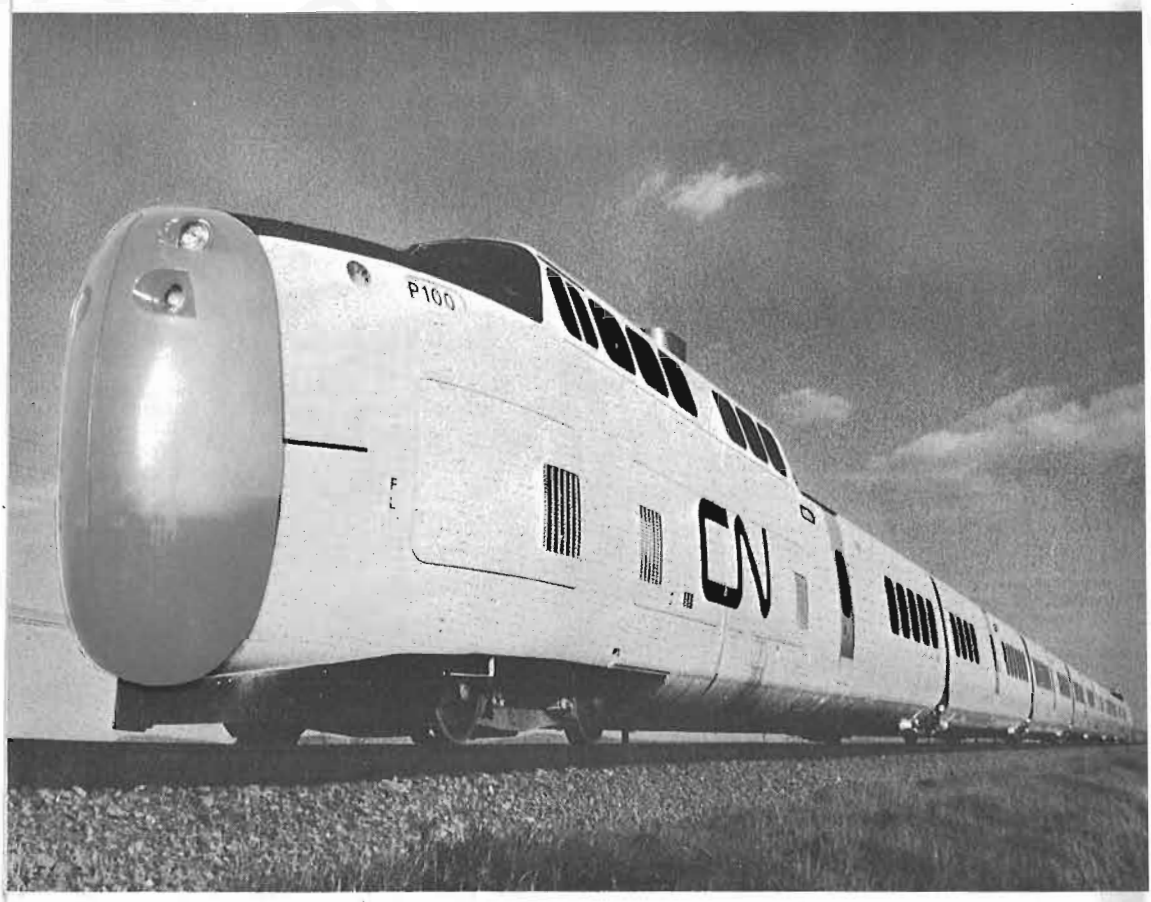
Canadian Rail

NO. 207
FEBRUARY 1969



Turbo


6218
6793
CN

TURBO - historical antecedents

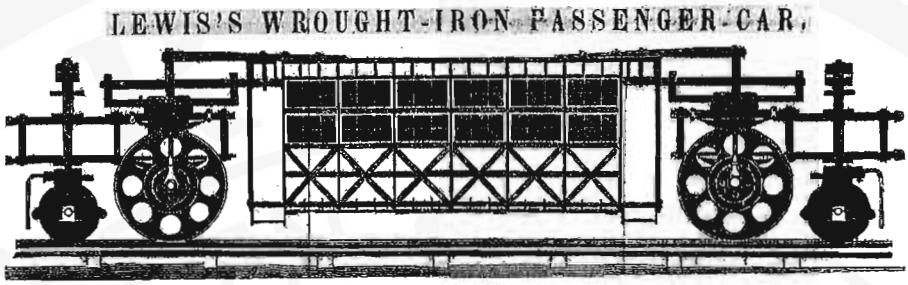
F.F. Angus

The basic concepts which make TURBO possible are lightweight construction, streamlined design, pendulum suspension and small, powerful engines. These features did not develop overnight, but are the results of years of experimentation and change, dating back to the era of steam propulsion.

