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British Columbia Electric Railway, Early Cape Breton Colliery Railways

Chemin de fer électrique de la Colombie-Britannique. Les débuts du chemin de fer de la mine du Cap-Breton



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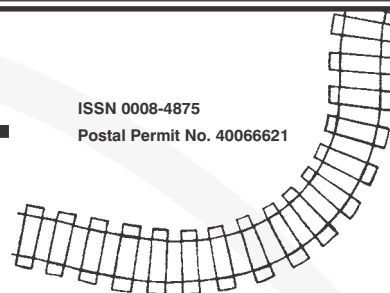


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FRONT COVER: End of the line of Canada's longest interurban railway! The first interurban train of the day from Vancouver has just arrived from its 76 mile run and now sits on the Chilliwack depot's magnificent double loop at 11:55 AM on a summer's day in 1949. Baggage-express car 1706, one of a set of 4 1912 Niles cars, 1706-1709, leads the way. Car 1305, a B.C. Electric product of 1911 is trailing with its trolley wheel to the wire. Robert W. Gibson, Collection Electric Railway Historical Society.

BELOW: Built in 1912 by B. C. Electric, car 255 loops through downtown Victoria on its way to traversing the scenic 5 – Gorge route in July, 1946. This line was one of two lines abandoned on Victoria's first 'Rails to Rubber' day, June 30, 1947. Henry Ewert collection.

PAGE COUVERTURE : *Fin de la plus longue ligne de chemin de fer interurbain du Canada! Le premier train interurbain de la journée en provenance de Vancouver termine un parcours de 122 km. Il est en attente à la superbe double boucle du dépôt de Chilliwack en cette journée d'été de 1949. Il est 11 h 55. Au premier plan, on voit le fourgon à bagages express no 1706, l'un des quatre construits par Niles Cars en 1912. À l'arrière-plan, on aperçoit la voiture no 1305, construite par le BCER en 1911, avec la perche en position sur le fil aérien. Robert W. Gibson, collection de l'Electric Railway Historical Society.*

Ci-DESSOUS : *Le tramway de la BCER no 255 termine son circuit au centre-ville de Victoria avant de parcourir la ligne panoramique no 5-Gorge en juillet 1946. Cette ligne est l'une des deux qui furent abandonnées à Victoria le 30 juin 1947. Collection Henry Ewert.*

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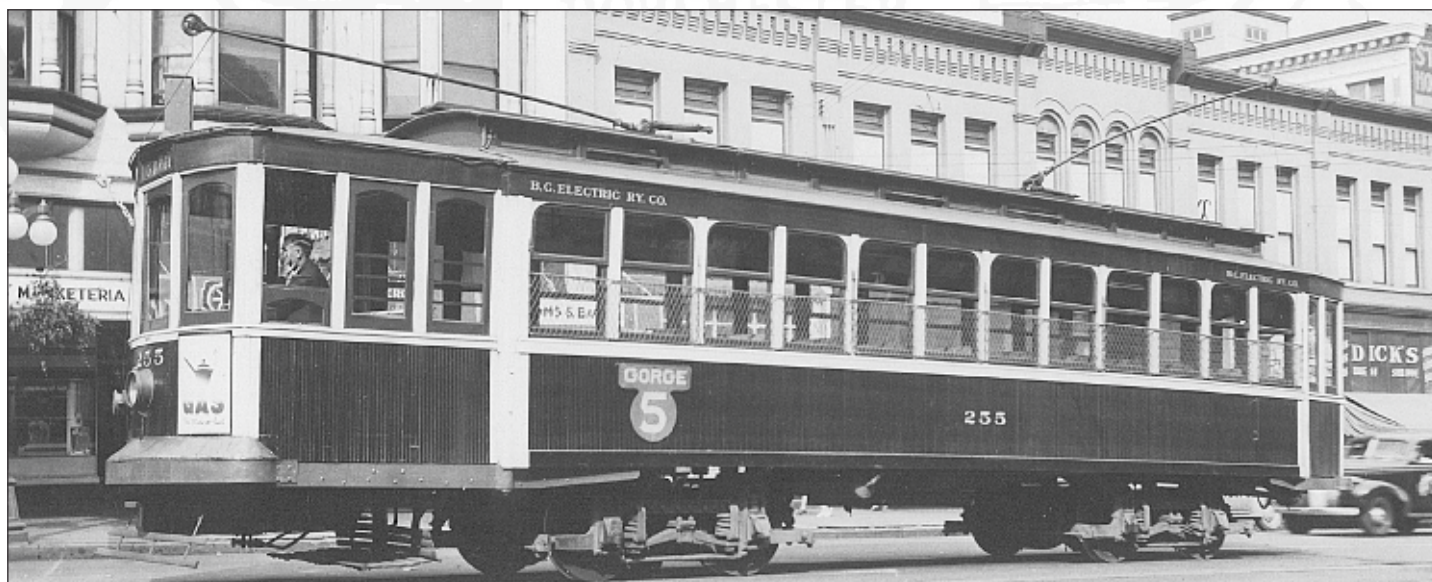
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British Columbia Electric Railway Company Limited

By Henry Ewert

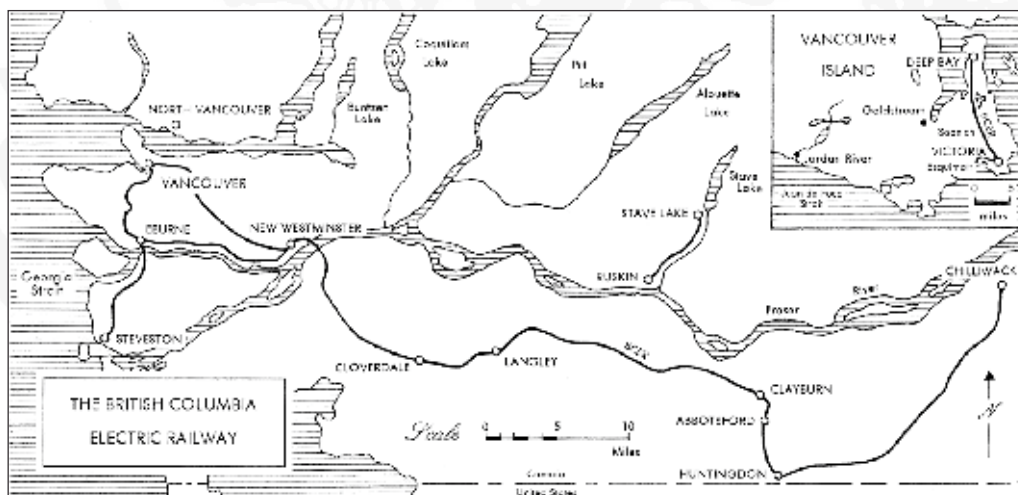
Henry Ewert grew up in Vancouver just two blocks from B. C. Electric's formidable, fabulous, double-decked Mt. Pleasant streetcar barn, a venue which fascinated and drew him from his earliest years. Even though he became a teacher, a degreed pianist, a soccer player and coach, and a lecturer on opera, it was the lure and romance of streetcars and interurbans which never relented. He has written four books on the B. C. Electric, beginning with his first "The Story of the B. C. Electric Company Limited", commissioned for Vancouver's EXPO 86, with yet a fifth currently in preparation.

Naturally, the arrival on May 23, 1887 in Vancouver of Canadian Pacific Railway's first passenger train, from Montreal, propelled British Columbia's three little southwest coast cities into a frenzy of projects and progress. Everything now seemed possible. Victoria's National Electric Tramway and Lighting Company Limited instituted its streetcar service on February 22, 1890; it was the third city in Canada with streetcars (after Windsor and St. Catharines, Ontario). In Vancouver, streetcars began regular service on June 27, 1890 under the aegis of the Vancouver Electric Railway and Light Company Limited, and on October 8, 1891, the Westminster and Vancouver Tramway Company got its streetcars going in New Westminster, as well as its fourteen-mile-long interurban line between New Westminster and Vancouver, Canada's longest interurban line at the time.



Along Victoria's Government Street on June 8, 1940, Birney car 400, one of a set of ten built in 1922, services the No. 2 Cloverdale – Outer Wharf line. Street car service in Victoria was inaugurated in 1890 and would end on July 5, 1948. Fortunately car 400 has survived and is currently in Nelson B.C. CRHA Archives, Fonds Corley.

Le 8 juin 1940, rue Government à Victoria, le Birney no 400, l'un des 10 construits en 1922, desservant la ligne 2 Cloverdale-Outer Wharf. Le service de tramways de Victoria fut inauguré en 1890 et cessa le 5 juillet 1948. Heureusement, le no 400 a survécu et circule maintenant à Nelson C.B. Archives ACHF, Fonds Corley.



Map of the British Columbia Electric Railway interurban lines, the company also operated city streetcar service in Vancouver, North Vancouver, Victoria and New Westminster. On a Streak of Lightning – Electric Railways in Canada by J. Edward Martin, Studio E – now out of print.

Carte du réseau des lignes interurbaines du British Columbia Electric Railways. La compagnie a géré aussi le service de tramways à Vancouver, Vancouver-Nord, Victoria et New Westminster. On a Streak of Lightning-Electric Railways in Canada par J. Edward Martin, Studio E (édition épuisée).

But as excitement gathered, a worldwide depression wreaked havoc on rampant optimism, throwing the three local companies into receivership, Vancouver's first, then New Westminster's, and finally Victoria's, on June 4, 1895. The three moribund companies were gathered together as the Consolidated Railway and Light Company, financed by local and English investors. Purchased by a London syndicate headed by Robert M. Horne-Payne, the Consolidated Company increased its capitalization to \$1, 500, 000 and changed its name to the more concise Consolidated Railway Company.

But then tragedy struck with overwhelming force: on May 26, 1896, Victoria streetcar number 16 was bound for Esquimalt for festivities in honour of Queen Victoria's birthday with 140 passengers and a crew of two. As it crossed badly-maintained Point Ellice Bridge, a section of the bridge gave way, plunging 55 of car 16's riders to their death, in the worst electric railway disaster ever in Canada or the United States.

Thrust into receivership, and massive uncertainty, the new company was resuscitated by the incorporation on April 3, 1897 in London of the British Columbia Electric Railway Company Limited, Horne-Payne the chairman and R. Henry Sperling the general superintendent. With confident, vigorous headiness---and no local capital whatsoever---the street car and interurban systems of the three steadily-growing cities,

Vancouver especially, were undergirded for an early twentieth century of tumultuous, unprecedented development.

In 1903, B. C. Electric commenced building its own streetcars, interurbans, locomotives, work equipment, and freight cars in a shop in New Westminster. During the shop's eleven years of existence, 192 streetcars and interurbans would be outshopped by this award-winning plant. (B. C. Electric would ultimately operate 457 streetcars and 84 interurbans.) B. C. Electric was operating 69 streetcars in 1904, and that year would see it transporting 8,869,486 passengers on its complete three-cities system and one interurban line. Freight was beginning to be a factor, with 6,065 tons hauled during the year.

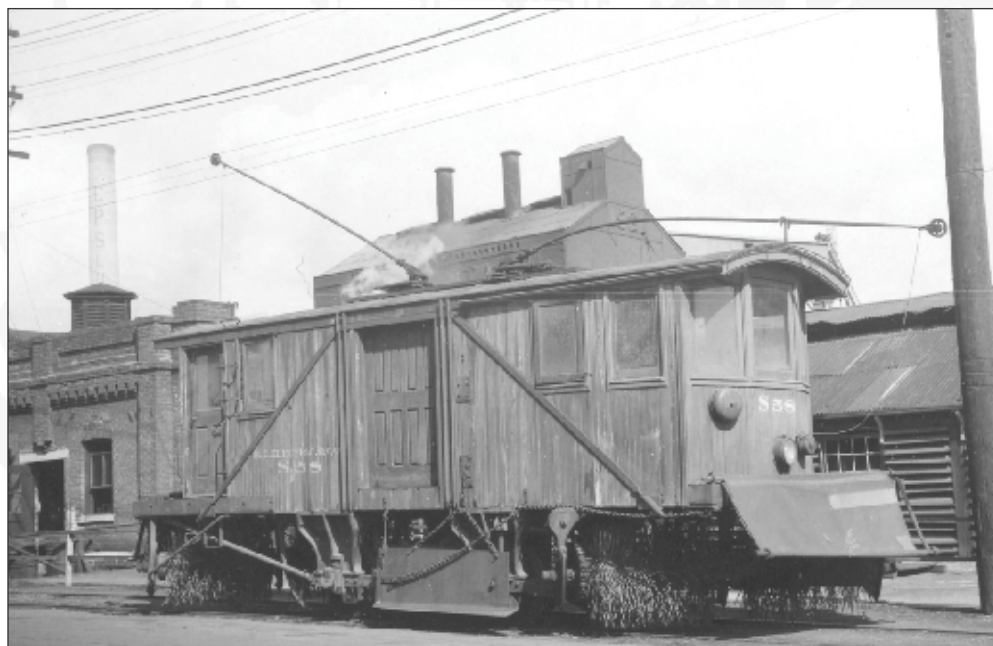
Having leased C. P. R.'s three-year-old Vancouver and Lulu Island Railway, B. C. Electric electrified it and began interurban and freight service in 1905 over its fifteen-mile Vancouver-to-Steveston distance, and in the following year, the company added a fourth city to its roster with the inauguration of streetcar service in North Vancouver.

A third interurban line was built in 1909, by C. P. R.'s V. & L. I. Ry., between Marpole, the mid-point of the Steveston line, and New Westminster, ten miles distant, for immediate lease and electrification by B. C. Electric.

October 4, 1910 brought the company an unsurpassed day of triumph, the beginning of regularly-

scheduled passenger service, and booming freight traffic, on its new, \$3, 500, 000, 64-mile line from New Westminster to Chilliwack, an eastward thrust, but nudging the U. S. Border, which finally opened the southern side of the lower Fraser Valley to settlement and sophisticated communications, and brought electricity. Passenger interurban trains would operate between Vancouver and Chilliwack for the next four decades, three trains each way daily, plus market specials, milk trains, and the like, a distance of slightly more than 76 miles, the longest interurban run ever in Canada.

Less than a year later, the company opened

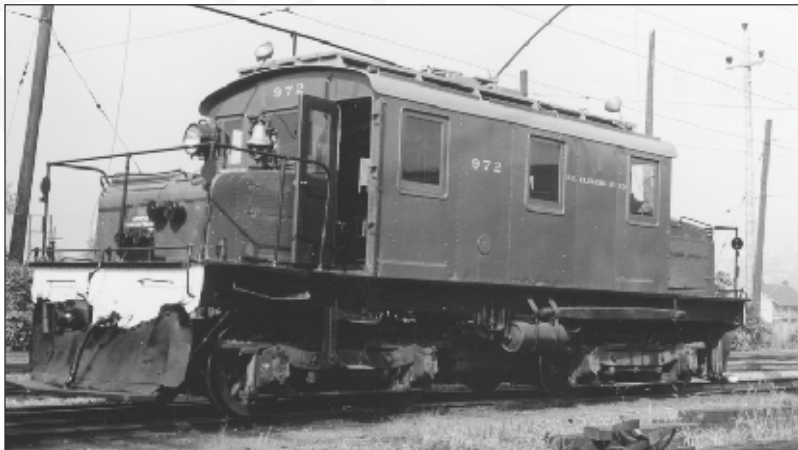


Peter Cox caught sweeper S.58 in Victoria in September 1947. Somehow we think this shot was arranged, sweepers don't have their trolleys up in September! The S.58 was built by Ottawa Car in 1913 and was assigned to the Victoria division. Peter Cox.

Peter Cox a pris ce cliché du balai chasse-neige S.58 à Victoria en septembre 1947. Évidemment on a installé la perche sur le fil aérien pour le besoin de la photo (pas de neige en cette période de l'année). Le S.58 fut construit par l'Ottawa Car en 1913 et assigné à la Division Victoria. Peter Cox.

a much-needed new interurban depot in New Westminster, and in 1912 a splendid B. C. Electric head offices structure and interurban terminal in Vancouver, both city's buildings still in existence today in other uses. During these two years, B. C. Electric's fifth, sixth, and seventh interurban lines were inaugurated, the ten-mile Burnaby Lake line, joining Vancouver and New Westminster street carlines via central Burnaby, in 1911, and in 1912, centered on New Westminster's new depot, the two-mile Fraser Mills line and the similar-length Queensborough line.

Since freight had become a pressing reality on the interurban lines, B. C. Electric constructed the 16th Street freight yard in New Westminster containing 8,488 feet of track in 1913. In the same year, the company opened its eighth interurban line, 23 miles in length, from Victoria north through the Saanich peninsula to Deep Bay. During 1913, B. C. Electric's street cars and interurbans carried 69,639,764 riders and its locomotives hauled 448,750 tons of freight.

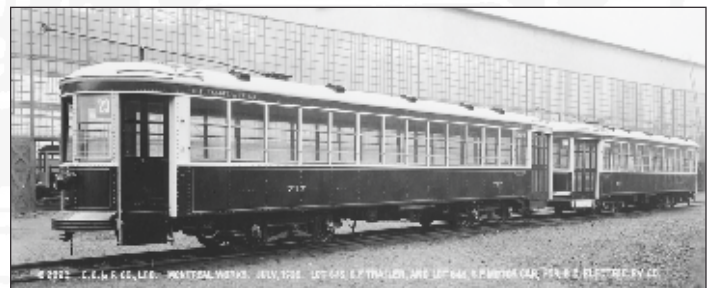


Over the years the BCER counted 27 electric locomotives on its roster including 7 Baldwin–Westinghouse built units. Here we see B-W 972 at New Westminster in September 1953. CRHA Archives, Fonds Corley.

Pendant son existence, le BCER a possédé un parc de 27 locomotives électriques, dont 7 engins Baldwin-Westinghouse. Nous voyons ici la B-W 972 à New Westminster en septembre 1953. Archives ACHF, Fonds Corley.

Built by Canadian Car and Foundry in 1925 and 1926, cars 700-719, ten two-car, multiple unit streetcar sets caused a sensation when they hit Vancouver's streets. In this July 1926 Canadian Car & Foundry view you can see why Vancouverites were indeed impressed with their new streetcars! CRHA Archives, Fonds Canadian Car & Foundry.

Les 10 tramways en tandem, construits par la Canadian Car and Foundry entre 1925 et 1926, firent sensation dans les rues de Vancouver. Photo prise à la CC&F en juillet 1926. Archives ACHF, Fonds Canadian Car & Foundry.



Motor car 714 probably with trailer 715 operates in this mid 1940's view southbound on Main Street, about to cross the Great Northern's original main line into Vancouver. The No. 7 – Fraser line would cease operations in 1948, replaced by Vancouver's first trolley coach line on August 16. CRHA Archives, Fonds Corley.

Le tramway 714 avec probablement la remorque 715, au milieu des années 1940, en direction sud rue Main, se prépare à traverser la voie du Great Northern à Vancouver. La ligne no 7 Fraser a cessé ses opérations en 1948 et fut remplacée par la première ligne de trolleybus le 16 août de la même année. Archives ACHF, Fonds Corley.

Having purchased the Western Power Company of Canada Limited, B. C. Electric electrified its seven-mile railway between Ruskin, on the C. P. R.'s main line, and Stave Falls to the north and offered rudimentary interurban service from 1922 until its abandonment in 1944. Three other hydro development railway lines, but not electrified and freight only, were built and operated by B. C. Electric: the six-mile Jordan River line, 1910 to 1971; the nine-mile Coquitlam Lake line, 1914 to 1931; and the four-mile Alouette Branch railway, 1924 to 1931.

By the end of 1923, Vancouver's streetcar route miles count stood at 62, with two short segments to be added in 1927 and 1928, and three loops to be inaugurated in 1929, 1949 and 1950. New Westminster's system was complete with 15 route miles, North Vancouver's with 10, and Victoria's with 31.

During 1923, B. C. Electric's first city bus service began with Vancouver's Grandview Highway line on March 19, and the company's first intercity bus service, obviously between Vancouver and New Westminster, commenced on May 1, 1924, operated by a B. C. Electric subsidiary, B. C. Rapid Transit. And then---the company's most recently inaugurated interurban line, the Saanich, was abandoned, on November 1, 1924, for want of

adequate patronage. In 1926, Vancouver-to-Chilliwack bus service was instituted by B. C. Electric's subsidiary, and the company's first major streetcar line shutdown, Georgia East, occurred.

When B. C. Electric placed two new bus lines into operation in Vancouver on October 6, 1930, MacDonald and Granville Street South, the company thereby made it abundantly clear that the building of streetcar lines was in the past. Here were two lines that were logical candidates for streetcar operation: they were relatively lengthy, they did not jut into new areas, and they made streetcar connections at either end of their Vancouver services.

Nonetheless, beginning in 1937, the company would over the following nine years completely rebuild 150 of its streetcars: exteriors were modernized, often radically, and interiors were thoroughly refurbished, even including leather-covered foam seats. And more modernization would come with the placing in service of B. C. Electric's PCC streetcar number 400 in 1939, the first of 36, numbered 400 to 435, all assigned to Vancouver.

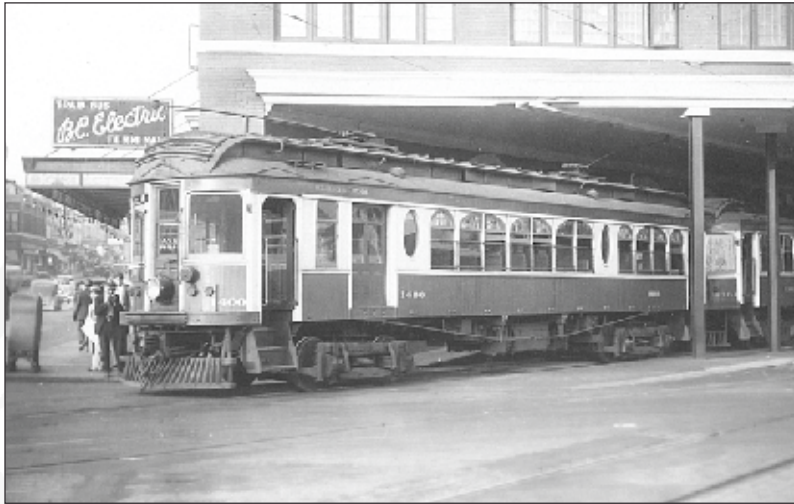
The building of a new bridge across the Fraser

River in 1937 at New Westminster with its invasive exits and approaches in the city, brought an end to interurban services of the Fraser Mills and Queensborough lines, and an end to interurban operation into New Westminster's depot by the Burnaby Lake line, whose terminus was cut back 2.4 miles to Sapperton. The Queensborough line survives, re-worked, as a busy freight operation. New Westminster's last streetcar line would cease operating on December 5, 1938. B. C. Electric after these shutdowns was operating 167.56 track miles of streetcar lines and 168.97 of interurban lines.



Streetcars of North Vancouver's three lines, 1 – Lonsdale, 2 – Lynn Valley, and 3 – Capilano, wait at the foot of Lonsdale Avenue, on the very shore of Burrard Inlet, as ferry passengers from Vancouver stride to their streetcars on a late afternoon in July 1946. The criss-cross on the face of 150 denotes a one man car. Significantly, car 153 to the right is one of only three B.C. Electric streetcars still in existence. Vic Sharman, Henry Ewert collection.

