newsletter

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pper Canada Railway Society

UPPER CANADA RAILWAY SOCIETY 1941

newsletter

Number 276 January, 1969

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James A. Brown, Editor

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Please address NEWSLETTER contributions to the Editor at 3 Bromley Crescent, Bramalea, Ontario. No responsibility is assumed for loss or nonreturn of material.

All other Society business, including membership inquiries, should be addressed to UCRS, Box 122, Terminal A, Toronto, Ontario.

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The Cover

It was 1/30 second at f4 for the Kodachrome II boys as CN's 6218 enacted the final runpast of our October 27th excursion at Doube's Viaduct, near Omemee, Ontario. We have a few other photos of recent excursions as well in this issue, starting on page 11.

-- James A. Brown

Coming Events

Regular meetings of the Society are held on the third Friday of each month (except July and August) at 589 Mt. Pleasant Road, Toronto, Ontario. 8.00 p.m.

Feb 21: (Fri) Regular Meeting. The entertainment -- 'Steam Days on the CPR' -- will be presented by Mr. F.H. Howard, formerly with Canadian Pacific, and a charter member of UCRS.

Feb 28: (Fri) UCRS Hamilton Chapter regular meeting. Board Room, CNR James Street Station, Hamilton, Ont. 8.00 p.m.

Mar 21: (Fri) Regular meeting, followed by an auction of railroadiana, presided over by Omer Lavallee. Please bring objects to be auctioned as early as possible, accompanied by a listing of the items. The auction rules are as follows:

1) All types of railway objects are acceptable, although relatively small items such as slides, tickets, transfers, etc. may be difficult to auction unless they are sold in groups and listed as to contents.
2) The seller retains 85 per cent of the sale price of his article; the remaining 15 per cent goes to the Society.
3) Provincial Sales Tax (5 per cent) will be charged, based on the selling price (books and magazines excepted).
4) Reserve bids of $5.00 and up will be allowed with the proviso that if the article is not sold, a fee of 50 cents will be collected by UCRS from the would-be seller.

Mar 28: (Fri) UCRS Hamilton Chapter regular meeting. Board Room, CNR James Street Station, Hamilton, Ont. 8.00 p.m.

Readers' Exchange

WANTED: CRHA News Report/Canadian Rail issues as follows: Nos. 127 and earlier, 143-146, 148, 151-153, 159-161, 166, 169, 172-176, 178-180, 182-186, 189-192. Please write Ken Chivers, 67 Somerset St. W., Apt 3, Ottawa 4, Ontario.

JUST ONE DOLLAR brings you postpaid a striking 8x10 glossy photo of CN 6218 at night, on the turntable at Spadina roundhouse with the Toronto skyline (T-D Centre) in the background. A bonus lithograph of 6218 at speed in winter is included. Orders filled immediately. James A. Brown, 3 Bromley Cres., Bramalea, Ontario.

FOR SALE OR TRADE for 'old' Toronto photos, books, etc: Electric Railway Journal for years 1930, 1931; Transit Journal for years 1932-1936 inc; Transit Journal and News for years 1937-1942 inc. All the foregoing bound by year in black buckram bindings. Also have a limited number of Pursley's 'Toronto Trolley Car Story' at $10 each and TTC's 'Wheels of Progress - 1st Ed.' at $5 ea. Mike Filey, 310 Tweedsmuir Ave., Apt 310, Toronto 10.

CANADIAN LOCOMOTIVE PHOTOS WANTED: ACR 155; Algoma Steel 4(std.ga.)/5/31/34/40/41/42; Alcan 72-360; A&D 47; C&GT 101; C&O 11, 5240/42-44, 5730-38; BC Hydro 911; GO Transit 603, C750/52-54/57, D700/02-04/06/07; Inco MLW units serials M-3497-1 to -3; NYC 5818/19/21/23/5825-27, 7431-40; NAR 207; IOCC electrics 431501/03/06; QCM 2-5/7-9/61-68, 101/02/04-06, 899 (SGU); Quebec Iron & Titanium (Allard Lk) 2/3/4,(Sorel) 38 & new unit; QNS&L 90/92, 100/01/03-16/18-56/59-75, 200-05; R&S 21; Stelco (Montreal) GE unit, (Hamilton) 51/53/71/73-77/79-87/89-93; Wabash 121-24, 657/65/69/72-76; Texas Gulf Sulphur 053; Wabush 901/08/10/11; Arnaud 904-07. Roger Boisvert, 2231 Second Ave., Trois Rivieres, Quebec.

RAILWAY NEWS AND COMMENT

RAIL WAGE PACT SIGNED BEFORE OLD AGREEMENT EXPIRES

Wage increases of 6.5 per cent a year in a two-year contract are a major feature of a new labour agreement reached between eight non-operating rail unions and Canadian railways. About 75,000 union members making an average of $2.76 an hour received the first increase New Year's Day, the effective date of the contract, and will receive the second on January 1st, 1970.

Agreement between CP Rail and Canadian National and the unions was reached on December 23rd, eight years before the existing contract expired. This was the first time a contract affecting the non-ops has been signed before the previous agreement ran out. The settlement came after Labour Minister Bryce Mackasey appointed the chief of the labour department's conciliation and arbitration branch to mediate the dispute almost at the outset of bargaining.

TURBOTRAINS STILL GROUNDED

The unplanned holiday of CN's gremlin-plagued Turbotrains will likely stretch to at least a month. CN and Turbo's builders, United Aircraft of Canada, withdrew the trains from the Montreal-Toronto run on January 6th -- after a total of 88 trips -- because of continuing mechanical failures. All five trainsets are undergoing modifications at the Central Station maintenance depot in Montreal.

