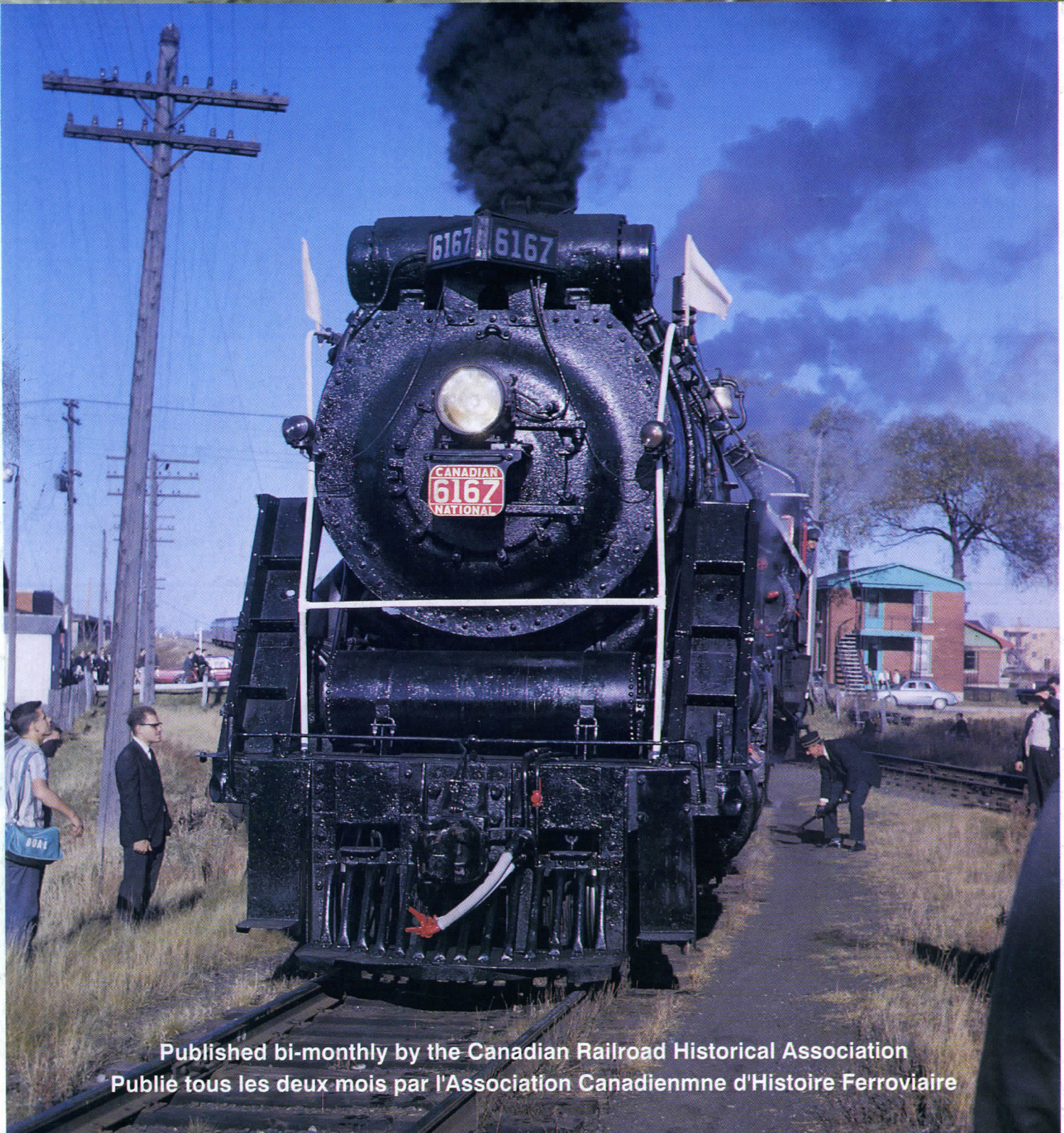




# Canadian Rail

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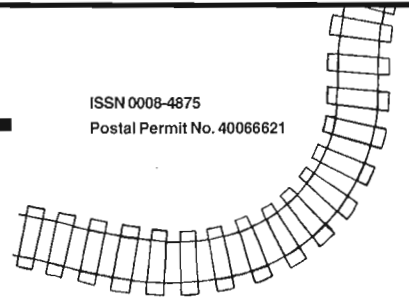
# CANADIAN RAIL

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*FRONT COVER: CNR U-2-e locomotive 6167 at Victoriaville Que. on an excursion run by the CRHA on October 27, 1963. Note the trainman shovelling sand on to the track to aid traction on the tight curve. Photo by Fred Angus*

*BELOW: A builder's photo of CNR U-2-d class Northern type locomotive 6162 when new in April 1936.*

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Canadian Rail is continually in need of news, stories, historical data, photos, maps and other material. Please send all contributions to the editor: Fred F. Angus, 3021 Trafalgar Avenue, Montreal, P.Q. H3Y 1H3, e-mail angus82@aei.ca. No payment can be made for contributions, but the contributor will be given credit for material submitted. Material will be returned to the contributor if requested. Remember "Knowledge is of little value unless it is shared with others".

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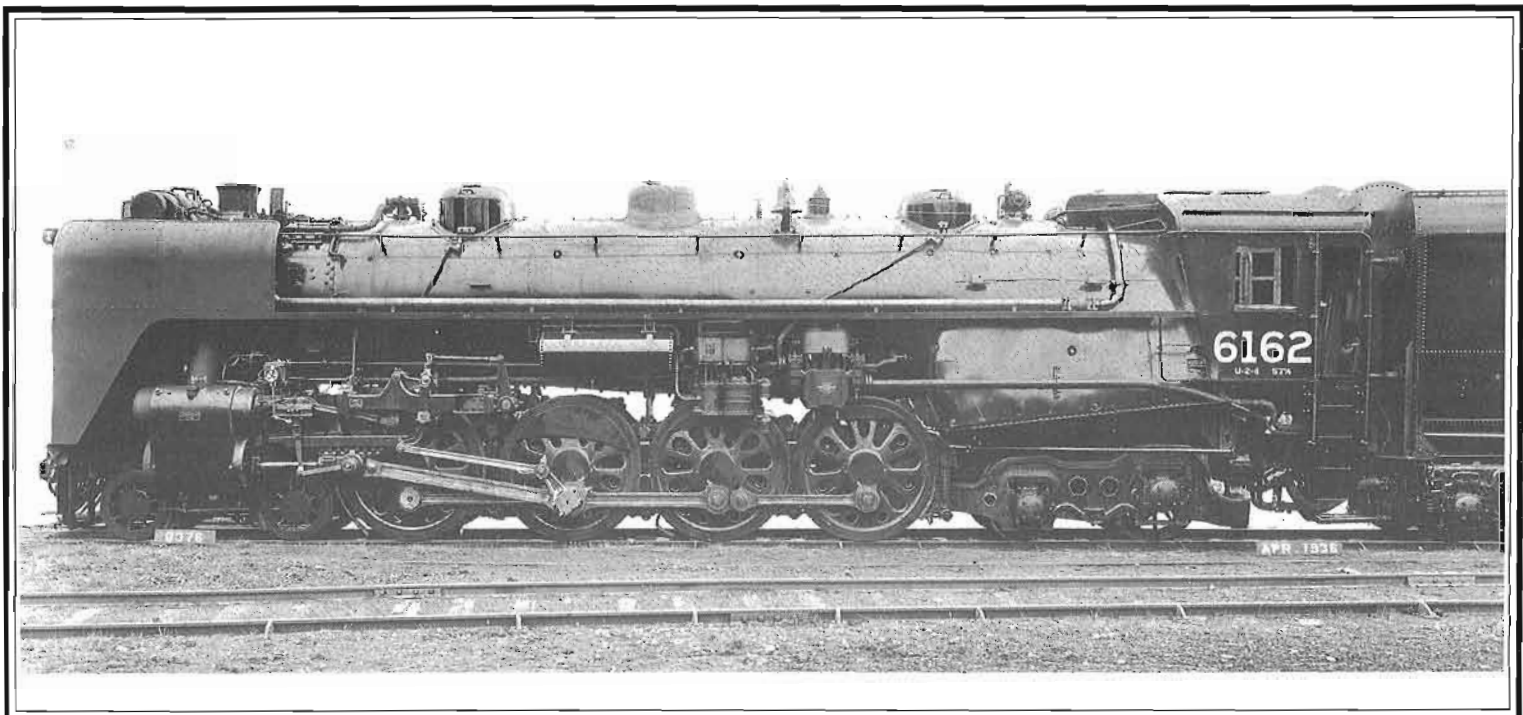
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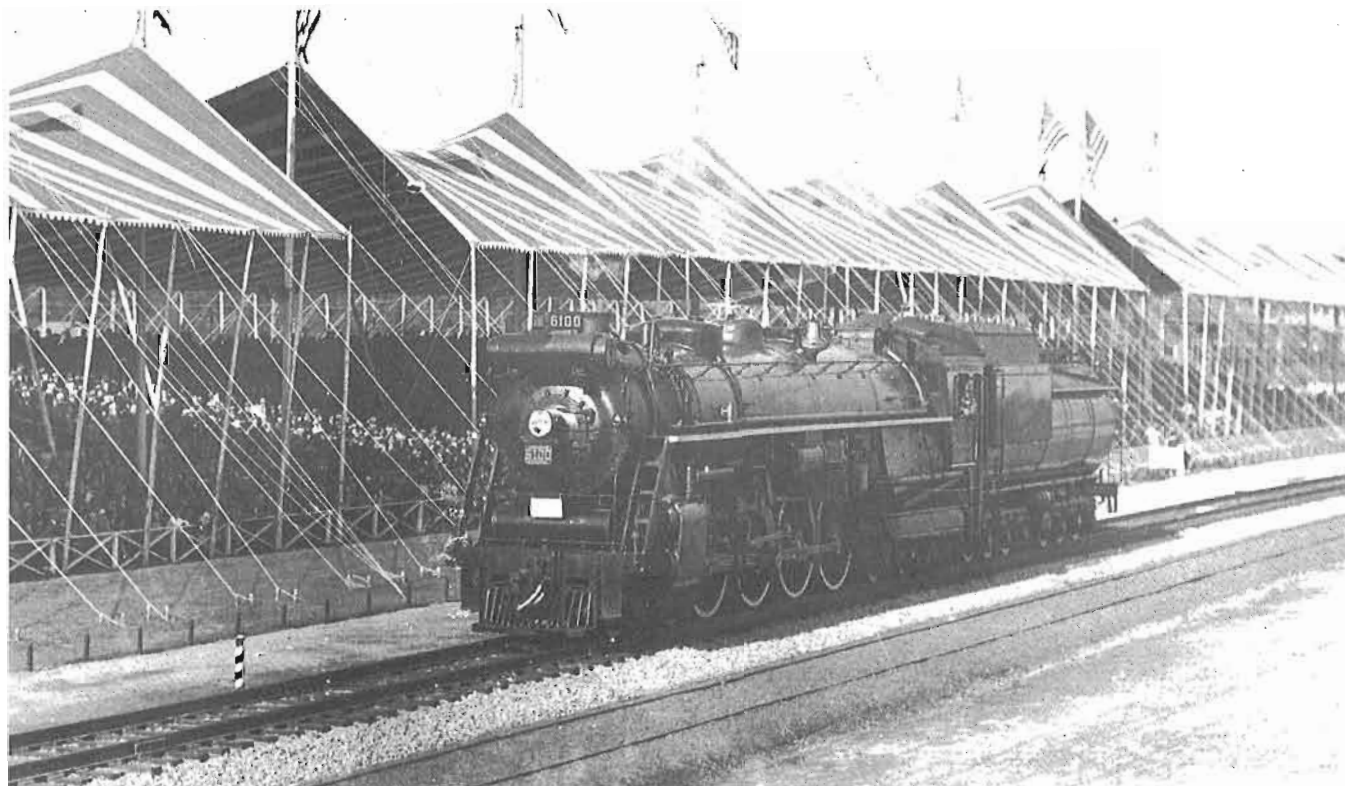


# The Northern Type Locomotives in Canada

## 1927 - 75th Anniversary - 2002

### Introduction

by Fred Angus



*Canada's first Northern type locomotive, CNR 6100, taking part in the Fair of the Iron Horse in Baltimore Maryland in 1927. Photo courtesy of Canadian National*

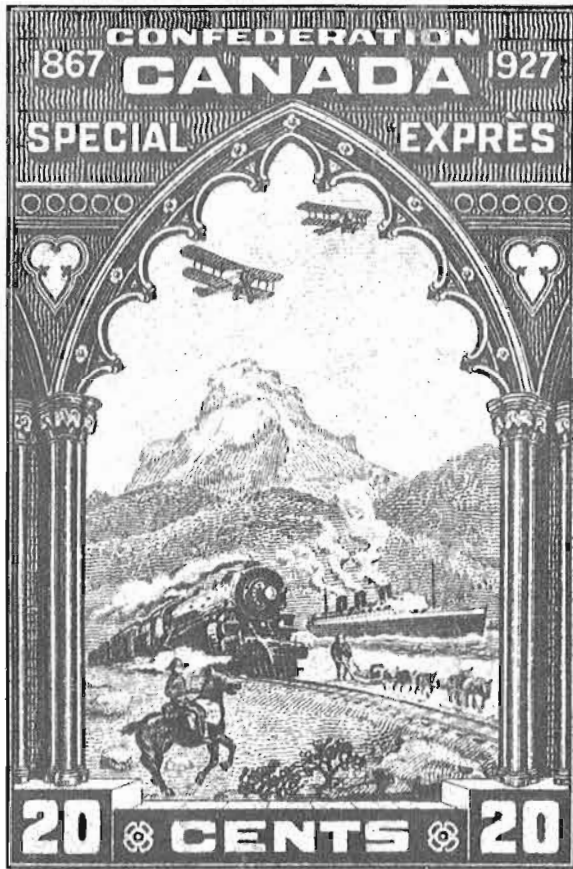
**1927.** It was a prosperous and eventful year. More than eight years had passed since the end of the Great War of 1914 - 1918, and the postwar depression of 1920 - 1921 was only an unpleasant memory. It was the era known as the "roaring twenties", and times were good; fortunes were being made in stocks and there was no sign of the financial crash that would plunge the world into depression little more than two years later. Some well remembered events of 1927 included Charles Lindberg's solo trans-Atlantic flight and Babe Ruth's 60 home run season.

Canada shared in this general feeling of well-being; times were good and the 60th anniversary of Confederation provided an excellent excuse for a great jubilee celebration. Ten years earlier, Confederation's 50th anniversary had occurred during the dark days of the war so celebrations were very much curtailed. Now, however, the world was at peace and plans were made for the Diamond Jubilee observance. Not until 1967 would Canada again see such celebrations.

As part of the commemoration, the Prince of Wales (later Edward VIII) toured Canada and, on July 1, the actual anniversary, he officially inaugurated the Peace Tower in Ottawa. Originally to have been called the Victory Tower, the name Peace Tower was finally chosen as being more appropriate. Thus was completed the rebuilding of the centre block of the Parliament buildings which had been destroyed by fire in 1916.

Canada's railways shared in this general feeling of good times. It is no coincidence that it was in 1927 that the Canadian Pacific Railway announced that they would build the largest hotel in the British Empire - The Royal York. Both CNR and CPR introduced modern first-class passenger trains that same year, and Toronto Union Station finally opened, more than a decade after the building was completed.

Times had changed. The railways no longer had a monopoly on long distance transportation. Roads were better and automobiles more numerous. Airplanes were coming



The 20-cent special delivery stamp of 1927 commemorated the Confederation jubilee. It depicted several means of transportation in Canada, prominent among which was the passenger train. Note that the automobile does not appear.

more and more into use, and the excitement over the Lindberg flight served to draw more attention to this new means of transportation which someday might be a serious rival. Progressive railways realized they would have to improve their service in order to keep their customers, both passengers and shippers.

The historical aspect of railways was not forgotten either in this year of 1927. In the United States the 100th anniversary of the founding of the Baltimore & Ohio Railroad was commemorated by a "Fair of the Iron Horse" which included a procession of historic motive power and rolling stock from the earliest to the most modern - including 6100 from the CNR and 2333 from the CPR.

The Canadian National system had come a long way since it was formed, only eight years before, as a collection of bankrupt railways taken over by the federal government. Under the guidance of Sir Henry Thornton, the CNR had become the largest railway system in America, operating a wide ranging transportation system that included ships as well as trains. Adopting the slogan "Courtesy and Service", the CNR provided service that rivaled the best anywhere.

As part of its transformation into a world-class transportation system, the CNR ordered a great many new locomotives and cars, and in 1927 acquired the first of a class of locomotive that became a legend, the 4-8-4 Northern type. Originally these new engines had been named "Confederation" type in honour of the Diamond Jubilee of Confederation. However it was soon decided to use the name "Northern" due to the fact that this type had been introduced by the Northern Pacific the year before. Since many of CN's lines were, in fact, northern, it was felt that this name was appropriate. Between 1927 and 1944 CN and its United States subsidiary Grand Trunk Western acquired 203 Northern's, the largest such fleet in North America.

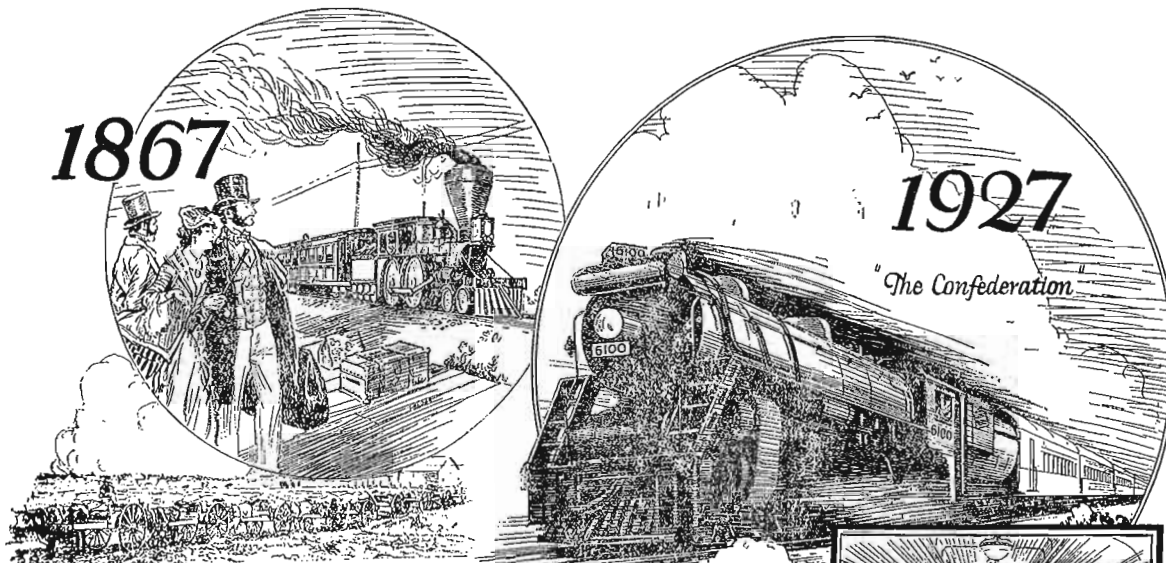
To commemorate the 75th anniversary of the introduction of this famous type of locomotive, we have devoted this entire issue of Canadian Rail to the Northern's. While CNR and GTW had the great majority of the Northern's owned by a Canadian system, they were not the only ones. We have also included the two built by the CPR as well as the four built for the Temiskaming & Northern Ontario, later the Ontario Northland.