For hundreds of years before the coming of the railway, the speed of land transportation had undergone little improvement, so that, by 1800, the fastest way to travel was still on the back of a galloping horse. The first railways changed all that and it was soon possible to travel at 20 or even 30 miles an hour, much to the alarm of the critics, who thought at once that such extreme speeds would have a very serious effect on the health of the traveller. As steam locomotive engineering became more advanced, experimental designs evolved, capable of much higher speeds. A rate of a mile a minute had been achieved before 1850 and, in the 1890's, runs exceeding 100 miles an hour, for short distances, had been made. These speeds would be impressive even today and represented the practical upper limit, without resorting to completely new concepts of rolling stock and roadbed.

However, it should be emphasized that these early high-speed runs bore little relationship to the practical, day-to-day running time of trains. While the maximum speed reached its effective limit in the Nineteenth Century, the average operating speed only crept up slowly, year by year and an average of 40 miles an hour was still fast running in 1900. Occasionally, where two railways competed directly, a "speed war" would temporarily drastically raise the schedule speed. The most famous examples of this were the British "races to the North" on the trains between London and Scotland in 1888 and again in 1895. In Canada, the competition between the Canadian Pacific and the Canada Atlantic Railways on the Montreal-Ottawa service in 1899-1900 saw both lines build high-speed Atlantic (4-4-2's) locomotives, setting speed records which remained unbroken for years. Once the heat of the competition cooled however, schedules returned to their more leisurly pace, as the high-speed engines could not pull long trains, and load, rather than speed, was what made the railway pay.

These brief excursions into the realm of higher speeds had shown that the effect of air resistance, almost negligible below 20 m.p.h., became an important factor at high speeds. The laws of physics tell us that the force required to overcome the resistance of air varies as the square of the velocity; thus, the work done to overcome this force in travelling a given distance is 36 times as great at 60 m.p.h. as at 10 m.p.h. Every protruding part of a train contributes to this drag and for best efficiency, a smooth, unbroken surface should be used. In 1865, a patent was issued in the United States for a train embodying such features. This train consisted of a 4-4-0 locomotive and one car, the entire unit being cigar-shaped and completely enclosed, even on the underside. The platforms were connected by flexible diaphragms and the whole train for-



Underslung car (from the *Scientific American*, March 19, 1846)

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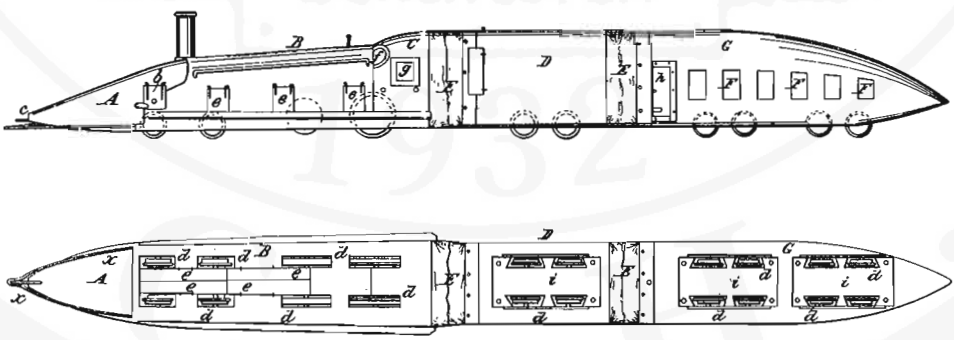
med a streamlined surface. Even the rear end was pointed,showing that the pronounced retarding effect of turbulence,behind a flat moving surface was appreciated,even then,probably as a result of experiments on ships. This train would look modern,even today and to a person in 1865,in the era of wood-burning locomotives and open-platform,wooden coaches,it must have seemed as unrealistic as air travel.