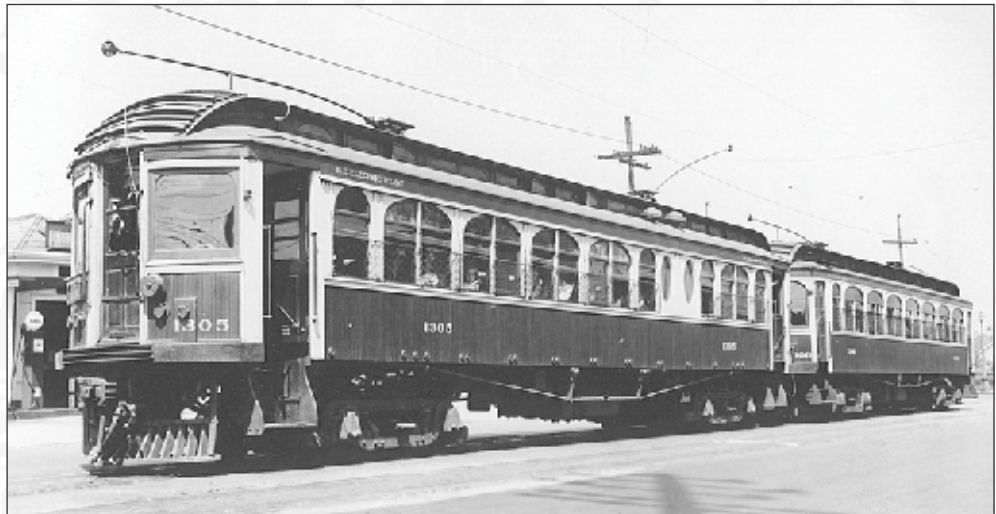
Des tramways des trois lignes de Vancouver-Nord, 1-Lonsdale, 2-Lynn Valley et 3-Capilano, avenue Lonsdale près de la rive de l'anse Burrad, attendent des passagers en provenance du traversier en cette fin d'après-midi de juillet 1946. La croix devant le no 150 indique un tramway à un seul homme. Le tramway no 153 à droite est le seul de la BCER encore existant. Vic Sharman, collection Henry Ewert.



A Vancouver-bound interurban train from Chilliwack waits momentarily at the three-track through depot in New Westminster in 1940. One of three B.C. Electric combines, car 1400 was built by American Car Company, coupled car 1301 by Ottawa Car Company, both in 1910, expressly for Chilliwack line operation. Henry Ewert collection.

Un train interurbain en provenance de Chilliwack et en direction de Vancouver attend au dépôt à trois voies de Westminister en 1940. L'un des trois véhicules combinés du BCER, le no 1400, construit spécialement pour la ligne Chilliwack par l'American Car Company en 1910, est attelé au no 1301 construit par la Ottawa Car Company également en 1910. Collection Henry Ewert.

Two interurban cars built for the Chilliwack line are seen here in operation in 1946 on the Central Park line, on Commercial Drive at Broadway, New Westminster-bound. The first 3.6 miles out from the Vancouver BCER terminal were street-run before taking to the private right-of-way. Car 1305 was built by B.C. Electric in 1911, and car 1306 was one of three (1306-1308) especially handsome G. C. Kuhlman products also 1911. Henry Ewert collection.



Deux véhicules interurbains construits pour la ligne de Chilliwack en service sur la ligne Central Park, rue Commercial Drive à l'intersection de Broadway et en direction de Westminister, en 1946. La voie ferrée partageait la rue sur les premiers 5,8 km à partir du terminus du BCER avant de poursuivre sur une emprise privée. La voiture no 1305 fut construite en 1911 par la BCER tandis que la no 1306 fut l'une des trois voitures (1306-1308) spécialement construites par G. C. Kuhlman également en 1911. Collection Henry Ewert.

As World War II was slowly coming to an end, B. C. Electric announced, on September 30, 1944, its 'Rails-to-Rubber' programme, a multi-million-dollar plan for the elimination of most of its rail passenger services, though there were indications in it that streetcars on main arteries would survive, the older streetcars to be replaced by the extraordinary PCC's. In 1944, B. C. Electric was operating 327.41 track miles, Montreal Tramways 279.34, and the Toronto Transportation Commission 266.88. Its 398 streetcars, of which 133 were one man vehicles, were distributed in the following manner: 11 in North Vancouver, 346 in Vancouver, and 41 in Victoria, including 10 Birneys. Seventy-three interurbans were kept busy on the company's interurban lines.

"Rails-to-Rubber" struck North Vancouver first, with its last streetcar in regular service on April 24, 1947. The programme began in Vancouver six days later as two

major streetcar lines ended service. In the early morning of July 4, 1948, operations ceased on the last of Victoria's streetcar lines. However, electric transit of a different kind was instituted by B. C. Electric on August 16, 1948 with its first trolley coach line, Vancouver's 'Fraser-Cambie.'

By January 1950, 24.35 route miles of Vancouver's streetcar operations had been abandoned and only eight streetcar lines remained. On B. C. Electric's complete system, 225 streetcars, 73 interurbans, 168 trolley coaches, and 381 city and 105 intercity busses were in daily operation. During 1950, B. C. Electric's streetcars, interurbans, trolley coaches, and busses transported 148, 746, 411 riders, and its locomotives hauled 952, 784 tons of freight, connecting with the C. N. R., C. P. R., Great Northern, Milwaukee Road, and Northern Pacific.



Curved sider car 88 was a 1917 home built product that seated 41 passengers. It was 43' 4" long and weighted 46,300 pounds. It is seen here plying the Dunbar 14 route, note the ad for Rat Portage wood and coal! CRHA Archives, Folds Corley.

Le tramway à flancs recourbés no 88 construit par le BCER en 1917 pouvait accueillir 41 passagers. Il avait une longueur de 13,1 mètres et un poids de 20,998 kg. On le voit ici sur la ligne 14 Dunbar. À noter l'affiche publicitaire "Rat Portage wood and coal"! Archives ACHF, Fonds Corley.



B.C. Electric's observation streetcars graced many a post card, here car 124 with 'Teddy' Lyons conductor posed for Harry Bulein photographer. Michael Leduc collection.

Le tramway observatoire du BCER a illustré beaucoup de cartes postales. Ici, la voiture no 124 avec son contrôleur, « Teddy » Lyons, pose pour le photographe Harry Bulein. Collection Michael Leduc.

Observation streetcars 123 and 124 worked their last day on Sunday, September 17, 1950, there being too few streetcar lines left to form a viable routing. Just two weeks later, on October 1, the very last interurban to operate on the Chilliwack line, car 1304, closed passenger service on the line, almost forty years after its opening. (Car 1304 rests today in Surrey, B. C. under the care of the Fraser Valley Heritage Railway Society, awaiting restoration.) The Chilliwack line today is still a vigorous mover of freight, operated by Southern Railway of British Columbia.

The next interurban line to shut down was the well-patronized, double-tracked Vancouver-to-Marpole line, 6.9 miles, on June 18, 1952, replaced by a bizarre new trolley coach line that ended in a loop one mile short of Marpole and didn't even come close to covering the same territory in the interurbans' time.

October 23, 1953 marked the cessation of service on, and the complete abandonment of, the Burnaby Lake interurban line, as well as the end of passenger service on the 6.7 miles of the Central Park interurban line between Vancouver's eastern boundary and New Westminster. Then, in the early morning of July 16, 1954, interurban service ended on the remaining Vancouver end of the Central Park line, and the first 4.1 miles of track at the Vancouver end were abandoned. (After 62 years of interurban service between Vancouver and New Westminster, there would be a hiatus of more than 32 years before a new type of interurban service began between the two cities on January 3, 1986 with 'SkyTrain,' following the identical route but largely elevated.)

Almost eleven years after 'Rails-to-Rubber' had been decreed, it was the appointed time for the end of B. C. Electric's last streetcar line, No. 14 'Hastings East,' with PCC car 424 in the early morning of April 22, 1955; Vyv Saundry was the motorman and Jung Sing was the last passenger. On Sunday, April 24, 'Rails-to-Rubber' Day, 29 of the PCCs gave free rides all along the No. 14 line from 1 to 5 p.m.; car 415 was the very last car to operate. All 36 PCCs were scrapped locally.

Two interurban lines were left, Marpole-Steveston and Marpole-New Westminster, and the hourly service on the latter came to a conclusion with the closing out of passenger service on November 18, 1956, thereby ending 65 years of interurban service in New Westminster and Burnaby, the municipality---now city---sandwiched between Vancouver and New Westminster.

Interurbans ran for the last time between Marpole and Steveston on February 28, 1958. The last run, with car 1225, left Steveston at 1 a.m., Lawrence Love, conductor, and Bert Hall, motorman, along with a standing room only host of last-timers, including this writer. Two special interurban trains, 1231 and 1222, and 1208 and 1207, brought specially invited guests to a 'last ceremonial run' luncheon at 12:15 p.m. half way along the line to Steveston in the hall of Brighthouse United Church, signalling the end of rail passenger service by B. C. Electric.

In freight operations still today, under C. P. R. management, is the Marpole-New Westminster line, as well as a short stretch from Marpole of the Steveston line. In addition, as noted above, the New Westminster-Chilliwack line still flourishes, as does the almost completely rerouted Queensborough line, operated by Southern Railway of British Columbia.

On B. C. Electric's freight only former South Shore line along Vancouver's False Creek, the Transit Museum Society's Downtown Historic Railway has made possible a tourist operation featuring brilliantly restored interurbans 1207 and 1231, the former built in 1905 by B. C. Electric, the latter, the very last interurban to roll over B. C. Electric rails, in 1913 by St. Louis Car Company.

Other extant B. C. Electric interurbans include 1220, 1223, 1225, and previously noted 1304, all in the Vancouver area, and 1235 at the Canada Museum of Science and Technology in Ottawa. Only three street cars survive: single truck 53 in the Spaghetti Factory Restaurant in Vancouver; 153 in North Vancouver; and Birney 400 in Nelson, B. C., and snowplow S. 103 at the Puget Sound Railway Historical Association's compound near Snoqualmie Falls, Washington.



BCER PCC 402 operating on route 14, Hastings East on July 8, 1954. The BCER had 36 PCC's (400 to 435) built between 1938 and 1945, car 402 was built by St. Louis Car Company and assembled by Canadian Car and Foundry in Montreal in 1940. Stan Styles, GTC Collectibles BCE-402-1.

Le PCC no 402 de la BCER sur la ligne 14, Hastings East, le 8 juillet 1954. Le BCER a possédé 36 PCC (no 400 à 435) construits entre 1938 et 1945. Le no. 402 fut construit par la St. Louis Car Company et assemblé par la Canadian Car & Foundry de Montréal (Lachine) en 1940. Stan Styles, GTC Collectibles, BCE-402-1.

The Early Horse-Powered Mining Railways of Cape Breton

by Herb MacDonald

Introduction

My article on the Albion Mines Railway in Canadian Rail # 474 included brief references to the introduction of horse-powered railways by the General Mining Association [GMA] in both Pictou County and Cape Breton at the beginning of the 1830s. This article examines the horse-powered era in Cape Breton,¹ a product of the GMA's adoption of the mine waggonway which had become a core component of the coal transport system in Britain (Fig.1).² GMA records usually referred to the firm's early rail lines using the British 'waggonway' with its double-g and I have retained that term, except in quotations, throughout the article. Original Imperial measures of weights and distances and currency references in Sterling are used throughout.

This drawing, believed to be of the Willington waggonway approaching the north bank of the river Tyne, symbolizes the mine railways that had evolved in British coal fields over the previous 200 years.² The wagon is fairly representative of those used in northeast England though when compared with Figs. 4 and 5 several things stand out. The back of the wagon here is vertical, not sloped, and its sides likewise seem to be vertical. This wagon also appears a bit higher than most 'Newcastle chaldrons.' These details may reflect artistic license or may illustrate the variations in wagon design, rails, track construction and gauge that existed from one line to another. The prominent hand brake and the combination of flanged iron wheels with edge rails illustrate northeast England norms of 1820. The nature of the track is unclear but the fill between the rails to protect the horses suggests use of stone blocks to carry the rails. The two wharves with wagons in the left background reflect the extensive use of waggonways in the northeast. By this time, mines in Northumberland and Durham operated many hundreds of miles of horse-powered rail lines running to shipping wharves on the coast and the banks of the Tyne, Wear, and Tees rivers. North of England Institute of Mining and Mechanical Engineers Collection, Northumberland County Record Office, Newcastle upon Tyne.

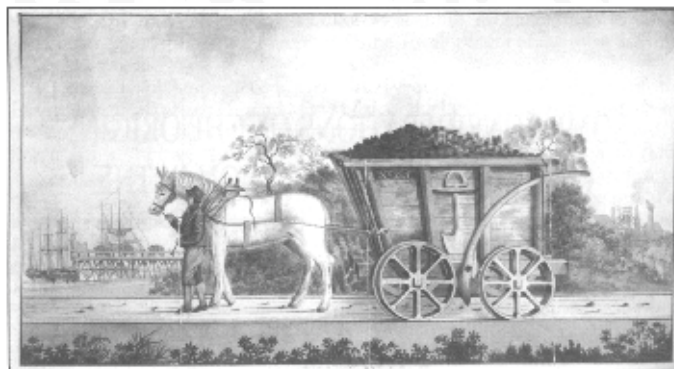


Fig. 1: A North England Waggonway, c. 1820

This drawing, believed to be of the Willington waggonway approaching the north bank of the river Tyne, symbolizes the mine railways that had evolved in British coal fields over the previous 200 years.² The wagon is fairly representative of those used in northeast England though when compared with Figs. 4 and 5 several things stand out. The back of the wagon here is vertical, not sloped, and its sides likewise seem to be vertical. This wagon also appears a bit higher than most 'Newcastle chaldrons.' These details may reflect artistic license or may illustrate the variations in wagon design, rails, track construction and gauge that existed from one line to another. The prominent hand brake and the combination of flanged iron wheels with edge rails illustrate northeast England norms of 1820. The nature of the track is unclear but the fill between the rails to protect the horses suggests use of stone blocks to carry the rails. The two wharves with wagons in the left background reflect the extensive use of waggonways in the northeast. By this time, mines in Northumberland and Durham operated many hundreds of miles of horse-powered rail lines running to shipping wharves on the coast and the banks of the Tyne, Wear, and Tees rivers. North of England Institute of Mining and Mechanical Engineers Collection, Northumberland County Record Office, Newcastle upon Tyne.

Cette gravure semble illustrer un wagonnet de Willington s'approchant de la rive nord de la rivière Tyne. Elle représente l'évolution des voies ferrées des mines dans les houillères d'il y a 200 ans¹. Ce wagonnet est une représentation fidèle de ceux utilisés dans le nord-est de l'Angleterre. Lorsqu'on le compare avec ceux des figures 4 et 5, plusieurs éléments ressortent. L'arrière du wagon est vertical et non incliné, les côtés aussi semblent verticaux. Il est aussi un peu plus élevé que la majorité des « chaldrons de Newcastle » (standard). Ces détails sont peut-être des interprétations artistiques, ou alors, ils illustrent les variations du design, des rails, de la construction et de l'écartement des voies, qui différaient d'une ligne à une autre. Les normes anglaises de 1820 sont traduites par la proéminence du levier de frein, par les roues de fer à boudins et par le rebord des rails. Les caractéristiques de la voie ferrée ne sont pas précisées, mais il semble que la pierre ait été utilisée pour remplir l'espace entre les rails afin de protéger les chevaux. Les deux quais et les wagonnets en arrière-plan indiquent une grande utilisation de ces voies dans le nord-est du pays. À cette époque, les mines de Northumberland et de Durham exploitaient plusieurs centaines de kilomètres de lignes ferroviaires hippomobiles pour expédier leurs produits vers les quais sur les rives des rivières Tyne, Wear et Tees. Collection du North of England Institute of Mining and Mechanical Engineers, Bureau des données de la région du Northumberland, Newcastle sur Tyne.

1. The only published references to the GMA waggonways which warrant mention are two articles by Robert R. Brown: 'Railroads of the General Mining Association,' *Bulletin of Canadian Railroad Historical Association*, # 6-7, 1938; and 'Canada's Earliest Railway Lines,' *Bulletin of the Railway & Locomotive Historical Society*, # 78, October, 1949. An unpublished study, 'Mine and Industrial Railways in Cape Breton,' 1956, provides some extension of Brown's earlier articles. His efforts were a work in progress over two decades but problems persisted because he did not have access to the GMA papers that are now available or the related documents found more recently in England. The few references to the waggonways that have appeared since the 1950s have all been based on Brown's work and inherited the problems contained within it. The waggonway era is generally ignored in Canadian railway history where a 'railway' is usually assumed to involve locomotive power. A good example from a Nova Scotian perspective is SE Woods, *Cinders & Saltwater: The Story of Atlantic Canada's Railways*, Halifax: Nimbus Publishing, 1992. Woods grants thirteen lines of text to the pre-locomotive period in Nova Scotia.

2. For background on the development of British waggonways from the 1600s to the early 1800s, the definitive study is still Michael Lewis, *Early Wooden Railways*, London: Routledge, 1970. Another valuable work is Bertram Baxter, *Stone Blocks and Iron Rails*, Newton Abbot: David & Charles, 1966. An early start on the subject was made by Dendy Marshall in his *History of British Railways Down To The Year 1830*, Oxford University Press, 1938. A concise review, more easily found in Canada, is in Michael Flinn, *The History of the British Coal Industry*, vol 2, 1700-1830, Oxford: Clarendon Press, 1984; see chapter 5, 'The Transport of Coal.'

The footnotes are numerous and sometimes lengthy but I make no apologies for them. When breaking new ground, it is important to indicate the basis for what is presented. When that content includes an extensive array of speculations as well as many unanswered questions, it is even more important to provide details that could assist future researchers who might explore the challenges that remain. Where potentially useful to those researchers, the notes also include references to missing documentation and potential sources of answers to the questions that still exist.³

The Sydney Mines ‘Temporary Railway,’ 1830-35

Sydney Mines⁴ was always the most important of the GMA mine sites on Cape Breton Island. An 1871 book by Richard Brown⁵ (Fig. 2) – the first GMA manager there who spent almost 40 years in that position – provides a brief overview of the beginning of serious activity once legal problems regarding the company’s mineral rights in Cape Breton were resolved in 1829. A 200 ft shaft was sunk at Sydney Mines in 1829-30 and two steam engines installed for pumping and winding. A new wharf and a ‘light temporary railway’ were also built, though Brown failed to note precisely when or provide any detail about the rail line. He recorded the opening of a second shaft in 1834, this one 320 ft deep, and construction of another wharf. A second waggonway, designed to replace the temporary line, connected both pits to the new wharf, though again Brown provided few details. Brown’s omissions and the absence of local newspaper coverage of the early years of GMA activity in Cape Breton leave us dependent on the limited supply of remaining primary documents.⁶

One important early source from England is a letter, probably from Brown, to the GMA head office in

London. Dated 15 January 1830 and quoted later that year in the *Quarterly Mining Review* [QMR]⁷, it stated that work on the temporary waggonway had begun before the end of 1829. The letter reported, ‘The line of rail-way from the pit to the wharf has been surveyed and leveled, the length of which is 1560 yards.’ The new wharf was recorded as ‘built up to the required height, viz 12 feet above high water to the extent of 160 feet, which was as far as could be done that season.’

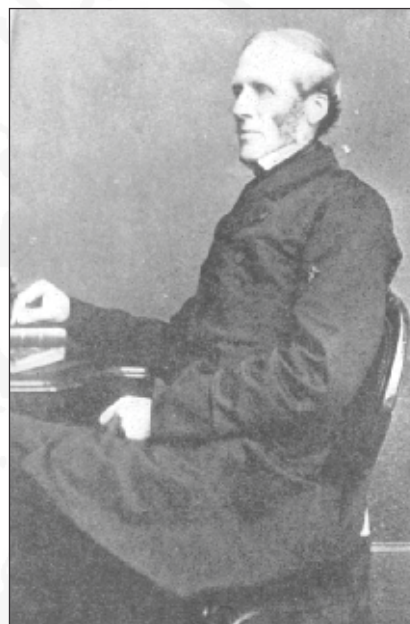


Fig. 2: Richard Brown, the First GMA Manager in Cape Breton

C W Vernon, *Cape Breton at the Turn of the 20th Century*, Toronto: Nation Publishing, 1902, p 16

3. Suggestion that missing material may appear may seem overly optimistic but there is a basis for optimism. Since the publication of my article on the *Albion Railway* in 2000, a number of interesting things relevant to GMA railways in Nova Scotia have unexpectedly emerged from obscurity including a collection of nearly 50 letters from Richard Smith, the first GMA manager in Pictou County; an English drawing of the locomotive *John Buddle* made before its shipment to Pictou County in 1839 (and probably the earliest illustration of a locomotive that operated in Canada); newspaper accounts from both Nova Scotia and England to answer the question about when the GMA introduced the first two locomotives in Cape Breton (see note # 55); and long-forgotten photos of Stephenson and John Bridge, the third and fourth GMA locomotives used at Sydney Mines. (The drawing of the *Buddle* and the two photos will appear in articles in preparation for future issues of *Canadian Rail*.)
4. While modern-day Sydney Mines was the location of the original colliery and wharf plus the first waggonway, the second wharf and the wharf end of the second waggonway were in what is now North Sydney. During the era covered in this article, the entire ‘northside’ of Sydney Harbour was usually referred to by the GMA as ‘Sydney Mines’ and I have retained that usage.
5. *The Coal Fields and Coal Trade of the Island of Cape Breton*, London: Samson, Low, Marston, Low & Searle, 1871.
6. The critical source is the collection of GMA papers from Cape Breton at the Beaton Institute, Cape Breton University, Sydney, series MG 14,19 [hereafter BI, GMA papers]. This collection is extensive but far from complete. Many documents that could shed much more light on the GMA’s early railways are still missing.
7. *Quarterly Mining Review* [QMR], vol 1, no 3, September, 1830, p 347. The first four issues of this London journal have extensive coverage of GMA activity in both Nova Scotia and South America and I am indebted to Michael Lewis for alerting me to their content. For reason(s) unknown, the flow of GMA information through QMR was cut off at the end of 1830 and nothing more about the company appeared during the rest of this journal’s publishing life which ended in 1835. For a Canadian, the closest known complete set of QMR is in the Science Museum’s Historical Collection now at Imperial College Library in London. The location of this material is highly appropriate. Just across Exhibition Road is the Victoria & Albert Museum with the largest public collection of work in gold & silver made by Rundell, Bridge & Rundell – the original source of the core of the GMA’s capital base. When QMR ceased publishing in 1835, the *Mining Journal* [MJ] became the coal industry’s journal of record. A recently developed search engine for MJ on the website of the North of England Institute of Mining and Mechanical Engineers < <http://www.mininginstitute.org.uk/tools/jsearchv2.php> > shows a vast array of references to the GMA and Sydney Mines in that journal over the period 1835-1860. I have not had an opportunity to examine the journal in England and those early issues could prove valuable to future researchers.