BELOW: Another 1927 commemorative stamp showed the map of Canada in 1867 and 1927, together with the main line transcontinental railways.



OPPOSITE: The main elements of a CNR advertisement that appeared in newspapers across Canada on June 30 1927, the day before the Jubilee. It depicts trains of 1867 and 1927, as well as a brief history of CN and its predecessors. Note that brand-new 6100 is hauling the "Confederation", CN's newest train.

# See Canada in Canada's Diamond Jubilee Year 1867-1927



## Sixty Years of Canadian National Progress



In 1860, the Grand Trunk Railway, now a part of the Canadian National Railways, comprised 872 miles of track. Today, Canadian National embraces 22,548 miles of line, the largest railway system in America, touching every important Canadian City; fleets of steamships that carry Canada's ensign and products to every quarter of the globe; Dominion-wide express and telegraph services; a chain of distinguished city hotels; resort hotels and bungalow camps, and an Industrial Department to foster the location and development of new industry.

The development of Canada and the Canadian National Railways is interwoven closely. As one grew, so did the other, mutually dependent.

Before even the memorable year of Confederation, portions of the present-day Canadian National had attracted world-wide attention to themselves and to the then-struggling young country. The construction of the original Victoria Bridge for the Grand Trunk Railway and its opening by the Prince of Wales in 1860, focussed the eyes of Nations on Canada as perhaps no preceding event had ever done.

Canada, being a land of vast distances, the railway was seen to be the key to her future expansion and prosperity. Indeed, the Grand Trunk Railway had long been the dominating factor in Canada's growth to date. It had opened up the then known parts of Ontario and Quebec to settlement and had tapped the country's resources from the International Boundary at Sarnia to Riviere du Loup.

In Confederation year, the dependence of national growth upon rail communication became even more strikingly evident, the construction of the Intercolonial Railway being insisted upon by the Maritime Provinces as a condition of entry into the Dominion.

Thus, within a single decade, Canadian National was linked with two of the greatest events in Canada's history, and helped make Confederation an accomplished fact.

Since then, Canada and the Canadian National have developed hand in hand. Mile upon mile of new track was laid in Quebec and Ontario; new towns and industries sprang into being, new lands were opened to cultivation. The sister country to our South was brought into intimate communication with us, commerce was stimulated, capital attracted, immigration fostered.

Then the West called and the Canadian Northern and Grand Trunk Pacific Railways opened up vast areas of fertile prairie to the settler; rich Pacific timber and mineral lands were made to yield their wealth; scenic wonderlands were made accessible and a new route afforded to Canada's Pacific Coast. The Transcontinental Railway, from Winnipeg to Quebec, connected this great west with the eastern provinces.

Wherever it was needed, the railway appeared, a typical modern instance being that of the Rouyn Mining District the development of which is made possible by Canadian National service.

# CANADIAN NATIONAL

## *The Largest Railway System in America*

## CANADIAN NATIONAL SYSTEM NORTHERN TYPE LOCOMOTIVES

Class	Initials & Numbers	Builder & Year	Builder's Number	Cylinders (ins)	Drivers (ins)	Weight of loco in working order (lbs)	Tractive Effort (lbs)	Boiler Pressure (lbs)	Disposition	Notes
U-2-a	CN 6100-'19	C.L.C. 1927	1800 -'19	25½ x 30	73	385,590 396,390 (1)	56,785 66,100 (1)	250	Scrapped	(1) Booster equipped : 6100, '03, '05, '06, '08 to '13, '15, '16, '18 & '19
U-2-b	CN 6120-'39	M.L.W. 1927	67351-'70	25½ x 30	73	381,900	56,800	250	Scrapped	
U-2-c	CN 6140-'59	M.L.W. 1929	67769-'88	25½ x 30	73	383,000	56,800	250	Scrapped Except 6153	6153 at Delson (CRHA)
U-2-d	CN 6160-'64	M.L.W. 1936	68710-'14	25½ x 30	73	390,000	56,800	250	Scrapped	
U-2-e	CN 6165-'79	M.L.W. 1940	69260-'74	25½ x 30	73	402,700	56,800	250	6167 in Guelph – rest scrapped	
U-2-f	CN 6180-'89	C.L.C. 1940	1960-'69	25½ x 30	73	389,330	56,800	250	Scrapped	6184 equipped with poppet valve Nov. '49 to Feb. '52
U-2-g	CN 6200-'34	M.L.W. 1942-43	69698-'722 69790-'799	25½ x 30	73	399,600	56,800	250	Scrapped except 6200, 6213 & 6218	6213 displayed at C.N.E. Toronto 6200 stored N.M.S. & T. 6218 Ft. Erie
U-2-h	CN 6235-'64	M.L.W. 1943-44	70303-'327 70664-'668	25½ x 30	73	400,300	56,800	250	Scrapped	
U-3-a	GTW 6300-'11	ALCO 1927	67339-'50	26¼ x 30 26 x 30	73 73	399,000 399,000	60,200 59,200	250 250	Scrapped Scrapped	6306, '07 & '09 Remainder # became CN 1949
U-3-b	GTW 6312-'36	ALCO 1942	69618-'42	26 x 30	73	403,000	59,034	250	Scrapped except 6323 & 6325	6323 Illinois Railroad Museum 6325 operating on Ohio Central
U-4-a	CN 6400-'04	M.L.W. 1936	68715-'19	24 x 30	77	379,800	52,457	275	Scrapped except 6400	6400 N.M.S. & T.
U-4-b	GTW 6405-'10	LIMA 1938	7759-'64	24 x 30	77	382,700	52,457	275	Scrapped	

Table courtesy of Lorne Perry



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# “The Mighty Northerns” of Canadian National Railways

by Peter Murphy

Much has been written and spoken about Canadian National's 6167 and 6218 which remained in excursion service for years after the official “end of steam” in 1960. With all the interest concerning these two locomotives, one tends to overlook the fact that they were only two of a fleet of some 203 “Northern Type” 4-8-4 locomotives on the CN system. Following is the story of this fleet of engines which were the backbone of CN's heavy main line operation, both passenger and freight.

In 1927 the Canadian National Railways ordered some 52 locomotives of the 4-8-4 wheel arrangement. Originally called “Confederation Type”, they were soon redesignated “Northern Type” after the series built by the Northern Pacific earlier that year. This original order broke down as follows: 20 from Montreal Locomotive Works, 20 from Canadian Locomotive Company of Kingston and 12 from ALCO for use on the Grand Trunk Western in the United States. These were the first of some 203 locomotives which were ordered and designated in twelve different classifications from the U-2-a, built by CLC starting with 6100, through to the U-4-b (6405 - 6410) built by Lima in 1938 for the GTW. Although last in the classification, this group was not the newest. The honour of being the newest Northern on the CN system goes to U-2-h number 6264 which was delivered in 1944.

The “vital statistics” of all these locomotives varied only slightly. Cylinder diameter ranged from 24 to 26 inches, wheel diameter varied from 73 to 77 inches and overall length was approximately 95 feet for all units. Visually, however, there were distinct differences. The most apparent was the streamlining on the 6400 series of class U-4-a and class U-4-b. Other differences were the overhanging feedwater heaters on the early 6100s. Also some had spoked drivers and, at various times, numerous Northerns were fitted with “elephant ears”, i.e. smoke deflectors, which gave them quite a different appearance. Tractive effort ranged from 52,457 lbs. for the streamlined 6400s to 66,100 lbs. for those 6100s equipped with boosters.

The Northerns were truly a dual purpose locomotive, whether hauling a fast passenger train or a fast heavy freight with 80 or more cars. They were used far and wide across the system and could be seen regularly in most cities served by the CNR and its subsidiaries; Vancouver, Winnipeg, Chicago, Toronto, Montreal, Moncton, Halifax, to name just a few. Truly Canadian National depended heavily on its Northerns for almost a third of a century.

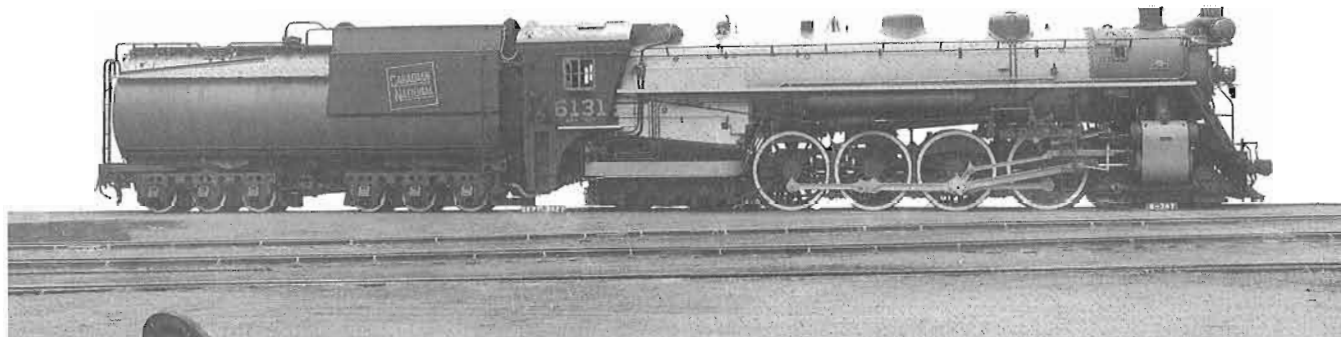
It is fitting that three of their number, 6153, 6167, 6218, were each used extensively on special steam excursions long after regular steam power had disappeared

from the National system altogether. No doubt their ability to haul a heavy passenger train at better than a mile a minute speeds led to the selection of the Northerns for these special trips. As it was realized that steam had all but disappeared these excursions rapidly gained in popularity. In 1960, as complete dieselization was achieved, CNR held “farewell to steam” excursions operating out of Toronto and Montreal. The first Toronto trip was hauled by 6167 and ran to Niagara Falls on July 10 of that year. An excursion from Montreal to Ottawa behind 6153 was held on September 4. For two years 6153 hauled trips out of Montreal while 6167 did the same duty at Toronto, the latter trips being much more numerous. On October 14 1962, 6153 was retired and 6167 carried on alone. Most of its special trips continued to be out of Toronto, but it was available for other service as well; one example being a trip from Montreal to Victoriaville and return on October 27 1963.

So popular had these steam excursions become that, as 6167 neared the end of its career, CNR overhauled another Northern, 6218, for excursion service, outshopping it on November 26 1963. On the weekend of September 26-27 1964, 6167 and 6218 were double-headed on a trip and then 6167 was retired. The excursion career of 6218 was the longest of them all, for it hauled more than 150 special trips during its “second career” which lasted almost seven years. However it could not last forever and on July 4 1971 the “Grand old lady of steam”, No. 6218, made its last run at Belleville, Ontario. This was not, however, the end of steam on CN, for Mountain type locomotive 6060 went into excursion service and ran for a number of years more. But 1971 marked the end of the operating career of the famous Northerns of the CNR and its subsidiaries, a career which dated back 44 years, 11 years after most of the series had been retired. Now it was truly the end of an era - or so it seemed - and it was, for thirty years.

As the old saying goes “it ain't over till its over” and, as it turns out, the operating career of the Northerns was not entirely over. Grand Trunk Western number 6325, a member of the U-3-b class, built by Alco in 1942, had been saved and was for many years on display at Battle Creek Michigan. In the late 1990s it came to the Ohio Central Railway and over a period of several years it was restored to operating condition. On March 20 2001, 42 years after it had last dropped its fire, and thirty years after the last run of 6218, the 6325 was fired up for a test run. Then, on September 22, 2001 it returned to service hauling a special excursion train. These special trips are held on the OC from time to time, so it will still be possible to see, and ride behind, a CNR-type Northern in the twenty-first century.

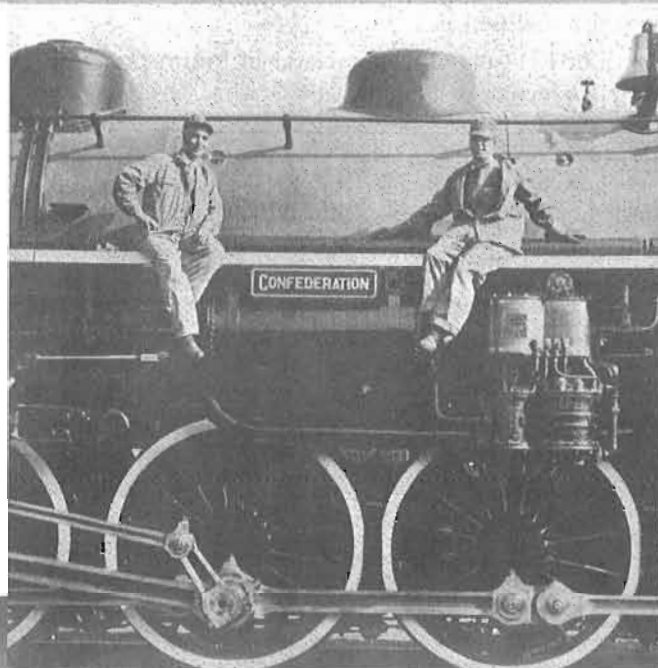
## The First Group, Classes U-2-a and U-2-b, 1927 6100-6119 from CLC and 6120-6139 from MLW



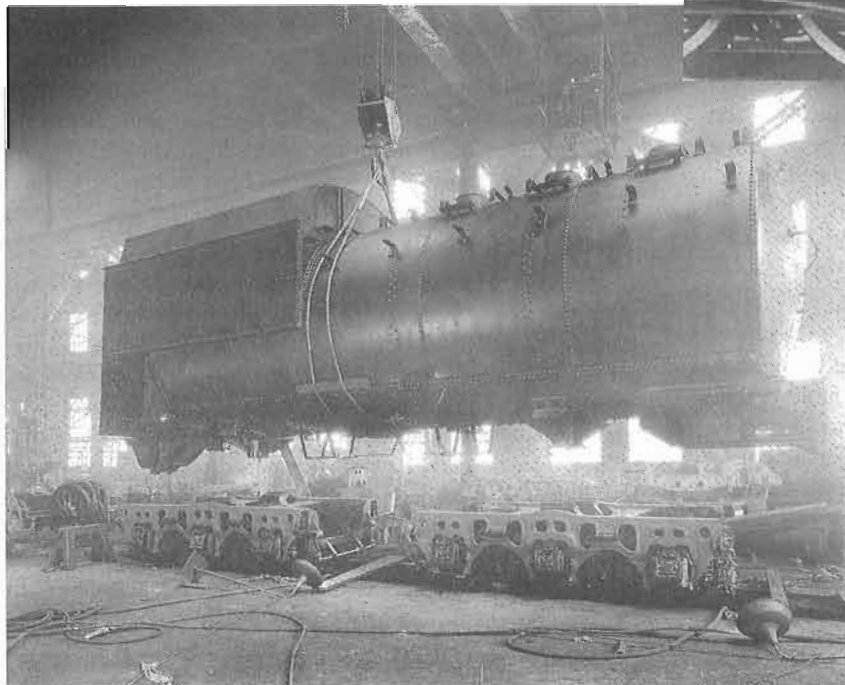
ABOVE: A builder's photo of 6131. Note that a print from the same negative was attached to the specification sheet opposite.

RIGHT: Engineer Duncan Campbell and fireman Robert McKay sitting on the running board of 6100 just before it left for the Fair of the Iron Horse in Baltimore in September 1927. Note the sign reading "Confederation", the original name for the class.

C.N. Magazine



BELOW: The tender of a 6100 is lowered on to its trucks during construction in 1927.



OPPOSITE: The specification sheet for 6120 - 6139, built by Montreal Locomotive works and delivered in August and September 1927.

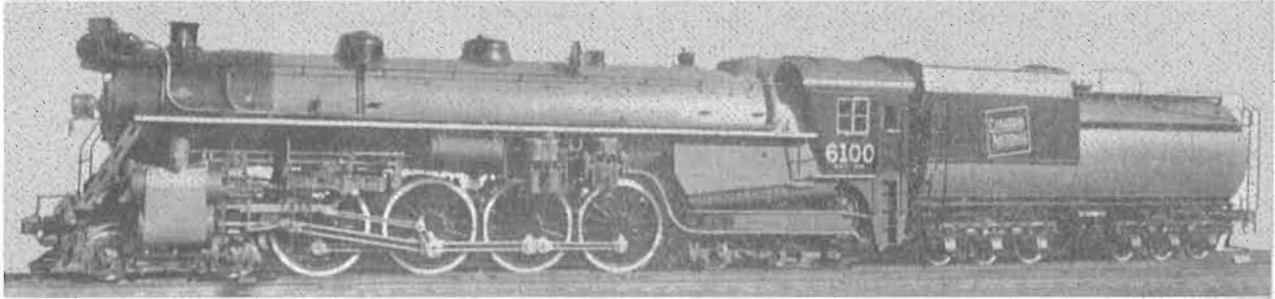
PAGES 50 TO 53 INCLUSIVE: An article which appeared in Canadian Railway and Marine World in July 1927 describing the first of the CNR's Northerns.





## Northern (4-8-4) Type Locomotives, Canadian National Railway.

From Canadian Railway and Marine World, July 1927.



As stated in Canadian Railway and Marine World for March, the C.N.R. ordered forty 4-8-4 locomotives, 20 from Montreal Locomotive Works and 20 from Canadian Locomotive Co., for Canadian lines, ten 4-8-4 locomotives from American Locomotive Co. for Grand Trunk Western Lines, four 4-8-2 locomotives from American Locomotive Co. for Central Vermont Ry., and ten 0-8-0 switching locomotives from Lima Locomotive Works, for Grand Trunk Western Lines. As stated in our April issue, the order for 4-8-4 locomotives for Grand Trunk Western Lines was increased subsequently to 12.