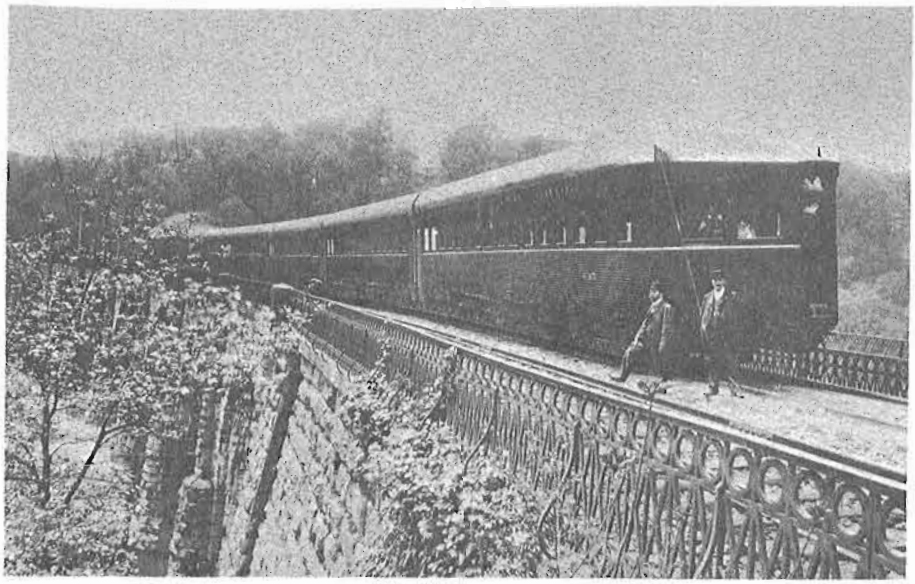
It is very doubtful if an actual train was built from the designs of this patent and not much was done towards high-speed trains until the end of the century. By then,the trend was definitely to higher speeds,and in the year 1900,the Baltimore and Ohio Railroad in the United States,actually constructed a streamlined train named the "Windsplitter", which underwent tests at speeds of up to 90 m.p.h. However,a conventional, unstreamlined locomotive was used and lightweight rolling stock had not yet been developed,so much of the benefit of the streamlining was lost, and the "Windsplitter" was soon retired,dismantled and forgotten.

As so often happens to a good idea,the whole concept of streamlining and high-speed travel lay virtually dormant for many years, until a new competitor,the aeroplane,made the railways realize that they would have to improve their schedules or lose business. The first,modern streamlined train,the Union Pacific's diesel-powered,articulated train named "City of Salina" was placed in service in 1934. Other railways throughout the world soon inaugurated streamlined trains,both steam and diesel powered. The problem of reduced pay-load was minimized by the use of modern lightweight equipment and few heavyweight cars were built thereafter. In Britain,one of the streamlined 4-6-2 steam engines of the London and North Eastern Railway captured the world's speed record for a steam engine, and in Canada,speeds above 100 m.p.h. were not unknown with the Canadian National's 5700's and the Canadian Pacific's 3000's.



First streamlined train (patented by S. R. Calthrop, August 8, 1865, No. 49227)

During World War II,longer trains precluded high-speed running, but by 1950,radically new designs were on the drawing boards, or even on the rails. It was at this time that the Spanish "Talgo",the American "Train X" and others of their type were developed. In 1956,the Chesapeake & Ohio Railroad in the United States,evolved a train very similar to TURBO although diesel-powered. It embodied the concepts of low centre of gravity,pendulous suspension,an idea conceived in 1846,but long since forgotten,two-wheeled trucks under the articulations between the cars and other features. This would allow high speeds to be maintained on curves, giving a decided advantage over earlier streamlined trains. This train was not built at that time but was TURBO's immediate predecessor. In the 1960's , the Japanese electrically-powered Tokaido train became the world's fastest regularly scheduled train,a title which it retains to this day. With the development of a small turbine engine,similar to that used to power aircraft,the design of the C. & O.'s 1956 streamliner was revived in North America by United Aircraft Corporation,and TURBO became a reality.