Among the questions that remain unanswered are when the decision to build that first rail line was made and whether that decision was made in London or in Cape Breton⁸. Also unknown are when this temporary line was completed or when it went into service. From a Nova Scotian perspective, it would also be interesting to know if construction of the first Sydney Mines line began before or after work started on the first waggonway at Albion Mines in Pictou County⁹ and to establish which went into service first. These have also proved impossible to resolve, though it seems likely that both lines were being used before the end of 1830.

Few engineering details about the temporary Sydney Mines line have been found. Brown refers to it as a 'light railway,' a description that raises questions about the rails and where they were made.

A tantalizing reference in the letter of 15 January 1830 in QMR noted the 'rails &c. it was intended to manufacture at the Albion Mines foundry.' Intention is one thing, but rail manufacturing is something else. Contemporary press references indicate the Albion Mines waggonway was built with iron rail, but there are nagging uncertainties about its origin(s). As a native of Pictou County, I would like to accept the claim that rails

were made there in 1829-30, because this would have been a North American 'first.' Various sources in Canada and beyond have accepted the reliability of that claim but, as a result of conflicting evidence, I regard it as unproved.¹⁰

Similarly, there is no evidence to confirm the precise source of either the first rails laid – or the later ones – at Sydney Mines. The earliest reference found to rails that may have gone from the Albion Mines to Cape Breton is a request for shipment of 'old rails' dating from mid-1833,¹¹ though this was without any indication of where they were to be used. From the beginning of that same year come the first limited details about British rails for Cape Breton. Letters from Richard Brown¹² to Belcher & Co in Halifax, and William Fairclough of Liverpool, confirm the arrival on 9 January 1833 of the brig Mary Anne from Liverpool with 200 tons of 'Railway Iron for the Sydney Mines.' Brown's letters unfortunately fail to offer information about the manufacturer or specifications of the rails. The intended use of this cargo is also uncertain, though the timing and size of the shipment suggest it was for the waggonway built at Bridgeport later that year rather than for use at Sydney Mines.

8. Among the most significant GMA records which appear lost is most of the correspondence between Sydney Mines and head office in London. No part of this run of records is found in the BI collection. Pursuit of the head office papers at logical locations in London such as the Guildhall Archives, the British Library, the London Metropolitan Archives, the archival directories at the Royal Commission on Historical Manuscripts, and the National Archives at Kew has been to no avail. Despite the absence of papers at the time of writing (save for the 1829 Deed of Settlement at the Guildhall referred to in note # 17 below), any one of these sites would be logical sources for future acquisitions of GMA papers or knowledge of their existence elsewhere.
9. The beginning of work on the waggonways at the two sites was close to simultaneous. At Albion Mines, the first 200 yards of rails were laid at the end of April, 1830 indicating that work on the roadbed had started very early that year if not before the end of 1829; QMR, vol 1, no 3, September, 1830, p 348. Unfortunately the letter that reported the date included no details about the source or specifications of the rails.
10. One key basis for this claim was a report in *The Colonial Patriot* (Pictou, NS), 28 January 1829, that 'railways (rails) are now casting and will be ready for laying down in the spring.' However, the QMR letter referred to in note # 9 indicates no rails were laid for over a year after the Patriot report. This raises the question, why not? Was the delay the result of quality or production problems? If so, were they resolved or was the idea of local manufacture abandoned? The answers to these are unknown but if the Patriot's 'now casting' is taken seriously, the possible appearance of some major production problem must also be taken seriously. The Patriot and QMR indications of intent to manufacture rails at Albion Mines must also be seen in the light of an earlier press report. The *Novascotian* (Halifax, NS), 18 October 1827, less than five months after the arrival of the first GMA contingent in Pictou County, stated that 'the materials for a rail-road are also in the possession of Mr. Smith at Pictou.' Had Smith brought any railway material from England in 1827, the most likely components would have been the iron work – wheel sets, chairs, and rails. On 21 July 1830, *The Novascotian* reported within Joe Howe's note about the Albion Mines waggonway, 'all the iron materials for it having been cast at the Establishment...' While this sounds definitive, Howe's report went on to comment on the limited activity and success at the foundry where there had been high plans but no output 'except for the bars for the railway' and a few other items. These two segments from Howe are not fully compatible and raise the question of what was meant by the 'bars for the railway.' These press references must be considered in the context of two other sources. In 1894, HS Poole published an account of foundry activity that obviously was based on original GMA documents. Here one would expect to find details about rail manufacturing, if such had actually taken place, but there is no reference to the production of rails; see 'Iron Making in Nova Scotia Early in the Century,' *Transactions of the Mining Society of Nova Scotia*, 1893-94, vol II, part II, pp 144-52. The evidence from Cape Breton, despite its limitations, also seems relevant. As will be seen in the text, it appears that the original 1830 right of way at Sydney Mines was built with 15-foot rolled rails, specifications that indicate British manufacture. Given the apparent expectation in 1830 of higher output at Albion Mines than at Sydney Mines, something reflected in the use of Winchester wagons on the Albion Mines waggonway, twice the size of those first used at Sydney Mines, it seems improbable that the GMA would have laid lower quality, locally manufactured rail in Pictou County. Though cost considerations could have theoretically played a role in the decision, at this time the company was flush with cash and committed to a capital-intensive approach to developing its properties. With the uncertainties and inconsistencies here, I believe my "unproved" conclusion is warranted until more definitive evidence is found - if it is ever found.
11. BI, GMA papers, D-8-a, Manager's Letter Book, 1827-1833, R Smith to J Smith, 12 June 1833; a follow-up letter on 18 June requested the addition of any old chairs available to any shipment of rails.
12. BI, GMA papers, D-8-a, Manager's Letter Book, 1827-1833, R Brown to Belcher & Co, Halifax, NS, 6 January 1833, and to William Fairclough, Liverpool, 12 January 1833. The Belcher firm was the GMA shipping agent in Halifax where they had been merchants for Cape Breton coal for over 35 years prior to the arrival of the GMA in Nova Scotia. Andrew Belcher, then resident in England, was a member of the GMA Board in 1829. On Belcher, see David Sutherland's biography in *Dictionary of Canadian Biography* [DCB], vol IX, 1976. William Fairclough was owner of the Mary Anne, probably the GMA shipping agent in Liverpool, and possibly a GMA shareholder. His name appears a number of times in correspondence about cargos shipped out of Liverpool.

The 1837 Sydney Mines Stock Book,¹³ the earliest surviving GMA inventory record from Cape Breton, reports the presence of over seventy-five tons of 'light rails' in 15-foot lengths. These were classed as 'loose' stock and further described as 'malleable iron,' ie they were rolled rails. This fact, plus their 15-foot length, indicates they were of British origin. They may have been new stock for future use but, given the fact that there was no obvious short-term need for such a stock, I suspect they were old rails that had come from the temporary line.¹⁴ This hypothesis plus the British origin of the Mary Anne's cargo seem to indicate the Albion Mines foundry could not supply rail in any significant quantity and increases my doubt that it was ever the source of new rail, whether for Cape Breton or Pictou County.

Little has been found about operations on the temporary Sydney Mines waggonway, though the 1837 Stock Book's record of old wagons shows the wagon size was ½ Winchester chaldron.¹⁵ More than two years after abandonment of this line, the company inventory showed twenty-two of the first wagons still operational plus an additional twenty-nine similar wagon bodies without wheels. There is no basis, however, for speculating about whether the original wagon complement was much in excess of that fifty-one. The 1837 inventory also records an 'old incline wheel' located 'near the old wharf,' suggesting use of an incline of some type there – a point

that will be addressed below. The terrain, with a steep slope that dropped about fifty feet down to the shoreline, certainly required one if wagons were moved down to the wharf.¹⁶ There is no basis for drawing any other conclusions about the line's structure or operation though it is possible to calculate estimates of traffic. These will be considered below along with an analysis of traffic on the second waggonway.

A Second Waggonway For Sydney Mines

By 1833, a major expansion at Sydney Mines was being planned. It involved a second mine called Biggs Main, a new wharf, and a new waggonway to link the new pit as well as the older Sydney Main colliery to the new wharf. That summer, J. B. Foord, Secretary to the GMA Board of Directors, and Thomas Bigge, a member of the Rundell family, one of the largest GMA shareholders, and an important member of the Board,¹⁷ came to Cape Breton.¹⁸ Preliminary decisions about locations for the new wharf and waggonway had been made and work had begun on both before the arrival of Foord and Bigge. Arrival of a large shipment of chairs in September of 1833¹⁹ suggests the original objective had likely been to start laying track before the end of that year. However, the presence of the visitors from head office seems to indicate concern about some aspect of the new projects. This conclusion is supported by Foord's return to Sydney

13. BI, GMA papers, B-1-k; detail in the 1837 Stock Book is extended by the content of the 1838 volume, BI, GMA papers, B-4.

14. Assuming a weight of no more than 30 pounds per yard, this 'light rail' inventory is compatible with the 1,560 yards reported in the QMR letter of 15 January 1830 if provision is made for additional trackage in sidings and on the wharf. The 1837 Stock Book entry was not carried forward to 1838. I speculate this indicates the rails went into use in one of the pits, something that further suggests these were old rails, the only logical source of which would have been leftovers from the original waggonway.

15. The Winchester chaldron was equal to half a Newcastle chaldron. Though both were primarily measures of volume rather than weight, a 'Newcastle wagon' carried about 5,900 pounds and the original Sydney Mines ½ Winchester wagons about 1,475 pounds. GMA reports to the Nova Scotia government relating to sales, the base for royalties payable, used the Newcastle measure. For internal purposes, the company used the Winchester chaldron as its standard unit of account. Use of the Newcastle measure for royalties was negotiated with the British government and the agreement was regarded by the Nova Scotia government as a case of 'sharp dealing' since pre-GMA royalties had been paid to Halifax based on the Winchester measure. On the origin of this and other legal and political disputes between the GMA and the government in Halifax, see Del Muijs, 'The General Mining Association and Nova Scotia's Coal, Bulletin of Canadian Studies, Autumn, 1983, pp 71-87.

16. Richard Brown's 1871 book includes a fold-out engraving showing the shoreline of the north side of Sydney harbour. It illustrates the topography which dictated use of an incline if the wagons were brought down to the first wharf.

17. Board membership plus a detailed list of shareholders and their holdings as at April of 1829 are in the GMA 'Deed of Settlement,' Guildhall Archives, London [GA], ms 24,532. Members of the Rundell and Bridge families and others associated with their goldsmithing firm held about 45% of GMA shares at that time. Thomas Bigge was a first cousin of Edmund Rundell, the GMA Chairman. Reference in my paper on the Albion Mines Railway to Rundell, Bridge & Rundell as a 'notable firm' has been found to be a considerable understatement. After completion of that paper, one later stop in my ongoing pursuit of GMA documents was at Goldsmiths' Hall Library in London where a number of secondary works on the goldsmithing partnership were found. One of the most valuable is an article by John Culme, an authority on Regency gold and silver, which refers to the Rundell firm as 'the most celebrated of its kind in the history of the British goldsmiths' trade.' See 'A Devoted Attention to Business: An Obituary of Philip Rundell,' *Silver Society Journal*, Winter, 1991, pp 91-102.

18. BI, GMA papers, D-8-a, Manager's Letter Book, 1827-1833, R Smith to J Smith, 12 June 1833.

19. BI, GMA papers, D-9-a, Richard Smith Correspondence, 1831-33, #s 94-96, Belcher & Co, Halifax, to R Smith, 10 August, 12 August, and 3 September 1833. The letters report arrival in Halifax of over 2,800 chairs, enough for more than three quarters of a running mile of track. Unfortunately the shipment also included '70 iron bars' within its total identified weight of 56 tons. As a result, it is impossible to determine a unit weight for the chairs. If, for the sake of guesswork, we assume the "bars" might have weighed as much as half a ton each, the chairs would have been about 14 pounds each, comparable to the weight then in use on British main lines and compatible with chair weights reported in the 1838 Sydney Mines Stock Book. William Fairclough was noted as UK agent for this cargo which had sailed out of Liverpool. While I have interpreted these letters as referring to chairs for the waggonway, it is possible that the 'tram plates' were in fact platelay rails intended for use in one of the mines. The term 'tram plate' appears to have had dual meanings at this time.

Mines in January of 1834²⁰ and the fact that by this time the Board had engaged the services of two high-profile British consultants, Thomas Telford and John Buddle.²¹ Both would be ‘armchair’ consultants; neither crossed the Atlantic to view the site in person.

Telford’s role was limited to a review of plans for location and construction of a breakwater to protect the new wharf from winter storms and ice.²² Buddle was charged with assessing the plans for underground operations in Biggs Main²³ as well as the plans for the new wagonway. His responses were contained in two reports, each about twenty pages in length.²⁴ The ‘Railway Report’ and associated correspondence provide considerable evidence about the successor to the temporary wagonway.²⁵

Buddle had been provided with an array of maps and documents though these unfortunately have not survived within his papers. When completing his ‘Railway Report,’ he was assisted by Daniel Hoard who had travelled early in 1834 from Sydney Mines to Buddle’s home in Wallsend, Northumberland, England. It is

uncertain whether Hoard had been engaged by the GMA or if he had been recruited by Buddle to do fieldwork in Cape Breton. I suspect he was Buddle’s own ‘man on the spot’, though I cannot account for his selection because of the dubious reputation he would likely have carried as far as the GMA Directors were concerned.²⁶

The initial location chosen by the GMA for the new wharf was four miles further inside the harbour than the original one²⁷ with a resulting length of about 4½ miles for the new wagonway’s main line.²⁸ Buddle knew work had begun on both and assumed that the locations were set. He also assumed the line needed a capacity of 100,000 Newcastle chadrons per year.²⁹ These assumptions had an impact on some of his recommendations which included:

- using locomotives because of the projected 4½ mile length of the main line;
- 40 pound per yard malleable iron rail on 14 lb chairs to be set on ties supported by 2 feet by 2 feet by 1 foot stone blocks (Fig. 3);

20. *The Cape-Bretonian and General Reporter* (Sydney, NS), 25 January 1834. This weekly published at least 60 issues during 1833-34 though copies of only eight issues have survived. These are at the Public Archives of Nova Scotia, Halifax [PANS], microfilm # 8506. The timing of Foord’s second trip suggests a sense of urgency since a winter voyage would have been much more dangerous.

21. See my paper in *Canadian Rail*, #474, regarding Buddle’s role in the construction of the Albion Railway. For a wider perspective on Buddle, see *Dictionary of National Biography*, London: 1886, vol VII, pp 222-23. Flinn, 1984, contains numerous references to Buddle in the contexts of transportation, engineering, and colliery management. On Buddle’s influence on railways, see the papers by Andy Guy and Jim Rees included within the volume, *Early Railways*, London: The Newcomen Society, 2001, which they edited. The only accessible copy known in Canada is at the Robarts Library at the University of Toronto (from where it is available on inter-library loan).

22. PANS, Mines & Minerals papers, RG 21A, vol 39, no 32, George Duval (GMA, London) to John Buddle, 12 March 1834. Telford’s diary for this period is in the collection of the Institution of Civil Engineers in London. A review of the diary by Mike Chrimes, Chief Librarian at ICE, indicates Telford invoiced the GMA for seven days of work for the breakwater study.

23. The new mine was called ‘Biggs Main’ in the 1837 and 1838 Stock Books and obviously named after Thomas Bigge despite the missing ‘e.’ These references are the only ones found using this name for this mine which became known locally as ‘Jacob’s Pit.’ While the Bridge and Rundell names disappeared from the GMA during the 19th century, the Bigge family connection continued. Edward Bigge was Secretary of the GMA Board when the firm was wound up in 1900.

24. Copies of these that came to Nova Scotia, presumably from the GMA head office, are at PANS, RG 21A, vol 39, nos 32-33. Buddle’s file copies are at the Northumberland County Record Office [NCRO], John Buddle papers, Reports Volume, BUD/19.

25. Unless otherwise noted, all details about the new wagonway in the rest of this section are based on Buddle’s ‘Railway Report’ and several letters attached to the PANS copy; Buddle’s ‘Report on the Sydney Colliery,’ the Sydney Mines Stock Books of 1837 and 1838; and one critical letter in the Buddle papers at the Durham County Record Office [DCRO] from Daniel Hoard (Sydney Mines) to Buddle, 4 August 1834, NCB1/JB/717. It should be noted that at the time of writing the Buddle papers at DCRO and NCRO have relatively little documentation on Buddle’s connections to Cape Breton. These collections, however, are prime contenders for the future appearance of material relevant to the early years of the Cape Breton wagonways.

26. While I have not been able to establish anything about his background before 1827, Hoard was involved during 1827-31 with the attempted construction of the Shubenacadie Canal from Halifax harbour to the Bay of Fundy. A number of GMA investors became involved in this ill-fated scheme. Eight GMA directors and several other shareholders plus Thomas Telford collectively took over £7000 of the £27,000 in preferred shares floated in London in 1829 by the canal company; PANS, Shubenacadie Canal Company papers, MG 24, vol 43, no 1. Though the fixed dividends were paid on the preferred stock through 1835 under a Nova Scotia government guarantee, by 1832 the company was effectively bankrupt. For a corporate obituary, see *The Novascotian*, 29 March 1832, pp 97-98. During the final stage of this undertaking, Hoard had been an important contractor and the evidence indicates that problems with work he supervised or carried out made a major contribution to the collapse of the canal company. In the wake of that collapse, Hoard spent most of 1831 in debtor’s prison in Halifax. It seems highly unlikely that Buddle would not have known about Hoard’s involvement with the canal project and the implications of that involvement from the perspective of the GMA Directors in London.

27. The idea of relocation may have been the result of heavy storm damage to the first wharf in March of 1830; QMR, vol 1, no 3, September, 1830, p 348.

28. Buddle’s ‘Railway Report’ identifies these as ‘Mr. Smith’s plan.’ Richard Smith was the Albion Mines manager and the designated ‘Mining Engineer’ for the firm; his position is noted in the GMA’s 1829 Deed of Settlement, GA, ms 24, 532, p 17, and in QMR, vol 1, no 1, March, 1830, p 168. In that capacity, he seems to have been Richard Brown’s superior. The 1827-33 Manager’s Letter Book shows that Smith was in Sydney Mines most of the time during 1833 and early 1834. For background on Smith, see David Frank’s biography in DCB, vol IX, 1976.

29. Sydney Mines output by the GMA never reached this level. Production peaked in the 1890s with outputs ranged around 80,000 chaldrons.

- lighter weight rail for pit sidings and other lower traffic locations;
- stone bridges rather than wooden ones;
- upgrading wagon size to the Newcastle chaldron;
- a single track line with passing sidings; and
- standard gauge track.

Following some of these recommendations, Buddle ordered a completed Newcastle chaldron plus a set of iron work for another wagon, several chairs, and a set of components for a switch, all from Robert Rayne of Busy Cottage Iron Works, Newcastle, for shipment to Sydney Mines.³⁰ These were undoubtedly samples of specifications he wanted to have adopted. For the wharf, Buddle recommended use of loading frames³¹ (Fig.4) and a reorganization of the original plan for the layout of sidings on the wharf.

Buddle also suggested reconsideration of the locations planned for the wharf and the wharf-end of the waggonway. He proposed moving the wharf to just inside the 'North bar' as it offered the only natural shelter from wind, wave or ice coming from the open sea. This site, the location of the modern-day wharf used by the Newfoundland ferries, was about mid-way between the old wharf and the site first accepted for the new one. This relocation would shorten the waggonway's main line by 40% - from 4.5 miles to 2.7 miles. While identified as Hoard's idea, the proposal was endorsed by Buddle and incorporated into his report with Hoard's estimate of savings of £8,000³² to be achieved by its adoption.

Following the submission of Buddle's 'Railway Report,' it appears that Hoard met with the GMA Directors in London on his way back to Cape Breton though no decisions about the wharf location and waggonway route were immediately forthcoming. They were made by a new player on the scene, Samuel Cunard, who had recently become the GMA agent in Halifax.³³ By mid-1834, after visiting Sydney Mines to look at the alternate locations for the wharf, Cunard accepted the

NORTH SYDNEY
RAILROAD.

TENDERS will be received at this office until the 20th day of MAY from PERSONS disposed in contract for the supply of
STONE BLOCKS OR SLEEPERS,
 For the NORTH SYDNEY RAILROAD.

EACH BLOCK to be one foot thick, and to contain four cubic feet: none will be taken of less width than 20 inches. The material to be a strong sandstone, perfectly free from joints.

SIX THOUSAND Blocks will be required: but TENDERS will be received for lots of four hundred each or upwards.

TO be delivered at the Mines, Wharf, Plant's Bar, or North Sydney, as may be required, before the 31st day of August next: Security will be required for the performance of Contracts. Further particulars may be obtained at this office, where a specimen of the blocks may be seen.

Office of General Mining Association.
 Sydney Mines.
 April 29, 1834.

Fig. 3: GMA Tender Call for Stone Blocks, 1834

Despite Buddle's recommendation and the tender call illustrated here, stone blocks were not used, a decision assumed the result of problems of availability and/or cost. The Cape-Bretonian and General Reporter, 24 May 1834; Public Archives of Nova Scotia, microfilm # 8506

Malgré les recommandations de Buddle et la soumission illustrée ici, les blocs de pierres n'étaient pas utilisés, et ce, à cause de leur prix élevé ou de leur non-disponibilité. The Cape-Bretonian and General Reporter, 24 mai 1834; Archives publiques de la Nouvelle Écosse, microfilm no 8506.

30. Details on Rayne's 1834 invoice to Buddle were provided by Michael Lewis from notes taken from the Buddle papers, vol 64, no 27, at the North England Institute of Mining & Mechanical Engineers. This document was transferred with other Buddle material to NCRO but I have not established its new call number at NCRO. Rayne was also involved though Buddle in the supply of boiler parts and other pit machinery to Cape Breton; DCRO, NCB1/JB/1761. He was supplier, again through Buddle, of a substantial order of iron work for wagons for the Albion Mines Railway in 1838; DCRO, NCB1/JB/1733-5 and NCRO, BUD/60/2/Folio 31; and had later connections with that railway (including the supply of the locomotives Albion and Pictou in 1854) after Buddle's death in 1843.

31. No evidence has been found about how coal was loaded at the first Sydney Mines wharf. Despite this, the presence of a loading frame at Little Bras d'Or (which likely preceded the recommendations in Buddle's 1834 'Report') suggests that a frame may have also been used on the first wharf at Sydney Mines.

32. All currency references are in Sterling, the base for GMA accounts. Some comparative financial references have been converted from colonial 'Halifax currency.' A rule of thumb conversion formula to provide a 2009 Canadian dollar equivalent of an 1830s Pound Sterling is to multiply by 130. For those looking for a more precise approach, I recommend as a starting point, R Twigger, 'Inflation: The Value of the Pound 1750-1998,' London: Economic Policy and Statistics Section, House of Commons Library, Research Paper 99/20, 1999 (presently online at < www.parliament.uk/commons/lib/research/rp99/rp99-020.pdf >)

33. Having foreclosed on money owed him by Andrew Belcher, in 1834 Cunard added Belcher's business including the GMA agency to his growing empire that evolved into the Cunard shipping line. At about this time, he also became a GMA Director. I suspect Cunard joined the Board when he became GMA agent in Halifax though the earliest documentation showing him as a Board member is the Act of Incorporation of the GMA in Nova Scotia, Public Statutes of Nova Scotia, 1836, ch 87. Whether on the Board or not, when he made the decision about the wharf and railway as reported in Hoard's letter to Buddle in August of 1834, Cunard had obviously become an influential voice within the company.

