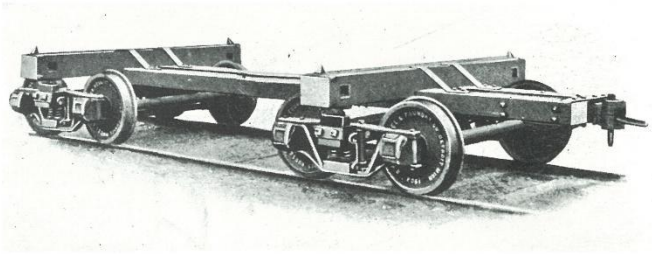
- The disconnect truck was a two axle freight car wheel assembly (called a truck) with a bunk mounted across it to support the ends of the logs. A pair (called "disconnects") was separated when loading



[1] "A device for loading logs onto rail cars, consisting of two timbers fastened together and horizontally attached to the spar tree. The hayrack boom rotated around the spar tree to allow logs to be picked up and then lowered onto rail cars."

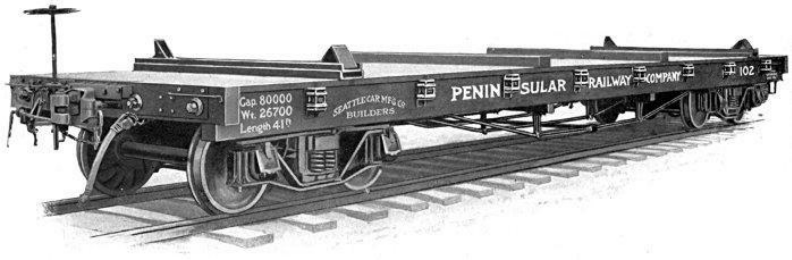
[2] All told, Comox Logging built about 1,600 km of track in the Comox Valley and nearby.

to accommodate any length of log. The weight of the logs bearing on the bunks kept the trucks in position. With nothing spanning the trucks other than the logs themselves, disconnected trucks were not fitted with air brakes[3] (a major drawback). The picture is from Western Lumberman magazine.



- The skeleton car had a narrow frame (reach) connecting two trucks. The reach and bunks resembled a skeleton. The reach provided support for air brake hardware. The picture is from Western Lumberman magazine.

- The "more or less" standard flatcar equipped with log bunks was heavier, more costly and accumulated bark, adding weight to the decks. The picture is from Seattle Car & Foundry Company's Catalogue No. 3, December 1913.



The foremost manufacturer of log cars was William Pigott's Seattle Car Manufacturing Company which started in 1906 after he recapitalized an earlier version of his foundry. Seattle Car was also the Pacific Northwest's distributor of Climax locomotives. The company pioneered the manufacturing of what we now call logging trucks.

A steam engine is a machine that burns fuel to release heat (energy) which boils water to produce steam. A steam locomotive is a type of railway locomotive that produces its pulling power through a steam engine, usually fuelled by coal, wood or oil. The steam is piped into one or more cylinders, each equipped with a piston which moves first one way then the other (reciprocating) to, in the case of a locomotive, drive (turn) wheels. The piston is connected to the wheels through a crankshaft and connecting rod. As the piston is pushed by the steam entering the cylinder via an intake valve, the crank and connecting rod turn the locie's wheels. The cylinders are "double-acting:" steam is admitted alternatively at both ends to push the piston to and fro, generating a full revolution of the driving wheel(s). Crank pins on either side of the locomotive are at a 90° angle to each other so that one of the cylinders is always in a power stroke. Early locomotives had two cylinders.

[3] Brakes powered by steam pressure were outlawed in 1920.

The steam generated in the water boiler not only moves the locomotive, but also operates other devices such as a whistle, an air compressor for brakes, etc. The water is either kept in a tank on the locomotive's tender or in the case of tank locomotives, in square tanks mounted on either side of the boiler or in a saddle-shaped tank straddling the boiler.

Locomotives have their own braking system, independent of the rest of the train. Locomotive brakes employ large shoes which press against driving wheel treads. With the advent of air brakes, a separate system allowed the engineer to control the brakes on all cars.

Most locomotives used for logging in BC were made in the US. The BC market for locomotives was relatively small and the US manufacturers were able to develop specialized designs at lower costs.

Logging locomotives had to be versatile, flexible, rugged and able to operate in both directions (turnarounds were a luxury in rough, steep terrain). They had to operate on steep grades pulling heavy timber "over some of the crudest track ever laid in North America." The maximum grade normally acceptable on a major railway system like the CNR is/was 2.2%. On logging mainlines, 2-3% grades were typical; on spur lines, 5-6% grades were common. In extreme circumstances, grades over 10% might be built for short-term use (up to two months).