The 4-8-4 locomotives being built in Canada are the first in the country to be equipped with 4-wheel trailing trucks, and have been named the Northern type. They were designed for either passenger or fast freight service, and it is intended to use them on extended runs over two or more divisions. The first of the 20 ordered from Canadian Locomotive Co. was turned out about June 1, and was exhibited at Montreal during the recent American Railway Association Mechanical Division meetings there. The 20 being built at Montreal are identical with those from Kingston with the exception of a few details mentioned further on. The chief dimensions, etc., are as follows:-

Gauge	4 ft. 8 1/2 in.
Cylinder diam. and stroke	25 1/2 x 30 in.
Driving wheel diam	73 in.
Boiler, inside diam., 1st course	80 7/8 in.
outside diam., largest course	90 in.
working pressure	250 lb.
Firebox, length and width	126 1/2 X 96 1/4 in.
Tubes, no. and diam	15 - 3 1/2 in.
	27 - 2 1/4 in.
Flues, no. and diam	162 - 3 1/2 in.
Length of tubes and flues	21 ft. 6 in.
Combustion chamber, length	48 1/2 in.
Wheel base, driving	19 ft. 6 in.
engine	43 ft. 10 in.
total	82 ft.

Weights in working order:

	With booster.	Without booster.
Engine truck	65,000 lb.	65,000 lb.
Drivers	232,000 lb.	230,000 lb.
Trailing truck	91,000 lb.	83,000 lb.
Total engine	388,000 lb.	378,000 lb.
Tender	260,000 lb.	260,000 lb.
Total	648,000 lb.	638,000 lb.

Heating surface:	
Tubes and flues	3,814 sq. ft.
Firebox	315 sq. ft.
Syphons and arch tubes	117 sq. ft.
Total	4,246 sq. ft.
Superheating surface	1,700 sq. ft.
Grate area	84.4 sq. ft.
Maximum tractive power	without booster 56,800 lb. with booster 69,700 lb.
Factor of adhesion,	engine 4.05 booster 4.6
Capacity of tender,	water 11,300 Imp. gall. coal 20 tons
Limiting height	15 ft. 3 in.
width	10 ft. 9 in.

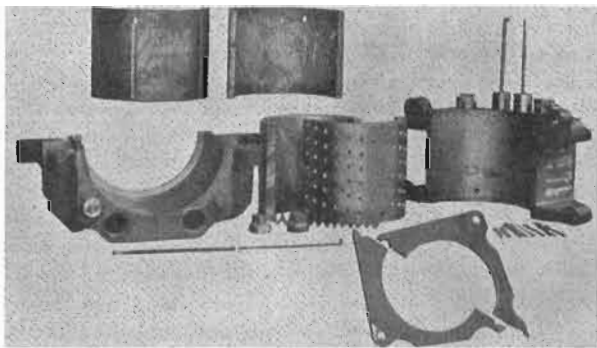
These locomotives will operate on curves up to a maximum of 18 degrees. All are being equipped with Duplex type D-1 stokers; Elesco K-39 feed water heaters with C.F. pumps; type E superheaters; American multiple throttles; precision reverse gear; and thermic syphons, two of the latter in the firebox and one in the combustion chamber. The locomotives being built by Montreal Locomotive Works are being equipped with Shoemaker firedoors; hand grate shakers; cast steel grates; Alco lateral motion device on front drivers; and Miner draft gear, and are being finished with Sherwin-Williams paints. Those being built by Canadian Locomotive Co. are being equipped with Franklin firedoors; Franklin power grate shakers; cast iron grates; Franklin lateral motion device on front drivers; and Cardwell draft gear, and are being finished with Thorpe Hambrooke paints. Other equipment, common to all 40 locomotives, includes Huron arch tube and washout plugs; two 3 1/2 in. Consolidated safety valves; Hancock H.N.L. inspirator on right hand side; Hancock side cheeks; improved type Ashcroft cut-off control gauge; air operated cylinder cocks; C.N.R. standard cast steel water column and mountings; Ashcroft steam gauges; nickel steel main axles, main crank pins, side and main rods and piston rods; carbon steel springs, except in engine truck, which are of silico-manganese steel; Laird crosshead with removable shoe; C.N.R. standard steel pilot and cast steel bumper beam; World Leslie steam heat reducing valve; and World C.C. tank valves.

The boiler is of the straight top type, with radially stayed firebox, and carries 250 lb. pressure. In order to save weight, the shell courses have been made of high tensile silicon steel, developed by Carnegie Steel Co., with tensile strength of from 70,000 to 83,000 lb., and minimum yield point of 38,000 lb. Steel



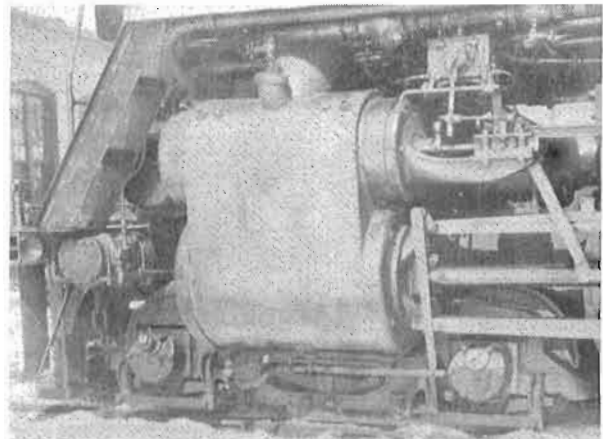
staybolts are used throughout, and the flexible bolts are of the F.B.C. welded telltale type curity arch brick are carried on three 3-in. arch tubes, and the 2 syphons in the firebox. The boiler is lagged with 85% magnesia, and jacketed with Keystone locomotive jacket steel painted a dark gray. None of the tubes or flues are welded to the back tube sheet.

The boiler pressure carried, and the high tensile shell steel used in the boiler construction, are of special interest. Considerable publicity has been given recently to the use, in England, and on the European continent, of structural and navy steel having a high elastic limit. Prominence has also been given to a similar steel manufactured on the Pacific Coast for use in transmission towers for high tension electric lines. Certain reports implied some mystery in the manufacture of this steel, and that special furnaces were necessary, but whatever other means may have been employed in obtaining the high elastic limit and ductility claimed, silicon was the principal factor. While certain manufacturing problems, including the addition of the necessary silicon, result in an added cost in making silicon steel, there is no mystery involved. It can be made by the usual basic open-hearth method, the silicon being added while the steel is being tapped. The usual additional precautions taken in the manufacture and inspection of boiler quality steel were observed in making the plates for the C.N.R. locomotives. As the minimum tensile strength specified for these plates was 10,000 lb. less than the standard grade of silicon steel, slightly lower carbon and silicon limits were used, giving the following average results from 350 tests: yield point, 46,146 lb.; tensile strength, 76,811 lb.; elongation, 25.2%; reduction in area, 47.1%. This permitted the construction of the boiler barrel for 250 lb. pressure with no added weight, compared with a similar boiler for 200-lb. pressure, with carbon steel plates.



*Component Parts of Floating Bushing Bearing Main Driving Box.*

The cab is a short, vestibule type, all steel, and wood lined. Standard C.N.R. turrets are located ahead of the cab, the left hand one being supplied with superheated steam by a 3-in. pipe leading from a connection on the superheater header, and the right hand one with saturated steam from a direct connection to the boiler. The superheated steam is supplied to air pump, feed water heater pump, stoker and headlight generator, while saturated steam is supplied to the steam heat line, inspirator, lubricator and other small auxiliaries. The C.N.R. standard 4-chime type whistle is located on the left hand side of the smokebox, near the stack, with a 1-in. connection from the superheated steam line from the header, and is operated by wire cable carried through the handrail on the left hand side. Two World locomotive blow-off valves are located on the right hand side of the firebox, and can be operated in unison from the cab. Both blow-off cocks are connected to L. and C. sludge remover. One has an internal pipe connection along the bottom of the barrel, extending to within 2 ft. of the front tube sheet, and



*Four-wheel, Outside Bearing Engine Truck, with Floating Bushing Bearings.*

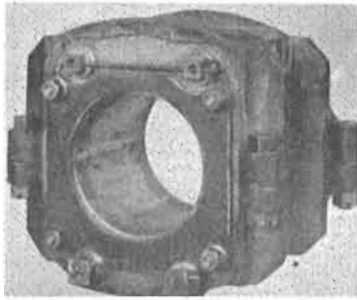
the other has a pipe connection across the throat, with opening opposite the side water legs. The side cheeks carry the feed water through troughs on the inside of the barrel down near the bottom of the tubes, so as to prevent deposits gathering on top of the tubes.

The front end is fitted with C.N.R. standard barrel netting, and the exhaust tip is a steel insert in the end of the exhaust stand. The smokebox front is of pressed steel, with a cast iron door. A Barco blower connection is applied on the left side of the smokebox.

The main frames are half nickel and half vanadium steel; the cradle castings are of Commonwealth type. Shoes and wedges are of cast iron. The cylinders are of cast iron, and both cylinders and valve chests are fitted with Hunt-Spiller bushings. The pistons are of C.N.R. standard built up type, with Hunt-Spiller bull rings.

Baker valve gear is applied. Maximum valve travel in forward motion is 9 in., and the valve setting is such that lap is 1 5/16 in., lead 5/16 in., and exhaust clearance 3/16 in. The main driving journals are 12 x 13 in., and all others 10 x 13 in., and all journals throughout are finished by grinding.

The locomotives are equipped with main driving boxes of the floating bushing bearing type, illustrations of which are given herewith. This design of box, developed on the Canadian National, has been applied to the main drivers of a number of locomotives in both freight and passenger service, and the results secured have been so satisfactory that the same type is being applied to all of the 4-8-4 locomotives now being built, the 12 for Grand Trunk Western lines as well as the 40 for Canadian lines. The box is made of cast steel, in two sections parted horizontally and held together by 4 fitted bolts. These are 1 3/8 in. diam. and of high tensile steel. A high grade iron bushing is keyed into the cast steel box, and the brass floating bushing revolves between the journal and the iron bushing. The bushings are both made in 2 pieces, so that they may be removed if necessary. A 1/2 in. steel plate on the inside face of the box holds the bushings in place. The box is lubricated by ordinary driving journal compound, grease being supplied to the bearing from 4 pockets, 2 at the top and 2 at the bottom of the box. The grease is carried from the pockets through holes and grooves in the iron bushing to the inner brass bearing. The brass bearing contains a large number of 1/4 in. holes countersunk on the outside and full of grease. The grease from the two top pockets feeds the bearing when softened up, but on the two bottom pockets a plunger is applied, with a coil spring which will put

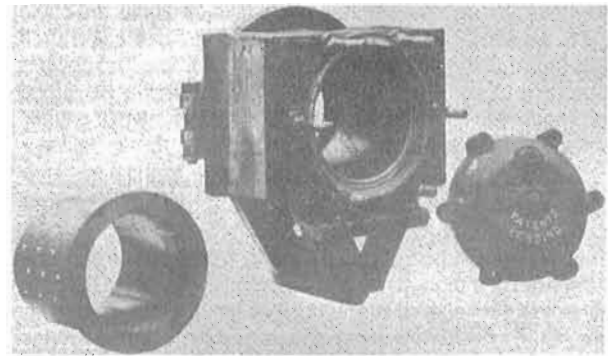


*Floating Bushing Bearing Main Driving Box.*

some pressure on the grease and help to feed it to the bearing. The grease pockets open on the inside face of the box, and are each equipped with a plug, the plugs, when screwed in, being locked in pairs by a rod passing through them, as shown. It is a very small job to remove the plugs and fill the pockets with grease. It is stated that these boxes have run large mileages on one packing of grease, and the cost of lubrication is very low. Two eyebolts are screwed into the top half of the box, for convenience in lifting off, and tapped holes are provided in the inside face of the floating bushing, to facilitate removal. The life of the floating bushing for driving boxes has not been fully determined, but one locomotive is stated to have made 40,000 miles with only 1/64 in. wear, and this should run from shopping to shopping. Another has made 25,000 miles with only 3 or 4 thousandths of an inch wear. If, however, the wear develops to such an extent that it becomes necessary to change the bushings, that is only a locomotive house job and can be done in an hour. This design of main driving box has eliminated pounding, and has reduced, to a very noticeable extent, the amount of maintenance required on rods. In addition, it provides a very much larger continuous hub area than the conventional design. The big end of the main rod and the intermediate side rod connection are equipped with floating bushing bearings of C.N.R. design.

Cylinders and valves are lubricated by a Nathan mechanical lubricator, type D.V.3, of 16 pints capacity, suitable for long runs. The auxiliaries are lubricated by a 3-feed Detroit hydrostatic lubricator in the cab. Where boosters are applied, the hydrostatic lubricator is a 4-feed Detroit.

Another feature of these locomotives is the engine truck, a 4-wheel outside bearing truck with floating bushing bearings, grease lubricated, and with steel-tired wheels 34 1/4 in. diam., with cast steel spoked centers. Views of one of these trucks, and of bearing details, are given herewith. Three engine trucks of this design were applied to Canadian National mountain type passenger locomotives, one now having had 3 years' service and the other two 9 months' each. A fourth truck was applied to a Grand Trunk Western 4-6-2 type locomotive, and this has been in service for about a year. These trucks have all shown a remarkable freedom from hot box troubles, and have reduced the usual maintenance costs due to changing wheels, brasses, etc., and packing cellars. In view of the results obtained from the trucks in service, it was decided to apply this design to all of the 4-8-4 locomotives, and the four 4-8-2 locomotives, ordered recently. The truck frame, with bolster and lateral resistance device, is a Commonwealth design. The boxes are vanadium cast steel, with high grade hard iron bushings pressed in, and a 7 x 10 in. hard bronze bearing revolving between the journal and the iron bush. The bushings may be either solid or in 2 or 3 pieces. A removable collar on the end of the axle holds the bearing in place and at the same time by its lateral movement pumps the grease into the bearing. The cover contains a removable plug for applying grease. A 3/8 in. bronze liner is applied on the inside face of the box, and between this bronze liner and the inner end of the floating bushing a felt ring in a brass container is applied to hold the grease in the box. The



*Floating Bushing Bearing and Box Assembly, Outside Bearing Engine Truck.*

spring arrangement on this truck is novel, there being 3 semi-elliptic springs on each side, the center one acting as an equalizer, while the other two are each under a box with the spring seat cast integral with the box. The grease used is similar to rod cup grease, but with a lower melting point. The wear on the bronze bearings is very slight, and a set of these should run 100,000 miles. A 4-wheel truck, with inside journals and floating bushing bearings, similar to the main driving wheel boxes, as described above, is in service on the Canadian National, and has made a good performance. This makes a cheaper application to existing locomotives.

The trailing truck is of the Commonwealth 4-wheel design, with steel tired wheels 34 1/4 in. diam. on the front axle and 48 in. diam. on the rear axle. The journals are 7 x 12 and 9 x 14 in. respectively, and the boxes are of the floating bushing type, grease lubricated. The front axle floats with a total lateral of 1 1/4 in., while on the rear axle the total lateral is 3/8 in. Franklin boosters are being applied to 10 of the locomotives ordered from Canadian Locomotive Co., but all trailing trucks are being arranged so that boosters may be applied later. The design of boxes and bearings is very similar to those on the engine truck, with the exception of the grease retaining rings, which are of bronze instead of felt. With this design of floating bushing engine truck, trailing truck and driving box bearings, where the width between the jaws is limited, the iron bushing can be replaced by a hard steel bushing, which allows a thinner section to be used.

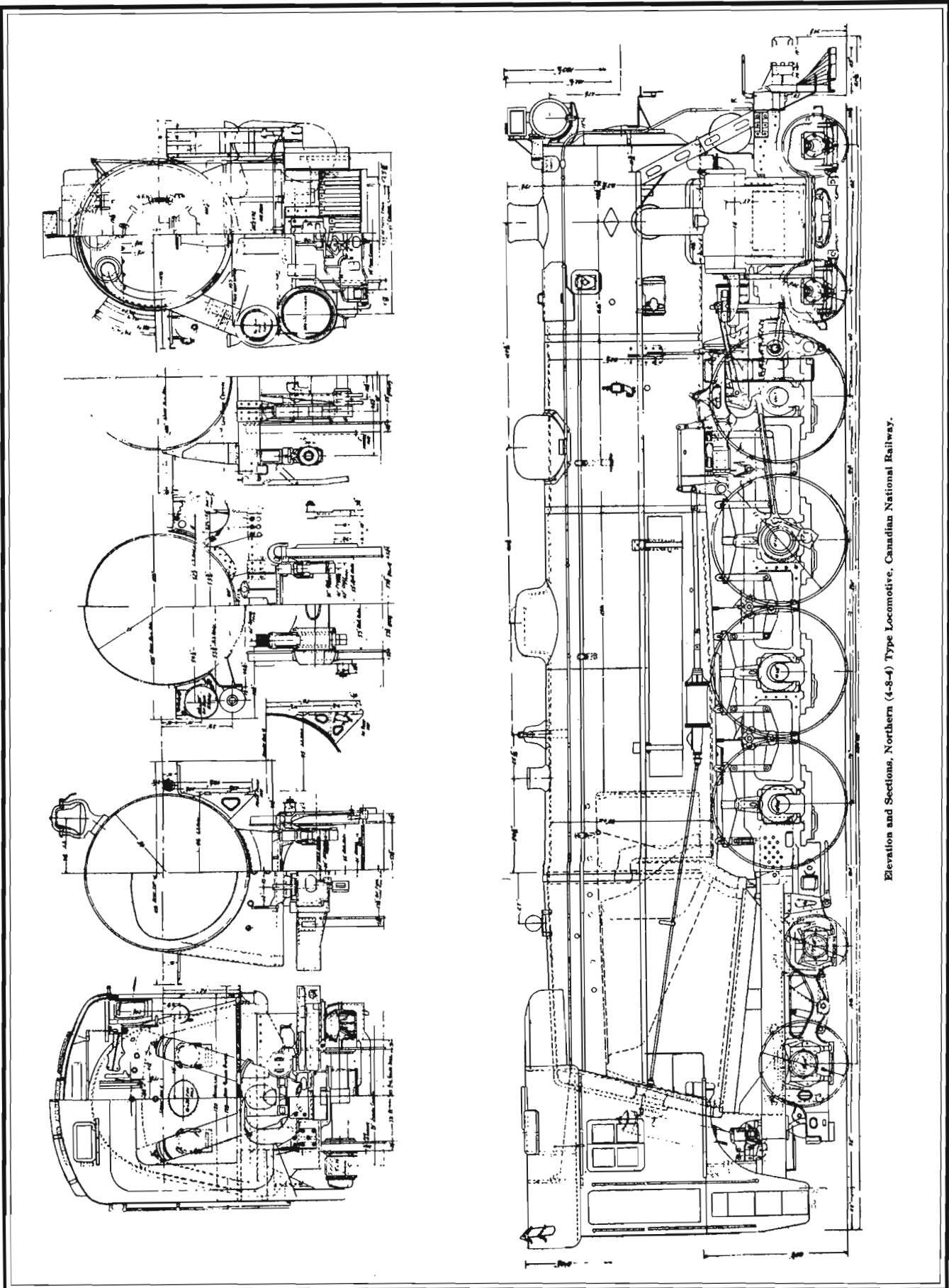
The tender frame is Commonwealth design, and the tank is the Vanderbilt type. Tender trucks are Commonwealth 6 wheel, with 6 x 11 in. journals, 34 1/4 in. steel tired wheels with semi-steel centers, McCord journal boxes, Chaton fibre dust guards, and clasp brakes.