This drawing from a GMA copy of Buddle's 'Railway Report' illustrates operation of a loading frame. The frame was hinged at point 'a' and would be in a vertical position when a ship tied up. When the vessel was positioned to align the hold with the frame, the frame would be lowered to the horizontal position shown in the drawing. When loading was completed, the frame would be pulled back to the vertical to permit the ship to depart and another vessel to tie up. A contemporary British account in

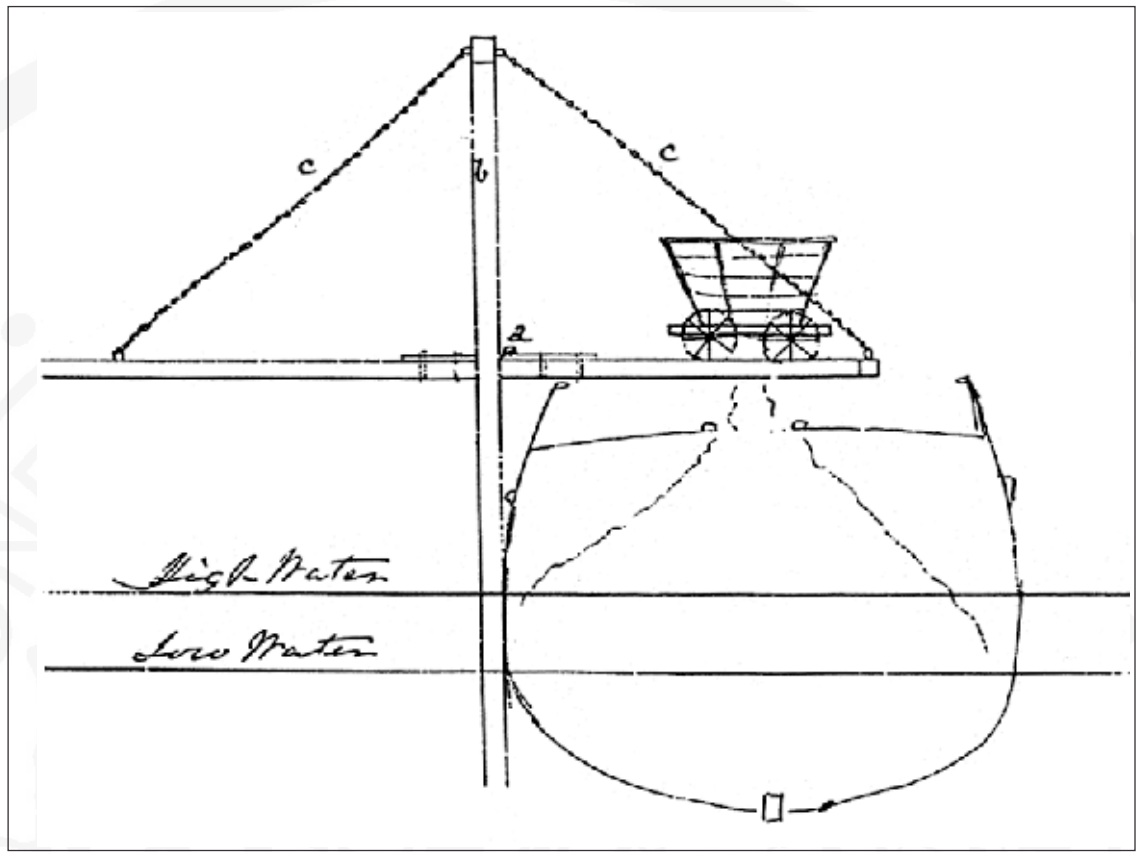


Fig. 4: Copy of John Buddle's Sketch of a Wharf Frame

The Monthly Supplement of the Penny Magazine (# 197, 31 March–30 April, 1835, p 162) offered the following related description: 'A man ... unfastens a latch at the bottom of the waggon, which, being made to turn upon hinges like a door, immediately opens and the whole of the coal in the waggon is cleanly poured into the hold. To facilitate this operation the sides of the waggons converge toward the bottom and are lined with smooth iron plates.' Nothing has been found to indicate if any of the early wagons in Cape Breton had internal iron plating. Public Archives of Nova Scotia: RG 21A, vol 39, no 32, p 12e berths for three vessels to load at the same time.'

Ce dessin, une copie du Railway Report de Buddle, illustre l'utilisation d'une structure de chargement. Le cadre attaché au point « a » basculait en position verticale quand le bateau remontait avec la marée. Lorsque le navire était aligné avec le cadre, celui-ci était abaissé en position horizontale, comme illustré sur le dessin. Le chargement complété, le cadre était retiré vers l'arrière, permettant ainsi au bateau de partir et à un autre de prendre la relève. Un compte rendu du magazine britannique contemporain The Monthly Supplement of the Penny Magazine (no 197, 31 mars au 30 avril 1835, p.162) donne la description suivante : « Un homme [...] retire le loquet à la base du wagonnet qui permet à des charnières, comme une porte, de s'ouvrir et au charbon de s'échapper. Pour faciliter cette opération, les côtés du wagonnet convergent vers le fond et sont garnis de plaques de fer lisses. » À noter qu'on n'a rien trouvé qui puisse confirmer la présence de ces plaques dans les anciens wagonnets du Cap-Breton. Archives publiques de la Nouvelle-Écosse : RG 21A, vol. 39, no 32, p. 12.

Hoard-Buddle proposals for the wharf site and the wagonway route.

Richard Brown's book stated the new wagonway opened in 1834³⁴ but this is unlikely. The best evidence found is an advertisement by Cunard that first appeared in Halifax in The Novascotian on 17 September 1835. It reported that, 'The line of railway at the Sydney Mines having been completed from the Pits direct to the North Bar, vessels can now load in all kinds of weather

without any risk of being detained as heretofore.' Details noted the protected location of the new wharf and stated that 'there are berths for three vessels to load at the same time.'

So what do we know of the second wagonway and the impact of Buddle's suggestions?

The following list revisits the core recommendations with the GMA responses:

34. Brown 1871, p 84.

RECOMMENDED	FINAL DECISION
Locomotives	No – not used until 1853
40 pound per yard malleable iron rail	Weight uncertain, but most ‘heavy’
14 pound chairs	Inventory shows 12 pound and 16 pound used
Chairs to be set on ties	Yes
Ties to be supported by stone block	No – despite the advertisement for blocks
Lighter weight line where appropriate	Yes – 10% of trackage as recorded in 1837
Stone bridges rather than wooden one	No
Newcastle chaldron wagons	Yes – 102 in use in 1837 ³⁵ (Fig.5) ³⁶
Single track with sidings	Yes
Standard gauge	Yes ³⁷
Loading frames on wharf	Yes – three at outset of operation
Relocation of proposed wharf	Yes (Fig. 6)
Shortened waggonway route	Yes (Fig. 6)

The completed main line was 4,953 yards or 2.8 miles with an additional 3,782 yards in a branch to the new mine, seventeen line and pit sidings, several wharf sidings, plus one other interesting section to be referred to below. Nearly 90% of the total of 8,735 yards was laid with ‘heavy’ rail; the remainder – mostly in ‘pit sidings’ – was identified as ‘light’ rail. Given Buddle’s recommendations about rail weight and construction standards to carry locomotives plus the presence of rail identified as 28 pound per yard at nearby Little Bras d’Or, a much less important GMA site (which will be discussed below), I speculate that the ‘light’ rail at Sydney Mines was also 28 pound per yard and the ‘heavy’ rail approached or even exceeded Buddle’s recommendation of 40 pound per yard. The likelihood of what might seem extraordinarily heavy rail for this setting is supported by the inventory of loose chairs recorded in 1838. A total of 2,600 were on hand of which 90% were 16 pound with the remainder weighing 12 pounds each.³⁸

The ‘loose’ 28 pound rails at Little Bras d’Or in 1838 and the 75 tons of ‘loose stock’ rails at Sydney Mines in 1837 were in 15 ft lengths, the most common length in use in Britain at the time. It thus seems likely that all rails laid in Cape Breton in the 1830s were also 15-footers, regardless of weight. Most references to waggonway rails in the Sydney Mines Stock Books included identification as ‘malleable iron,’ indicating they were rolled rather than made of cast iron. At this time, British 15-ft rails generally had 5 sections, each 3 ft in length, with each section incorporating the ‘fish-bellied’ design with greater depth from bottom to top in each section between the supporting blocks or ties than at the points where the rails and chairs rested on their supporting ties and/or blocks. The side view of the Newcastle chaldron in Fig. 5 illustrates the profile of fish-bellied rail though it appears in that drawing in 4-ft sections.

35. In addition to the large inventory of new Newcastle wagons, the 1838 Stock Book also recorded ‘6 New 1 Chaldron wagons’ (assumed to be Winchester chaldrons), BI, GMA papers, B-4.

36. This drawing has been selected to indicate that even before the GMA introduced the waggonway in Nova Scotia, American engineers and businessmen were importing the technology in conceptual form, either via British publications or through on site research in England. William Strickland was one of the most influential early American reporters and his Reports ... put first-hand accounts and fine technical drawings of British equipment into circulation in the United States; see James Calvert’s account of Strickland at < <http://www.du.edu/~jcalvert/railway/strickla.htm> >. The ‘Beginnings of Railways’ section of this website includes several other articles that provide contexts for both Strickland and the Cape Breton waggonways. Especially relevant is Calvert’s commentary on ‘Tramway Engineering.’ For a recent perspective on Strickland and other Americans who brought the concept of the waggonway and the railway to the USA, see Alan M Levitt, ‘How America Discovered The Railway,’ in Michael R. Bailey, ed., *Early Railways 3*, Sudbury, UK: Six Martlets Publishing, 2006, pp 126-152. An earlier assessment of trans-Atlantic technology transfer is DH Stapleton, ‘The Origins of American Railroad Technology, 1825-1840,’ *Railroad History*, # 139, 1978, pp 65-77. For a valuable account of the evolution of the Newcastle wagon, see RR Darsley, ‘The Origins of the Chaldron Waggon in the Northeast of England,’ in Bailey, 2006, pp 221-41.

37. The question of gauge on this line and the other waggonways is considered later in the paper.

38. Consultations with Michael Bailey, Andy Guy, and Michael Lewis about norms for rail and chair weights in the UK in the period 1830-35 have made me conclude the second Sydney Mines right of way was designed to provide a lengthy period of service. While the weight of the rails at Sydney Mines is uncertain except in the context of the precisely weighted rails at Little Bras d’Or, the 12 pound and 16 pound chair weights are high even by British main line standards at this time. Achievement of line longevity can be seen through the use of most of the 1835 main line by the locomotives introduced nearly 20 years later. Related to this assumption about the GMA’s decision to come close to matching UK main line standards is the fact that in early 1838 the company indicated intent to use 51 pound per yard rail on the locomotive-powered line then being planned for Albion Mines, DCRO, Buddle papers, NCB1/JB/1740, JB Foord (GMA, London) to George & John Rennie, 22 February 1838. The only contemporary reference I have found to the weight of the rails laid in Pictou County in 1839-40 appeared in *The Observer* (Pictou, NS), 24 September 1839, where they were described as ‘about 100 tons to a mile,’ a weight that converts to 57 pound per yard.

Stan's Photo Gallery

January – February, 2010

By Stan Smaill

French Version, Denis Latour

Introduction:

The Photo Gallery for this issue of Canadian Rail has a steam and traction theme partly by design and partly by default! Continuing with our remembrance of the end of Canadian traction operations fifty years in 1959 (except for Toronto), we are pleased to present a colour photo gallery featuring the streetcars and interurbans of the British Columbia Electric Railway. The B.C. Electric operated Canada's longest interurban electric railway, running from Vancouver eastward through the Fraser valley / Lower Mainland to Chilliwack, B.C. Streetcars on the BC Electric made their last runs on April 24, 1955 and interurban passenger operations ended on February 28, 1958. The editors of Canadian Rail gratefully acknowledge the assistance of M. Brian L. Kelly and Henry Ewert in preparing this photo gallery and especially to George E. Kanary for making available the images of noted American traction photographer Robert W. Gibson.

The steam component of this Photo Gallery features a selection of images taken by Canadian Rail editor emeritus the late Sandy Worthen. The subject of Sandy's lensing ties in nicely with Barry Biglow's article 'My First Diesel Repair' in that it features images of the October 5, 1958 CRHA excursion to Garneau, Quebec powered by CNR K5 class 4-6-4 5702. Because Barry was otherwise occupied with trouble shooting the errant CLC 1600 series roadswitcher on the CNR Granby-Montreal passenger train, he missed his connection with the CRHA excursion with the famous Hudson on the point! Hopefully, this selection of images taken by Sandy Worthen will partially compensate Barry for the photo opportunities he missed!



A two car British Columbia Electric Railway interurban train is heading west on Hastings Street and is taking the crossover track to the eastbound line. Back to back switches will permit the train to turn left into the 'run through' Vancouver Interurban Depot. The photo was taken from an upper floor of the BCER head office, the interurban depot was on the ground floor. The building still exists today with no hint that interurban cars 'ran through' the building, which now houses a bank! Note the two PCC's crossing in the background. See another view showing the LUX theatre on the back cover of this issue. Stan Styles, courtesy GTC Collectibles BCE-1309-1.

Un tandem de voitures interurbaines du British Columbia Electric Railway roule en direction ouest sur la rue Hastings et se prépare à prendre la voie de croisement pour la ligne en direction est. Les aiguillages dos à dos permettront au train de franchir le dépôt des véhicules interurbains de Vancouver. La photo fut prise d'un étage de l'édifice du siège social du BCER qui abritait au rez-de-chaussée le dépôt. L'édifice existe encore de nos jours mais sans aucun indice qui laisserait croire que des interurbains traversaient le rez-de-chaussée de part part, on y trouve plutôt une succursale bancaire! À noter en arrière plan les deux PCC qui traversent la rue. Voir une autre vue sur la couverture arrière sur laquelle on peut apercevoir le théâtre LUX. Courtoisie, Stan Styles GTC Collectibles BCE-1309-1.

Les photos de Stan

janvier – février, 2010

Par Stan Smaill

Version française : Denis Latour

Introduction:

La GALERIE DE PHOTOS du présent numéro de Canadian Rail comporte deux sujets, la vapeur et la traction électrique! Nous continuons à nous rappeler le retrait définitif des tramways urbains et interurbains électriques au Canada en 1959 (sauf à Toronto). Il nous fait plaisir de dédier la partie traction électrique à la British Columbia Electric Railway, dont la liaison interurbaine Vancouver-Chilliwack était la plus longue au Canada. Les tramways urbains de Vancouver furent retirés du service le 24 avril 1955 tandis que les voitures interurbaines cessèrent le service le 28 février 1958. Les rédacteurs de Canadian Rail remercient M. Brian L. Kelly et M. Henry Ewert de son aide dans la préparation de la présente galerie de photos, ainsi que George E. Kanary qui a mis à notre disposition les photos de Robert W. Gibson, un renommé photographe de tramways.

La partie Vapeur de notre galerie nous montre une sélection de photos prises par feu Sandy Worthen, rédacteur émérite de Canadian Rail. Le lien est bien apparent entre les photos de Sandy et l'article de Barry Biglow intitulé « My First Diesel Repair ». Barry était occupé à remettre en état de marche une locomotive diesel CLC de classe 1600 remorquant le train de voyageurs Granby-Montréal. Malheureusement, le retour à la gare Centrale ne put être effectué avant le départ du train spécial vers Garneau... remorqué par une des fameuses Hudson de la classe 5700! Espérons que la sélection de photos prises par Sandy pourra compenser pour celles que Barry n'a pu capter sur pellicule!

Un train interurbain de la British Columbia Electric Railway, composé de deux voitures, se dirige vers l'ouest en empruntant l'aiguillage qui permet un accès plus direct au terminus. La photo fut prise d'un étage supérieur du siège social de la BCER; le terminus était situé au rez-de-chaussée. L'édifice est toujours là, quoique aucun indice n'indique que les voitures interurbaines aient circulé dans la bâtisse, qui aujourd'hui abrite une banque! À noter, les tramways de type PCC se croisant en arrière-plan. Une autre vue, en page couverture arrière, nous montre le cinéma LUX. Cette dernière photo est de Stan Styles et est offerte par GTC Collectibles (-1309-1).

Car No. 306 was built by Canadian Car and Foundry in Montreal and is a one man front entrance car as designated by the 'bow tie' scheme around the headlight. It is eastbound on Hastings Street on the No. 14 Hastings East line. It is crossing the viaduct that takes Great Northern Railway trains to the Vancouver waterfront and the CPR interchange. Brian L. Kelly.

Le tram no 306 fut construit à Montréal en 1912 par la Canadian Car & Foundry. L'applique en forme de nœud de cravate qui entoure le phare avant indique que la voiture est du type solotram et qu'elle est aussi bidirectionnelle. Il circule vers l'est sur le circuit 14 HASTINGS EAST et traverse le viaduc qui permet au chemin de fer Great Northern d'atteindre le port de Vancouver et les voies d'échange avec le Canadien Pacifique. (Photo Brian L. Kelly).



Car No. 196 is a curved side or 'Narraganset' type seen here eastbound on Hastings at Carrall Street, the car is plying the No. 14 route. The car is passing in front of the interurban depot and BCER's head office. This car originally had a clerestory roof but was rebuilt during the BCER's streetcar modernization program of the 1940's. Brian L. Kelly.

Le tram no 196, du type à flancs courbés ou Narraganset, du circuit no 14 circule vers l'est, face au terminus interurbain et au siège social de la BCER. À l'origine, le tram avait une toiture de type claire-vue, qui fut remplacée par un toit en arche lors de travaux de modernisation au cours des années 1940. (Photo Brian L. Kelly).

A half block from BC Electric's impressive headquarters and interurban station in downtown Vancouver, car 1316 and an unidentified mate arrive with a train from New Westminster via the 12.5 mile Central Park line. The BCER 1300s were built by St. Louis Car Company in 1913. These two cars are near the intersection of Hastings and Columbia Street in this undated photo. Robert W. Gibson, Collection Electric Railway Historical Society.

À peu de distance de l'impressionnant édifice de la BCER, au centre-ville de Vancouver, le tramway interurbain no 1316 et un autre (non identifié) arrivent avec un train en provenance de New-Westminster via la ligne de Central Park; nous sommes en 1949! Ces trams avaient été construits par la St. Louis Car Co. en 1913. (Photo Robert W. Gibson, collection Electric Railway Historical Society).





Car 316, a one-man, double-ended Brill product of 1912, makes its way along Oak Street on March 28, 1952. The Oak Street line of the BC Electric was Vancouver's longest and much loved; it saw its last regular service run on April 18, 1952, less than a month after this photo was taken. Collection of Electric Railway Historical Society.

Le solotram bidirectionnel construit par Brill en 1912 roule rue Oak, le 28 mars 1952. Ce circuit de la BC Electric était le plus long et aussi le favori des usagers. Le service régulier de tramways sur cette artère fut suspendu le 18 avril 1952, moins d'un mois après la prise de cette photo. (Photo Collection de l'Electric Railway Historical Society).



This view looks eastward on Vancouver's legendary Hastings street near the intersection of Carroll back in 1948. An interurban train with car 1306 and an unknown sister share the line with streetcars from the city division. In the distance, a westbound Central Park line train approaches. Robert W. Gibson, Collection Electric Railway Historical Society.

Cette vue de 1948 vers l'est nous montre la légendaire rue Hastings près de l'intersection Carroll. Un train interurbain, remorqué par la voiture 1300 et une autre, partagent ce circuit avec les tramways urbains. À distance, on peut voir un train du circuit Central Park qui s'approche. (Photo Robert W. Gibson, Collection Electric Railway Historical Society).



It's a bright April day in 1951 as three streetcars including a PCC head east on Hastings Street in downtown Vancouver. The beflagged Eaton's department store looms in the background, various smaller shops including Rogers Jewellers make up the foreground. Car 328 is a Brill product, one of a set of 30 numbered 326-355 built in 1913; 328 was refurbished in 1938 and scrapped in 1954. Here, car 328 is operating on route No. 1 – Fairview belt line, inner. Following Fairview car 328 is one of the BC Electric PCCs, which came to Vancouver in January 1939. Henry Ewert Collection.

Par cette belle journée d'avril 1951, trois tramways, dont un PCC, se dirigent vers l'est au centre-ville. On distingue bien le grand magasin Eaton, de même que de plus petits immeubles à l'arrière-plan. Le tram no 328 fut construit en 1913 par la compagnie Brill et faisait partie d'un groupe de 30 (numérotés 326-355). Le 328 fut remis à neuf en 1938 et envoyé au rancart en 1954. Nous apercevons ici le no 328 en service sur le circuit 1-FAIRWAY/BELT LINE. Le PCC qui le suit fait partie du groupe livré à la BC Electric en janvier 1939. (Photo Henry Ewert Collection).

The ever-itinerant Forster Kemp visited the BC Electric near the end of operations in 1958 and stumbled into an enthusiast charter by fortunate 'accident'. In this Kemp view at Marpole station from early 1958, St. Louis built car 1232 heads up a two car Steveston line train. The BC Electric interurban division was dispatched using the timetable and train order rail traffic control method as evidenced by the train order signal in the 'STOP' indication ahead. Not long after this photo was taken, all interurban passenger service on BCER ceased on February 28, 1958. CRHA Archives, Fonds Kemp 2589.

Notre ami Foster Kemp, grand voyageur, photographe, amateur de trains et tramways, etc., effectua une visite des installations de la BC Electric peu de temps avant l'abandon du service interurbain en 1958. Coïncidence ou hasard, il se trouva au milieu d'un groupe qui désirait profiter des derniers moments du chemin de fer électrique. La photo à la gare de Marpole est de Foster et met en vedette le tramway interurbain 1232, construit par la St. Louis Car Company. La circulation des trams sur ce parcours se faisait par signaux et ordres de marche. Le service sur le trajet Marpole-Steveston prit fin le 28 février 1958. (Photo Foster Kemp, Archives de l'ACHF, Fonds Kemp 2589).



This view of a meeting of two BCER PCCs looks westward near the intersection of Hastings and Carroll Streets in 1949. To the left is the famous BC Electric headquarters building that was also Vancouver's downtown 'Interurban Train Depot'. The PCCs are servicing the No. 14 Hastings East line. They were two of the 36 PCCs owned by BCER. The car in the distance is painted in the all cream paint scheme that would become the standard for BCER trolley and diesel buses. Streetcar service on the No. 14 route ended on April 22, 1955. Robert W. Gibson, Collection Electric Railway Historical Society.



Cette vue de tramways PCC se rencontrant près de l'intersection Hastings et Carroll date de 1949; ces trams modernes sont affectés au circuit 14 Hastings East. La BCER en a eu 36 exemplaires qu'elle utilisa jusqu'au 22 avril 1955. Le tram qui s'approche est dans la nouvelle livrée crème, couleur que les trolleybus et autobus de la BCER arboreront pendant de nombreuses années. Le 22 avril 1955 marqua aussi la dernière journée de service des trams sur le circuit 14. (Photo Robert W. Gibson, Collection Electric Railway Historical Society).