Adams *Windsplitter* on the Thomas Viaduct, Relay, Maryland, 1900 (by courtesy of the Baltimore & Ohio Railroad)

Future increases in schedule speeds on existing railways will depend as much on the improvement of track and the elimination of level crossings as on improvement in equipment,since TURBO is theoretically capable of more than 150 m.p.h. Certainly,there is need for high-speed trains for runs of less than 500 miles,to conserve air space for longer flights. History has shown that maximum speeds,achieved under ideal conditions are two to three times greater than the practical speeds. Already an experimental electric train in France has surpassed 200 m.p.h. and, if new developments can increase the ratio of practical to maximum speed, it is not inconceivable that,by the year 2000 C.E.,intercity rail travel averaging 160 m.p.h. and exceeding 200 m.p.h.in places,may,under certain conditions,be commonplace.

TURBO - propulsion

W.G.BLEVINS.

One of the major innovations incorporated in the design of the propulsion system of United Aircraft Corporation's TURBO Train is the aircraft-type gas turbine.

The gas turbine in itself is not new to railroading. Its first cousin,the steam turbine,was employed in several steam locomotives in the United States,using both electrical and mechanical transmission (reference Norfolk & Western 2300 and Pennsylvania Railroad 6200,respectively). In 1948,ALCO-GE constructed No. 101,a demonstrator 4500 hp. gas - turbine electric locomotive which saw service on the Pennsylvania Railroad and the New York,Chicago & St. Louis (NICKEL PLATE),before being delivered to the Union Pacific Railroad,in 1949,as U.P. 50. Although this locomotive was returned to the builder in 1951,it was the harbinger of twenty-five 4500 hp. gas turbines,delivered by General Electric to U.P. between 1952 and 1954. Finally,from 1958 to 1961,numbers 1 to 30,which were initially rated at 8500 hp.,were received by U.P. from GE. Many of these latter locomotives have been rerated to 10,000 hp. at the turbine,in more recent years.

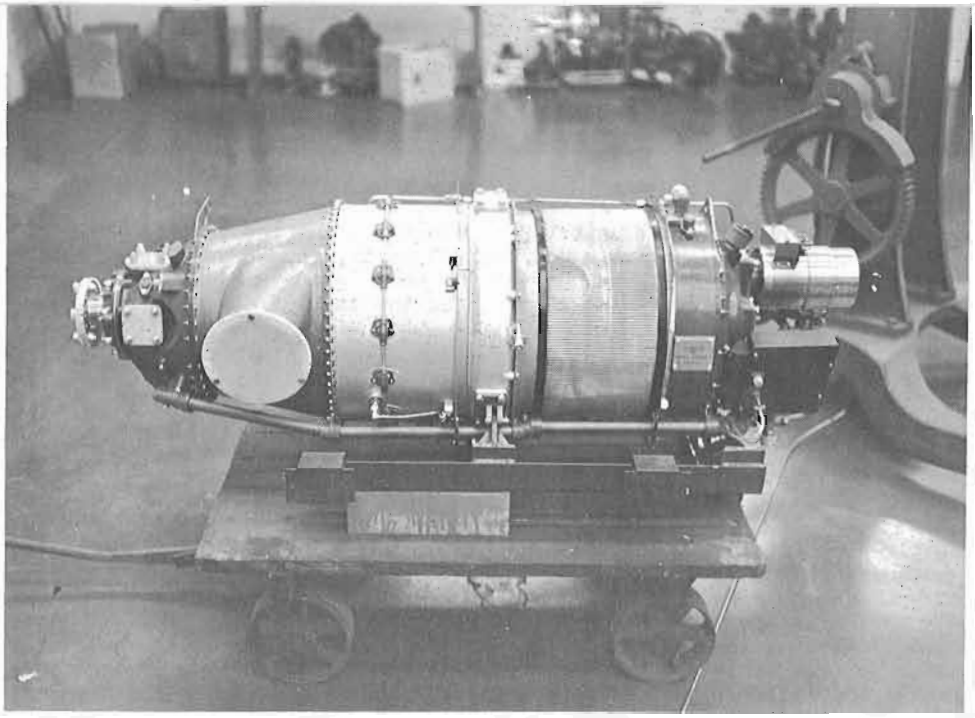
One other gas turbine,number 80,later no. 8080,was constructed by U.P. in their own shops,utilizing a 2000 hp. ALCO passenger A-unit,number 607-A,model PA-1,as the control unit. A GE 4900 hp. gas turbine, arranged to burn both Bunker-C fuel oil and pulverized coal was installed in a former Great Northern electric locomotive,number 5018. This two-unit set was trailed by an ex-4000 class tender,equipped with a coal pulverizer. The final results of testing this most ambitious project were such that number 8080 was retired after only 5 years of service.