Turbo's troubles have not been confined to the electrical systems. Subzero temperatures have created difficulties through freezing of the water systems and condensate in the air suspension bellows. Suspension link failures have been attributed to bumpy track conditions brought on by the cold weather, according to published reports.

Although Turbo underwent some 70,000 miles of testing, relatively little of this was under the sort of winter conditions experienced on the Toronto-Montreal run. It is reported that cold-weather testing of a Turbo set in northern Ontario is a distinct possibility within a few weeks.

One more misfortune befell Turbo on January 29th, when a yard switcher entered the Turbo facility at Central Station and rammed a standing train. Published accounts made no mention of damage.

CP RAIL/QCR STATION CLOSINGS OK'D BY CTC

CP Rail and the Quebec Central Railway have received permission from the Canadian Transport Commission to close a number of stations in Quebec province in favour of a Sherbrooke-based Customer Service Centre. All told, 43 agents and 14 caretakers will be removed from wayside stations in the eastern Quebec pocket between the St. Lawrence River and the U.S. border.

CP Rail will remove agents at Foster, Cookshire, Waterloo, Sawyerville, St. Guillaume, Sutton, Magog, Scotstown, Actonvale, St. Pie, Bedford, Highwater, Lennoxville, Knowlton, Drummondville, St. Hughes and Cowansville; caretakers will be removed from Adamsville, Roxton Falls, West Shefford, St. Simon and Nantes.

Quebec Central agents will be removed from East Angus, St. Gerard, Leeds, Ste. Marie, Ste. Justine, St. Georges, Courcelles, Rock Island, St. Anselme, Bishopton, Disraeli, East Broughton, Scotts Junction, Ste. Germaine, Beauceville, St. Evariste, Ayers Cliff, Levis, Weedon, Black Lake, Tring Junction, Lac Frontiere, Morisset, St. Joseph, Beebe Junction and Ste. Hendine; caretakers will disappear from Coleraine, St. Samuel, St. Victor, Robertson, St. Sabastien, North Hatley, St. Camille, St. Ephrem and St. Henry Village.

Skyview lounge at Central Station -- CN

MORE NEWS FROM THE TORONTO-MONTREAL CORRIDOR

Running time for conventional Montreal-Toronto trains continues to decline. With the substitution of conventional equipment for Turbo runs 62 and 63, a schedule of four hours, 45 minutes has been set up; including two crew-change stops, this betters the original Rapido's timing by 14 minutes. On one occasion at least, conventional train 63 rolled into Toronto Union just four hours and 36 minutes after leaving Montreal!

After two weeks of substandard loadings, conventional trains 68 and 69 (1810 departures) were cancelled pending the return of Turbotrains.

And once again the afternoon Rapido has something new to recommend it. Two 'Skyview' cars, formerly in the Montreal-Halifax service, now grace the rear of trains 64 and 65. Their glassed-in lounges are available to all club car passengers, and bedrooms (called 'private day rooms') may be occupied for a $14 charge, plus the regular blue-day fare.

ALCO UP FOR SALE: MLW-WORTHINGTON TO CARRY ON

In a surprise move, Alco Products, Inc. announced January 6th that it will dispose of all of its business operations, including its Schenectady locomotive plant. No time limit was specified for disposal, but it was emphasized that the plant would remain in operation in order to be offered for sale as a going concern.

The reason given for the decision was the 'highly depressed' state of the railroad transportation business. In 1968, Alco received orders for just 29 domestic units out of a total of 1010 placed with U.S. builders -- about 3 per cent; the company maintained about the same record for export orders, building four units of a total 1968 export output of 129 locomotives.

And what of MLW-Worthington Ltd., Alco's Canadian licensee? Henry Valle, president of MLW-Worthington said, following the U.S. announcement, that his company is expanding its development and design groups, which will eliminate licensing arrangements 'with regard to some of its products.' MLW did better in 1968 than its U.S. affiliate, turning out 16 locomotives for 24 per cent of Canadian domestic production; in the export field, MLW chalked up 16 per cent of the North American business, selling 20 units to foreign purchasers.

PHILLY'S ANSWER TO TROLLEY/AUTO LEFT TURN CONFLICTS

Construction of U.S. Interstate Highway 95 through the Kensington section of Philadelphia has indirectly resulted in a clever and inexpensive solution to an annoying problem confronting any streetcar line operating on city streets -- streetcar/auto conflicts at left turn zones.

A new exit ramp from the freeway is expected to increase greatly the volume of traffic on Girard Avenue, and much of this will be trucks turning left at Palmer Street to reach the Delaware River docks in the area.

To avoid delay to Southeastern Pennsylvania Transportation Authority (SEPTA) streetcars on route 15, the two tracks have been 'split' to create a 'super devilstrip' wide enough to accomodate a left turn lane between them. In gentle curves, the new tracks now allow the busy PCC's on route 15 to glide past the lineup of vehicles waiting for the left turn at Palmer. Might be an idea worth copying!

No congestion in Philadelphia, as trucks make their left turns from a wide devilstrip between SEPTA's two tracks. Here's PCC 2127 on Girard Ave. at Palmer in November 1968.