BC Electric combine 1401 was one of three interurban cars that inaugurated the company's 76 mile run from Vancouver to Chilliwack on October 3, 1910. In this view from February 11, 1951, car 1401 is in work service and has the sad task of dismantling the overhead wire four months after the end of service on the Chilliwack line. Car 1401 was built by Ottawa Car Company. Robert W. Gibson, Collection Electric Railway Historical Society.

La voiture mixte no 1401 de la BCER, une des trois voitures interurbaines qui ont inauguré le service sur le trajet de Vancouver à Chilliwack (76 milles), le 3 octobre 1910. La photo du 11 février 1951 nous montre la voiture 1401 effectuant la triste tâche d'enlever les fils aériens alimentant les trams du trajet vers Chilliwack. Cette voiture interurbaine avait été construite par la compagnie Ottawa Car. (Photo Robert W. Gibson, Collection Electric Railway Historical Society).

Now for the steam section of this issue's Photo Gallery. On October 5, 1958, the CRHA operated a round trip CNR steam excursion from Montreal to Garneau, Quebec using K5a Hudson type steam locomotive 5702. This excursion also apparently commemorated the 25th anniversary of the 1933 CN-CP Pool Agreement, which allowed for the joint use of trackage and station facilities, motive power and rolling stock for passenger services mainly in eastern Canada.

Passons maintenant à la section Vapeur de la Galerie de photos. Le 5 octobre 1958, l'ACHF organisait une excursion aller-retour Montréal/Garneau (Qué.) mettant en vedette la locomotive no 5702 du CN (classe K5a, type Hudson). Cette excursion commémorait le 25e anniversaire de la mise en service (en 1933) des trains de voyageurs en commun CN-CP entre Montréal et Toronto, service pour lequel ces locomotives avaient été acquises. On pourra dire qu'au moins une fois, une locomotive de

CNR 5702 was selected as the motive power for this excursion since the famous Hudsons were specifically constructed in 1930 to power a new generation of fastpassenger trains between Montreal and Toronto thereby spending many years on both CNR and CPR trackage. Thus, a CNR Hudson operated at least once outside the usual Montreal-Toronto-Southern Ontario corridor where these engines normally ran. [Peter, Already stated in intro – hence redundant] CNR Hudson 5702 is a treasured, restored exhibit in Exporail's Building 5 and sister 5703 is at the Elgin County Railway Museum in St. Thomas, Ontario.



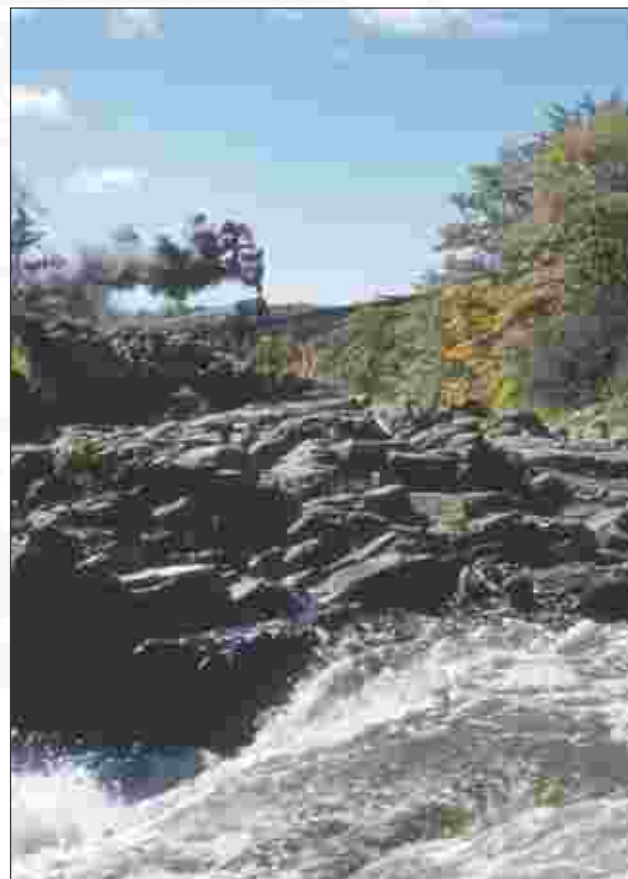
type Hudson fut utilisée sur un parcours auquel elle n'était pas destinée! L'excursion avec la 5702 fut aussi celle que Barry Biglow (auteur de *My First Diesel Repair*) manqua de peu alors qu'il tentait de remettre en marche une locomotive diesel CLC-FM 1600, en difficulté entre Granby et Montréal! La locomotive Hudson no 5702 est en exposition dans l'édifice 5 à Exporail tandis que la 5703 a élu domicile au Elgin County Railway Museum (St. Thomas, Ontario).

The CRHA ran many steam excursions out of Montreal for over twenty years from the fifties to the seventies. If a CNR excursion operated to a destination north of Montreal, the train was hauled through the Mount Royal tunnel by any of the CNR's Z class electric locomotives to EJ Tower. At that point, steam replaced electric as the motive power. In this view from the baggage car, the CNR Z class electric hauler is in the clear in the "hauler pocket track" as Hudson 5702 prepares to couple on to her train. CRHA Archives, Fonds Worthen.

L'ACHF organisa plusieurs randonnées en trains remorqués par des locomotives à vapeur en partance de Montréal pendant plus de 20 ans dans les années 1950 à 1970. Lorsque l'excursion avait comme point de départ la gare Centrale et une destination au nord de Montréal, le train spécial était remorqué par les motrices électriques de classe Z, entre la gare Centrale et la jonction de l'Est (EJ Tower). La photo, prise du fourgon à bagages, nous montre la 5702 alors qu'elle se prépare à prendre charge de son train. Après le départ du train, les motrices retourneront à la gare Centrale. (Archives de l'ACHF - Fonds Worthen).

Mid distant and riding high across the Ste. Ursule trestle on CNR's Joliette Subdivision, CNR Hudson 5702 performs a runpast for the faithful on a beautiful October 5th morning in 1958. Many steam excursions to Garneau would use this location for photo stops and runpasts but only one featured a K5a class CNR Hudson. CRHA Archives, Fonds Worthen.

Vers le milieu du pont ferroviaire en chevalet de Ste-Ursule, la locomotive 5702 exécute un runpast pour les cinéastes! Une excursion ferroviaire à Garneau sans un arrêt à cet endroit, c'est impensable... avec une locomotive Hudson, il n'y en eut qu'une! (Archives de l'ACHF - Fonds Worthen).





Once again Ste. Ursule trestle, once again CNR 5702, this time from the fireman's side! The usual liberties taken by firemen to "make smoke" for photo opportunities on steam excursions are evident in this shot as the high wheeled Hudson struts her stuff for the cameras on October 5, 1958. CNR Hudsons had 80 inch driving wheels, the largest diameter drivers of all CNR steam motive power. This attribute made them very slippery with heavier trains a fact that led to their being replaced by more sure footed U class 4-8-4's on the heavier and longer wartime pool trains between Montreal and Toronto. CRHA Archives, Fonds Worthen.

Toujours au pont de Ste-Ursule, même locomotive, mais cette fois-ci on est du côté du chauffeur (fireman) de la locomotive. On remarque que ce dernier n'a pas à se faire prier pour que la locomotive fasse le plus de fumée possible... pour le bénéfice des photographes! Les locomotives à vapeur de type Hudson avaient des roues motrices de 80 pouces de diamètre, les plus grandes roues de toutes les locomotives à vapeur du CNR. Cette caractéristique provoquait des glissements de roues lors de remorquages de trains trop lourds! On remédiait à ce problème en utilisant, lorsque requis, des locomotives plus lourdes et puissantes de type 4-8-4. (Archives de l'ACHF - Fonds Worthen).



"Red board at St. Justin" Passenger Extra 5702 North is stopped for orders at St. Justin, Quebec. The train order signal indicates 'Stop' for orders. Passenger Extra 5702 North's train is operating outside signalled territory. As such, it is controlled with timetable and train orders. Any train orders restricting a passenger train movement require the passenger train to 'STOP for orders'. A train order signal like the one visible on St. Justin station decorates the Hays Station building at Exporail. CRHA Archives, Fonds Worthen.

« Signal rouge à St-Justin » – Le train de voyageurs Extra 5702 s'est arrêté pour prendre les ordres de marche et autres directives. On peut voir un signal semblable à celui de St-Justin à la gare HAYS, sur les terrains d'EXPORAIL. (Archives de l'ACHF - Fonds Worthen).



'Tunnel 1000 feet' says the sign as CNR Hudson 5702 executes a spirited runpast exiting the Val Pichette tunnel just south of Shawinigan Falls, Quebec on the October 5, 1958 CRHA excursion to Garneau. The Val Pichette tunnel is one of very few railway tunnels on Quebec railway lines and many steam excursions stopped here for photos. CRHA Archives, Fonds Worthen.

« Tunnel 1000 pieds », indique l'enseigne pour les trains empruntant le tunnel en direction opposée. Le tunnel de Val-Pichette est situé juste au sud de Shawinigan; c'est un des rares tunnels sur le réseau CN au Québec. Aucun train d'excursion ne saurait passer à cet endroit sans y faire un arrêt-photo! (Archives de l'ACHF - Fonds Worthen).

If Barry Biglow had not missed his connection from the Granby train to the CRHA special, he might have taken this 'down the train' image of CNR Hudson 5702 climbing the grade from Grand'Mère to Garneau. The profile of the very distinctive Vanderbilt tenders designed especially for the CNR Hudsons is evident as 5702 struggles to hold the rail on her northward trek. The CPR's St. Maurice Valley Sub bridge is visible in the distance. CRHA Archives, Fonds Worthen.

Si Barry Biglow n'avait pas manqué le raccordement entre le train en provenance de Granby et le départ du train spécial de l'ACHF, il aurait probablement pris des images semblables du train alors que la 5702 s'attaquait à la pente assez abrupte entre Grand-Mère et Garneau. Le profil très distinctif du tender de type Vanderbilt, conçu spécialement pour ces locomotives du CNR, est très apparent dans cette photo alors que le train fait route vers le nord. On peut apercevoir le pont du CP (subdivision de la Vallée du St-Maurice) à distance. (Archives de l'ACHF - Fonds Worthen).





Garneau, Quebec. October 5, 1958. The unlikely sight of a CNR K5 4-6-4 in this Laurentian division point is definitely for real as 5702 backs around the wye to turn her baggage car and herself to be in position for the return trip to Montreal with the CRHA Fall Foliage excursion. The coal chute was still standing and was evident in subsequent steam excursions which operated to Garneau as late as 1962. CRHA Archives, Fonds Worthen.

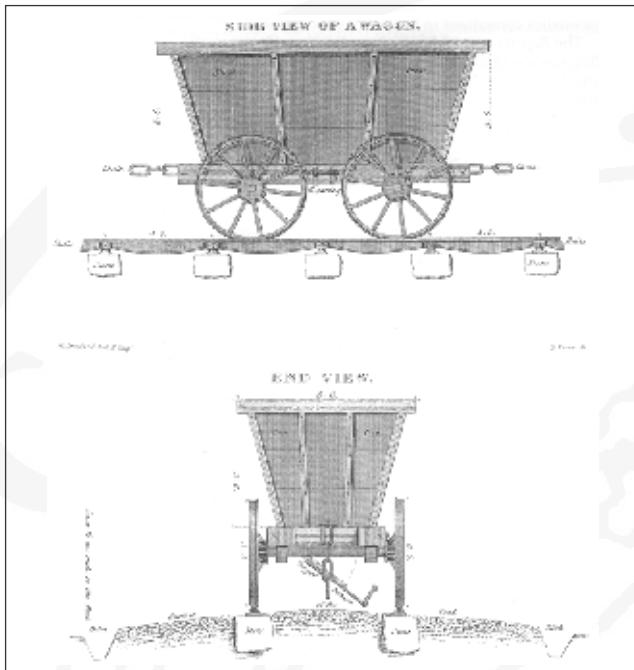
Nous sommes à Garneau, Qué., le 5 octobre 1958; la photo n'a pas été truquée et c'est bien la locomotive à vapeur Hudson (classe K5a du CN) que l'on aperçoit à ce point ferroviaire. Elle utilise le virage en Y, avec le fourgon à bagages, pour le retour à Montréal avec l'édition 1958 de l'excursion Feuillages d'automne de l'ACHF. On remarquera que la chute à charbon et d'autres appareils de l'époque de la vapeur étaient toujours en place lors d'excursions vapeur subséquentes vers Garneau, jusqu'en 1962. (Archives de l'ACHF - Fonds Worthen).



A brisk west wind blows CNR Hudson 5702's exhaust steam and smoke eastward on the afternoon of October 5, 1958 as she prepares to leave Garneau, Quebec for Montreal with the CRHA excursion. In the distance, the coal chute at the Garneau engine terminal is apparent, as is the curious sight of 6500 series FP9 passenger diesel. Other railway relics to ponder are the baggage/express cart on the cinder platform, the outside braced boxcar, the platform water plug for watering through passing passenger trains and the semaphore signal that protects the crossing of the CPR Piles Subdivision. CRHA Archives, Fonds Worthen.

Un bon vent d'ouest souffle la vapeur d'échappement et la fumée de la locomotive 5702 en direction opposée en cet après-midi du 5 octobre 1958, alors que l'imposante machine à vapeur se prépare à quitter pour le retour à Montréal. Plusieurs autres sujets d'ordre ferroviaire attirent l'attention dans cette photo : la chute à charbon avec des locomotives diésel de la classe 6500 tout près, le chariot à bagages, le signal de croisement avec le CP, les vieux wagons de marchandises, etc. (Archives de l'ACHF - Fonds Worthen).

Continued from page 17



Title: Fig. 5: A Newcastle Chaldron Wagon

This drawing shows two profiles of a 'Newcastle chaldron' from a set of three (a top-down view has been removed) published in Philadelphia in 1826. In contrast to the drawing in Fig. 1, the basic design with sloped sides and ends (as in Fig. 4) is much closer to the 'standard' Newcastle wagon. The drawing also illustrates the nature of the hinged bottom hatch for unloading. The chain couplings indicate that wagons were sometimes run in sets rather than as singles. As in Fig. 1 we see flanged wheels and edge rail with stone blocks to carry the rails. The profile of 'fish-bellied' rail here is a valuable bonus. As with Fig. 1 there are also several untypical things. There is no sign of a normally prominent hand brake, and the 'sheet iron' body differs from the more common British construction of wood with an interior iron lining. Edited from William Strickland, *Reports on Canals, Railways, Roads, and Other Subjects*, Philadelphia: HC Carey & I Lea, 1826, plate # 51 orth Bar, vessels can now load in all kinds of weather

Ce tableau représente les deux vues en élévation d'un « Newcastle chaldron » (la vue en plan a été omise) publiées à Philadelphie en 182636. Contrastant avec le dessin de la figure 1, le design de base avec les côtés et les extrémités en pente (comme dans la figure 4) est plus proche du « standard » du wagonnet de Newcastle. Le dessin illustre aussi la trappe qui permet de vider le wagonnet. La chaîne d'attelage indique que les wagonnets étaient manipulés en groupe plutôt qu'à l'unité. Comme à la figure 1, nous voyons des roues à boudins, des rails à rebords et des pierres qui supportent ces rails. Le profil de rail en « ventre de poisson » est un atout précieux. Comme à la figure 1 aussi, on remarque quelques particularités atypiques. Il n'y aucun indice de levier de frein et le corps en feuilles métalliques diffère des constructions en bois avec renforts métalliques à l'intérieur. Reports on Canals, Railways, Roads, and Other Subjects de William Strickland, Philadelphie, HC Carey & Lea, 1826, plaque no 51.

It should be noted that Buddle's influence had led indirectly to most manufacturers of rolled rails including this design element (which had first appeared in much shorter cast iron rails before 1800). Buddle's direct influence was on and through Michael Longridge of the Bedlington Iron Works where Britain's first rolled rails were produced in 1820 using a technique developed by Longridge's partner, John Berkinshaw.³⁹ Bedlington rails, including the 'fish-bellied' design, were copied by other producers and the design was in wide use in the UK by the end of the 1820s.

It is also interesting to note the 28 pound weight recorded at Little Bras d'Or was identical to the weight of the Bedlington rails laid on most of the original right of way of the landmark Stockton & Darlington in 1824-25. Though a number of British firms were producing rolled rail by the end of the 1820s, the many linkages between Buddle, Longridge, Timothy Hackworth, and the Stephensons in the UK plus the known Buddle, Longridge and Hackworth connections to the GMA⁴⁰ provide a basis for speculating that the rails laid in the 1830s in Cape Breton (and perhaps Pictou County as well) may have come from the Bedlington Works.⁴¹

Now to the 'interesting' section of track noted above. The waggonway had a slight downward grade away from the pits until fairly close to the wharf where there was a slope with a vertical drop of about thirty-five feet in a 3% grade. For reason(s) unknown, consideration of this slope on the side of Goat Hill and how to deal with it is conspicuously missing from Buddle's 'Railway Report.' Despite the lack of reference in the report, Hoard advised Buddle in his letter in August of 1834 that 'we have a self-acting incline plane.' It should be noted in passing that the construction of the incline indicated a decision had been made before the letter's date to reject Buddle's recommendation of locomotives, at least in the short term, a decision that will be assessed below.

Simply described, a 'self-acting incline' (or 'self-acting engine' or 'balanced incline') was a double-track line on a steep grade with a rope or cable controlled by a

39. An 1832 letter from Michael Longridge crediting Buddle with convincing him to incorporate the fish-belly design when the Bedlington Works started rolling rails is quoted in Evan Martin, *The Bedlington Engine and Iron Works, Newcastle upon Tyne*: Frank Graham, 1974, p 10. The Longridge firm was located at Morpeth, about 20 km north of Buddle's home at Wallsend.

40. Hackworth's primary involvement with the GMA was as builder of the first three locomotives to come to Albion Mines in 1839; Longridge was the builder of Vulcan, the fourth Albion Mines engine, which went into service in 1850.

41. While the Mary Anne sailed from Liverpool to Nova Scotia, there is no evidence that the 'Railway Iron' was loaded there. My speculation is contingent on the possibility the rails and chairs could have been loaded at a port in the northeast and the Liverpool stop was to pick up additional cargo or supplies for the voyage. A recognized limitation on this speculation is the absence of any documented link between the GMA and Buddle or his northeast England compatriots prior to Buddle's engagement by the GMA during the winter of 1833-34.

large wheel at the top of the slope and rollers to support and guide the rope down each track. One end of the rope would be attached to downward bound loaded wagons at the top of the incline and the other end to empties at the bottom. Gravity power, controlled through the wheel, carried the loads down while the loads simultaneously pulled the empties up the hill on the other track. It was a very simple yet highly effective way to deal with grades too steep for horse power or settings where low traffic volumes made a stationary steam engine uneconomic. Use of such a system was obviously more efficient in a setting where the loaded wagons were going downhill though it could also be used to pull loads uphill.

The 1837 Stock Book records the double-tracked section on the incline as 441 yards long, while Hoard referred to a length of '16 chains' (1 chain is equal to 66 feet) with 'a fall of 1 foot in 30.' The two are compatible with the terrain and its thirty-five foot drop. The Stock Book reports the incline was equipped with a wheel costed at £35 and used a 5½ in rope '200 fathoms' long (1 fathom is equal to 6 feet). This rope length suggests that a total of about 40 yards of double track was distributed above and below the working section of the incline where the down loads pulled the empties up the slope. Hoard's '16 chains' falls short of the Stock Book references to incline and rope lengths. Perhaps his distance referred only to the part of the incline with a grade and excluded the level sections usually included at the top and bottom of an incline. This was the first documented self-acting incline in Canada.⁴² Unfortunately, no first-hand accounts of operation have been found.

By 1834, self-acting inclines had been in use in the UK for over 75 years. Buddle had no monopoly on the concept, but did incorporate inclines in various projects. For example, at Seaham in County Durham, where an artificial harbour and a waggonway were built under his supervision for the Marquis of Londonderry between 1828 and 1831, the Rainton and Seaham Railway included two self-acting engines each more than a half mile in length.⁴³

Despite the absence of reference to dealing with the slope down to the site of the new wharf in Buddle's 'Railway Report,' the 1834 incline there may have been built according to his directions. As noted previously, however, an incline of some type, either a self-acting design or a single-track winch-driven model, appears to have been used down the slope to the original wharf and construction of the 1834 incline might have been influenced by that earlier model.

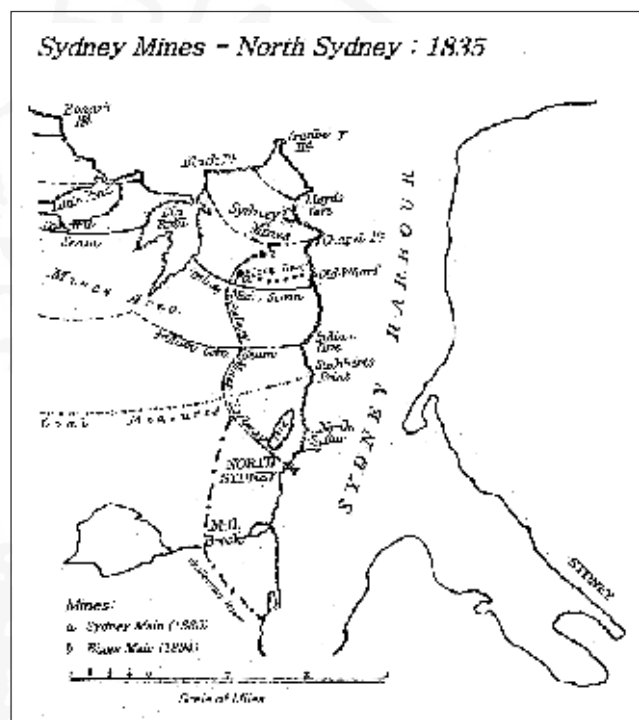


Fig. 6: The Sydney Mines / North Sydney Area

This map is a simplified and reworked section from a larger map in Richard Brown's *Coal Fields and Coal Trade of the Island of Cape Breton*.

Une version réduite et simplifiée d'une carte extraite du Coal Fields and Coal Trade of the Island of Cape Breton de Richard Brown.

42. If there are other prime contenders for the status of 'first,' they are from the same neighborhood. The first possibility is the original line at Sydney Mines. The second possibility is in the Biggs Main colliery. Two 'incline wheels' appear in the Stock Book accounts for Biggs Main though there is no indication they were used on the waggonway and the terrain does not indicate potential need for inclines there. I speculate that they were used to move waggons out of the mine. Buddle's 'Colliery Report,' recommended use of self-acting engines to draw pit wagons up to the surface though the reference to the incline wheels is the only hint that his recommendation was adopted in some form. Use of the self-acting model at Sydney Mines was a late arrival in a wider North American context. Fred Gamst documents a self-acting incline on what he considers the first railway in the United States, a line on Boston's Beacon Hill in 1805 (that he noted may have operated in an earlier form in 1795); see 'The Context and Significance of America's First Railroad,' *Technology and Culture*, vol 33, no 2, January, 1992, pp 66-100. In the 1820s, a double track incline appears to have been used by the Royal Engineers during reconstruction work on the Citadel at Quebec City though it is reported as powered by a stationary steam engine; see Robert Brown, 1949, p 52.