The air brake is Westinghouse, with one 8 1/2 in. cross compound air pump and E.T.6 equipment.

A further feature of these locomotives is the use of a common exhaust pipe, on the left side, for the air pump, feed water heater pump and stoker. It is carried forward and tees into the exhaust steam pipe leading from the exhaust passage in the cylinder saddle to the feed water heater located on top of the smoke box. On booster equipped locomotives, the exhaust from the booster is carried along the right side of the locomotive, and tees into the exhaust pipe on the right side leading from the cylinder to the feed water heater, and a special Crane check valve is applied at the booster exhaust line.

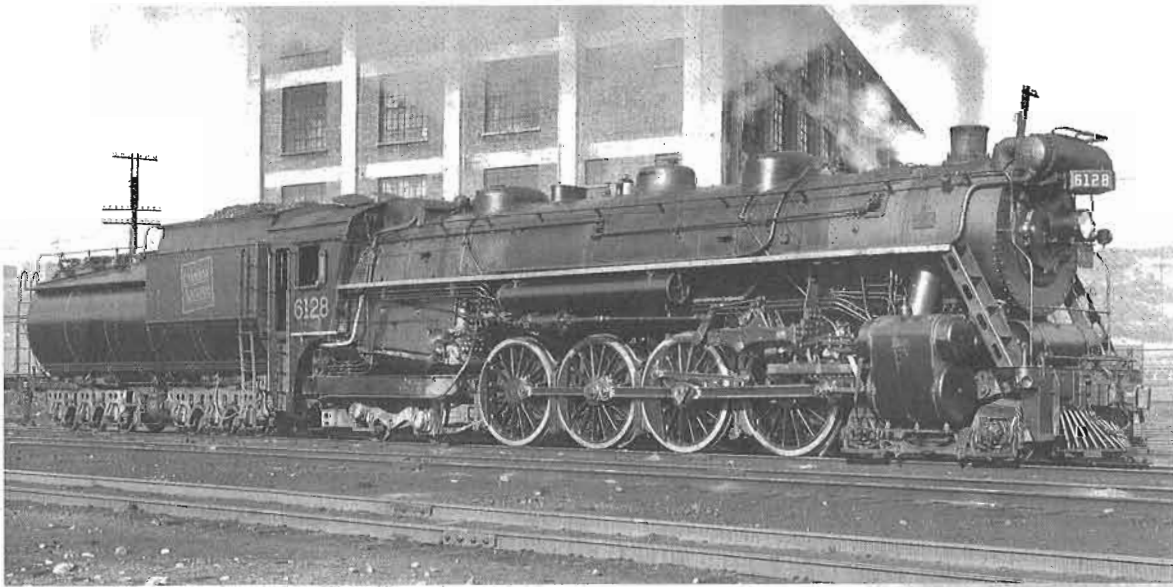
The foregoing article has been compiled from data furnished by C. E. Brooks, Chief of Motive Power, Canadian National Ry.







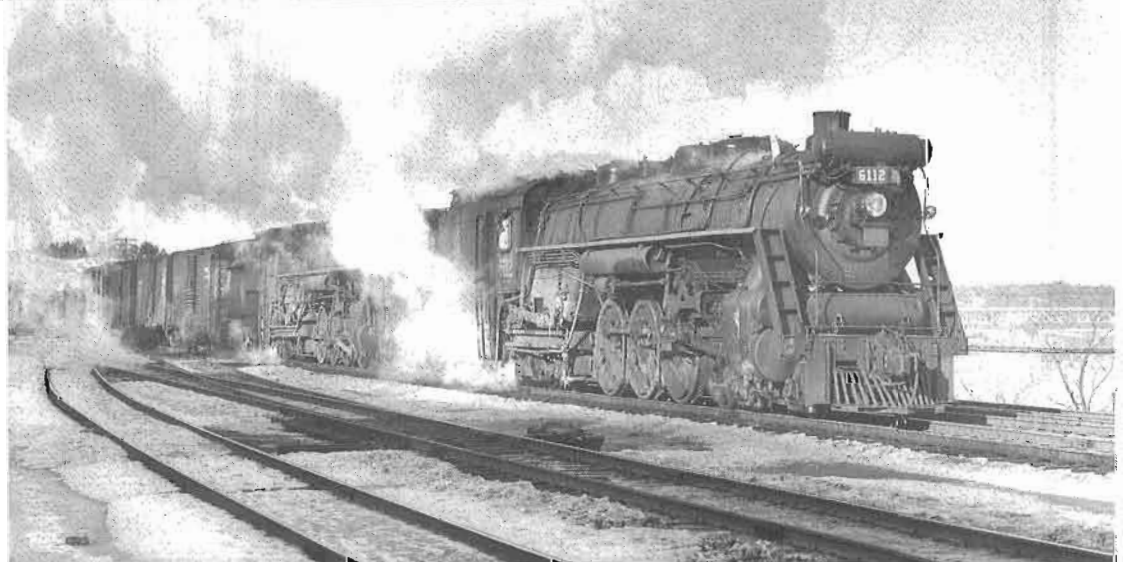
*6118 coupling on to the Maritime Express at Bridge Street in Montreal in July 1951.  
Photo by Lorne Perry*



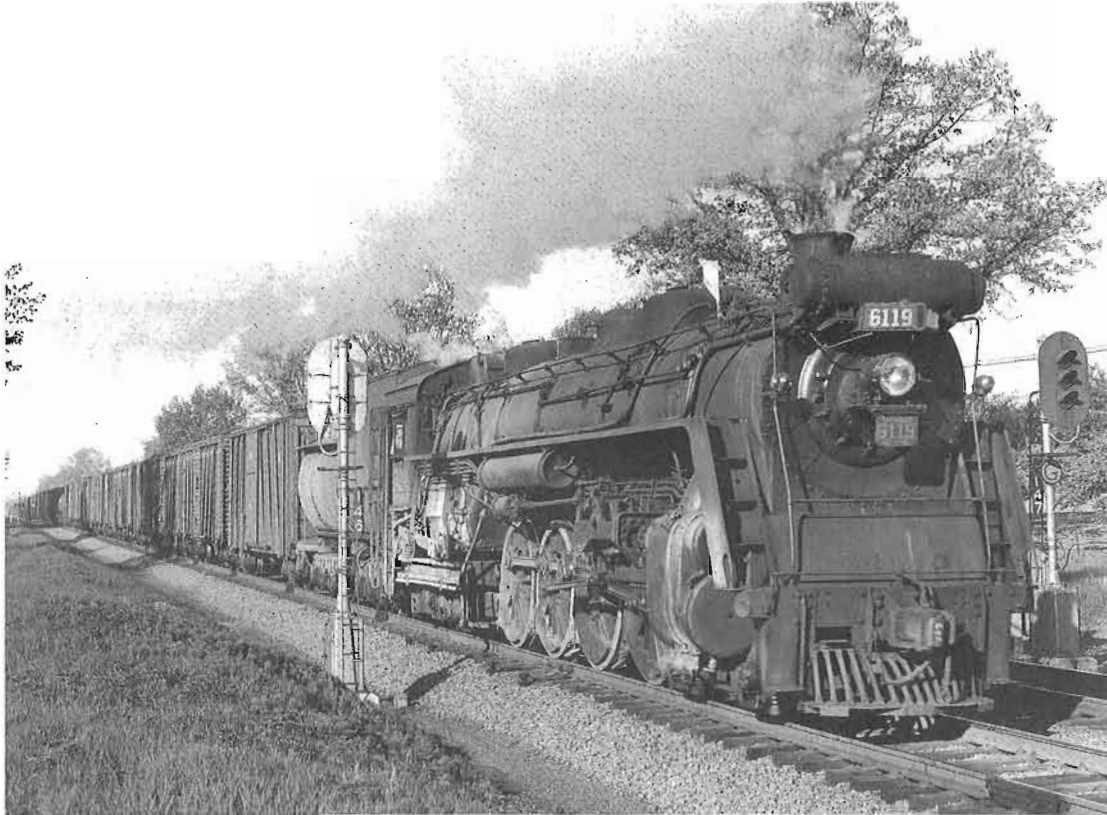
*ABOVE: 6128 at Turcot  
on October 3, 1937.  
Collection of Dave Shaw*

*RIGHT: 6112 leads a  
double-header freight at  
Hamilton Junction Ont-  
ario on February 1,  
1959.*

*Photo by F.J. Sankoff,  
collection of Dave Shaw*



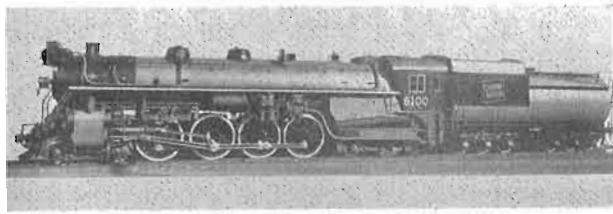




*6119 hauls an Extra East through Lorne Park, Ontario on May 21, 1955.  
Photo by J.F. Beveridge, Collection of Dave Shaw*



*6135 is the motive power for freight train 477 at Long Branch Ontario on October 3, 1956.  
Photo by F.J. Sankoff, Collection of Dave Shaw*



## An Outstanding Example of Motive Power Progress

The forty new 4-8-4 type locomotives on the Canadian National Railways are designed for use in heavy fast passenger service.

For this service, high sustained steaming capacity to provide power at speed is a fundamental essential. This is provided by a large grate area and a large boiler equipped with an Elesco type "E" superheater which gives maximum superheating surface. To obtain still greater efficiency, all auxiliaries are operated by superheated steam.

Further capacity and economy are obtained by use of the Elesco feed water heater which utilizes heat in part of the exhaust steam to heat the feed water before it enters the boiler.

In both design and equipment, these new Canadian National Locomotives exemplify the motive power progress made during the past few years.

### THE SUPERHEATER COMPANY, LIMITED

190 St. James Street  
MONTREAL, QUE.



Works at  
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# STEEL CASTINGS

OPEN HEARTH AND ELECTRIC PROCESSES  
FOR ALL PURPOSES

Quotations promptly submitted



4-8-4 "Northern" Locomotive for Canadian National Railways. Built by Canadian Locomotive Company, Limited.

## CANADIAN STEEL FOUNDRIES LIMITED

General Offices:

307 CRAIG STREET WEST

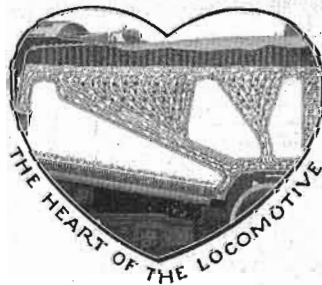
MONTREAL

D. 71



Syphons Added 95 Sq. Ft. to Firebox Heating Surface on the New 4-10-4 Type Locomotives of the Canadian National Railways

Heating  
Surface  
Circulation  
Capacity  
Safety  
Economy



Nicholson Thermic  
**SYPHONS**  
Locomotive Firebox Company  
New York Montreal Chicago

Companies that supplied parts for the new CNR Northern were quick to advertise the fact. These eight ads appeared between July and November 1927. The ad for syphons somehow added an extra pair of drivers! The Northern Pacific locomotives gave the name "Northern" to the type.

## CANADIAN NATIONAL

New 4-8-4's  
fired by the  
"DUPLEX"



To permit the hauling of heavier tonnage trains at fast schedule speeds, the Canadian National Railways has had developed for them a 4-8-4 locomotive which they have designated as the "Northern" type.

Forty of these locomotives are being built—20 by the Canadian Locomotive Company, and 20 by the Montreal Locomotive Works—for use in passenger and freight service on extended runs over two or more divisions between Montreal and Sarnia.

To insure that the intended purpose of

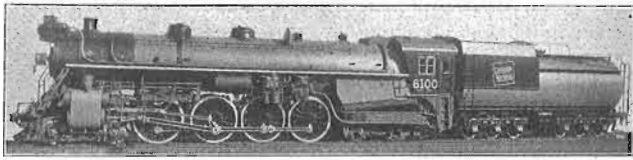
this improved motive power may be fully realized, all of these 40 locomotives, as well as 12 of the same design for the Grand Trunk Western, are equipped with the DUPLEX STOKER—a guarantee that full hauling power can be maintained over extended periods.

As a result of years of satisfactory service from this distinctive method of mechanical firing, there are over 300 locomotives on the Canadian National now fired by the Duplex Stoker—"Because the Promise has been Performed!"

## LOCOMOTIVE STOKER CO.

Manufacturers of Duplex Stokers, Elgin Stoker Type Stokers,  
Mechanical Coal Pushers

Main Office and Works—30 General Robinson Street, West  
Northside, PITTSBURGH, PA.



## For Passenger and Fast Freight Service

AMONG the many outstanding locomotives recently designed to meet increasing power requirements and reduce the cost of operation is the new 4-8-4 type built for the Canadian National Railways.

Twenty of these new locomotives which are designated by the railroad as the "Northern Type" are now under construction at our plant in Kingston, Ont.

These new engines are designed for either passenger or manifest freight service and it is intended to operate

them on extended runs over two or more divisions between Montreal, Que., and Sarnia, Ont.

The boilers are designed for a working pressure of 250 lbs. per sq. in. To save weight, the shell courses have been made of high tensile silicon steel.

Several new maintenance saving features have been incorporated which will be of vital interest to every railroad executive and mechanical department officer.

Some of the more important details concerning the above illustrated locomotive are as follows:

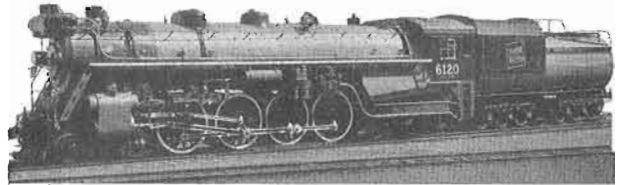
Weights in working order	With Booster	Without Booster
on drivers	232,000	230,000
on front truck	65,000	65,000
on trailing truck	91,000	83,000
total engine	388,000	378,000
Tender	260,000	260,000
Rated Tractive force	67,700	56,800
Dia. of driving wheels—73 inches	Boiler Pressure—250 lbs.	
Cylinders—25½" x 30"	Fuel—Bituminous Coal	
Tender:	Water Capacity 11,300 imp. gal.	
Fuel	20 Tons	

Canadian Locomotive Co., Ltd.  
Kingston Ontario



## Britain's Premier in the Cab

When the Right Honorable Stanley Baldwin, Prime Minister of Great Britain, was in Canada recently, he displayed considerable interest in the Canadian National Railways rolling stock. Here we see the British Premier in his shirt sleeves, sitting in the cab of one of the Canadian National 6100 Series Northern Type Locomotives.



It is not surprising that Canada's distinguished visitor showed such keen interest in this member of the "6100" series.

It is one of the largest and fastest locomotives in the British Empire and—naturally enough—is finished throughout with Sherwin-Williams Railway Finishes, produced in Canada by the largest Paint and Varnish makers in the British Empire.

**SHERWIN-WILLIAMS**  
PAINTS VARNISHES LACQUERS



## Locomotive 6100

The largest Locomotive ever produced in Canada is equipped with *Coghlin Springs*—another tribute to Coghlin craftsmanship, efficiency and reliability.

**COGHLIN SPRINGS**

All Types—for All Purposes



Manufacturers of Springs **COGHLIN CO** Limited Since 1869  
MONTREAL

TORONTO: Harvard Turnbull & Co. WINNIPEG: Filer Smith; Machinery Co., Limited  
VANCOUVER: Gordon & Belyea, Limited NEW GLASGOW: R. C. Grant

## Northern Pacific Type (4-8-4)



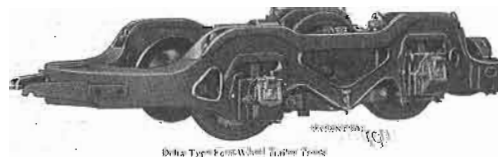
### COMMONWEALTH EQUIPPED

The locomotive illustrated above is one of twelve recently built for the NORTHERN PACIFIC RAILROAD to be used in hauling the famous NORTH COAST LIMITED.

They are the largest and most powerful locomotives ever constructed for passenger-train service in the Northwest.

The DELTA TYPE FOUR-WHEEL TRAILER TRUCK is one of the many COMMONWEALTH devices used in the construction of this locomotive and is most noteworthy. It permits of a material increase in the size of the firebox and boiler capacity, also of proper suspension and weight distribution, as the Trailer Truck is equalized with the drivers.

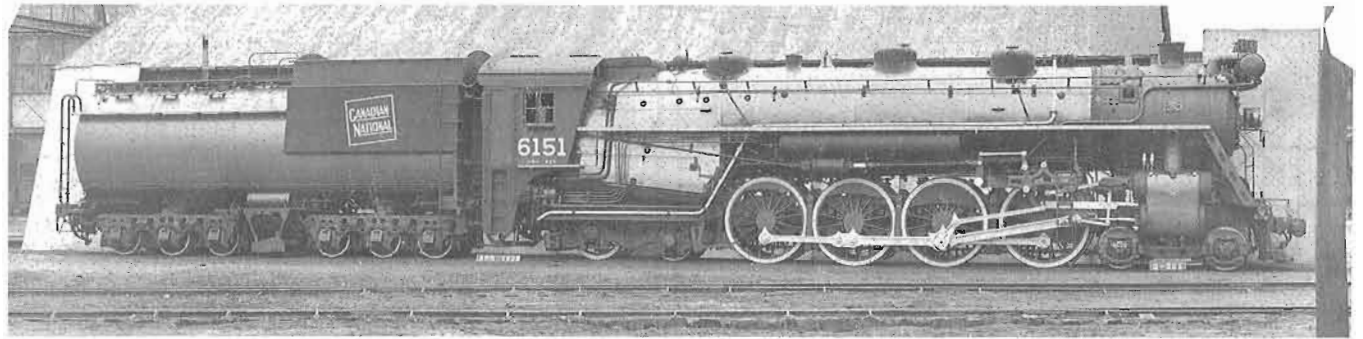
The tender is equipped with COMMONWEALTH TENDER FRAME and SIX-WHEEL TENDER TRUCKS.