-- Alf Nanders

BUSES, TRAINS OPERATING IN NEWFOUNDLAND

CN's 'Roadcruiser' highway service began running on December 2nd, following approval by the Newfoundland Public Utilities Board of the railway's application to set up the bus service. Augmented by additional trips on December 30th, the schedule provides two daily trips in each direction -- one local and one express, known as the Expedo -- between St. John's and Port aux Basques; four other runs in both directions between intermediate points round out the schedule. Best bus time across the island is 14 hours, 15 minutes -- not quite the 12 hours predicted when the bus operation was first discussed, but significantly shorter than the still-operating train's best time of 21 hours, 35 minutes.

Strong lobbying continues for retention of the rail service, and withdrawal plans for the narrow gauge trains are by no means firm. The opposition notwithstanding, however, with only a partial service in operation, the buses carried 6,299 passengers in December while only 3,378 rode the 'Bullet'.

Much of the opposition to the buses centres on their ability to survive the rigors of a Newfoundland winter. In a sudden wind and snow storm that struck the island in early January, one bus was forced off the highway, and passengers from another were transferred to a train for the completion of their journey.

What's new in St. John's? CN highway buses, for one thing. Here's 'Roadcruiser' No. 1 at St. John's in company with two Gray Coach vehicles used for training purposes. No pun intended.

-- Ted Wickson

RAIL UNIONS WORRIED OVER LANGUAGE BILL

The federal government's plan to make bilingualism mandatory in services to the travelling public is running into heavy criticism from rail unions, who have ordered a study of the bill's implications.

The law will apply directly to crown corporations -- such as Canadian National -- and will make both French and English necessary in spheres outside officially-designated bilingual areas.

PULLMAN DROPS SLEEPING CAR OPERATIONS

Effective January 1st, U.S. railroads took over the operation of sleeping cars formerly handled for them by the Pullman Company, the service organization that the railroads bought in 1947 from Pullman, Inc., of New York. Pullman operated about 800 of the 1,000 cars still in service on U.S. railways.

Pullman porters continue to work the cars, in the employ of the operating road. However, most of the 275 Pullman conductors are out of work, albeit with severance pay ranging up to $10,600. Pullman will continue to maintain and supply the cars.

In the peak Pullman years of the '40's, the company operated about 8,000 cars and employed 2,400 conductors.

CP RAIL TO BUY B.C. UNIT TRAIN EQUIPMENT IN 1969

CP Rail has announced that tenders will be called in 1969 for a multi-million dollar order for five unit trains to haul coal under the Kaiser Coal Ltd. sales contract with Japan. Equipment deliveries will be scheduled so that the first movement of coal from the East Kootenays to the Roberts Bank port near Vancouver can take place late in the year.

The railway's unit train system will be capable of a much greater annual tonnage than that confirmed by sales so far. Testing of a prototype car built by the railway is now in the final stages, and a decision will soon be made on large-scale acceptance of mid-train remotely-controlled locomotives.

CP RAIL'S NEW HULL STATION TO OPEN SOON

A new railway station built with federal funds by the National Capital Commission at Hull, Que., has been turned over to CP Rail and will open shortly.

The $200,000 station marks the completion of a final stage of one of the largest railway relocation schemes attempted in North America. The program, began as a result of a 1951 report to Parliament, cost about $39-million and resulted in the removal of 35 miles of track and level crossings in the Ottawa-Hull region.

ACI EQUIPMENT INSTALLATION PROGRESSES RAPIDLY

With less than a year remaining to complete the job, Canada's railways are rapidly proceeding with their 'Kartrak' car labelling and installation of electronic equipment to make Automatic Car Identification a reality. The Association of American Railroads has set January 1st, 1970 as the target date for completion of labelling of the North American interchange equipment fleet.

The reflectorized label on each piece of equipment is the coded equivalent of the car number and name of the railway owning the car to which it is applied. Wayside scanners will read the labels, translating the red, white and blue stripes into numbers and transmitting the information to central computer locations, where it will be used in a number of data processing functions.

-- Canadian National

-- CP Rail

A BOOST FROM BEHIND FOR JAPANESE NATIONAL RAILWAYS

The JNR has hired 506 more men to shove more passengers into already crammed commuter trains, an operation which it says helps support Japan's economy 'from behind.'

Winter is dufficult because passengers wear heavy coats which take up precious room, but the railway has 'the supreme duty' of getting millions of commuters to their Tokyo offices on time. This winter, the addition of the new pushers to 'Operation Push Bottom' brings the total number of JNR pushers to 2,577, including 754 college students skilled in judo, karate or soccer!

HIGH SPEED HAS ITS DRAWBACKS

Penn Central's new 100 m.p.h.-plus Metroliner whipped past a commuter train on January 20th, and its force sucked out five windows of the slower train. It was the second such incident since PC introduced the fast trains January 16th on its Washington-New York route. No one was hurt in either incident.

In both cases, the commuter trains had wooden window sashes. The railroad has now ordered that only trains with aluminum sashes be operated on tracks adjacent to the speeding Metroliners.

LET GO SERVE CNE, SAYS TTC COMMISSIONER

People heading for events at the Canadian National Exhibition grounds should travel by GO Transit and not TTC buses, according to commissioner Douglas Hamilton. He said that TTC buses should be used to carry people from suburban areas to the GO stations, where they would board trains to the CNE. "We're not in the (public transit) area to cut each other's throats."

Mr. Hamilton said TTC buses shouldn't be tied up doing what GO Transit could do better. Following an eight per cent drop in passengers on the TTC suburban buses to and from the CNE last summer, the TTC agreed to set up a 'working liason' with GO Transit over coordination of services.

WORTH NOTING...

* The Union Pacific Railroad has announced the formation of a Canadian subsidiary, Union Pacific Resources Ltd., to 'conduct exploration for natural resources in Canada.'