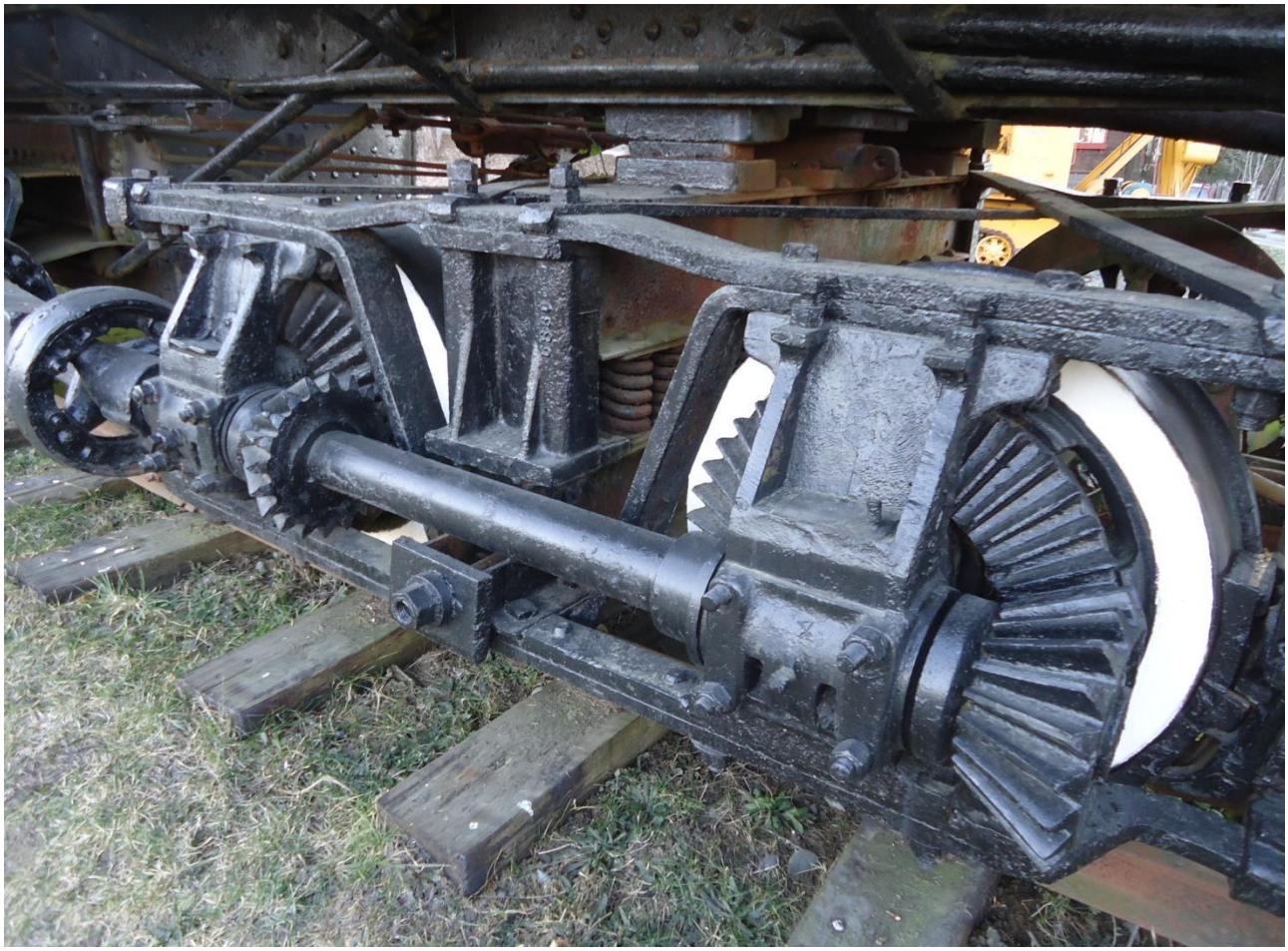
Two main types of locomotives were used for logging on Vancouver Island: geared, for steeper grades, sharper corners and heavy loads; and conventional rod, for speed and flatter grades. Distinct types of locomotives were developed for logging and these were often modified to suit specific operations.

The principle of geared steam locomotives was "to have the power from the locomotive's cylinders transmitted to the driving wheels by a system of gears and articulated drive shafts which produced a low speed but high power." The driving wheels were mounted in two-axle "trucks" which could move independently, instead of in a semi-rigid frame as used by rod locomotives. As a result, the geared locomotive could operate on tighter radius curves. The most common geared locomotives used on Vancouver Island were the Shay (manufactured in Ohio and easy to fix in the woods), the rough riding Climax (made in Pennsylvania with a service centre at Seattle Car), and to a lesser extent, the Heisler (built in Pennsylvania).