The conclusion reached by U.P.,- the acknowledged leader in gas-turbine motive power development,is that,at present,gas turbines are not economically justified,due to high capital expenditure and maintenance or operating costs. The railroad has turned to double-engined diesel - electrics to achieve their aim of unit reduction. As a result, the 4500 hp. gas turbines have now been retired.

For the past few years,the Budd Company of Philadelphia,Pa., has been experimenting with self-propelled commuter coach sets,powered by gas turbine prime movers. Apparently,work is still progressing. Overseas, the British Railways experimental GT-3,a 2750 hp. gas turbine-mechanical unit built in 1961 has come to naught in respect of being the prototype of the motive power selected to replace BR's thousands of steam locomotives.

This,in brief,is the history of gas turbines in railway motive power service and obviously,the results have been anything but promising. High maintenance costs,short life and a gargantuan appetite for fuel have discouraged their previously anticipated widespread usage. The U.A.C.'s TURBO Train will be watched most carefully by the railway industry to see whether or not the answer to rising costs of railway operation is in the use of aircraft-type gas turbines,installed in integral trains.

For those not acquainted with technical matters,a summary of the workings of gas turbines will be informative. The basic form of the gas turbine is the turbo-jet engine. This engine consists of an air inlet noz-



TURBO POWER - UAC's ST-6B is about 5 feet long and 1.5 feet in diamater. Turbine governor is on the right end;screen to left is air intake & compressor.Power turbine is enclosed by bright metal cover in centre, with exhaust port visible just to left. Output shaft is on left end of turbine.Photo courtesy of McGill University (Engineering) from U.A.C.

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zle,through which air is drawn by a turbine or fan. This inlet turbine,as one might expect,compresses the air to many times its initial pressure,so that this air,in its compressed state,is passed to a combustion chamber, where fuel is injected and ignited. Very rapid combustion occurs and the total pressure and temperature of the gas are raised tremendously.Seeking an outlet to a normal pressure state,the compressed gas passes through a small turbine,which uses up enough of the power generated to drive a shaft,running down the centre of the engine and powering the inlet compressor turbine.After passing through this small turbine,the expanding gas still has a great amount of energy for conversion to Kinetic Energy, by expansion and hence further acceleration of the gas through the outlet nozzle where it reaches a normal pressure state by being exhausted to the atmosphere. The rate of change of momentum of the gas passing through the engine produces the thrust,which is the output. This is the power which moves the turbo-jet aircraft.

The U.A.C. gas turbine is similar to the turbo-jet,except at the outlet nozzle,where a set of additional turbines is substituted to remove the unexpended energy of the expanding gasses. A shaft connected to these power turbines is used to transmit the power to whatever load system is desired. The spent gasses are usually then exhausted to the atmosphere , although sometimes the hot exhaust is used to preheat the inlet air. This function is very similar to the feedwater heater installed on many large Canadian and United States steam locomotives,which used exhaust steam to preheat the inlet water before it was injected into the boiler.

The prime movers used by the United Aircraft Company in the TURBO Trains are the ST-6B gas turbines,which are the Canadian development of the Pratt & Whitney PT-6 engines,used for aircraft. There is a total of 5 ST-6 engines installed in each seven car train set; four are rated at

400 hp. each and are used for propulsion,while the 5th.engine is employed as the Auxiliary Power Unit (APU). This gas turbine is rated at 527 shaft horsepower and drives a 460 volt,60 hertz,3-phase generator, which delivers 300 kw. at 3600 rpm. One of the propulsion turbines is arranged so that it can be substituted rapidly for the regular APU,should the latter fail.