**COMMONWEALTH STEEL COMPANY**  
GRANITE CITY, ILLINOIS



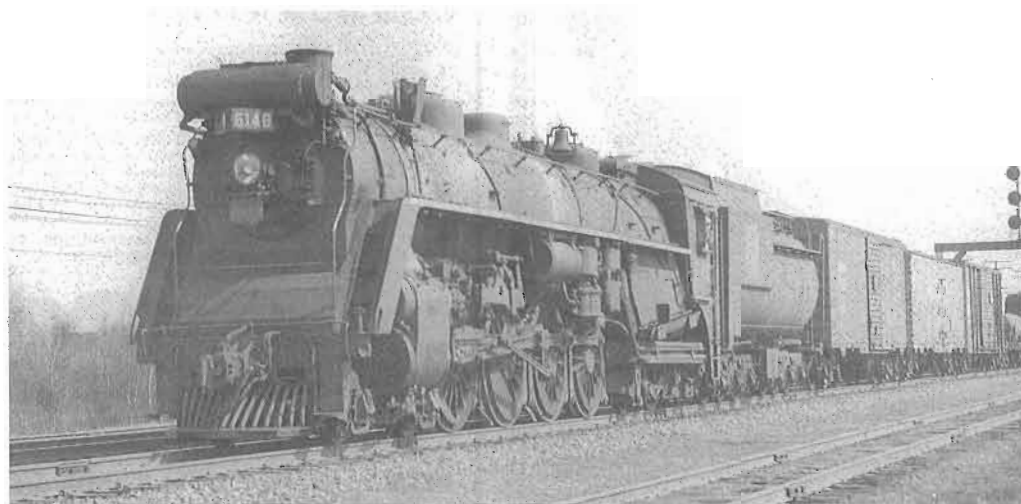
## Class U-2-c, 6140 - 6159, from MLW, 1929



*Builder's photo of 6151*



*An impressive head-on view of 6147. CN photo 36269*



*6148 hauling a freight at St. Lambert Que. Date unknown. Photo by A.W. Leggett*



*TOP: A double-header, led by 6148, blasts through Lorne Park Ontario on December 13 1958.*

*Photo by F.J. Sankoff, Collection of Dave Shaw*

*CENTRE: 6153 hauls a westbound passenger train through the western suburbs of Montreal in the early 1930s. This locomotive has been preserved.*

*CN photo 37538*



*BOTTOM: 6149 waits at Sarnia Ontario in October 1953.*

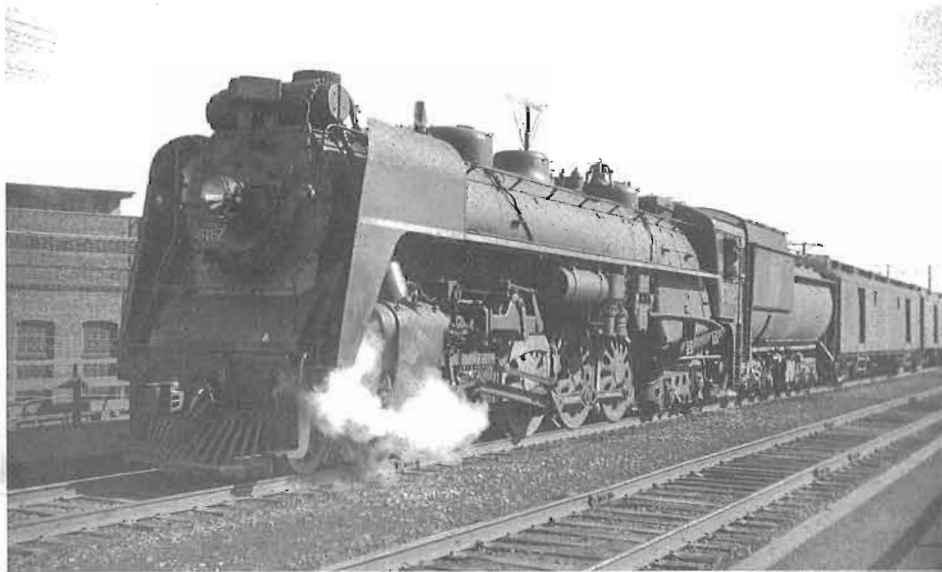
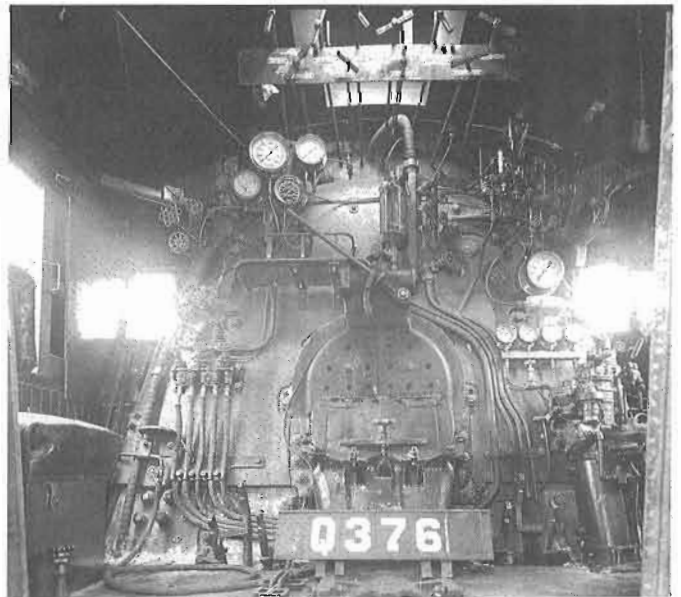
*Collection of Dave Shaw*



## Class U-2-d, 6160 - 6164, from MLW, 1936



ABOVE: Builder's photo of 6162. BELOW LEFT: 6160 When New, CN photo 38666. BELOW RIGHT: The backhead of 6162.

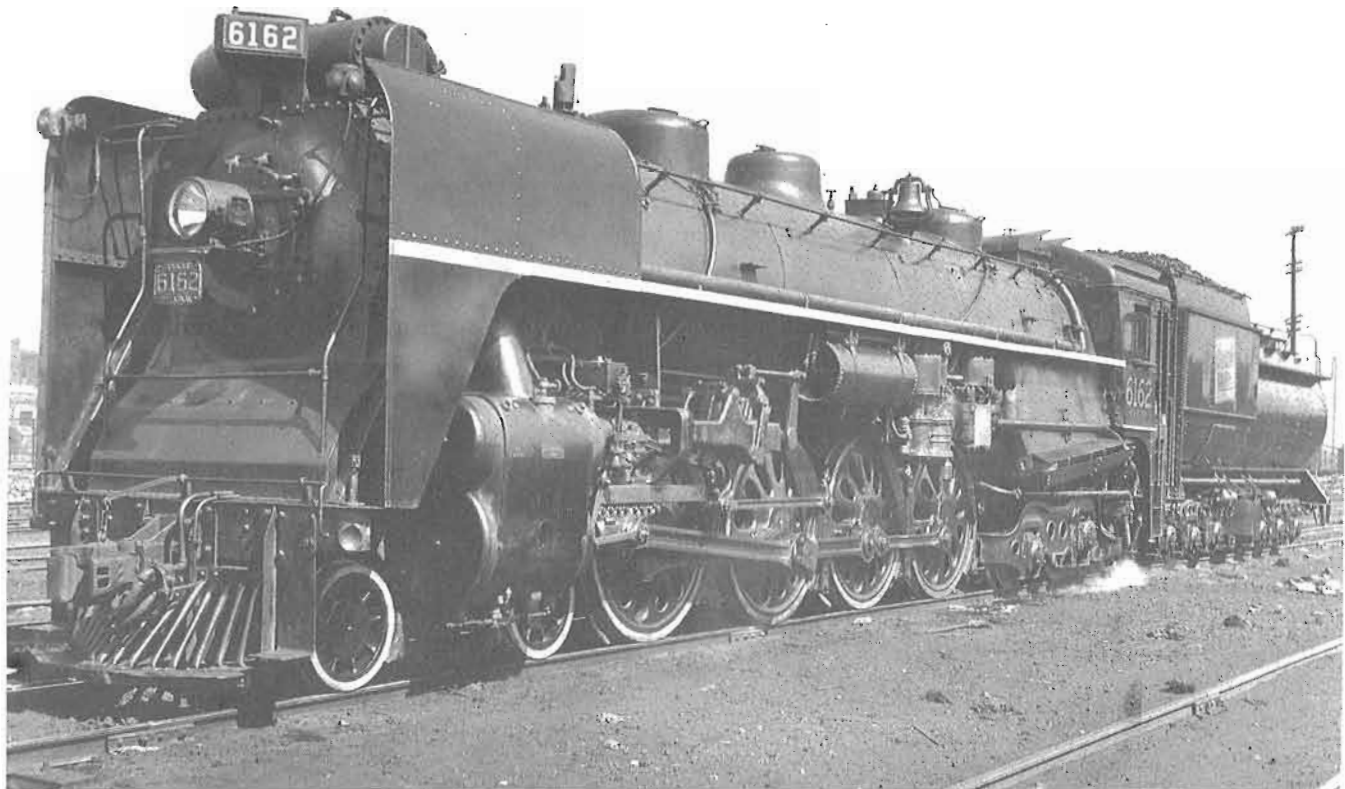


Train No. 59, the Scotian, at St. Lambert, April 7 1950. Photo by Lorne C. Perry





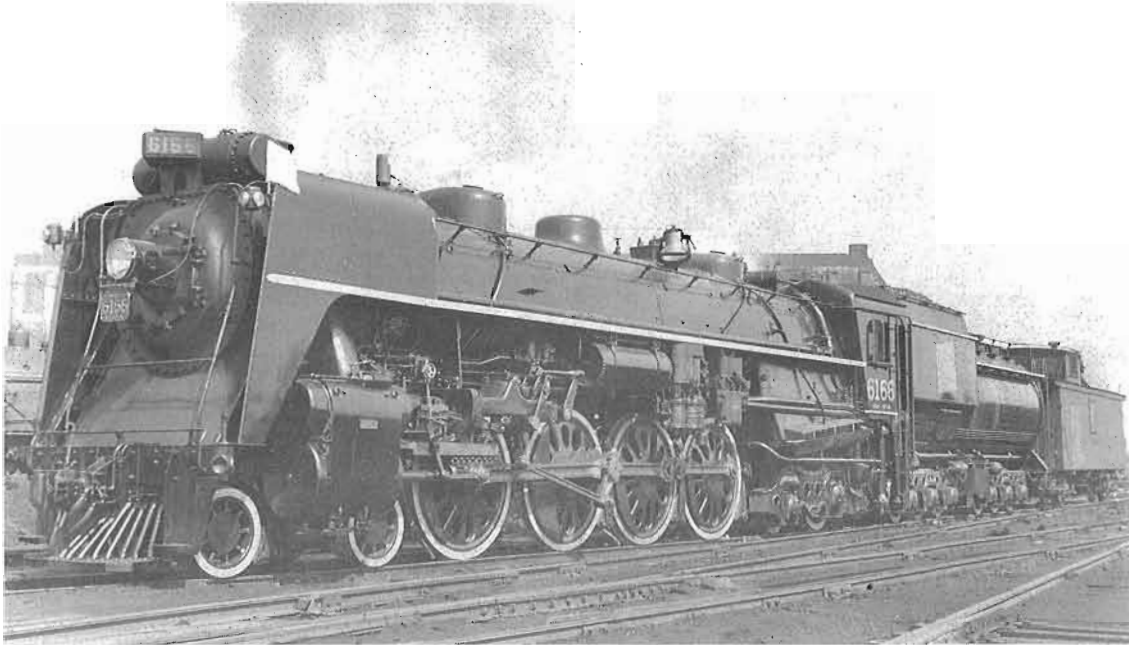
*The train to the Maritimes passing the old station at Charney Que. on August 2 1938. Collection of Dave Shaw*



*6162 At Montreal on March 29, 1939. Collection of Dave Shaw*

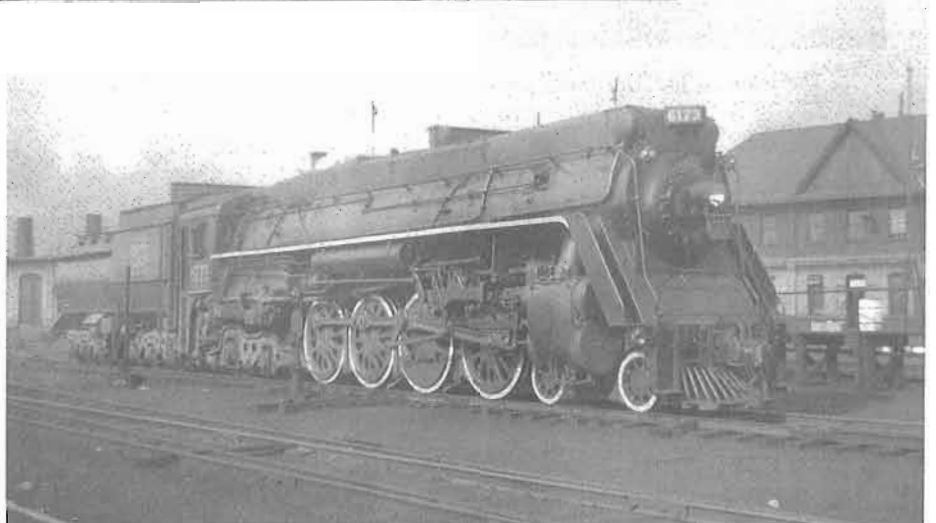
## Classes U-2-e and U-2-f, 1940

### 6165-6179 from MLW and 6180-6189 from CLC



*ABOVE: 6166 at Montreal on March 28 1940.*

*Photo by F.J. Sankoff, Collection of Dave Shaw*



*RIGHT: 6173 in the summer of 1947. CRHA Archives, Toohey Collection*



*LEFT: Train 21, the "Montrealer" at St. Lambert on December 10 1949. Note that 6173 has smoke deflectors, unlike in the photo above taken two years earlier.*

*Photo by Lorne Perry*

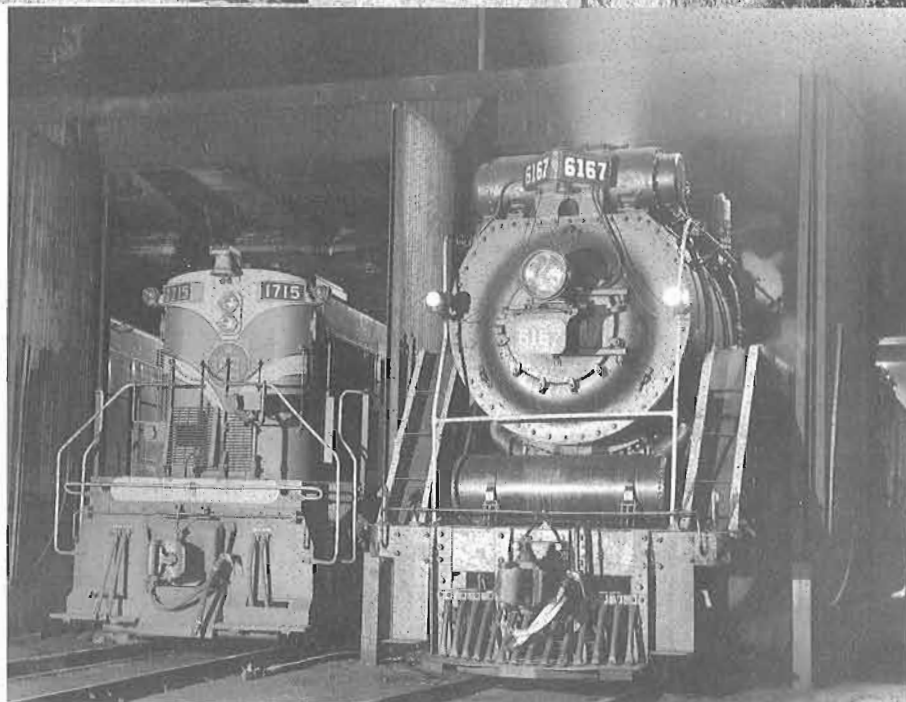


*Some views of 6167, the well known "excursion engine" of the early 1960s.*

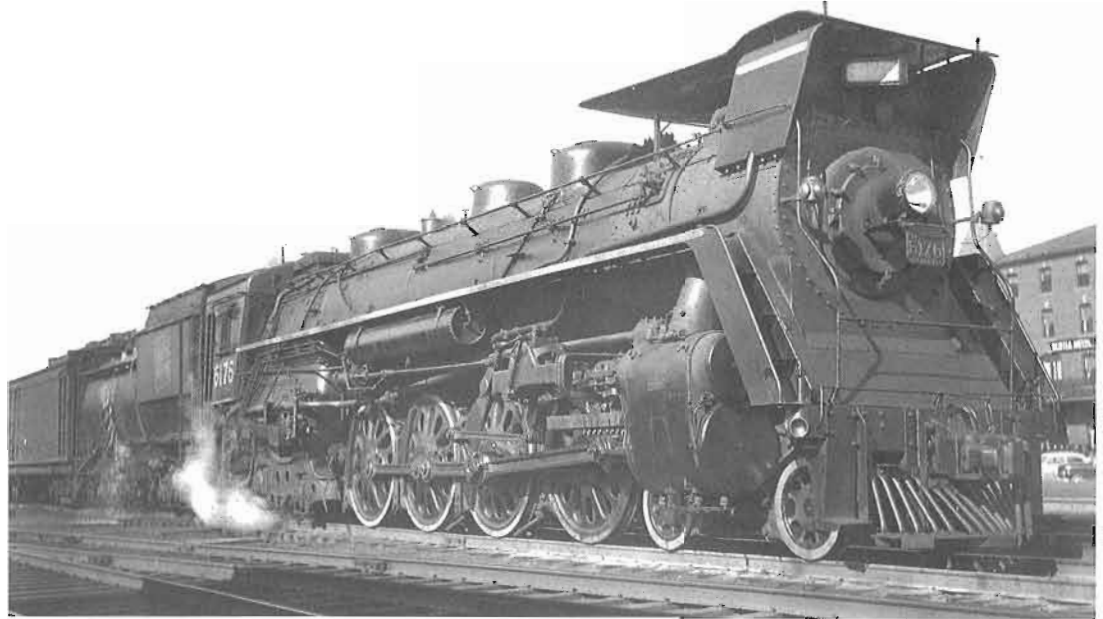
*TOP: Long before its excursion career this photo was taken of 6167 at the head of the "Maritime Express" at St. Lambert on April 27 1951.  
Photo by Lorne Perry*