* The proposed visit to North America of the famed British 4-6-2 'Flying Scotsman' (December NL, page 138) appears to have foundered. Reason given for the cancellation is the continuing longshoremen's strike on the Atlantic seaboard.

* The Delaware & Hudson withdrew the Chair Cars from its Montreal-New York PA-hauled passenger trains, effective January 20th, 1969.

* Canadian National has declared its intentions to cancel Toronto-Markham commuter train No. 990 effective March 31st, unless hearings are ordered by the Canadian Transport Commission.

* The U.S. government has no immediate plans to lend the Illinois Central one of the Turbotrains destined for the Boston-New York service, according to a government spokesman (December NL, page 147). The proposal is in exploratory stages only.

* Hamilton mayor Vic Copps plans to meet Ontario Highways Minister George Gomme to seek improved GO Transit service between Toronto and Hamilton. Two round trips operate from Hamilton to Toronto daily at present, leaving the former city at 0643 and 0723 weekday mornings.

* CN has ordered 90,000 tons of rails at a cost of $13-million from Sydney Steel Corp. It was the second rail order received in recent weeks by SYSCO, a provincial Crown corporation set up to operate the steel mill in 1967; PGE ordered $75-million worth of rails from SYSCO a few weeks ago.

* GTW 1509/10 and CV 4924 were extensively damaged on January 6th in a collision at Milton, Vt., Central Vermont's first in over thirty years. Elsewhere, CP and CN lines were alternately blocked by mishaps near Kamloops, B.C. the first week of January; CN passenger train 123 derailed near Montmagny, Que. on January 10th; CN freight 476 ran into the rear of a standing train at Brantford on January 20th, damaging unit 3236 and derailing four cars.

EQUIPMENT NOTES...

CN RENUMBERS RDC'S, ELECTRICS, BOOSTERS TO SUIT ACI

* To accomodate Automatic Car Identification, which does not provide for alphabetic characters in car or locomotive numbers, CN is renumbering an assortment of equipment, as follows:

Type of Equipment	Old Nos.	New Nos.
RDC-1	D-100 to D-118	6100 to 6118
RDC-2	D-200 to D-206	6200 to 6206
RDC-3	D-302	6302
RDC-3	D-350 to D-356	6350 to 6356
RDC-4	D-401	6401
RDC-4	D-450 to D-453	6450 to 6453
RDC-4	D-475	6475
RDC-9	D-500 to D-506	6000 to 6006
Boosters	B-1 to B-15	300 to 314
Electric Locos.	100 to 105	6710 to 6715
Electric Locos.	180 to 188	6716 to 6724
Electric Locos.	200 to 202	6725 to 6727
Commuter Cars - Motor	M-1 to M-6	6730 to 6735
Commuter Cars - Trailer	T-1 to T-7	6740 to 6746
Commuter Cars - Trailer	T-9 to T-12	6747-6749, 6739
Elect. Zone work car	D-1	15709
Business car	Acadia	6
Business car	Bonaventure	98

Here's CN 6109, the 1929 and 1969 versions. Which do you prefer?

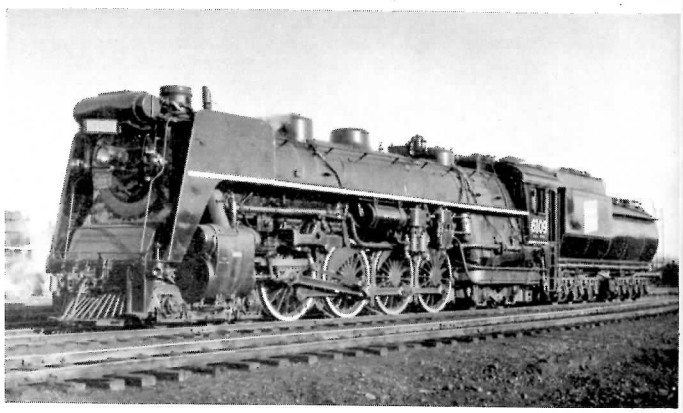
-- Upper, J. Bryce Lee
-- Lower, J. A. Brown Collection

LOCOMOTIVES ORDERED BY PACIFIC GREAT EASTERN

* It is reported that PGE has placed an order with MLW-Worthington for four 3,000 h.p. Century 630's, to be delivered later this year. Further details are not yet available.

300 NEW MECHANICAL REEFERS FOR CN

* Canadian National has placed an $11-million order for 300 mechanical refrigerator cars with Hawker Siddeley Canada Limited. The 70-ton cars, with end compartment enginators, will be built at Trenton, N.S., and are scheduled for delivery commencing in July 1969.



CP RAIL MOTIVE POWER NOTES

* Traffic pressures obliged CP Rail to lease 22 locomotives from U.S. roads in January:

Ten SD-9's from the DM&IR are now operating on the Prairie Region; units involved are 112, 121, 131, 133, 135, 137, 138, 147, 152, 154.

Temporarily assigned to CP Rail's Eastern Region are 12 B&LE F-7's, 712A, 714B, 716 A&B, 717 A&B, 718 A&B, 719A, 721A, 722B, 725B.

* CP Rail FP-7A 1404 will be the first cab unit to receive the road's new colours. Look for it on the Canadian in early February.

* FP-9A 1415, damaged in a shop accident some months ago, will probably not be repaired. Replacing it in passenger service will be unit 4041, renumbered (again) to 1432 and regeared from 65 to 89 m.p.h.