The photographs show a Class B, 42-ton, 2-truck Shay geared locomotive (on display at the BC Forest Discovery Centre in Duncan). This locomotive was bought (new) in 1911

by Bloedel, Stewart & Welch Ltd.[4] The structure at the rear includes a tank for water and an insert for fuel (wood).

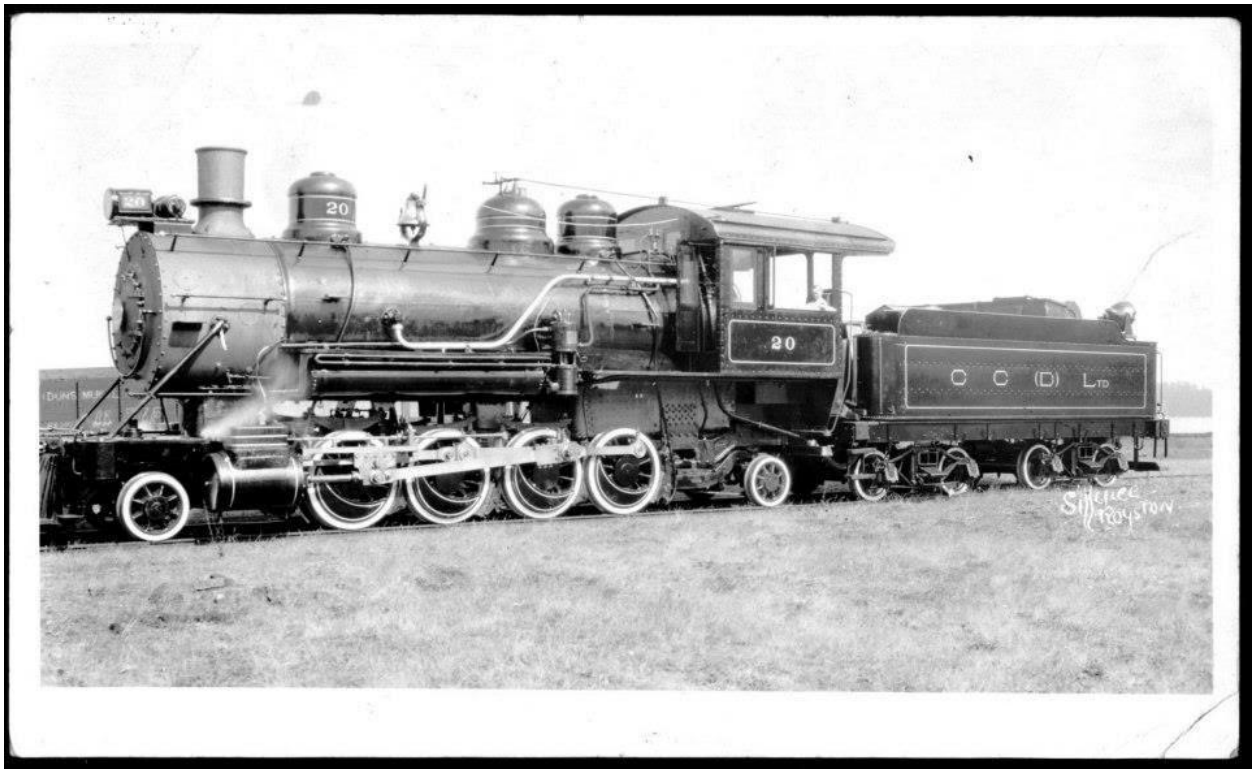
[4] "Bloedel" is mispelled on the locie.



Conventional rod steam locomotives have their pistons directly attached to cranks on the driving wheels (thus no gearing). Coupling rods (or side rods) connected all the driving wheels, transferring power to them.[5] Conventional rod logging locomotives were nearly all fitted with small drive wheels to provide extra traction and to shorten the wheel base, making it easier to negotiate sharp curves. The Baldwin locomotive manufactured in Pennsylvania was by far the most popular on the Island.

The photo below shows Canadian Collieries' Baldwin conventional rod locomotive Number 20 in 1913 when it was brand new. The small guide wheels at each end allowed the locomotive to operate equally well in both directions.

[5] On duplex (or articulated) locomotives, driving wheels are grouped into sets which are linked together within each set.