43. At the time of writing, two 1835 engravings from the Penny Magazine showing of one of the Seaham inclines are available on the University of Newcastle website; see < <http://sine.ncl.ac.uk/search.asp> >. In the search engine, enter 'seaham incline' to locate the engravings. A further demonstration of the importance of self-acting engines in northeast England at this time is the presence within a five-mile radius of the Rainton & Seaham line of nine other self-acting engines on the Lambton waggonway and the two branches of the Hetton Colliery line. For an excellent review of different types of inclines, see Colin Mountford, 'Rope Haulage: The Forgotten Element of Railway History,' in Guy and Rees, 2001.

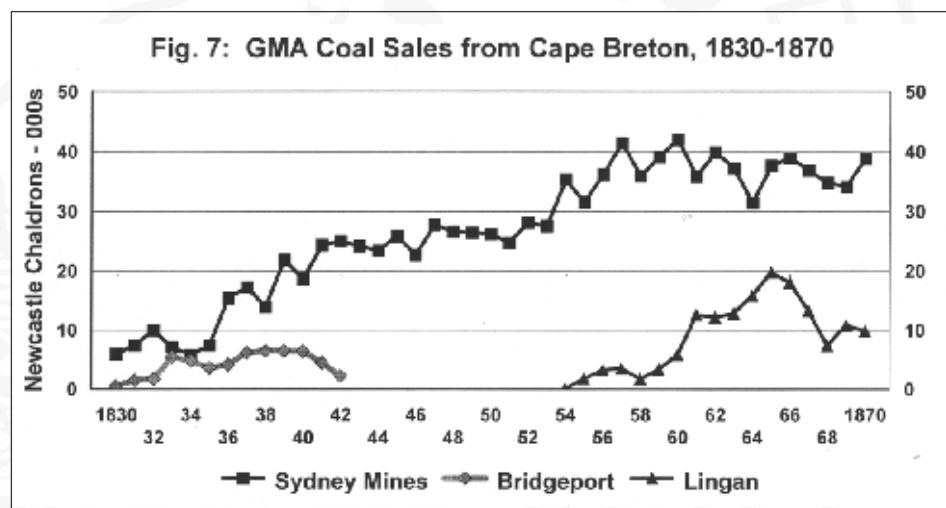
The documentation of the incline clearly undermines references over the last fifty years⁴⁴ that suggested use of ‘dandy cars’ on the slope to the wharf with horses being carried down and being used to pull empties back up the slope. The term ‘dandy car’ was widely used in England to refer to cars used to carry horses, usually down grades where loaded wagons either coasted under gravity power or were under the control of some kind of incline. Despite the relatively recent appearance of references to the use of dandy cars on the Goat Hill slope, knowledge of the 1834 incline’s existence had not vanished during the 19th century. In a letter written in early 1933,⁴⁵ Michael Dwyer, then General Manager of Scotia Steel & Coal, the GMA’s successor firm at Sydney Mines, referred briefly though very explicitly to the incline by stating, ‘the coal was dropped down to the wharf by an endless rope – the full cars going down brought the empties back.’ The transition between the date of Dwyer’s letter and what has appeared in print in Nova Scotia in recent decades illustrates the problems that may emerge as ‘history’ is written and rewritten without examination of original sources.

Even though the recent references to the use of dandy cars at Goat Hill are not credible, they may have some other basis in fact. The 1837 and 1838 Stock Books do record the presence of ‘4 Waggon for carrying horses’ and the waggonway section between Sydney Main colliery and the top of the incline might have been the location of ‘dandy’ operations. Buddle’s report indicated the route would have a slight downward grade leading away from the mines. With good track and wheels, it is possible that gravity could have carried the loads to the top of the self-acting engine and the horses, carried down in dandy cars, might have been used to move empties from the top of the incline back to the mines. While this suggestion seems plausible, it is

speculation rather than fact.

The Stock Books provide costing data useful for comparison purposes. Assuming that all construction and materials costs are included in the accounts, the main line was completed at a cost of 15 shillings per yard or £1,320 per mile. Fully equipped, including wagons, the wharf, and significant items of additional inventory such as rails and chairs, the total cost of the new transport system was 38 shillings per yard or just under £3,400 per mile.⁴⁶

These data invite comparison with the first two Canadian locomotive-powered lines. The Albion Mines Railway in Pictou County, completed by the GMA in 1840, had a right of way cost of £8,935 per mile and a fully equipped cost (including its wharf) of £12,275 per mile.⁴⁷ The much more modest Champlain & St Lawrence reported a fully equipped cost of just under £2,300 per mile for its 14½ mile strap-rail, single locomotive line (with several wharves) when it opened near Montreal in 1836.⁴⁸



Data sources: Journal of House of Assembly of Nova Scotia, 1859, Appendix 22, pp 389-90, and other Journal issues, 1860-1872.

Source : Journal of House of Assembly of Nova Scotia, 1859, annexe 22, p. 389 à 390 et autres éditions, 1860-1872.

44. For example, see EE Jackson, *North Sydney, Nova Scotia: Windows on the Past*, North Sydney: 1975, p 5; *Town of Sydney Mines, The History of Sydney Mines*, Sydney Mines: 1990, p 121; and most recently, Rannie Gillis, *Historic North Sydney*, Halifax: Nimbus, 2005, p x. These I suspect all have roots in a reference in Robert Brown's 1949 paper, p 60.

45. BI, MG 12, 40; Michael Dwyer Papers, C-1-38; Dwyer to Thomas Cantley, 11 January 1933; Cantley, then MP for Pictou County, had previously been a senior manager at Nova Scotia Steel & Coal, the company which purchased the GMA's Cape Breton properties in 1900 and which evolved into the firm then managed by Dwyer.

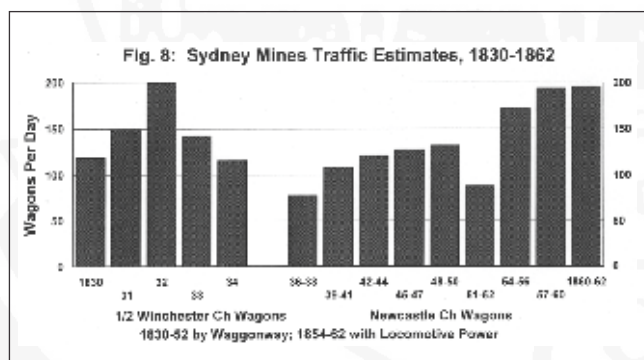
46. As at 1838, the fully equipped capital cost of the second Sydney Mines line including the wharf was just under £17,000, one fifth the total GMA investment of £78,000 in Cape Breton, BI, GMA papers, B-4, Sydney Mines Stock Book, 1838. That £17,000 would have been the equivalent of about 2.2 million 2009 Canadian dollars.

47. AH MacDonald, 'The Albion Railway: A Study Of An Early Nova Scotia Experience With The Industrial Revolution,' Halifax, NS: Saint Mary's University, MBA Thesis, 1999, Appendix E. For comparative construction costs in a North American context, this appendix includes cost per mile estimates for the 30 lines that had laid about 1200 miles of solid iron rail in the USA prior to 1840.

48. Converted to Sterling from data reported at the C&SL 1836 Annual Meeting, *The Gazette (Montreal)*, 13 December 1836.

An obvious question is whether the new waggonway had any significant effect on activity at Sydney Mines. There was a slow, but steady, increase in traffic into the early 1840s that will be examined below. This was a function of the increases in output recorded in the sales data graph that also appears below. Employment levels, other things being equal, were tied to output. The total Sydney Mines workforce grew from 174 in 1832⁴⁹ to 187 in 1835, 214 in 1836,⁵⁰ and slightly above 400 in 1838.⁵¹ Within the 1838 total, for July of that year, there is an isolated reference to a waggonway crew of '20 cart and RailRoadmen' out of a total surface workforce of nearly 200.⁵²

Was any of this increase in activity attributable to the new waggonway? That is impossible to assess since we have no idea of the temporary line's capacity. Its estimated traffic peak of an average of 200 wagons per day in 1832 will be seen in the traffic graph below. But we don't know how many wagons it could have handled assuming requisite equipment, workmen, pit output, and wharf handling capacity. In 1836-7-8, the new line was handling 50-70% more volume than had been carried in 1832. But since the new wagons carried four times the load weight, fewer trips per day were needed. There is anecdotal evidence in shipping activity reports in the press that the old wharf was often backed up with waiting vessels. Ultimately, however, we don't know if the temporary waggonway was a bottleneck between pithead and market or if the new waggonway had any significant positive impact on the volume of coal the company could ship.



This graph is based on data for Fig.7 plus assumptions noted in the text.

Ce graphique est basé sur les données de la figure 7 et des hypothèses notées dans le texte.

A complementary question from the company's perspective would have been if the new waggonway had an effect on the transport cost per chaldron-mile between pithead and ship's hold. Either an increase in handling capacity without impact on unit costs or a reduction in unit transport costs independent of volume could have produced a positive effect on the GMA Income Statement. Whether the new line did this and, if so, at a level that exceeded the cost of capital invested in the new waggonway and wharf are questions that should have been of interest to the shareholders. It is impossible, however, to even speculate about the answers since the surviving records from this period do not contain any data on operating costs for the waggonways or overall colliery operations.

The GMA commitment to rail transport was not limited to surface waggonways. In 1838 the Stock Book shows the two pits at Sydney Mines had another 6,500 yards of underground track. Of this, 80% was recorded as 'metal waggonway,' presumably cast iron platway, weighing 58 pound per yard, obviously per running yard and likely including both rails and chairs. The remaining 1,200 yards was identified as 'malleable iron way' but without identification of weight. The presence of 77 switches and more than 3½ miles of track shows the underground systems were complex ones.⁵³

Traffic on the Sydney Mines Waggonways

The sales data graph (Fig.7) for three of the four sites considered in this article shows that Sydney Mines generally provided most of the output. Bridgeport was very much a secondary operation while it lasted. Little Bras d'Or's output was minimal and is not shown in the graph. Lingan became an important producer for a few years in the 1860s but never challenged the supremacy of the Sydney Mines pits. The data constitute a sound basis for estimating traffic at Sydney Mines and Lingan. Coal was stockpiled at the pits at both sites, so annual sales data are reliable indicators of waggonway traffic.

As a result of harbours freezing and the dangers of inshore pack ice, the shipping season for the GMA in Cape Breton was only about eight months in length⁵⁴ and rail operations were limited to that time frame. Assuming an eight-month season and a six-day work week, it is easy to convert the sales data into reasonably reliable estimates of traffic volumes on the waggonways.

49. BI, GMA papers, E-1-a-4, Workmens' Time Book, June 1832.

50. For both 1835 and 1836, see PANS, 'Statement of Men, Horses & Machinery Employed at Sydney Mines in 1835-36,' RG 1, vol 464, no 7.

51. PANS, 'Statement of Men, Horses & Machinery at Sydney Mines in September, 1838,' RG 1, vol 463, no 32

52. BI, GMA papers, C-1-n, Surface Labour Accounts, 1838.

53. Buddle's 'Colliery Report' offered detailed recommendations about underground operations to permit the most efficient extension or relocation of rail lines in the pit as coal was removed.

54. Buddle's 'Railway Report,' pp 11 and 14, includes his inaccurate projection of a six-month shipping season. A sampling of GMA shipping documents at the Beaton Institute indicates a season generally running from mid/late April to mid/late December during the 1830s and 1840s.

The Sydney Mines traffic graph (Fig.8) plots annual estimates for the temporary line from 1830 to 1834 plus estimates for the new waggonway averaged for multi-year periods from 1836 through 1852. An assumption in the graph is that the 'temporary' line was fully operational throughout 1830. The two transition years, 1835 and 1853, are skipped. Following 1853 when the use of the horses ended, multi-year average estimates are shown for the early years of locomotive operations for comparison. Note that this graph uses two different wagon measures. The wagons per day on the temporary line in the 1830-1834 period were ½ Winchester chaldron wagons carrying almost 1,500 pounds each; those from 1836 onward, whether handled by horses or locomotives, were Newcastle chaldrons carrying about 5,900 pounds each.

The data for the new line after 1835 show a pattern of gradually increasing traffic over the next two decades though there is no reason to believe that the waggonway would have been overly strained by the early 1850s. Even so, the horses were retired and two locomotives, the Sydney and Halifax, were introduced late in the summer of 1853.⁵⁵ Factors that appear to have influenced the conversion to steam power will be discussed below.

Bridgeport, 1833-42

Mining activity at Bridgeport⁵⁶ which started in 1829 was secondary to Sydney Mines based on both the output and longevity of the three Bridgeport pits.⁵⁷ The GMA Annual Report dated 30 June 1830⁵⁸ observed that 'Bridgeport will also require a tram road and wagons, and some improvements to its harbour.' However, a subsequent reference that 'steam machinery will not be

necessary for that place for some time to come' seems to indicate that the company did not have high expectations for this site in the short term. The 'tram road' was not built until 1833 when, as Richard Brown stated, 'a light railway, two miles in length, was laid from the pit along the sand beach to the harbour.'⁵⁹ Brown's account went on to report that Bridgeport was abandoned in 1842⁶⁰ when 'the railway materials and moveable plant were transferred to the Sydney Mines.'

Nothing has been found to indicate the Bridgeport waggonway was ever upgraded from its 'light railway' status⁶¹ and output levels make that unlikely. The weight and source of the rail are unknowns, though the 1833 construction date points to the cargo on the Mary Anne noted earlier. That total of 200 tons seems appropriate with an assumed rail weight of no more than 30 pounds per yard and the use of iron chairs.⁶²

With output volumes never exceeding 6,500 Newcastle chaldrons per year, Bridgeport would not have needed a large complement of wagons. With its 'light rail,' it is reasonable to assume the line did not handle wagons larger than the original half Winchester chaldron size used at Sydney Mines. Assuming this wagon size, the highest daily traffic total would not have reached over 130 per day at the peak of output in 1838. With the two-mile distance, it also seems likely that no more than 30-40 wagons would have been needed to handle the traffic.

These conclusions about the roster and traffic levels are all based solely on the assumptions noted. The extent of the surviving documentary evidence about rail operations at Bridgeport is a single reference to the transfer of twenty wagon axles from Sydney Mines in the summer of 1833.⁶³

55. Shortly after the original version of this paper went to press in England, I found a reference in *The Cape-Breton News* (Sydney, NS), 17 September 1853, p 3, that stated the locomotives Sydney and Halifax had 'recently' gone into service. Soon after, from Frank Jux of the Stephenson Locomotive Society, came a reference in the *Newcastle Courant* (Newcastle upon Tyne) of 29 April 1853 noting running trials of two locomotives named Sydney and Halifax built to handle 'coal waggons on a railway originally constructed for horse power.' A number of secondary references starting with Vernon, 1902, p 168, have suggested 1854 as the transition date. The most recent of these is Gillis, 2005, p.x. Robert Brown's unpublished 1956 paper and Colin Churcher's online roster of industrial locomotives in Nova Scotia offered 1856. An account by Ian MacIntosh, *The Cape Breton Post*, 10 May 1985, p 5, suggested 1838. None of these, however, gave any evidence for the various dates presented. I am satisfied that the News account, bolstered by the reference in the *Courant*, finally provides a date that is accurate within a margin of a few weeks.

56. The name of Bridgeport (close to Glace Bay) likely recognizes either John Bridge or his nephew, John Gawler Bridge. Both were GMA Directors as well as partners in Rundell, Bridge & Rundell when production began at this site. John Bridge was also the name carried by a GMA locomotive at Sydney Mines during the last three decades of the 19th century.

57. PANS, 'Statement of Men, Horses & Machinery Employed at Bridgeport Mines, 1835-36,' RG 1, vol 464, no 6.

58. QMR, vol 1, no 4, December, 1830, p 538; this is the only Annual Report found which precedes the printed series that began in 1868. An almost complete run of that series from 1868 till the GMA wound up its affairs in 1900 is found in the Richard H. Brown papers, PANS, MG 1, vol 157.

59. Brown 1871, p 86; absence of detail here about this period in Bridgeport is particularly frustrating. The BI correspondence shows that Brown was there most of the time in 1833 and he likely supervised construction of the Bridgeport waggonway.

60. Closure of Bridgeport in 1842 is one of the few critical events at that site that is well documented. An extensive file of correspondence about the closure is in BI, D-9-b. Though references can be found in GMA and government records to sales of Bridgeport coal after 1842, the closure correspondence indicates intent to stockpile unsold coal at the wharf till it could be disposed of at a later date. Small sales were reported from this Bridgeport stock throughout the rest of the 1840s.

61. Neither Stock Books nor other capital account documents from Bridgeport appear to have survived but they should be on the 'try to find' list for future researchers.

62. The two miles (plus an additional half mile assumed for sidings and the wharf) laid with 28 pound rail and 12 pound chairs would have taken 175 tons of iron. With an appropriate ratio of rails to chairs, the January 1833 shipment on the Mary Anne could have fitted out the line at Bridgeport with 25 tons of rails and chairs left over.

63. BI, GMA papers, D-8-a, Manager's Letter Book, 1827-1833; R Smith to R Brown, 5 August 1833.

Little Bras d'Or, 1833-37

The few secondary sources noting the existence of pre-locomotive GMA rail lines in Cape Breton prior to 1850 refer only to Sydney Mines and Bridgeport. In the fine print of the Sydney Mines Stock Book for 1838, however, there is also record of a waggonway at Little Bras d'Or. Though an extremely modest operation, this line was unique because it used both iron and wooden rail. This is the only identified use of wooden rail by the GMA in Nova Scotia. Despite high expectations demonstrated by acquisition of over 3000 acres of land in 1832 and 1833,⁶⁴ sales data show this mine was far from successful. The coal quality was poor from the outset of activity in 1833,⁶⁵ when the waggonway is assumed to have gone into service, and mining and rail activity were abandoned in 1837.⁶⁶

The Little Bras d'Or line was recorded in 1838 as having been 431 yards long with 231 yards of malleable iron rail plus 200 yards of wooden rails that were 5 inch x 5 inch hardwood in 8 foot lengths. A small quantity of loose iron rail was reported in 15 foot lengths and weighing 28 pound per yard – the only pre-1860s reference found where both rail length and weight per yard are documented. The loose stock also included over 200 hemlock ties identified as being 8 feet in length. The absence of loose chairs or wagons in the Little Bras d'Or inventory likely indicates removal of assets to Sydney Mines was under way when the 1838 inventory was done.⁶⁷

An interesting but unanswered question is why part of the line was built with wooden rail. My speculations about Bridgeport, the cargo on the Mary Anne, and related assumptions suggest that Mary Anne should have delivered enough iron to also construct the complete line at Little Bras d'Or, but this obviously did not happen even though the timing was appropriate. One possibility is that either the rails or chairs or both were heavier than estimated in my assumption. Another is that some of the cargo was diverted for use at Sydney Mines. In either case, or if wooden rail was laid on a temporary basis for some other reason, the next question is why iron rails did not replace the wooden ones fairly quickly. Perhaps the company had almost immediate second thoughts about the potential of the site though this should have led to initial construction of an all-wood line. Another possibility is that there were short-run reasons related to

supply or price that were not resolved until after a later conscious decision not to upgrade the wooden section of the line. All these, however, are speculations. Why the wooden rails were laid initially or retained throughout the waggonway's lifetime remains a mystery.

As with Bridgeport, it seems reasonable to also assume use of small wagons but there is no firm evidence. There are, however, references in the inventory to two other important details. The stock account included an incline wheel costed at £20 and a 'shipping frame with iron spout' costed at £50. The incline may have been on the waggonway or may have been to pull pit wagons out of the mine. The presence of a shipping frame indicates that the wagons would likely have been designed with bottom hatches for direct unloading into the frame's spout in a manner similar to that illustrated in the Buddle sketch in Fig. 4.

A final detail from Little Bras d'Or involves right of way costing. The wooden rail section is recorded at 3s 6d per yard, while the malleable iron segment appears at a cost of 12s 6d per yard, a ratio of 3.6:1. Absence of other capitalization entries for the line suggests these included all roadbed, material, and construction costs. The 12s 6d per yard for the iron rail section is fairly close to the 15s per yard cost for the 1834-35 main line at Sydney Mines, an indication that it was well built despite its connection to a wooden rail section.

The Question of Gauge

Buddle's 1834 Report had recommended use of 4 foot 8 inch gauge for the second Sydney Mines line. That recommendation was followed though we can only confirm that by working backwards. The line was documented as standard gauge some years after the introduction of locomotives.⁶⁸ We also know that the pre-locomotive complement of Newcastle chaldrons had continued in use with the locomotives.⁶⁹ This provides good evidence that the 1834-35 waggonway had been constructed as standard gauge.

In addition to the Newcastle wagons, the 1837 Stock Book recorded twenty-two operational half Winchester chaldron wagons from the first waggonway still on the books. The only logical reason for them not to have been written off during 1835 or 1836 is that they were still in use. This leads to the conclusion that the first Sydney Mines line had also been standard gauge.

64. JHANS, 1834, Appendix A-12.

65. Detailed annual output data show that almost 50% of this mine's total output had been graded as 'slack;' JHANS, 1859, Appendix 22, pp 389-90.

66. Brown 1871, p 90.

67. The absence of reference to Little Bras d'Or in the 1837 Sydney Mines Stock Book suggests that separate accounts were kept for that site till 1838 though none are found in the BI collection. These also belong on any 'try to find' list for future researchers.

68. See 'Railway Statistics, 1875: Lines of Railway Owned by Coal Mines,' Parliament of Canada, Sessional Papers, 1876, vol 8, Sessional Paper # 51, p 31.

69. BI, GMA Papers, B-1-a and B-1-b, Sydney Mines Stock Books, 1855 and 1862; the roster of Newcastle wagons had increased to 201 in 1855 and to 226 in 1862.

That conclusion seems transferable to Bridgeport as a result of the 1833 relocation of old wagon axles from Sydney Mines. The transfer of waggonway material back to Sydney Mines upon Bridgeport's closure in 1842 provides further evidence of the use of the same gauge on both sides of Sydney harbour.

About Little Bras d'Or, there is neither documentary nor circumstantial evidence about gauge. However, the assumed commonality of gauge between Sydney Mines and Bridgeport makes it seem likely that the Little Bras d'Or line, which opened at almost the same time as Bridgeport, would have been built to the same gauge. This would have permitted transfer of equipment among the three waggonways while all were operating.

Lingan, 1854-66

Though waggonway operations at Lingan did not begin until after the introduction of locomotives at Sydney Mines, it would be inappropriate to ignore this line. It was built in 1854-55⁷⁰ to serve a new mine across the bay from Bridgeport.⁷¹ While expanding capacity with this mine, the company remained financially cautious. As a result of the distance of just a mile from the Lingan pit to the wharf and the desire to curtail costs, this line used horse power in its early years. A second decision, presumably also to cut costs, made the Lingan line unique within a company context. It was 42 in gauge, the only use of narrow gauge by the GMA.