B&LE F7A's at CP Rail's Toronto Yard. -- D.M. More

WP&Y ROTARY, 2-8-2 PRESERVED AT LAKE BENNETT

* The White Pass & Yukon has placed Rotary Plow No. 1 and 2-8-2 No. 73 on permanent display at Bennett, B.C. The Rotary was built in Paterson, N.J. in 1899 by the Cooke Locomotive & Machine Co. The Mikado was constructed by Baldwin in 1947. Both pieces of equipment are three-foot gauge.

CANADIAN NATIONAL MOTIVE POWER NOTES

* Deliveries:

...from General Motors Diesel Ltd., 3,000 h.p. SD-40's class GR-30d;

5070 -- Nov 18/68	5073 -- Nov 28/68
5071 -- Nov 18/68	5074 -- Dec 10/68
5072 -- Nov 28/68	5075 -- Dec 10/68
	(Order completed)

* The fifty SD-40's slated for 1969 delivery will be classified GF-30e, the 'GF' designation arising from the fact that footboards will be eliminated from the trailing end of the units (as with recent CP Rail orders), removing them from the road-switcher category. Road numbers 5076-5125 have been confirmed for these locomotives.

Rumours have circulated that the forthcoming order would consist of carbody-type units of the F45 style. This will not be the case, although future orders may very well specify this road-switcher-cum-A-unit design because of its advantages in engine maintenance and accessibility, and its inherently warmer cab in severe climates.

* CN has been using a pair of GO Transit units to handle Friday night's train 300 to Montreal the past few weeks. The elongated GP-40's return to Toronto on 301 Saturday evening.

* A total of 54 diesel locomotives have been removed from the CN roster since our report in the November issue, page 127. The particulars are as follows:

775 -- Nov 8/68)	Sold: F. Libbey & Assoc.,
776 -- Nov 8/68)	Atlanta, Georgia.
777 -- Nov 8/68)	
3004 -- Dec 9/68	Retirement program
3016 -- Dec 9/68	Retirement program
3017 -- Nov 19/68	Retirement program
3038 -- Nov 19/68	Retirement program
3040 -- Nov 25/68	Retirement program
3074 -- Dec 26/68	Retirement program
3081 -- Dec 9/68	Retirement program
3084 -- Nov 11/68	Retirement program
3802 -- Dec 9/68	Retirement program
3815 -- Dec 9/68	Retirement program
4116 -- Nov 19/68)	Mud slide, Ashcroft Sub.,
)	Aug 14/68
9102 -- Nov 19/68)	
9432 -- Dec 9/68	Retirement program
9442 -- Nov 25/68	Retirement program

All remaining CR-12 class CLC 1,200 h.p. road switchers were retired en bloc on December 5th, 1968. Numbers of these units are as follows;

1600/01/03/04/06/08/13/14/17/19/20/22/23/24/25/27/34/35 1636/40/41/42/44/45; 1647-1659.

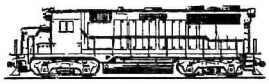
Last December saw the withdrawals of CN's last CLC/FM H-12-44's (left) and H-12-46's. These units have been out of service for some months.
-- James A. Brown

CP Rail's Montreal Terminals switcher 7012 (Alco, 1943) has been running for some months with an AAR Type A truck at the front end, and a standard Blunt truck at the rear.

-- R.J. Sandusky

Leased Duluth, Missabe & Iron Range units have been operating in recent months on the GTW and the D&TSL. Here are Nos. 190 and 189 at Port Huron on the Grand Trunk Western.

-- J. Bryce Lee



How FAST Can a Train Go..?

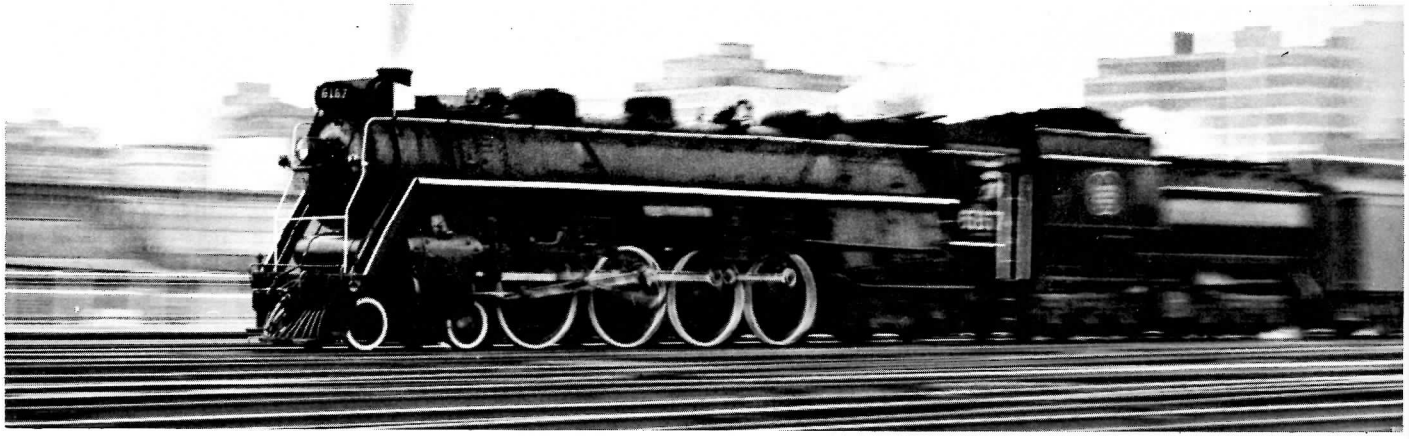
There was a time, not too long past, when such a question would have been viewed as a purely rhetorical one -- like the fabled query about the length of a piece of string. Throughout the whole century and a half in which railways have contributed their unique stimulus to the advance of industrialization and civilization, their technological accomplishments have enabled them to remain in the forefront of all phases of the transportation industry except in one important particular -- speed.