Each 400 hp. propulsion unit ST-68 weighs only 300 lbs.complete , which contrasts sharply with a diesel engine,such as the 16-cylinder ALCO 251C,producing up to 3900 hp. and weighing 42,000 lbs. The 16V-251C is about 12 feet long,6 feet wide and 6 feet high,without its generator, whereas the ST-68 is about 60 inches long and 18 inches in diameter. From these figures,the weight per horsepower or the horsepower per cubic foot of volume can be calculated.

In addition to the great weight and bulk savings,the ST-68 is arranged as a "free" turbine engine. That is, the output shaft is independent of the compressor shaft. Thus, while the engine is idling and the compressor is functioning,the output shaft need not rotate. This arrangement eliminates the need for a transmission system, such as an hydraulic torque-converter or electric generator,characteristic of the conventional diesel locomotive. The four propulsion turbines,- two in each end of each trainset,are directly coupled to a gear-mixing box, which reduces the turbine shaft speed and increases the torque applied to the cardan-shafts connected to axle-mounted gear-boxes. The power truck,under each dome car is of a two-axle design,incorporating high support points to facilitate banking on curves.

While the speed of the power turbines may thus be controlled by the train speed,the power developed by them is directly controlled by the fuel admission rate. This function is determined by the position of the engineer's controller,in the dome cab. Of an integral-type design, this controller,if turned clockwise from the mid-position,increases the power while if turned counter-clockwise,the air brakes are applied. When the controller is returned to mid-point while the train is at speed, a "free wheeling" condition ensues,with no great change in train speed, along level stretches of track.

Thus,unlike conventional diesel locomotives,it is not possible to have the locomotive still providing power,while the air brakes are functioning. This feature is essential on conventional trains, to prevent the effect of "slack" between the cars,but the articulated design of the TURBO Train has eliminated the need for such independant action between the braking and throttle systems.

The maximum rated speed of CN's TURBO Train sets is 120 mph.,while the 3-car sets,destined for the New York,New Haven & Hartford will have a substantially higher rating. These latter trains are still undergoing additional testing,under the auspices of the U.S.Federal Government's Department of Transportation,as part of the Northeast Corridor Project. Because of the noxious gasses which are given off by turbines,the New Haven sets will be provided with d.c.traction motors,connected to the gear mixing boxes,for use in the third-rail electrified territory in the tunnels and stations of subterranean Manhattan.

Technically speaking,the individual system designs for the TURBO Train are not new,but what is new is the combination of pendulum suspension,single guided axles,articulation,gas turbine motive power and lightweight design. Only the test of daily long-distance service will determine whether the aircraft manufacturer-turned-railway supplier can succeed in providing fast,efficient and reliable service in rail transportation,which will be so vital in the future.

"T-DAY"... and tomorrow

S.S.Worthen.