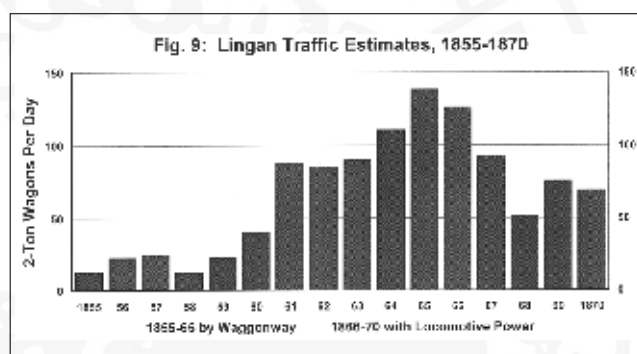
As with the other GMA waggonways, the scope of available information falls far short of what would be nice to have. It seems certain that separate accounts were kept for Lingan from the beginning of activity there, but from the first 15 years of operation only two Stock Books have survived – those for 1865 and 1870.⁷²

Those inventory records suggest the main line was first built with 22 pound per yard rail mounted on 8.6 pound chairs. Trackage on the wharf, originally fitted with three loading frames, was slightly heavier, 28 pound per yard, but supported by chairs identical to those on the main line. Neither the size nor the number(s) of wagons in use over the first decade are documented. In 1865, the wagon roster was reported as 70, though it seems likely this number would have increased over the ten years since the line started operation in response to the growing volume shown by the Lingan component in the sales graph above.

Lingan's production increased more quickly than had been the case at Sydney Mines, a reflection of the popularity of its coal for conversion to gas. The

demand for Lingan coal grew rapidly with the boom in the US market during the Civil War years. In response to that boom, the decision was made to introduce locomotive power and, in preparation for that, to upgrade the rail line. Despite these improvements, however, the 42 in gauge used on the waggonway was retained till the GMA abandoned the site 20 years later.

Pre-locomotive Lingan wagons also survived the transition to steam power, at least in the short term. This is shown in the Nova Scotia Mines Report for 1866 that also noted the wagons as 'containing two tons,' the earliest reference found to wagon size at this site.⁷³ This detail, combined with the assumptions that this wagon size had been in use since 1855 and that all traffic was handled by locomotive power in 1866, provides a basis for estimating traffic volumes through the life of the waggonway and five years beyond (Fig.9).



This graph is based on data for Fig.7 plus assumptions noted in the text.

Ce graphique est basé sur les données de la figure 7 et des hypothèses notées dans le texte.

The Triumph of the Iron Horse

In 1854, after years of negotiation, a ten-year Reciprocity Treaty was signed by Britain and the United States to reduce customs duties and expand trade between the British North American colonies and the USA. From a GMA perspective, the most important provision was the elimination of the American tariff on Nova Scotia coal. No contemporary GMA correspondence about the likely impact of the treaty has been found though Richard Brown, writing in 1871, stated the company had expected a major increase in sales into the US market.

Optimism about the American market appears to have led to the 1854 openings of the new mines at Lingan and Sydney Mines. Conversion of the Sydney Mines waggonway to locomotive power the previous year

70. Data reported to the government show the first coal was raised at Lingan in 1854; JHANS, 1859, Appendix 22, pp 378 and 389-90; but details in the Lingan Stock Books indicate the waggonway was not operational before 1855.

71. Richard Brown's 1871 book includes a fold-out engraving showing the shoreline at Lingan and the terrain from the mine to the shipping wharf.

72. BI, GMA papers, B-2-a and B-2-b. Future discovery of any Lingan Stock Books from the 1850s could yield evidence to replace the uncertainties about the early years of the waggonway at that site.

73. Department of Mines Report for 1866, JHANS, 1867, Appendix 12, p 27.

seems to have also been in expectation of sales to be generated by the anticipated treaty and fed by output from the new 'Queen Pit' at Sydney Mines since the growth in traffic up to that time does not appear to have justified the decision.

Sales to the USA from Sydney Mines did grow after 1854, but the growth was not particularly dramatic. Sydney Mines data indicate an increase in output of 37% from 1849-52 to 1854-57. Even with that increase, the two locomotives that went into service in 1853⁷⁴ would not have needed to move more than about four trainloads each per working day during the rest of the decade of the 1850s. The data show that the American Civil War had a stronger impact on GMA sales than the Reciprocity Treaty, but most of the additional business went to Lingan. Upgrading the Sydney Mines waggonway to locomotive power in 1853 thus seems to have been premature, a move that paralleled the heavy investment the company made in the Albion Mines Railway in 1838-40 in anticipation of traffic that did not materialise for over a decade.

Having gone out on a speculative limb about why the Sydney Mines waggonway was converted to steam power in 1853, the mirror image question should also be addressed: why did this not happen sooner?

The GMA had made the decision to introduce locomotives in Pictou County within a year of the first appearance of Cunard's advertisement that the new Sydney Mines wharf was open for business.⁷⁵ John Buddle had recommended use of locomotives at Sydney Mines in 1834 and most of the rail line built in 1834-35 was designed to handle steam engines as soon as the decision was made to retire the horses. In Pictou County, the original waggonway had to be rebuilt to handle the weight of locomotives and their trains. This cost on a per mile basis was almost seven times that of the 1834-35 right of way at Sydney Mines, though the line was only twice as long as that at Sydney Mines. If three additional Hackworth engines had been brought to Sydney Mines at the same time as Samson, Hercules, and John Buddle went into service in Pictou County, the additional cost should not have more than £10,000 - this based on £6500, the cost of the three Pictou County engines, plus an estimated additional £3500 for track realignment around Goat Hill and down a grade where the locomotives could operate. For the new railway in Pictou County, the GMA invested over £75,000 over the period 1838-1840.

Compared to that, the estimated incremental cost of introducing steam power at Sydney Mines would have been modest and could have been justified by the fact that overall production levels from Sydney Mines and Pictou County remained close to equal from the mid-1830s until well into the 1840s despite wide swings in output in Pictou County from one year to the next.⁷⁶ The question posed in the previous paragraph is thus a reasonable one.

No documentary evidence has been found to provide an answer. Since the decision was likely based on financial rather than engineering considerations, it should be noted that in addition to the absence of the correspondence between Sydney Mines and head office in London, we have neither annual reports for the relevant period, ie 1835-1853, nor information about company profitability on either an aggregate level or for individual collieries. Information about the company's capacity to invest or the willingness of the Board to do so are also missing. Finally, there is virtually nothing in the way of information about the company's expectations about future sales prospects for either of the two main collieries. Despite the missing documents, however, some speculations can be offered.

Since it seems safe to assume the company was not deterred by cost considerations in 1834, the initial decision was likely connected to either the revision and shortening of the original plan for the new waggonway route or to a revision of short-term expectations about coal output and sales. Hoard's letter to Buddle in August of 1834 noted the latter factor as a possible reason for rejection of locomotives in the short term. In the late 1830s, the level of investment going into the new railway in Pictou County may have been the basis for postponing additional investment at Sydney Mines.

In 1840, the year the Albion Mines Railway was completed, there was a dramatic drop of over 45% in output and sales in Pictou County. Foord came to Albion Mines that summer and was reported in the local press to have been 'ordering the discharge of a large number of the men.'⁷⁷ Though production in 1841 saw a recovery to the 1839 level, there were drops of 25% in 1842 and an additional 33% in 1843 by which time Pictou County output had fallen below the 1840 level. At Sydney Mines, however, things were much more positive. While there was a decline of about 15% in 1840, output throughout 1841-43 stood at close to 20% above the 1839 level. Despite the performance at Sydney Mines, it is quite

74. While GMA records indicate some details about these two engines, there are many unanswered questions plus contradictions between the primary sources found to date and what has been written about these locomotives over the past 50 years. The same applies to the next two engines that came to Sydney Mines over a decade later. Research on these four locomotives is ongoing and will be reported on at a later date.

75. The earliest indication of this decision appeared in *The Bee* (Pictou, NS) on 28 September 1836. The paper reported on GMA plans for improvements to the Albion Railway and stated that '... Locomotive Engines will be employed in propelling the cars ...'

76. Over the years 1835-40 inclusive, annual outputs at both sites averaged a bit over 15,000 Newcastle chaldrons; for the period 1841-49, both showed annual averages a bit over 25,000 chaldrons. Pictou County output was subject to wide swings from year to year but for the multi-year periods, the differences between Pictou County and Sydney Mines were less than 2%; JHANS, 1864, Appendix 18, p 25.

77. *The Mechanic & Farmer* (Pictou, NS) 5 August 1840.

possible that the volatility of activity at Albion Mines, which may have had parallel effects on GMA profits, may have caused the Board to become more conservative in its use of capital. In the decade following 1843, despite a clear long-term pattern of growth in output in Pictou County, the sales graph for Sydney Mines remained relatively flat. This could have justified the continuation of a more cautious approach to investment there until the stimulus of the anticipated Reciprocity Treaty came along.

Despite the strand of factual details noted, these interpretations are essentially speculations but they represent the best that can be offered at present to explain the continued use of horse power at Sydney Mines for almost 20 years on a right of way that required only minor changes to accommodate the introduction of locomotives.

While the question of when locomotives were first used at Sydney Mines has been resolved, it should also be noted that some doubt remains about the extent of their early operation. It seems reasonable to assume that the expenditure of almost £3000 on the first two engines⁷⁸ would have been accompanied by immediate realignment of the wharf end of the main line. This would have been needed to avoid the slope on the side of Goat Hill and run the locomotives all the way to the wharf on a grade they could handle. Only with this realignment would the GMA have been able to abandon the self-acting incline that had handled traffic on the slope going down to the wharf. While the assumption that this happened in 1853 seems reasonable, there is no documentary evidence to support it. The Cape Breton News account of the locomotives' arrival does refer to them operating 'to the Shipping Pier' but some elements in that account leave me uncertain about the reliability of all of its details. And there is a suggestion in the Michael Dwyer letter of 1933, referred to previously in the context of the 1834 incline, that the incline remained in operation till about 1870. Given the source of this suggestion, it must be kept on the table as a possibility until more concrete evidence appears to confirm when the locomotives first ran all the way to the wharf.⁷⁹

As noted above, the conversion to steam at Lingan took place in 1866. To handle the engine weight, 65% of the line was relaid with 63 pound per yard rail and 23 pound chairs with the remainder using 45 pound rail. Some time prior to 1864 (likely in response to the sales boom in the early 1860s), Lingan's shipping capacity had been extended by the construction of a second wharf. The rail line, however, remained single track until it branched close to the wharves.⁸⁰ The locomotive that came to Lingan, the only one to be used there, was a small 0-4-0 tank engine built by Black, Hawthorn & Co (BH) of Gateshead near Newcastle upon Tyne.⁸¹

When the GMA abandoned horse power at Lingan, their timing again proved to be less than favourable. Lingan's output had peaked in 1865. Non-renewal of Reciprocity in 1864 and the end of the Civil War the next year led to a big drop in GMA sales to the USA with Lingan being particularly hard hit. During the 20 years starting with 1867, in only three years would Lingan's output reach the average of the boom years of 1861-66. Except for its first year in operation, the little BH tank engine, locally known as Fairy, did not come even close to moving the volume of traffic handled by the waggonway horses during their last two full years of service in 1864-65.

Conclusions

Despite its extensive pool of available capital and willingness to apply new and expensive technology in the early years, the GMA recognized the usefulness and practicality of the traditional horse-powered waggonway for short-distance and/or low-volume routes. Recognition of that practicality was coupled with awareness of what would ensure longevity, minimize maintenance, and be readily upgradeable in the future. While the second Sydney Mines line used horse power for nearly 20 years, the roadbed and right of way were very well built by North American standards of the 1830s. With its use of rolled iron rails and heavy chairs, the right of way was far superior to the strap rail line opened by the Champlain & St. Lawrence in 1836 or many similar lines being built in the United States at this time.⁸²

78. This cost estimate is based on depreciated values at the end of 1855 and depreciation rates in use for 1855; BI, GMA Papers, B-1-a, Sydney Mines Stock Book, 1855.

79. Despite Dwyer's credibility based on his 1933 position and knowledge of mining history (reflected by his awareness of the self-acting engine on the Goat Hill slope), his letters to Cantley contain a number of inaccuracies about early GMA operations. One Cape Breton example is reference to 1854 for the arrival of the first locomotives at Sydney Mines. As a result, his suggestion that the incline remained in use well after 1853 merits recognition, but not automatic acceptance without documentary confirmation.

80. The second wharf appears in the detailed insert of Lingan in the 'Topographical and Township Map of Cape Breton County,' Bedford, NS: AF Church & Co, March, 1864. The detailed insert of North Sydney on this map shows that a similar upgrade had been made there. That insert shows a second wharf and indicates that from the point where the rail line branched toward the two wharves, both branches were double-tracked.

81. AC Baker, Black, Hawthorn & Co Works List, Richmond, Surrey: The Industrial Locomotive Society, 1988; Department of Mines Report for 1866, JHANS, 1867, Appendix 12, p 27.

82. Precise details on the c. 2,200 miles of strap rail laid on 140 railways in the USA during the 1830s are found in Fred Gamst's edition of Franz Anton Ritter von Gerstner's *Die innern Communicationen*; see Gamst, *Early American Railroads*, Stanford University Press, 1997; pp 785-89 provide a concise summary table. The American data in my thesis, referred to in note # 47, are based on this source.

The 1835 Sydney Mines line provided efficient service for two almost decades before the introduction of the iron horses John Buddle had recommended in 1834. Even when this transition took place at the most important colliery in Cape Breton in 1853, the company continued to operate waggonways into the 1860s⁸³ where the capital costs of locomotive power were clearly uneconomic for existing traffic levels.⁸⁴

The waggonway experience at Sydney Mines collapsed into fewer than 25 years the lengthy recorded history of the British waggonway that began with the wooden rail line constructed by Huntington Beaumont in Nottinghamshire in 1604. Though the Cape Breton lines skipped many of the formative British developments, for example the use of wooden rail (save for the 200 yd wooden section at Little Bras d'Or) or the use of flanged rather edge iron rail, they provide interesting parallels to the early days of rail transport in the UK.

The Cape Breton story is likely not too different from what happened at Albion Mines during the 1830s regardless of some superficial distinctions. Cape Breton had a number of lines in contrast to the single waggonway at Albion Mines that was extended on several occasions during its short operating life. The steep slope along the Sydney Mines-North Sydney shoreline provided a challenge not present at Albion Mines. The Albion Mines line appears to have used only Winchester chaldron wagons in contrast to the three different wagon models used in Cape Breton. Despite things like these, however, the essential aspects of construction and operation were probably quite similar and much of what is now known about developments in Cape Breton likely reflects the ten-year life of the GMA waggonway in Pictou County.

The important difference, however, is that there is a substantial documentary base dealing with the Cape Breton waggonways. Despite the many things missing from the surviving records and the resulting unanswered questions, that base has made it possible to offer this first

comprehensive look at some of Canada's earliest railways.

Acknowledgements

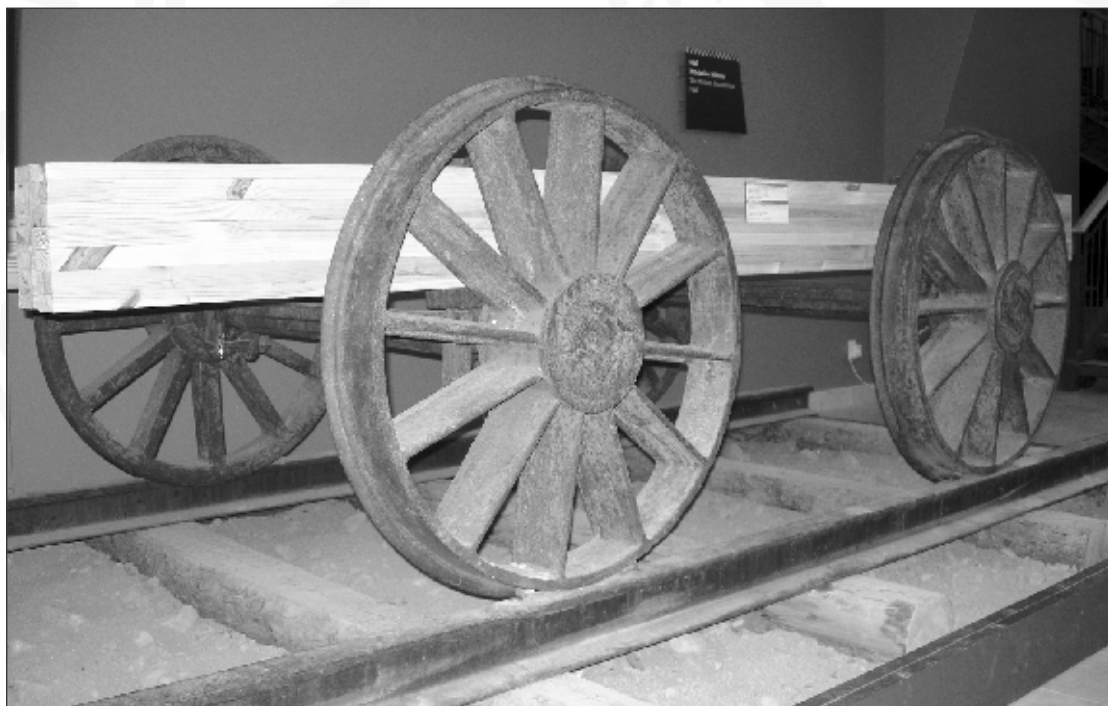
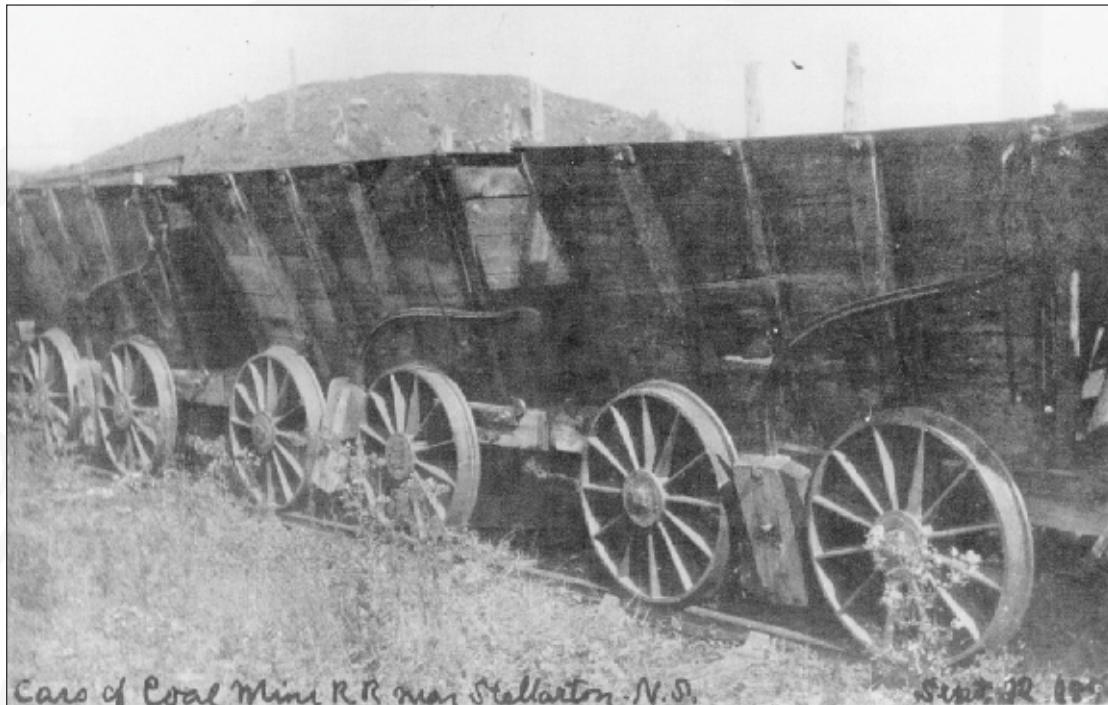
This article has evolved out of a preliminary presentation at the 'Early Railways 3' conference at the National Railway Museum in York, UK, in September 2004 and a first published edition in Michael R. Bailey, ed. *Early Railways 3*, Sudbury, UK: Six Martlets Publishing, 2006. That version has been revised and expanded for Canadian Rail's readership.

The original stimulus for this study goes back to the late 1990s to questions about Cape Breton raised by Fred Gamst during the course of our correspondence and discussions while my MBA thesis on the Albion Railway was in progress. His questions and encouragement prompted recognition that the Cape Breton waggonways warranted serious investigation though neither of us expected the project would take as long as it has.

During my research, I have incurred debts far and wide and some of these must be acknowledged. From the UK, Michael Bailey of Manchester, Andy Guy of Luddenden, and Michael Lewis of Hull, have helped in many ways. Staff at the Guildhall Archives, Goldsmiths' Hall, and Imperial College Library, all in London, plus those at the Durham and Northumberland County Record Offices in north England, offered hospitality along with crucial documents. In Halifax, staff at the Public Archives of Nova Scotia and the Nova Scotia Department of Natural Resources Library contributed greatly to my work. Jay Williams of Halifax provided invaluable assistance in preparing the illustrations for publication. Above all others, however, I am indebted to the staff at the Beaton Institute at Cape Breton University for their assistance during my extended explorations of their collection of General Mining Association papers.

83. In addition to Lingan, waggonway technology was introduced relatively late and retained well into the age of the locomotive at Joggins in Cumberland County. From its 1848 opening until sold by the GMA in 1871, this site contained a smaller version of the first Sydney Mines line. A wharf with capacity for three vessels was equipped with extended 'shoots' for loading the coal. These seem to have been a result of a cliff overlooking the wharf that was too steep for use of an incline or any other way to take wagons down to the wharf. An 800 yd waggonway was laid with iron rail, apparently about 30 pound per yard, from the mine to the top of the 'shoots' and equipped with eleven Winchester chaldron wagons. When the GMA left Joggins, the waggonway was still in service and was the last of the company's horse-powered surface lines. Details on the Joggins waggonway are in an 1859 GMA report to the Nova Scotia government, PANS, RG 1, vol 461, no 106; a second GMA report in 1864, PANS, RG 1, vol 464, no 75; the GMA Annual Report for 1870, PANS, MG 1, vol 157, no 54; and the 1871 prospectus of the Joggins Coal Mining Company, the firm which bought the site from the GMA, CIHM microfiche series, # 13205.

84. While they do not deal directly with the GMA's railways, I would be remiss not to refer the reader to two studies of the firm by Marilyn Gerriets of the Economics Department at St. Francis Xavier University. Gerriets looks at the company's managerial approaches, its early willingness to invest heavily in modern technology followed by a tendency in later years to live off its capital and minimize new investment, its failure to integrate the mines with other logical undertakings such as iron and steel, the influence of its London base, and other aspects of the firm's performance and local impact over its 70-plus years in Nova Scotia. Her papers provide a wider framework for consideration of the GMA's involvement with rail transport. See 'The Impact of the General Mining Association on the Early Development of the Nova Scotia Coal Industry,' *Acadiensis*, vol XXI, no 1, 1991, pp 54-84; and 'The Rise and Fall of a Free-Standing Company in Nova Scotia,' *Business History*, vol 34, no 3, 1992, pp 16-48. A third study that should be noted is Daniel Samson, 'Industrial Colonization: The Colonial Context of the General Mining Association, Nova Scotia, 1824-1842,' *Acadiensis*, vol XXIX, no 1, 1999, pp 3-28. Samson looks at the early days of the GMA from a more political perspective than Gerriets through his assessment of the firm as both instrument and reflection of British economic and colonial policy. An important element in this paper is Samson's beginning of an examination of the interests of major GMA shareholders in other business ventures in British North America. My reference to GMA links to the Shubenacadie Canal Company is just one example of the extent of those interests.