In the seventy-five years preceding the age of the motorcar, the train had enabled man to triple the speed of the fastest horse, which had been the upper limit at which he had been capable of travelling in nearly six thousand years of recorded history. Then, having attained velocities in excess of one hundred miles per hour before the dawn of the Twentieth Century, railways seemed content to rest on their laurels as far as speed was concerned, and turn their attention to the improvement of other facets such as increases in size and capacity of the fixed and rolling plant. In such a context, the difference between the 112.5 m.p.h. attained by the Empire State Express in 1893 and the 127 m.p.h. set by the LNER locomotive 'Mallard' some three decades later was purely academic.

Only the advent of the Sixties saw this record broken, but the break was a notable one -- the 208 m.p.h. attained by an SNCF electric locomotive, and it is far more in accord with the spirit and tendencies of our times.

There may thus be hope for the railways yet, and as we in Canada witness the beginnings of Turbo and the high-speed experiments south of our border, we may be foregiven if we cast our imaginations forward in time and speculate on the ultimate limit of speeds which can be attained by railway trains as we now know them. For these reasons the following article, which is a free translation from the February 5, 1967 issue of the French publication 'La Vie du Rail', is both intriguing and appropriate.

-- Omer Lavallee



WHAT LIMIT CAN BE FIXED TO RAILWAY SPEEDS ?

Speed has, in our time, become an essential preoccupation of transportation specialists. On highways, production vehicles commonly attain 110 m.p.h; in the air, we know that in the foreseeable future transport aircraft will attain Mach 1.5 or Mach 2 (twice the speed of sound). Railways themselves have not neglected this modern god of speed; in Europe, 100 m.p.h. is becoming more and more common, and 125 m.p.h. is on the verge of accomplishment. As to the Japanese, 150 m.p.h. is already at hand, and the Americans promise us 125 m.p.h. schedules in 1969.

Leaving to the other modes of transport the solution of problems peculiar to themselves in the realm of speed, and returning to our own sphere of interest, it may fairly be asked what factors impose a limit on speeds which may be attained by railways as we now know them, and what that limit is. A particularly interesting response to these questions was recently provided by Doctor Engineer Tadashi Matsudaira, director of the Technical Research Institute of the Japanese National Railways. His remarks follow:

- - - - -

The advent of faster trains is being acclaimed throughout the world. Questions therefore suggest themselves at once: *Can speed continue to increase in the future? What obstacles lie in the way of such increases? What steps need be taken to surmount them? What types of rolling stock will these measures necessitate? Let us consider these questions from a technical point of view.

Formation of Wave Cycles

Generally speaking, if a solid is displaced in a given environment, the wave cycle generated in that environment imposes a limit on the speed of the solid. Thus the speed of sound, in the air, constitutes a barrier for an aircraft. This applies also to the railway. It is true that jet aircraft can fly at supersonic speeds, but only at the expenditure of extraordinary power; for practical purposes, the sound barrier may be considered as virtually insurmountable for a train. Using this hypothesis, we can set an initial limit at the speed of sound, i.e., about 750 m.p.h.

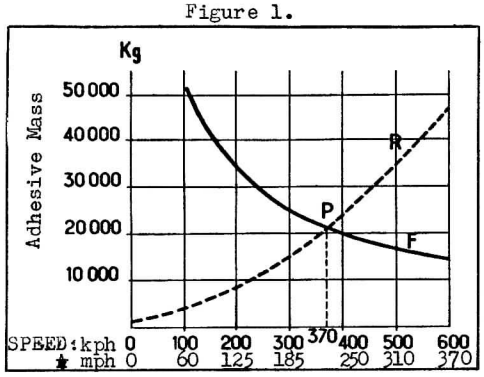
Let us now consider a wheel rolling along a rail. The rail distorts minutely under the weight of the wheel, and the distortion advances along the rail as the vehicle itself advances. As the speed of the vehicle increases and approaches the speed of the waves generated in the metal of the rail, an enormous resistance is produced, similar to the sound barrier in the air. The wheel will be accompanied by static waves of such great strength that they can increase until the rail itself is destroyed. Happily, with the rolling stock in use on the Tokaido Line, our research indicates that this speed limit is in the neighbourhood of 1,100 m.p.h! No problems, therefore, are presented in this area.

A similar phenomenon exists between the shoe of the pantagraph and the catenary where, at point of contact, the shoe gives a slight distortion to the wire. As the speed of the distortion increases and approaches the frequency of wave generation in the wire, difficulties commence; eventually, the combination of these forces will result in the destruction of the catenary and its suspension. The critical speed which we have determined by Tokaido Line experimentation is about 250 m.p.h. A speed of, say, 20 per cent less -- 200 m.p.h. -- can therefore be taken as the limit of total safety (for electrified operation with overhead pickup). It is possible to raise this limit by increasing the tension of the contact wire, or by selecting a conductor metal that is lighter, but without obtaining any spectacular improvements.

Problems of Adhesion

On a locomotive or railcar of conventional type, the wheels are propelled by a given form of energy, the tractive effort being obtained by the contact between the wheel and the rail. Unfortunately, this factor of adhesion decreases as speed increases, as shown in the accompanying Figure 1, which was prepared as a result of experiments conducted by the Technical Research Institute on the Tokaido Line. The curve 'F' shows the lessening of the factor of adhesion as the speed increases. Conversely, resistance to advancement increases with speed, shown in this case by the curve 'R', which was calculated on the basis of a twelve-car train on the Tokaido Line. The two curves have a common point 'P', corresponding to a speed of about 230 m.p.h. This is the upper limit after which additional motive power applied to the wheel will produce wheel slippage rather than acceleration.