*ABOVE: Two views of 6167 on one of its many excursions.  
Photos by Paul McGee*

*RIGHT: In the roundhouse beside diesel 1715.  
CN photo*







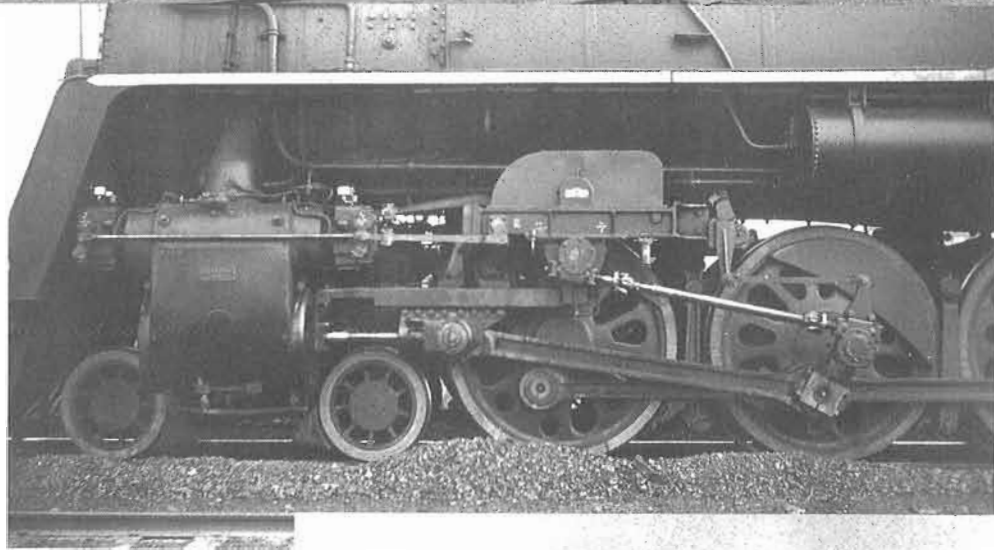
*ABOVE: 6176 with an experimental smoke deflector, as seen at Truro Nova Scotia in 1951.  
Collection of Dave Shaw*



*LEFT: Another view of 6176, also in 1951.  
Photo by Lorne Perry*

*BELOW: 6172 hauling an extra west out of Mimico Ontario on February 8 1948.  
Collection of Dave Shaw*





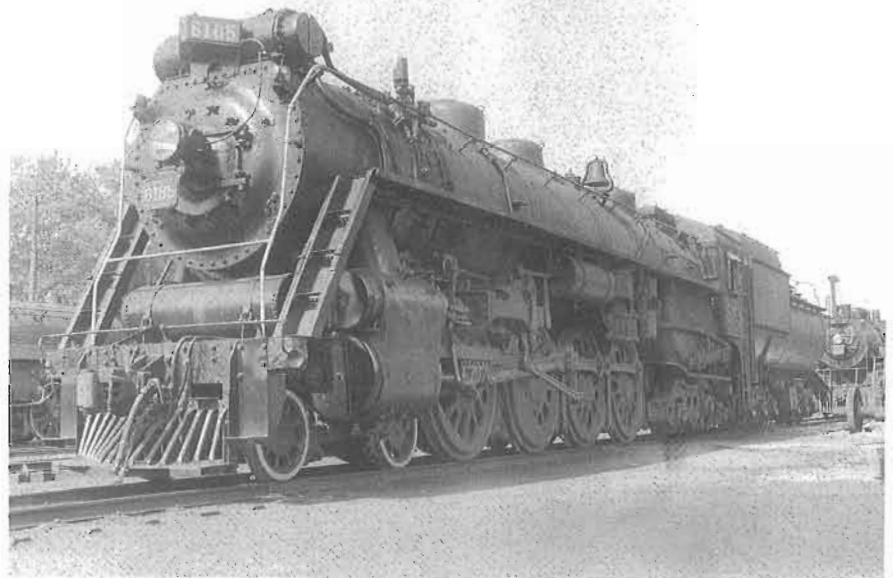
*TOP: 6184 with experimental rotary valve gear developed from Czech patents by Dominion Engineering.*

*Photo by Lorne Perry, April 6 1951*

*ABOVE: A closeup view of 6184's experimental valve gear.*

*Photo by Lorne Perry, June 24 1950*

*RIGHT: 6185 at an unidentified location.*





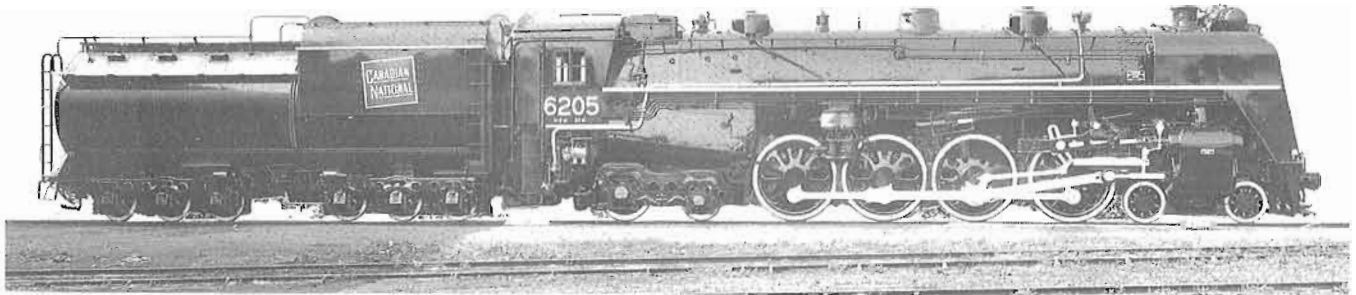
*TOP: 6188 is the motive power as a freight extra west passes Mimico Ontario on November 1 1947.  
Collection of Dave Shaw*

*ABOVE: 6184 hauling an extra west through Oakville Ontario on April 25 1959.  
Photo by F.J. Sankoff, Collection of Dave Shaw*

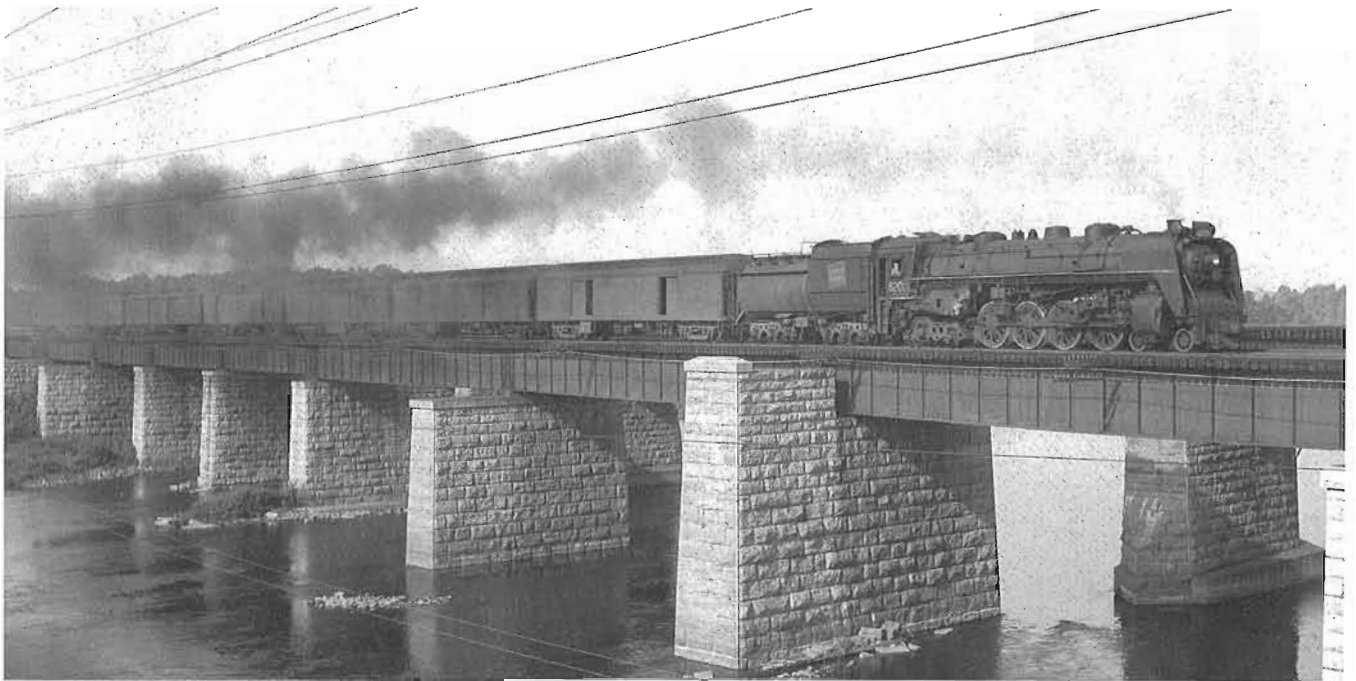
*LEFT: Another view of 6184, this time at Mount Dennis Ontario on August 13 1958.  
Photo by F.J. Sankoff, Collection of Dave Shaw*



## Class U-2-g, 6200 - 6234, from MLW, 1942-43



*Builder's photo of 6205.*



*ABOVE: 6200 east-bound on the bridge at Dorion Quebec with the overnight mail express train from Toronto. The first car is lettered New York Central. Note the single coach on the rear. CN photo*

*RIGHT: Another view of 6200 hauling a freight through Oakville Ontario on May 15 1954. Photo by F.J. Sankoff, Collection of Dave Shaw*



*LEFT: An Ottawa-to-Montreal freight at Coteau Quebec on October 2 1949.*

*CRHA Archives, Toohy Collection*



*BELOW: 6203 on train No. 14 at Danforth Ontario on March 14 1954. Note the three coaches in the brand-new green and black paint scheme.*

*Photo by F.J. Sankoff, Collection of Dave Shaw*

*BOTTOM: 6210 hauling No. 94 through Oakville Ontario on June 21 1958.*

*Photo by F.J. Sankoff, Collection of Dave Shaw*





TOP: 6209, 6210 and 6214 at Turcot in 1943.  
CN photo 43915

ABOVE LEFT: The front of 6214 about 1943.  
CN photo

ABOVE RIGHT: 6217at Turcot in the 1950s.

RIGHT: Passenger extra 6217 south, carrying a group of Boy Scouts, at Victoria Avenue, St. Lambert on June 2 1950.  
Photo by Lorne Perry





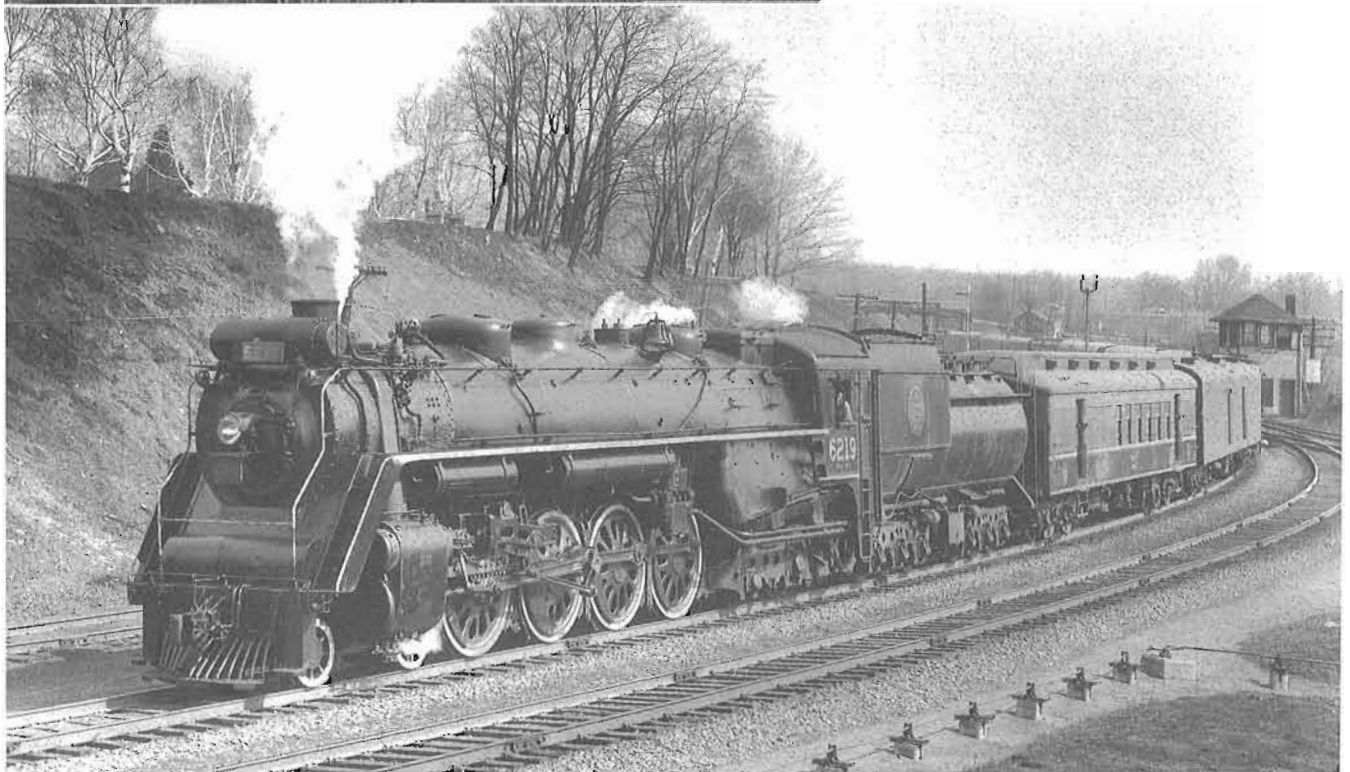
*RIGHT: Orders being hooped up to the engineer of 6218 on a morning train to Toronto. The place was Turcot West, and this was long before this engine began its excursion service.  
Collection of Peter Murphy*

*BELOW: As the railway enthusiasts remember her! 6218 on one of her many excursion trains.  
Collection of Peter Murphy*

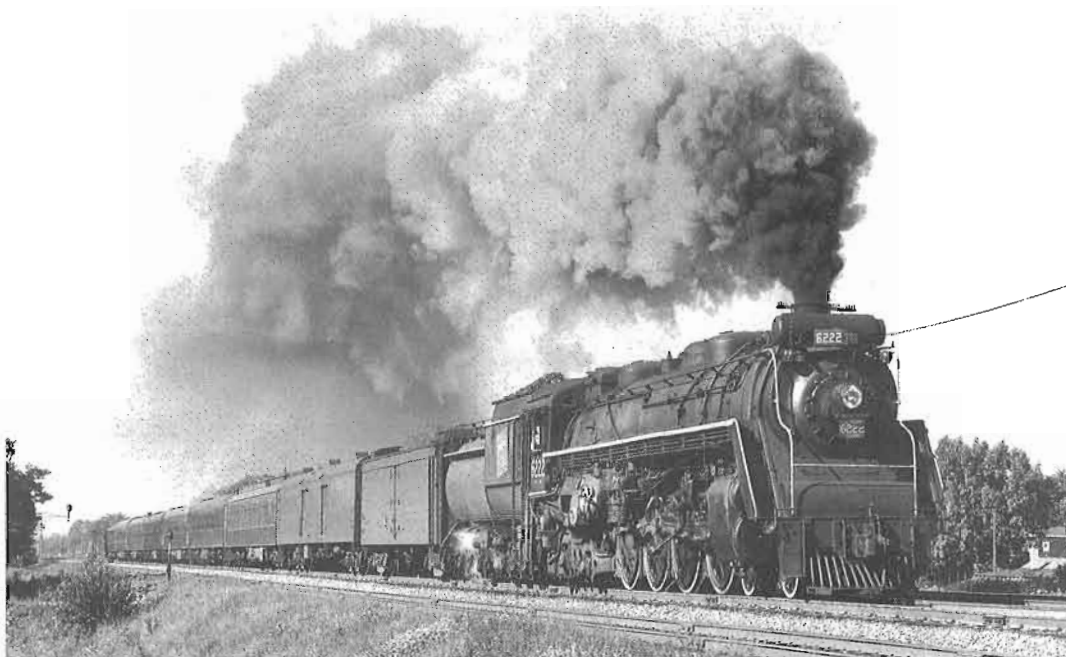


*BELOW: 6219 with passenger train 17 at Bayview Ontario on April 14 1956.*

*Photo by F.J. Sankoff. Collection of Dave Shaw*



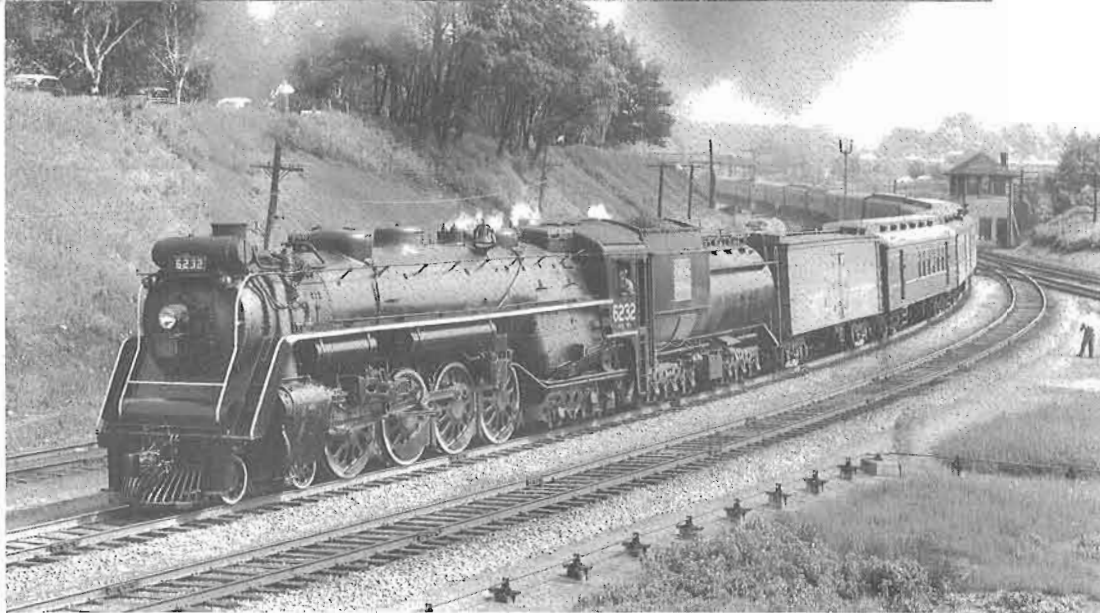
*RIGHT: 6222 with train No. 8 at Toronto September 23 1953.  
Photo by F.J. Sankoff.  
Collection of Dave Shaw*