Artifacts from the early Cape Breton coal mining railways were the first to be acquired by the CRHA in 1937 (Artifact No. 1937.1). These pairs of wheels and axles (and section of Bull Rail) came from the Acadia Coal Company in Stellarton, Nova Scotia and were used to support the wooden coal hoppers the subject of this Library and Archives Canada photo taken in 1858 (note the manual brakes). The wheels were stored at the home of Donald Angus in Senneville for many years. They have been mounted to form a primary display at Exporail, located immediately behind the wooden model of the *Dorchester*, Canada's first steam locomotive. Library and Archives Canada / Stephen Cheasley.

*Ces artefacts provenant des anciens chemins de fer de mines de charbon du Cap-Breton furent, en 1937, les premières acquisitions de l'ACHF (artéfact no 1937.1). Ces paires de roues proviennent de l'Acadia Coal Company à Stellarton, Nouvelle-Écosse, et furent utilisées pour supporter des wagons-trémies en bois. La photo fut prise en 1858 (à noter : le frein manuel). Les roues furent entreposées au domicile de Donald Angus à Senneville pendant plusieurs années. Elles sont maintenant installées à l'entrée d'Exporail, juste à côté de la réplique en bois de la *Dorchester*, première locomotive du Canada. Bibliothèque et Archives Canada/Stephen Cheasley.*

My First Diesel Repair

By Barry Biglow

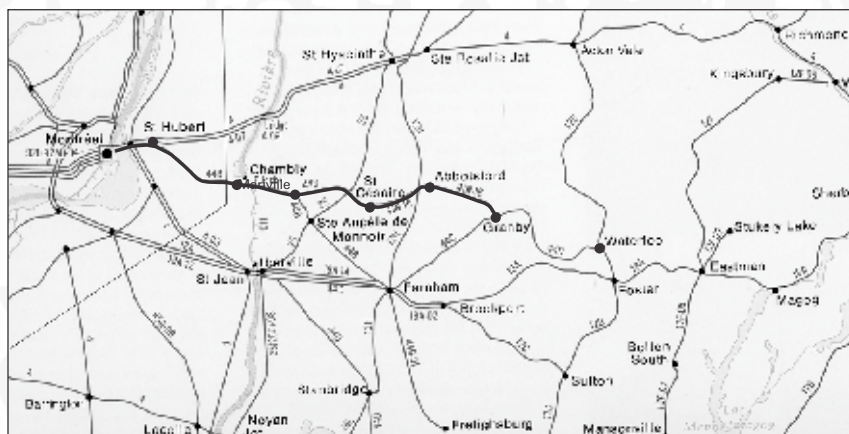
In 1958 having graduated from the University of Manitoba with a Bachelor of Science in Electrical Engineering, I went to work for the Canadian Westinghouse Company. I first went on the Graduate Training course in Hamilton, Ontario. I spent several months in Hamilton and in that time managed to get in fan trips on the Canadian National Railway (CNR) to Stratford shops and also on the Niagara, St. Catharines & Toronto Railway. I then went to Granby, Quebec working in the Lighting Division. Granby was the end of the Montreal & Southern Counties (M&SC) line, which was a well known interurban from Montreal, but by the time I went to Granby the electrification had been removed. The CNR had replaced the electrification with a diesel hauled service going directly into Montreal's Central Station.

Ma première réparation d'un diésel

Par Barry Biglow

Traduit en français par Denis Vallières

En 1958, avec en poche un diplôme de baccalauréat en science (génie électrique) de l'Université du Manitoba, j'ai été engagé par la compagnie Westinghouse du Canada. Je me suis d'abord inscrit à une session d'entraînement pour les nouveaux diplômés, d'une durée de quelques mois, à Hamilton, Ontario. J'ai alors profité de mon séjour dans cette ville pour participer à quelques excursions pour amateurs ferroviaires offertes par le Canadien National (CN), entre autres aux ateliers Stratford et sur le réseau du Niagara, St. Catharines & Toronto Railway. Après ma session à Hamilton, j'ai travaillé à la Division éclairage de l'entreprise à Granby, au Québec. Cette ville fut le terminus de la ligne du Montreal and Southern Counties (M&SC), un service interurbain électrique bien connu à l'époque. Mais lors de mon séjour à Granby, le CNR avait déjà remplacé le réseau électrifié d'origine par une traction au diésel qui amenait les trains directement à gare Centrale de Montréal.



Montreal & Southern Counties electric service was from Montreal to Granby, cut back to Marieville in 1951. The new CNR diesel service operated from Waterloo to Granby and on to Montreal. Enhanced map detail from Lines of Country by Christopher Andreae, published by Boston Mills Press in 1955, now out of print.

La ligne électrifiée du Montreal & Southern Counties reliait Montréal et Granby jusqu'en 1951 où le service s'arrêta à Marieville. Le nouveau service diesel du CNR relia à ce moment là Waterloo à Granby puis de là jusqu'à Montréal. Carte détaillée de /Lines of Country/ de Christopher Andreae publié par Boston Miles Press en 1955 (édition épuisée).

A wet snow was falling on November 24, 1951 when M&SC baggage motor 501 and 600 series passenger interurban made their final call at Granby's impressive brick station. CNR heavyweight coach passenger service hauled by new six-axle diesels would replace the electric cars the next day. Edmund Lambert.

Une neige mouillante tombait en ce 24 novembre 1951, au moment où le fourgon à bagages motorisé no 501 et des voitures de passagers de la série 600 se préparaient à quitter pour la dernière fois l'impressionnante gare de briques de Granby. Dès le lendemain, ces véhicules électriques étaient remplacés par des voitures lourdes du CNR tirées par des nouvelles locomotives diésels à six essieux. Edmund Lambert.

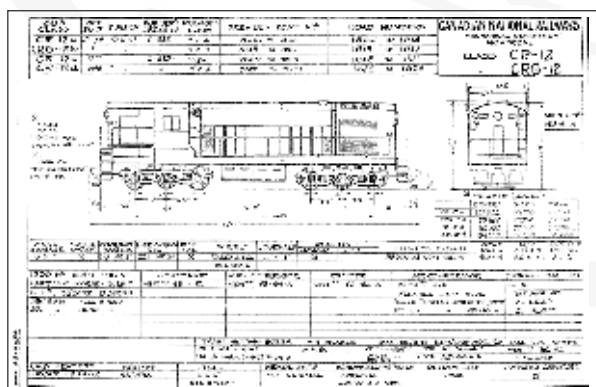


At this time CRHA fan trips were being held using as many different types of steam engines as possible before they were retired. On this occasion, October 5, 1958, a fan trip was being held from Montreal using one of the CNR 5700 Hudson class engines built for the high speed Montreal-Toronto service in the 1930's. By taking the early morning train from Granby to Montreal, I could make a connection to the fan trip at Central station. Thus I got up early and caught the diesel train to Montreal.

The M&SC, with its interurban origins, was not built using heavy rail. Thus the diesel electric locomotives for the Granby service were three special lightweight 1200 horsepower, 6 axle units equipped with a steam generator numbered 1615 to 1617. These class CRG-12b units were built by Canadian Locomotive Company to the designs of Fairbanks Morse. To spread out the weight of the units, their trucks were A-1-A style having an idler axle between the outer axles driven by traction motors.

These units were part of an order placed on September 21, 1950 by the Canadian National Railway for 18 road switchers from the Canadian Locomotive Company in Kingston, Ontario. CLC builder's numbers 2650 to 2652 were delivered in October and November 1951 as H12-64s (CNR Y-2-b). These three units had steam generators and were assigned to the Granby-Montreal passenger service replacing the M&SC electric interurbans, which had ceased operation beyond Mariville. These units originally carried CNR road numbers 7615 - 7617; they were re-numbered to 1615 - 1617 in 1956 to free up road numbers.

The other 15 road switchers were built as CLC builder's numbers 2653 - 2667 and were delivered between November 1951 and January 1952. They were classified as CNR Y-2-a and carried road numbers 7600 - 7614. Like their passenger hauling sisters, they were re-numbered 1600 - 1614 in 1956. (Don McQueen and Constructed in Kingston published by the CRHA)

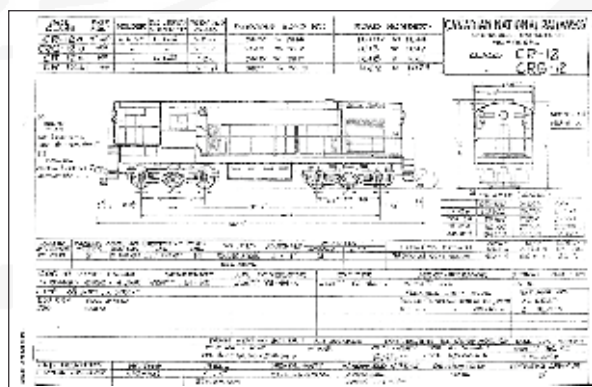


À l'époque, on utilisait pour les excursions à l'intention des amateurs ferroviaires de l'ACHF la plus grande variété de locomotives à vapeur possible avant qu'elles ne soient définitivement retirées. Ainsi, le 5 octobre 1958, pour une excursion entre Montréal et Toronto, on nolisait l'une des locomotives du CNR de type Hudson, série 5700, construites pour le service grande vitesse Montréal-Toronto dans les années 1930. En prenant le train tôt le matin vers Montréal, j'arriverais à temps pour la correspondance à la gare Centrale.

Le réseau du M&SC, conçu pour faire rouler des véhicules interurbains électriques, avait été construit avec des rails légers. C'est la raison pour laquelle on avait choisi d'utiliser trois locomotives diésels légères de 1200 chevaux-vapeur à six essieux, équipées d'une génératrice à vapeur. Numérotées 1615 à 1617, ces engins de classe CRG-12b furent construits par la Canadian Locomotive Company selon un design de Fairbanks Morse. Les bogies avaient une configuration A-1-A, un essieu libre entre deux essieux motorisés, afin de mieux répartir le poids des locomotives.

Les engins faisaient partie d'une série de 18 locomotives de manœuvre de ligne, commandées le 21 septembre 1950 par le Canadien National à la Canadian Locomotive Company de Kingston en Ontario. Portant les numéros de série 2650 à 2652 de la CLC et de type H12-64 (CNR Y-2-b), elles furent livrées en octobre et novembre 1951. Ces trois engins, avec génératrice à vapeur, furent assignés au service passager Montréal-Granby, remplaçant les véhicules électriques de la M&SC – dont le terminus fut ramené à Mariville. En 1956, le CNR changea leurs numéros d'origine, 7615 à 7617, pour 1615 à 1617, afin de libérer ces numéros pour d'autres séries.

Les 15 autres locomotives de manœuvre de ligne se virent attribuer par le CLC les nos 2653 à 2667 et furent livrées entre novembre 1951 et janvier 1952. Elles furent classées par le CNR comme Y-2-a et portèrent les nos 7600 à 7614. À l'instar de leurs sœurs assignées au service passager, elles furent renumérotées 1615 à 1617 en 1956. Constructed in Kingston de Don McQueen, publié par l'ACHF.





Montreal & Southern Counties 602 is on the passing track as the Granby train hauled by CNR 1616 pulls away from Marieville bound for Montreal on May 15, 1956. Marieville was the interurban's outer limit from November 1951 to October 13, 1956 when all electric service ended. Stephen D. Maguire.

Le no 602 du M&SC est sur la voie d'évitement tandis que le train de Granby, tiré par la locomotive no 1616 du CNR, quitte Marieville en direction de Montréal en ce 15 mai 1956. Marieville fut le terminus du service interurbain de la M&SC de novembre 1951 jusqu'au 13 octobre 1956, date à laquelle prit fin le service de la ligne électrifiée. Stephen D. Maguire.

The train having laid overnight at Granby left on time with me as the only patron. Good progress was made until we stopped in a field near St. Paul d'Abbotsford. The diesel engine was heard to start several times, but the train did not move. Finally being a brash young engineer I decided to go to the locomotive and see what the trouble was. Nodding to the baggageman, I stepped onto the unit and into the cab. As might be anticipated the unit would not generate current for the traction motors, i.e. would not load. Now Westinghouse made a sales feature of the fact that all circuits on their locomotives used breakers rather than fuses, which were used on GM and ALCO diesel locomotives. Fuses using zinc elements have a nasty habit of failing falsely when they are subjected to cycles of current and this fact disabled many early diesels.

What to do! Well having not been thrown off the unit and saying I worked for Westinghouse (I didn't say how long!), I was asked to repair the unit. I decided to start by turning all the breakers off and making sure they were reset. After starting the unit the engineman tried the throttle and the unit loaded. Fine now to get going. After whistling two on the horns and getting a reply of two on the communication whistle, we set off again. Some progress was made towards civilization but a breaker opened and engine loading stopped. I persuaded the engineman to keep on coasting while we waited for the breaker to cool. When the breaker thermal element cooled, it could be reset and the engine loaded. We proceeded in this fashion until it was discovered that if the throttle was not advanced beyond the third notch that the breaker did not trip. After some time we arrived at Marieville, a station with a working railroad telephone circuit and with the operator and his family prepared to go to Sunday mass. The train was now seriously off schedule and some protection was needed against the train from Montreal if we were to proceed. Were we to proceed?

Le train, garé pour la nuit à Granby, partit à l'heure. Un seul passager : moi-même! Nous avons parcouru un bon bout de chemin quand le train s'arrêta soudain dans un champ près de Saint-Paul d'Abbotsford. J'ai alors entendu l'engin redémarrer à plusieurs reprises sans succès. Finalement, jeune et fier ingénieur, j'ai décidé de m'avancer vers la locomotive pour m'enquérir du problème. Saluant au passage le préposé aux bagages, je suis monté à bord et suis entré dans la cabine. Comme je l'avais soupçonné, le courant de la génératrice ne se rendait pas aux moteurs de traction. La firme Westinghouse était la seule à installer des disjoncteurs sur ses circuits de locomotives, à l'opposé de GM et Alco qui persistaient à utiliser des fusibles. Ces derniers, à éléments de zinc, avaient la fâcheuse manie de sauter lorsque qu'ils étaient exposés à des variations de courant, ce qui avait pour effet de rendre inutilisables plusieurs locomotives âgées.

Que faire? N'ayant pas été expulsé de la cabine et ayant annoncé que j'étais à l'emploi de Westinghouse – sans révéler depuis combien de temps! –, on m'a alors demandé si je pouvais tenter une réparation. J'ai d'abord fermé tous les disjoncteurs et je me suis assuré ensuite qu'ils étaient tous remis en fonction. À la suite du démarrage de l'engin, le mécanicien a actionné le régulateur de marche et la locomotive fut prête à poursuivre sa route. Après deux coups de klaxon et les deux rappels du système de communication, ce fut le départ. Nous avons progressé quelque peu vers la civilisation lorsqu'un disjoncteur se déclencha de nouveau. Re-arrêt total. Nous avons attendu qu'il refroidisse et sommes repartis aussitôt. Nous avons répété cette manœuvre jusqu'au moment où nous avons découvert que le disjoncteur se déclenchait lorsque la manette du régulateur était à la troisième position. Après un certain temps, nous sommes enfin arrivés à Marieville, À cause du retard accumulé, notre train avait besoin d'une protection pour continuer son chemin, car maintenant, il devait en croiser un autre en provenance de Montréal. Poursuivrait-il son chemin?



The entire class of CNR Y-2-b's is represented in these three Lorne Perry photos taken when the units were almost new in 1952. All three photos of the Granby train were taken at St. Lambert, Quebec. Lorne Perry.

Photos prises en 1952 à la gare de Saint-Lambert au Québec. On y voit les trois locomotives du CNR de classe Y-2-b au moment où elles étaient encore neuves. Lorne Perry.

A discussion was then had with the foreman at the Pointe St. Charles diesel shop. Having come some distance in third notch I felt the unit could make the remaining distance to Montreal since we were within commuting distance from Montreal. But we still had to have an order on the train from Montreal. At this point the operator and the conductor had a dispute since the

La gare possédant un système téléphonique de réseau, une discussion s'engagea avec le contremaître de l'atelier diésel de Pointe Saint-Charles. Comme nous étions à proximité de Montréal, j'estimais que nous pourrions faire le reste du parcours même avec un régulateur de marche limité à la troisième position. Cependant, nous avions besoin d'un ordre en provenance

operator wanted to be called on duty (and be paid) for taking an order outside regular time. He then could go to Sunday mass. The operator was called on duty, the order giving the Montreal train rights over our train was duly given and we proceeded. The Montreal train was met on the way and having made a slow trip we arrived at St. Lambert. Could we make the rest of the way without assistance? We would try.



Our train, consisting of a locomotive, baggage car, and passenger car, crept its way across Victoria Bridge which has a significant (for our train) hump in the middle. At Bridge Street station a 180 series Z4 electric hauler was waiting to take us to Central station. Next problem - how to double head the air brakes? The engineman had not done it for some time and was not sure. After some tries the brakes were set in the correct position and the train set off for its final destination - Central Station. The ride behind the hauler into Central Station was the fastest portion of the whole train trip. We arrived in Central Station in grand style, though too late to connect with the CRHA excursion train.

Not being an experienced railfan at the time, I did not request a copy of the Marieville order or even note the number of the diesel engine. Thus the trip remains only a memory. I did get some pictures of the Montreal streetcar system while filling in the time until I returned to Granby. Thus I never did get to ride behind a CNR Hudson. Oh well, I had my own fun that day. And I subsequently became very familiar with diesel locomotives during my career of 31 years with Canadian National Railways in the Equipment department.

de Montréal pour agir. Le chef de gare venait de quitter son poste et se préparait à partir à la messe dominicale avec sa famille. Une dispute éclata entre lui et le chef de train, le chef de gare demandant à être rappelé officiellement en devoir afin d'être rémunéré. Finalement, tout rentra dans l'ordre, le chef obtint gain de cause. Puis, l'ordre de priorité a été dûment donné au train en provenance de Montréal, et enfin, notre train s'est remis en marche. Nous avons croisé le train de Montréal en toute sécurité et lentement, avons fini par arriver à Saint-Lambert. Pourrions-nous faire le reste du parcours sans assistance? Nous le tenterions.

Barry snapped 1616 (formerly 7616) at Granby circa 1958. Barry Biglow.

Cliché de Barry de la no 1616 (ex-7616) à Granby vers 1958. Barry Biglow.

Notre train comportait, outre la locomotive, un fourgon à bagages et une voiture de passagers. Il réussit à franchir le pont Victoria malgré la pente ascendante, significative dans ce cas-ci. À la gare de la rue Bridge, une locomotive électrique de type Z4 de la série 180 attendait notre train pour l'amener jusqu'à la gare Centrale. Nouveau problème : comment relier le système de frein des deux locomotives? Le mécanicien n'avait pas exécuté cette tâche depuis un certain temps et n'était plus sûr de la procédure à suivre. Après quelques essais, les freins furent reliés en bonne position et le train put se rendre à sa destination finale. Cette dernière portion du parcours fut la plus rapide de tout le voyage. Nous entrâmes à la gare Centrale en pavoisant, mais trop tard pour la correspondance avec l'excursion de l'ACHEF.

N'étant pas encore un amateur ferroviaire averti à ce moment-là, je n'avais pas demandé de copie d'ordre de marche de Marieville ni même noté le numéro de la locomotive. Cependant, j'ai profité de mon séjour à Montréal pour prendre des photos du réseau de tramway de la ville jusqu'à mon retour vers Granby. Je n'ai donc pas eu l'occasion de voyager derrière une Hudson du CNR ce jour-là, mais j'ai vécu un autre type d'expérience. Au cours de ma carrière de 31 ans au Service de l'équipement du CNR, je suis devenu très familier avec les locomotives diésels.



CNR H-12-64 7616 crosses Waterloo Lake on the last lap of her journey from Montreal to Waterloo, Quebec in the early 1950's. The CNR Montreal to Granby and Waterloo passenger service replaced the interurban service between Marieville and Granby after 1951. Diesels and interurbans overlapped between Montreal and Marieville between 1951 and 1956. James A. Brown.

La locomotive H-12-64 du CNR traverse le lac Waterloo vers la fin de son parcours entre Montréal et Waterloo dans les années 1950. Le service de trains passagers du CNR entre Waterloo, Granby et Montréal a remplacé le service de la ligne interurbaine électrifiée entre Granby et Marieville entre 1951 et 1956. James A. Brown.

Now reclassified as a CRG-12b, CNR H-12-64 1615 reposes with sister 1617 outside the Montreal yard diesel shop circa 1958. CNR diesels were reclassified according to builder in a classification scheme that still exists today on CN and VIA diesels. Thus CNR 1615 and 1617 are Canadian Locomotive Company (C), roadswitchers (R), equipped with steam generators (G), with 1200 horsepower (12), on six-axle trucks (6), with four axles powered (4). Peter Cox, CRHA Archives, Fonds Corley.

La locomotive CNR H-12-64 no 1615 est sur une voie de garage dans la cour de l'atelier diesel de Montréal autour de 1958. L'identification alphanumérique CGR 12-b de ces locomotives a été rendue nécessaire à la "12" à 12,000 c.v., le "6" (H-12-64) à 6 essieux et le "4" à 4 essieux moteurs. Peter Cox, ACHF, Fonds Corley.



At Granby, Quebec circa 1951 H-12-64 7615 prepares to leave for Montreal. The trolley wire over 7615 is of no use as interurban electric service no longer operates east of Marieville on the old M&SC. Photo: James A. Brown.

Granby, Québec vers 1951. La H-12-64 no 1615 prête pour le départ vers Montréal. Le fil aérien au-dessus de la locomotive n'est plus utilisé puisque le service sur le réseau électrifié de la M&SC s'arrête désormais à Marieville. Photo James A. Brown.

BACK COVER TOP: Car 147 built by the British Columbia Electric Railway in 1910 then completely rebuilt in 1940 makes its way west on Hastings Street just west of Columbia Street back in 1948. Sister cars as well as a fastback 'BC Radio Cab' are evident in this marvellous urban scene of late forties Vancouver. Collection of Electric Railway Historical Society.

COUVERTURE ARRIÈRE : Le tramway no 147 construit par la BCER en 1910, puis reconstruit en 1940, en direction ouest rue Hastings à l'ouest de la rue Columbia en 1948. On aperçoit aussi d'autres tramways semblables et un taxi de la BC Radio Cab sur cette magnifique scène urbaine de la fin des années 1940 à Vancouver. Collection de l'Electric Railway Historical Society.

BACK COVER BOTTOM : The CNR CRG CLC's certainly got around. So did the itinerant Forster Kemp. In this view from the early fifties, H-12-64 1619 is the power for today's mixed train from Pine Falls, Manitoba to Winnipeg. The 1619 still sports the 'CNR' herald she left the Kingston works of CLC with but has forsaken her original road number 7619. CRHA Archives, Fonds Kemp.

COUVERTURE ARRIÈRE : Photo prise par Foster Kemp de la locomotive de type H-24-64 du CNR no 1619 construite par la CLC au début des années 1950, à la tête d'un train mixte reliant Pine Falls et Winnipeg au Manitoba. Elle arbore encore l'emblème original du CNR, mais non le numéro 7619 qu'elle portait lorsqu'elle a quitté les ateliers de la CLC à Kingston. Archives ACHF, Fonds Kemp.

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