Figure 1.



* mph rounded to nearest 5mph.

Theoretically, this ceiling of 230 m.p.h. can be increased by augmenting adhesion and diminishing the moving resistance aerodynamically, and by employing traction systems not dependent upon adhesion, such as linear induction motors utilizing wires or coils between the rails, or propulsion by propeller or jet.

Vibration

Notwithstanding how geometrically rectilinear a rail can be, a railway vehicle travelling over it produces its own vibrations, more correctly described as 'galloping'. This itself constitutes a real obstacle to spectacular increases in speed. Extensive studies have shown that this galloping tendency can be diminished, and while complete control is difficult to ensure, it is believed that it will not constitute an insurmountable barrier to speed increases. Perfect as the alignment and maintenance of the track may be, the wheel is constantly being buffetted by minute imperfections and irregularities on the rolling surface. Much effort has been exerted to improve the suspension of truck frames and absorb the vibrations encountered by the wheels. Presently, the figure of 150 m.p.h. seems compatible equally with the safety and comfort of the passengers, the type of running gear used on the Tokaido Line, and the maintenance of the permanent way.

There is no doubt, however, that an even more refined maintenance program, an improved general alignment of the route and the adoption of a form of pneumatic suspension renders speeds of 215 m.p.h. and more possible, at least in theory. The ultimate, though revolutionary, solution consists surely of operating the train above its rails on the air-cushion principle.

The Problem of Curves

To compensate for centrifugal force, all railwaymen know that track is superelevated, by raising the exter-

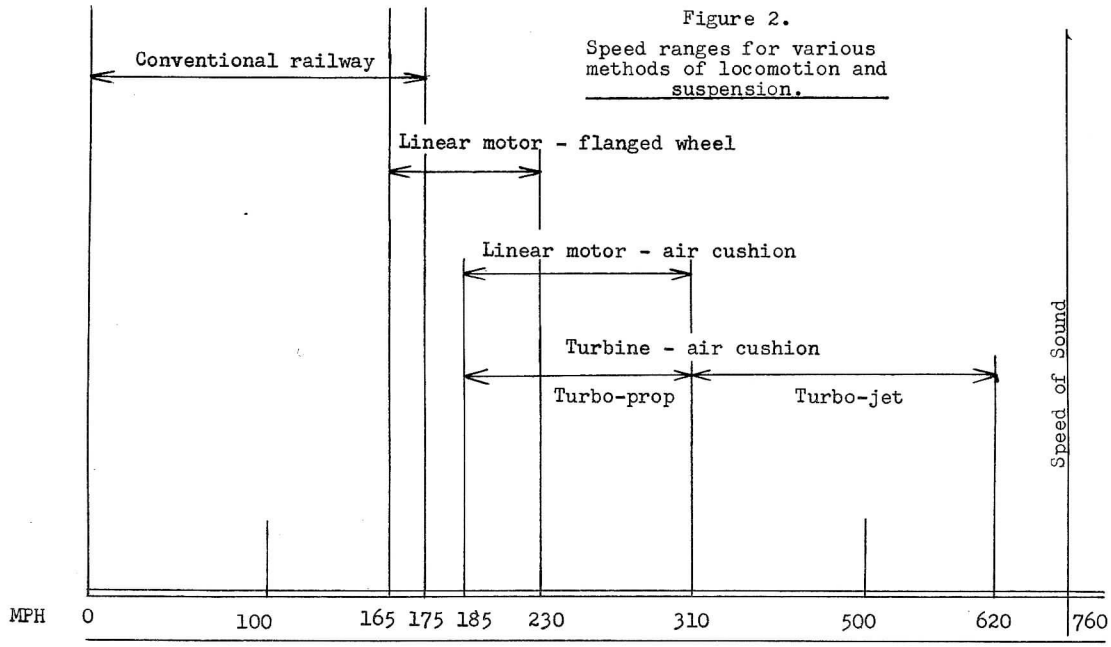


Figure 2.
Speed ranges for various methods of locomotion and suspension.

Not to scale.

ior rail on curves higher than the interior rail. This 'cant' increases with the maximum speeds required but it cannot be increased indefinitely; a train stopping on a highly superelevated curve would give the passengers a feeling of unease. In case of high winds, and particularly so in Japan where typhoons of great violence occur, a train could be turned over on its side. This is why on the Tokaido Line a figure of 200 mm (7.88 inches) has been adopted as the maximum superelevation. For a curve of 8,200 feet radius and a superelevation of 7.09 inches on the outer rail, a speed of 125 m.p.h. is perfectly admissable and is, in fact, practiced. Above 125 m.p.h., a sensation of discomfort is experienced by passengers, the centrifugal force no longer fully compensates, and a lateral acceleration takes place parallel to the floor of the vehicle.

Experiments have revealed that, at speeds lower than 60 m.p.h., a lateral acceleration on curves of 0.09g is uncomfortable to about five per cent of the passengers. The figure of 0.05g, which is perfectly acceptable to all passengers, has therefore been retained for all curves on the Tokaido Line; this permits a speed of 150 m.p.h. as the limit.