*BELOW: 6230 with train 183 at Sunnyside (Toronto) on December 28 1958.  
Photo by F.J. Sankoff.  
Collection of Dave Shaw*



*RIGHT: 6232 with train 17 at Bayview Ontario on May 28 1955.  
Photo by F.J. Sankoff.  
Collection of Dave Shaw*



## Class U-2-h, 6235 - 6264, from MLW, 1943-44



*Builder's photo of 6238. August 1943.*



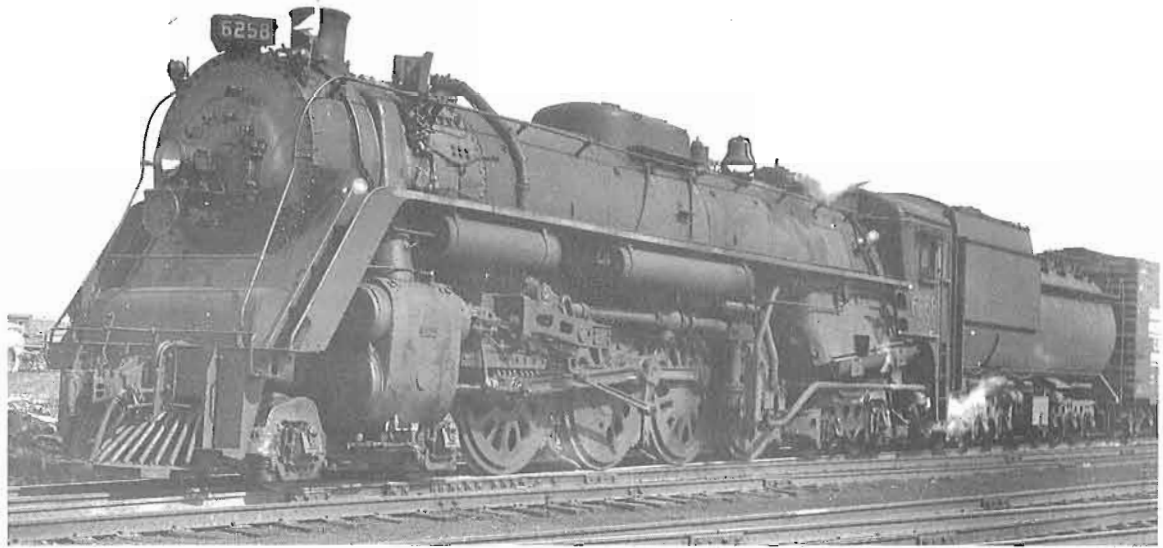
*ABOVE: 6235 at Turcot about 1950.*

*Photo by A.W. Leggett*

*LEFT: 6241 eastbound from Toronto meets 2533 from Ottawa at Coteau Quebec on October 2 1949.*

*CRHA Archives, Toohy Collection*





*ABOVE: 6258 with a round maple leaf front number plate. March 1952.  
Photo by Lorne Perry*

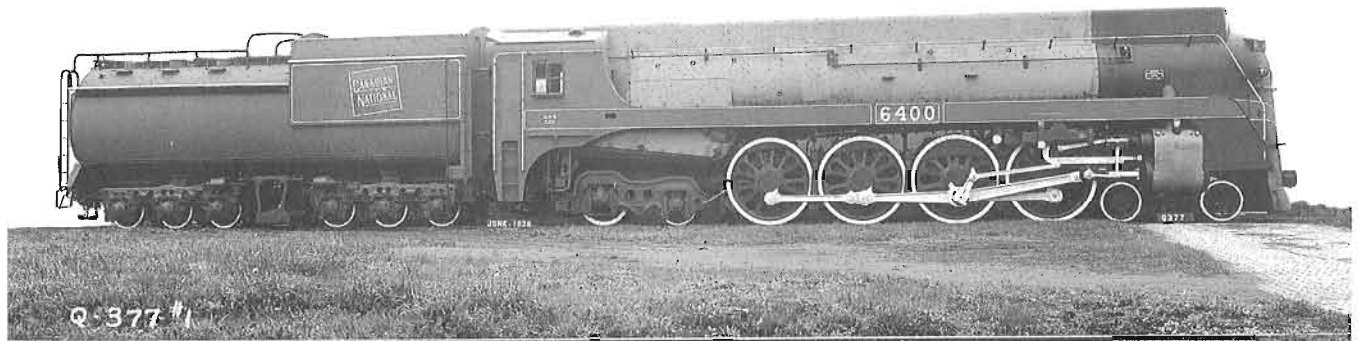


*LEFT: 6263 with a freight extra passes Dixie station at Lachine Que. on April 21 1951.*

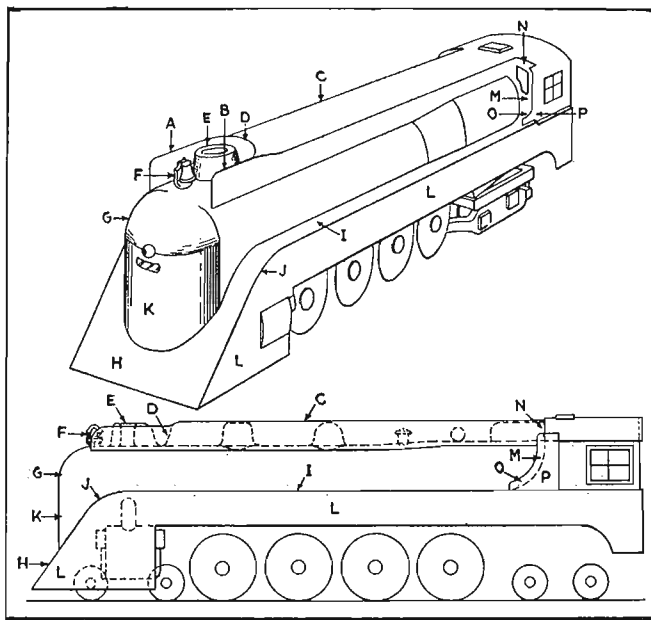
*RIGHT: The last of the series, 6264, running extra, hauls two cabooses.*



## Class U-4-a, 6400 - 6404, from MLW, 1936



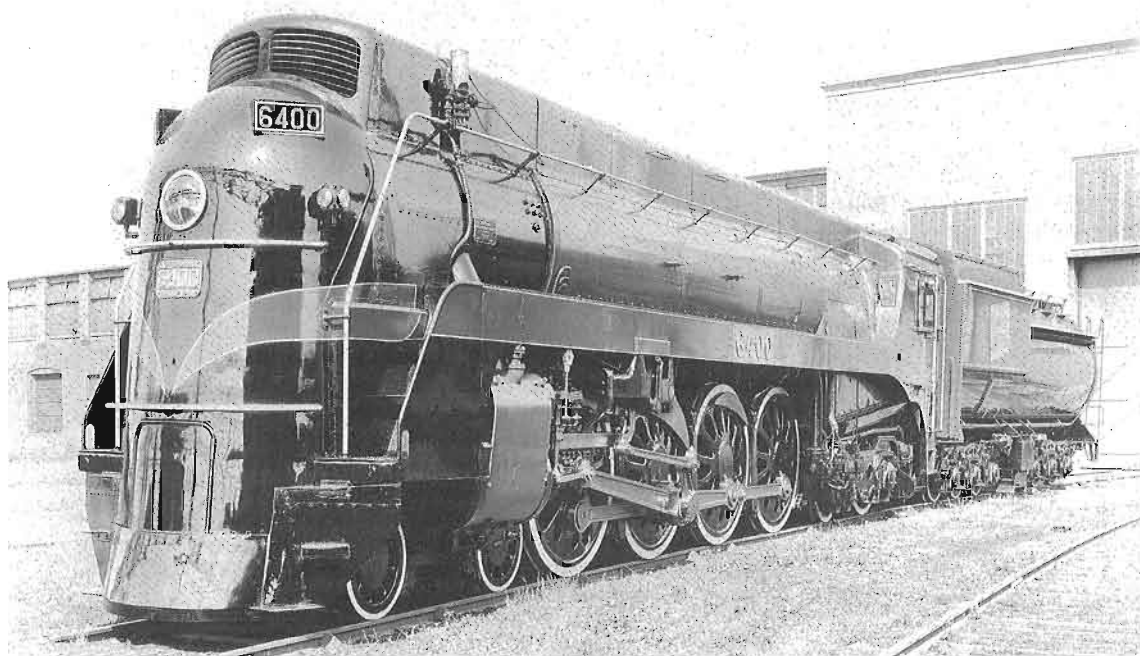
ABOVE and BOTTOM: Builder's photos of 6400

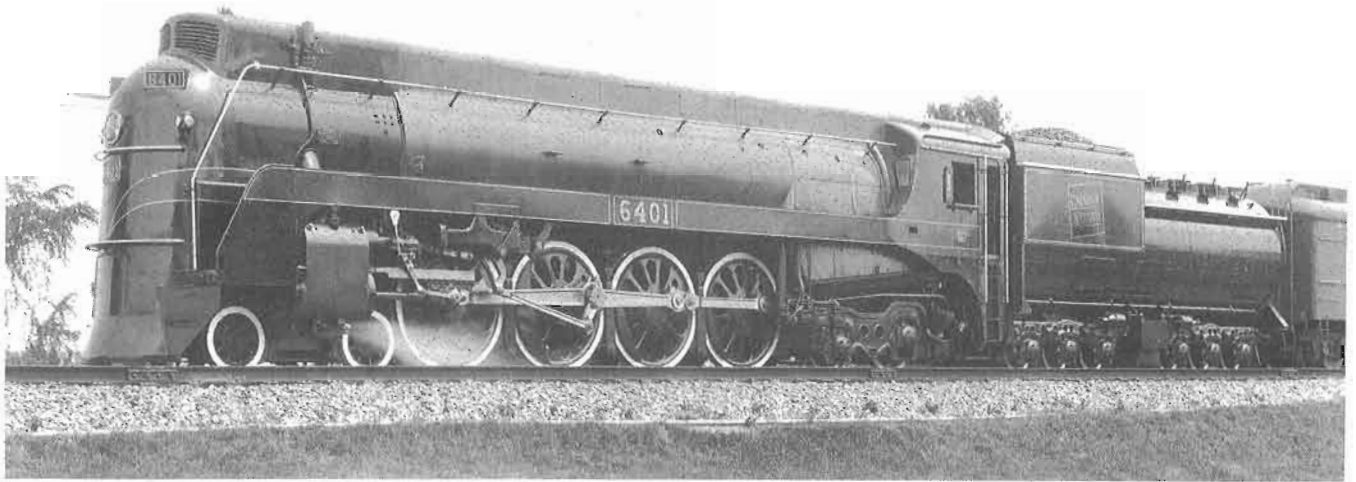
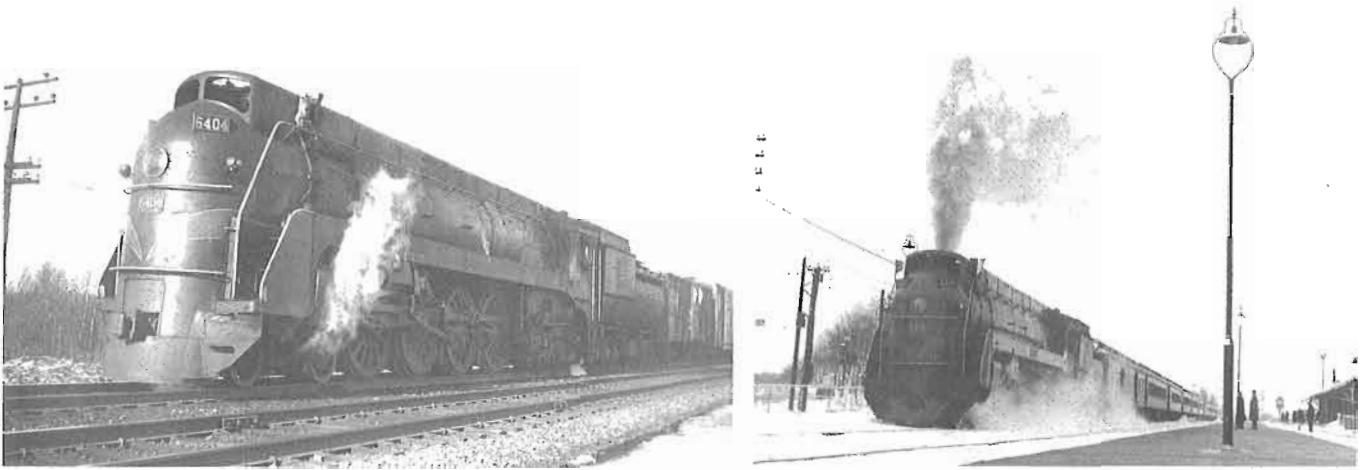


Canadian Railway and Marine World, November 1934.

During the Depression, railways in several countries tried many innovations in an effort to attract more passengers. One of the major attractions was the introduction of streamlined trains which looked "modern" and were usually faster than earlier types. The 1930s saw the start of the age of streamlining, a feature which was applied to all sorts of objects, even those that did not move.

There was one additional benefit of streamlining; smoke deflection. During 1934 the CNR made extensive studies on the effects of streamlining, resulting, two years later, in the 6400-class Northern. A model of a 6100-class locomotive was subjected to wind tunnel tests, and a model of a streamlined 4-8-4 was built. The drawing on the left shows this model with the features indicated: A, B, side plates on each side of stack. C, cowling over dome, turrets etc. D, smooth curved surface from boiler to top of cowling. E, streamlined smoke stack. F, bell edgewise to the wind in front of the stack. G, approximate quarter spherical nose on boiler. H, incline plane replacing pilot on existing types. I, running boards. J, rounded front of running boards. K, smooth cylindrical front. L, side curtains over cylinders, valve motion etc. M, new front to cab, sloping backwards from running boards. N, smooth rounded corner between cab roof and new cab front. O, smooth generous curve between running board and cab front. P, side plates fitted to cab sides and protruding somewhat forward of the cab front.





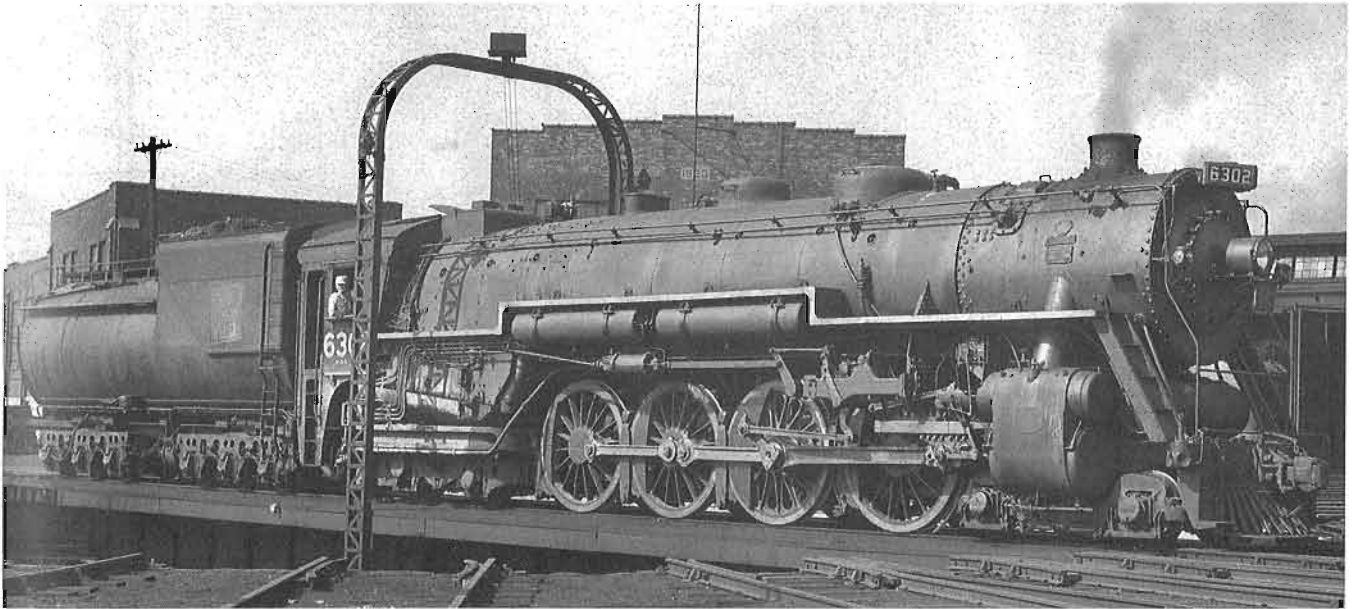
TOP LEFT: 6404 in freight service, picking up a train in Southwark Yard heading west, March 21 1950. Photo by Lorne Perry  
 TOP RIGHT: First section of pool train 15 at Montreal West, January 2 1949. CRHA Archives, Toohey Collection  
 CENTRE: 6401 hauling a passenger train in 1936. CNR photo 38739  
 ABOVE: 6401 at Sunnyside (Toronto) in 1955. Photographer unknown