The second conventional rod locomotive shown is the MacMillan Bloedel Number 1044 (on display at Chemainus with the correct spelling of "Bloedel"). Built by H.K. Porter Inc. of Pittsburg, it operated for over 82 years. Note the side tank for water and the detail of the connecting (coupling) rods.

The Whyte Notation system came into use after 1900 for classifying steam locomotives by wheel arrangement. The notation counts the number of leading wheels, then the number of driving wheels, and finally the number of trailing wheels. For example, a locomotive with two leading axles (four wheels) in front, three driving axles (six wheels) and two trailing axles (four wheels) is classed as a 4-6-4. Each configuration has a common name. A 4-6-4 is called a "Hudson" or "Baltic."

Suffixes to the numbers further describe configuration. No suffix means a tender[6] locomotive. A "T" indicates a tank[7] locomotive. There are other suffixes which don't apply here.

Tank locomotives generally do not have tenders, although there are exceptions. Loggers liked tank locies because they could be run equally well in forward or reverse, a distinct advantage on sidehill switchbacks where turning a corner was not possible.

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[6] A tender is a railcar (wagon) carrying coal or wood and water for the steam engine.

[7] The water for the locie is carried in a tank or tanks on the locie itself, rather than in a tender.

Geared locomotives do not lend themselves well to the Whyte system and are classified by their number of trucks[8] rather than their wheel arrangement. So you will find reference to a 3-truck Shay or a 2-truck Climax.
Often, both rod and geared locomotives were operated by Coastal logging companies. For example, Comox Logging used geared locomotives[9] to bring logs down from the steep slopes of the Bevan Sidehill west of Courtenay and from around Comox Lake; and various makes of rod locomotives for transport on flatter ground to its Royston log dump.

It took a crew of six to operate a wood-powered logging train: the engineer, the fireman, two brakemen, and two men to cut, stack and load firewood.

The engineer and fireman spent their working days in the small cab of the locomotive, close to the firebox and the boiler. It is reported that in summer they wore two sets of long-johns as insulation from the fierce heat: "One could smell a trainman, night or day...."

The fireman was responsible for maintaining the fire, regulating steam pressure, and monitoring boiler and tender/tank water levels.

The engineer was responsible for controlling the locomotive's starting, stopping and speed. His job has been described as "seat-of-the-pants." There were a multitude of levers, handles, switches, gauges and valves which had to be coordinated and continually adjusted (and monitored) to operate the train efficiently and safely. Operating a locomotive required not only knowledge of but also a feel for how all the components functioned on any particular engine. The engineer not only knew how to run his engine, he also knew a great deal about how it was built and how each part worked, so that he would know what to do if anything went wrong.

Before train brakes (i.e., braking systems which were controlled by the engineer from the cab, with connections to all the cars), brakemen had to set (by hand) brake pressure on each disconnect log car. The head brakeman was the most important member of the train crew. He decided how much brake pressure would be applied based on the number and weight of the loaded log cars and the steepness of the grade(s) ahead. A brakeman's job was dirty and dangerous. If too much brake pressure was applied, the log cars would peel steel off the rails; too little brake pressure would lead to derailment. Often the brakes required attention during the descent. If the train was moving slowly, the brakeman could hop off one log car and catch the next one as it came by. But if the

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[8] A "truck" is a frame forming a wheel unit, described earlier.

[9] Heislers and Shays.

train was moving too fast or he had to make his way forward, he had to walk along the swaying logs and jump from car to car.

As technology advanced, the brakeman's duties were reduced and his job became much safer. Individually operated car brakes were replaced with automatic air brakes.

In 1920 in BC, there were 90 steam and 19 gasoline locomotives employed in the 268 "more or less permanent" logging operations (camps).

Logging locomotives from the 1920s are on display at the BC Forest Discovery Centre in Duncan.

Credits for Illustrations

Disconnect (Detached) Truck	Western Lumberman Magazine
Skeleton Car	Western Lumberman Magazine
Flat Car	Seattle Car & Foundry Catalogue No. 3 1913
Shay Locomotive (Geared; Two-Truck) & Skeleton Car	A. Hopwood from the BC Forest Discovery Centre
Shay Locomotive	A. Hopwood from the BC Forest Discovery Centre
Detail of Gears on Shay Locomotive	A. Hopwood from the BC Forest Discovery Centre
Canadian Collieries' Baldwin Locomotive (Rod; 2-8-2) 1913(?)	Cumberland Museum & Archives C280-040, Courtesy of the Royston Community Club
Porter Connecting Rod Locomotive (2-6-2T)	A. Hopwood (Chemainus)
Detail of Connecting (Coupling) Rods	A. Hopwood (Chemainus)

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