The basic remedy, of course, is to increase the radii of curves or alternatively, to adopt vehicles using a pendulum suspension, such as (Turbo or) those under study by the SNCF, or automatic hydraulic control of inclination which is the subject of experiments by one of the privately-owned Japanese railway companies. The problem of curves must be viewed not only from the point of view of comfort but also from the safety aspect. In curving, an inequality in the distribution of the mass is experienced, one rail being more heavily loaded than the other, necessitating special precautions in the maintenance of the track.

To sum up, the problem of curves is not a predominant factor hindering the increase of speed, but it is among the principal difficulties in practical terms. For these reasons, the planning of new lines must contemplate the elimination of curves as much as possible.

And the Future ?

The author has confined himself here to a discussion o the restrictions imposed by the dynamics of solids. There exist, of course, restrictions due to factors other than wind resistance, of both a mechanical and a electrical nature, such as: the resistance of axles; wear on wheel treads; lubrication and design of journa wear of pantagraph shoes and of the catenary contact wire, etc. None of these would seem to present any serious fundamental obstacle to increase in speed.

For the moment then, we can conclude that with a conventional railway, such as the new Tokaido Line, the practical speed limit is between 155 and 175 m.p.h., though trials at higher speeds seem to be relatively easy to envision. In the case of the employment of a traction system which does not rely on adhesion, such as the linear induction principle, linked with a railway gauge possibly wider than the present standard (56½ inches), we can foresee a speed limit of about 215 m.p.h. for an orthodox railway.

Above this speed, we must consider 'floating' the vehicle; using rolling stock of the Tokaido Line type, travelling on a cushion of air about three quarters of an inch above the roadbed, would permit a speed of about 230 m.p.h.

Subsequently, a combination of the linear motor and th air cushion would permit the attainment of speeds of the order of 250 m.p.h. Above that, the motor would become inefficient as compared with a turbo-propeller or a turbo-jet. Thus, little by little, we would appraoch, in the transportation of masses on terra firma the probably-critical barrier of the speed of sound. But, once we reached that point, would a vehicle moving at 700 m.p.h., using aerodynamic principles under the limits implied by an air-borne environment in clos proximity to the ground, still qualify for the title 'train' ?

6218's Recent Trips

-- James A. Brown

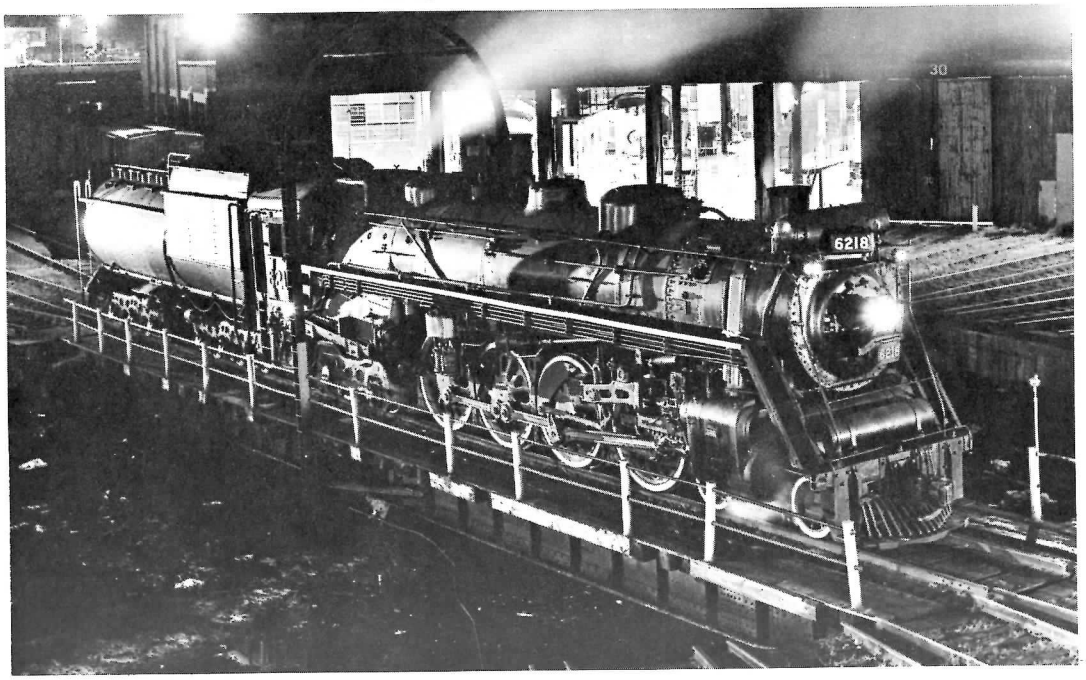
Since the 'rebirth' of steam on Canadian National -- at least from the excursion standpoint -- well over 100 trips have operated, carrying close to 70,000 passengers in all, behind such examples of the steam age as 5107, 5114, 6153, 6167 and 6218. Herewith a photographic sampler of the latest peregrinations of the current member of the team, CN's well known 6218:

September 28th, 1968: The UCRS 'Grape & Wine Special' to St. Catherines and Niagara Falls was blessed by ideal weather. Here's how the activities at Jordan looked; below, from the air, and left, to those photographing the runpast.

The weatherman was less generous on our October 27th trip to Belleville and Peterborough (see this month's cover), as cloudy skies and the occasional skiff of rain kept the picture-takers on their toes.

-- Doug Stubbs

January 26th saw 6218 storming up CN's double track at Lynden, en route to Galt and Guelph.
-- James A. Brown



Following one of the highly successful student steam excursions around the city, held the week prior to our October trip, 6218 takes a spin on the turntable at Spadina roundhouse.
-- James A. Brown