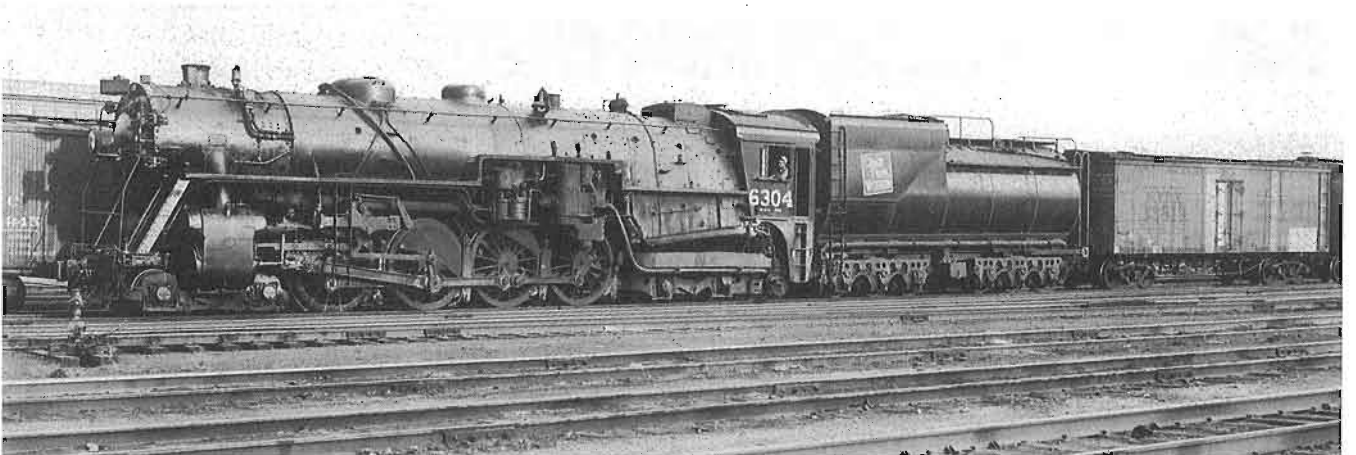
# Grand Trunk Western Northern Type Locomotives

## Class U-3-a, 6300 - 6311, ALCO 1927

## Class U-3-b, 6312 - 6336, ALCO 1942



*ABOVE: 6302 on a turntable. CN photo*    *BELOW: 6304 hauling a freight train. CN photo X5195*



*6313 on a westbound extra at Cornwall Ontario in 1949. CRHA Archives, Toohey Collection*

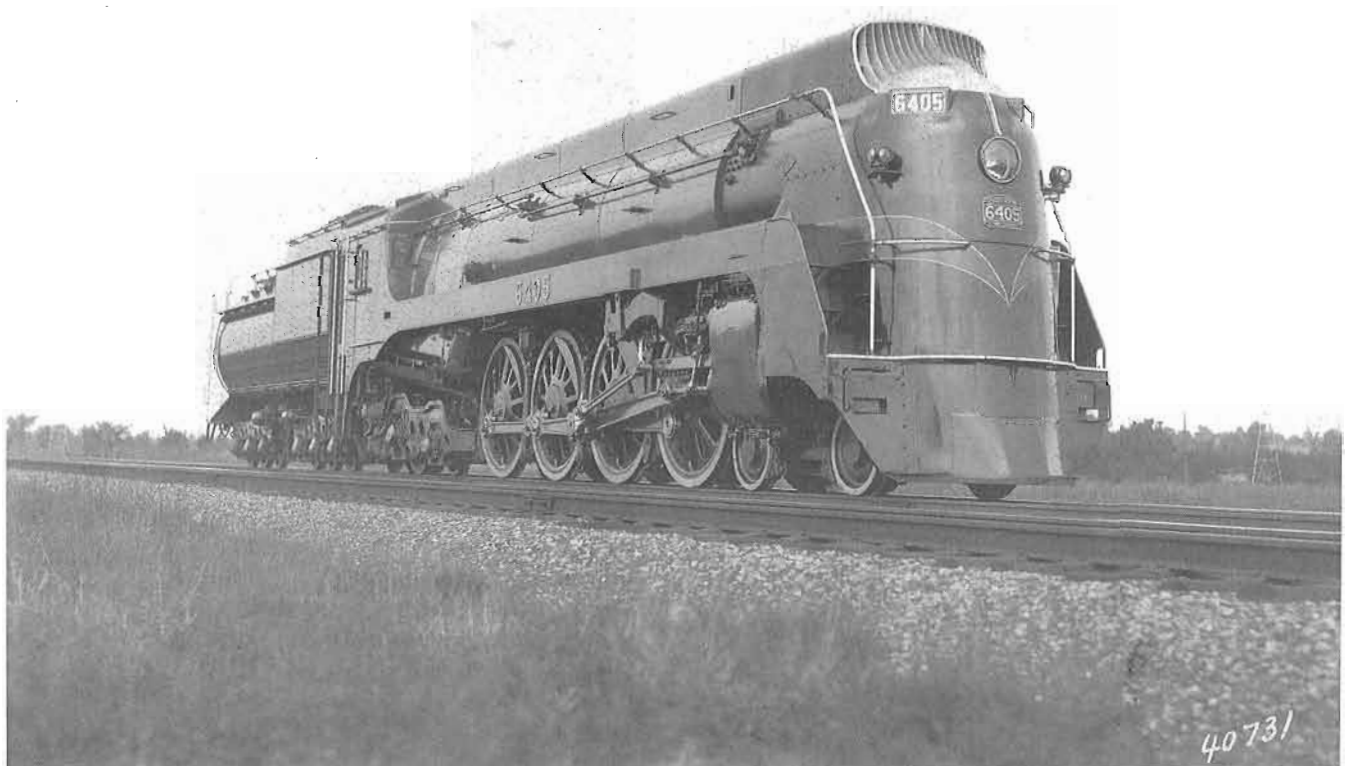


*Grand Trunk Western 6314 with a long freight, location unknown. CN photo X23519*



*Grand Trunk Western 6324 with a passenger train, passing through a busy yard. CN photo X23807*

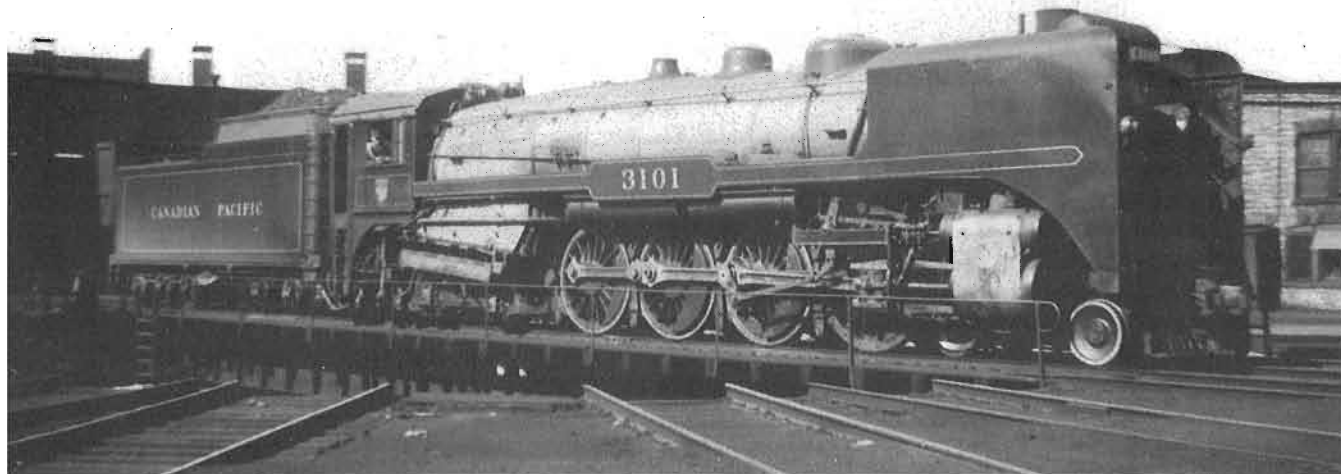
## **Class U-4-b, GTW 6405 - 6410, from Lima, 1938**



*Grand Trunk Western 6405 as it appeared when new in 1938. CN photo 40731*

## Canadian Pacific Class K-1-a, 3100 - 3101, Angus Shops, 1928

While the great majority of Northerns in Canada belonged to the CNR, the Canadian Pacific Railway also had Northerns, albeit only two of them, K-1-a class 3100 and 3101. They were designed by Charles Henry Temple, the Chief of Motive Power and Rolling Stock of the CPR, and were built in CP's Angus Shops in Montreal in 1928 and were somewhat larger than those of the CNR. Interestingly they were the first locomotives built by CP since 1922, all others having been constructed by outside builders. Following 3100 and 3101, CP would build only three more locomotives in its own shops, experimental 2-10-4 No. 8000 (1931) and 4-6-2s 1200 and 1201 in 1944. Both CPR Northerns had long careers and both have been preserved.



3101 on the turntable at the Glen Yard in 1947.

CRHA Archives, Toohey Collection

### SPECIFICATIONS FOR CPR K-1-a LOCOMOTIVES

Type	4-8-4
Gauge	4 ft. 8 1/2 in.
Type of Cab	Vestibule
Fuel	Bituminous Coal
Service	Passenger
Limiting Height	15 ft. 7 in.
Limiting Width	10 ft. 8 in.
Weight on Drivers	250,000 lbs.
Weight on Engine Truck	61,000 lbs.
Weight on Trailing Truck	112,000 lbs.
Total Engine Weight	423,000 lbs.
Total Weight, Engine and Tender	709,000 lbs.
Wheelbase, Rigid	19 ft. 9 in.
Wheelbase, Engine	45 ft. 9 1/2 in.
Wheelbase, Engine and Tender	87 ft. 0 3/4 in.
Diameter of Driving Wheels	75 in.
Material of Driving Wheel Centres	Nickel Cast Steel.
Leading Truck Wheels	Cast Steel.
Trailing Truck Wheels	Cast Steel.
Main Driving Journals	12 1/2 X 14 in.
Interim Driving Journals	12 1/2 X 14 in.
Leading Driving Journals	11 1/2 X 14 in.
Trailing Driving Journals	11 1/2 X 14 in.
Engine Truck Journals	6 1/2 X 12 in.
Trailing Truck Journals	7 X 14 and 8 X 14 in.
Boiler Type	Conical.
Boiler diam. outside 1st. ring	84 1/4 in.
Working Pressure	275 lbs. per sq. in.



3100, also on the Glen turntable in the 1940s. CPR photo

Boiler Tubes	7 3 1/2 in. 59 2 1/4 in.
Length of Tubes	20 ft. 6 in.
Combustion Chamber Length	5 ft.
Heating Surface, Firebox and arch	422 sq. ft.
Heating Surface, tubes and flues	4,509 sq. ft.
Superheating Surface	2,112 sq. ft.
Cylinders, Diam. and Stroke	25 1/2 X 30 in.
Tractive Effort	60,800 lbs.
Factor of Adhesion	4.12
Weight per Cylinder horse power	109.4 lbs.





## Temiskaming & Northern Ontario (Ontario Northland) 1100-1103

The Temiskaming & Northern Ontario Railway (which became the Ontario Northland in 1946) ordered two Northern's on September 18 1935. These were built by Canadian Locomotive Company in Kingston, were numbered 1100 and 1101 and were delivered in 1936. The following year, 1937, two more, 1102 and 1103, were placed in service. The article below tells the story.

The preference for the Northern (4-8-4) type locomotive for passenger service on Canadian railways was exemplified by Canadian National Rys. in the securing of the 6100 class locomotives now operating on that property, and in the adoption of a similar wheel arrangement on the same property in the partially streamlined 6400 class locomotives. It is again in evidence in the selection of that wheel arrangement by the management of the Temiskaming and Northern Ontario Ry., the Ontario Government property, with line extending from North Bay to Moosonee, 439.8 miles, when it ordered two locomotives for passenger service from Canadian Locomotive Co., Kingston, Ont. These two units have now been delivered, and advice from A. H. Cavanagh, General Manager, T. and N.O.R., under date of July 7, was that they were being assigned to trains 46 and 47, operating between North Bay and Timmins. This run is 258.8 miles, made up of the 225.7 miles from North Bay to Porquis Jct., and the 33.1 miles from Porquis Jct. to Timmins.

The two locomotives have been numbered 1100 and 1101. They have chief dimensions, etc., as follows:-

Gauge	4 ft. 8 1/2 in.
Boiler pressure	275 lb. per sq. in.
Boiler diam., first course	76 1/8 in.
Boiler diam., largest course	86 in.
Diam. leading truck wheels	33 in.
Diam. driving wheels	69 in.
Diam. trailing truck front wheels	36 in.
Diam. trailing truck rear wheels	48 in.
Cylinders, diam. and stroke	22 1/2 x 30 in.
Firebox length and width	120 1/8 x 84 1/4 in.
Tubes and flues:	
2 1/4 in. diam	45
3 1/2 in. diam	149
Tube length	21 ft. 0 in.
Driving wheelbase	18 ft. 6 in.
Loco. wheelbase	42 ft. 10 in.
Loco. and tender wheelbase	82 ft. 3 in.
Height, rail to top of stack	15 ft. 2 in.
Tube heating surface	3,407 sq. ft.
Arch tube and syphon heating surface	91 sq. ft.
Firebox heating surface	279 sq. ft.
Superheating surface	1,665 sq. ft.
Grate area	70.3 sq. ft.
Weight in working order, leading truck	62,650 lb.
Weight in working order, on drivers	218,210 lb.
Weight in working order, trailing truck	90,460 lb.
Weight in working order, total loco.	371,320 lb.
Weight in working order, tender	281,500 lb.
Weight in working order, loco. & tender	652,820 lb.
Maximum tractive effort excl. booster.	54,500 lb.
Maximum tractive effort incl. booster	64,950 lb.
Factor of adhesion without booster	4.0
Factor of adhesion with booster	5.2



*T&NO 1100 at Porquis Junction Ontario hauling train No. 47 about 1941.  
Photo by J.N. Lowe, Collection of Dave Shaw*

As the tractive effort and adhesion factor figures stated above indicate, these locomotives are equipped with booster; and the T. and N.O.R., it will be recalled, was among the earliest users of the Franklin Railway Supply Co. locomotive booster in Canada, and that it regards the device favorably is evidenced by the fact that it has utilized them in its latest power.

Another feature of these locomotives is their utilization of roller bearings in all truck boxes; these are of SKF manufacture. Inspection of the list of specialties discloses that these two units represent the last word in modern equipment. As the weight and tractive effort figures would indicate, they are stoker fired, being equipped with the Standard Stoker Co.'s type BK stoker. The air brakes represent the latest development, being the Westinghouse no. 8 E.T. schedule. The superheater is the Superheater Co.'s type E. Boiler feed is by the Superheater Co.'s C-F feedwater pump, located on the trailing truck, and by a World Hancock, L.N.L. 6,500 gall. inspirator. Other equipment includes a Westinghouse air horn, Pyle National type M-06 P turbo-generator, Wakefield mechanical lubricator, World Huron arch tube and washout plugs, cut-off control gauge, MeAvity flange lubricator, Nicholson thermic syphons, Dunlopillo cushioning material for cab seats and arm rests, General Steel Castings Corp. 4-wheel trailing truck with Alco lateral motion device, Barco flexible joints, Wilson sander, miner draft gear, Franklin adjustable wedges and radial buffer, King piston rod packing, Barco type M-1 reverse gear, Laird crossheads, Security brick arch, front end throttle and Viloco bell ringer and whistle operating rigging.

The tender, with cast steel water bottom frame, is carried on General Steel Castings Corp. Ltd. 6-wheel cast steel trucks, with 36 in. diam. wheels. Water capacity is 11,000 Imp. gall. and coal capacity is 20 tons. A track sprinkler is included in the equipment.

Canadian Railway and Marine World, August 1936.



*TOP: Spewing out vast quantities of black smoke, 1102 passes through Todmorton Ontario on March 3 1956, not long before the end of steam on the Ontario Northland.  
Photo by J.F. Beveridge, Collection of Dave Shaw*

*ABOVE: 1102 waits beside an engine house one day in 1949.  
CRHA Archives, Toohey Collection*

*RIGHT: This Dominion Foundries & Steel advertisement of 1936 featured T&NO 1100.*

CANADIAN  
STEEL



CANADIAN  
RAILWAYS



This illustration shows one of two locomotives built by the Canadian Locomotive Company Limited, Kingston, for the Temiskaming and Northern Ontario railway.  
D.F.S. Steel Castings (including Nickel Steel Locomotive Frames) . . . D.F.S. Steel Plate and Tender Truck Axles were used in their construction.

DOMINION FOUNDRIES & STEEL  
HAMILTON LIMITED CANADA

STEEL PLATE · STEEL CASTINGS · AXLE FORGINGS · TIN PLATE



*The essence of a northern Ontario winter is well captured in this photo of 1103 with its train of heavyweight cars.  
Collection of Dave Shaw*



*Another winter view of 1103. This time it's 1949 and no snow is falling! CRHA Archives, Toohey Collection*



# Where Are They Now?



*CNR 6218 and a caboose on exhibition at Fort Erie Ontario on April 29 2001.*

When steam locomotives were retired, most of the Northerns were scrapped. However a fortunate few have survived, being preserved as relics of the age of steam. Out of 209 Northerns owned by Canadian railways or their subsidiaries, ten remain as of 2002, being 4.78% of the total built. The smallest fleet of Northerns was that of the CPR, but both have been saved, a survival rate of 100%.

Unfortunately No. 6100, the one that started it all, was not preserved. It had been considered for preservation, but 6153 was chosen instead and 6100 was written off at Winnipeg on November 23 1961.

As we have seen, 6325 has returned to service, so it is still possible to ride behind one of these great locomotives that served so well for so many years.



*6167 at Guelph Ontario on March 25 2002. The old girl could use a new paint job!*

RAILWAY	NO. OF 4-8-4s	4-8-4s SAVED	PERCENTAGE
Canadian National	160	6	3.75
Grand Trunk Western	43	2	4.65
Canadian Pacific	2	2	100.00
Ontario Northland	4	0	0.00
<b>TOTAL</b>	<b>209</b>	<b>10</b>	<b>4.78</b>

NORTHERN TYPE LOCOMOTIVES PRESERVED, WITH THEIR LOCATION AS OF APRIL 2002		
CNR 6153	U-2-c	Canadian Railway Museum, Delson / St. Constant, Quebec
CNR 6167	U-2-e	Displayed by station at Guelph, Ontario
CNR 6200	U-2-g	In storage at National Museum of Science & Technology, Ottawa, Ontario
CNR 6213	U-2-g	Displayed near Canadian National Exhibition, Toronto, Ontario
CNR 6218	U-2-g	Displayed at museum at Fort Erie, Ontario
CNR 6400	U-4-a	Displayed at National Museum of Science & Technology, Ottawa, Ontario
GTW 6323	U-3-b	Illinois Railroad Museum, Union, Illinois
GTW 6325	U-3-b	In excursion service on Ohio Central Railroad, Ohio
CPR 3100	K-1-a	National Museum of Science and Technology, Ottawa, Ontario
CPR 3101	K-1-a	Ipsco Inc., Regina, Saskatchewan

*BACK COVER TOP: En route to Victoriaville on an excursion behind 6167 on October 27 1963.*

*BACK COVER BOTTOM: What was to have been a "Last of Steam" trip ran from Montreal to Ottawa behind 6153 on September 4 1960. As it turned out many more steam trips were run during the next two decades. Both photos by Fred Angus*



# Canadian Rail

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