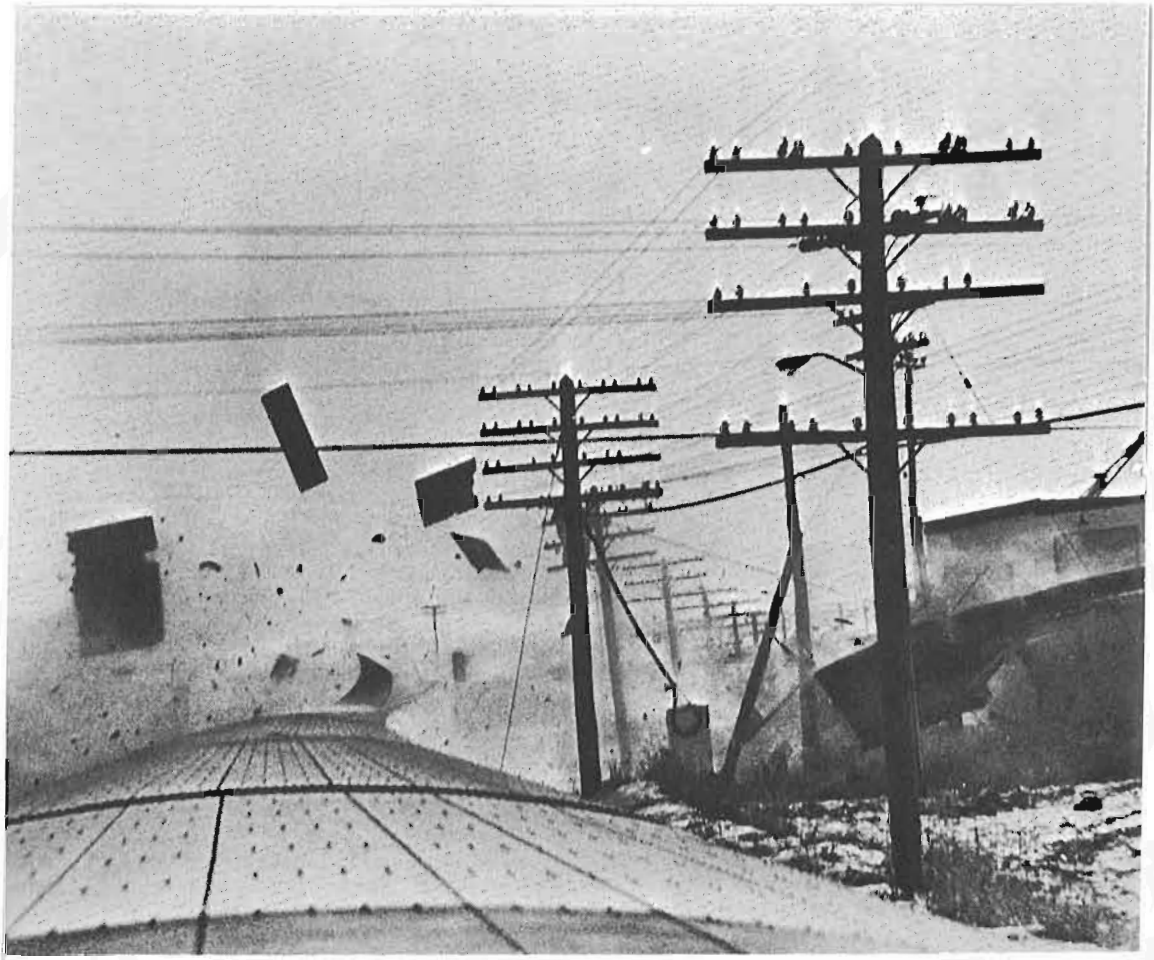
It was exactly as exciting as a five-year-old's Night Before Christmas,-or mabye it wasn't. It was just like seven days before Apollo 8 moon shot and it seemed as though the preparations had been under way quite a while longer. The target date was "before Christmas",but that was really the day after tomorrow,depending on what the project engineers said.And anyone who could persuade them to commit themselves was doing a superhuman thing because they weren't too communicative. In fact,they weren't saying a thing!

And then,as the data continued to pour in,everyone became a little more confident and a little more sure.About November 23, the word went around that Company employees could and were riding to Toronto and back on test runs. And then,on December 7,United Aircraft Company of Canada borrowed a unit for one day only,to take a group of "notables" on a Saturday trip to Brockville and back. The President of the Canadian Railroad Historical Association was among the participants. Finally,the logic system on the computer spat out the decision that all systems were "go"and that the lessor could preview the thing to the press,radio and television representatives on December 10,1968 at 1245 hours and thereafter.Thus the decision was taken and what followed thereafter is history.

Some history! In retrospect,what happened on that Tuesday , in the neighbourhood of Kingston,Ontario,looks almost like a put-up job. But nobody in their right mind would have set up a "cliff-hanger" like the one which actually happened. With every newspaper,magazine,radio and television notable for miles and miles around on the train,would you believe a thing like an accident!

TURBO P-204 headed out of Montreal on the advertised at 1245 hours,while its counterpart TURBO P-201 departed from Toronto at the same hour. A mile west of Kingston,eastbound P-201 approached a level crossing at a considerably reduced speed,since one of the Company's RAPIDO's had whacked a cement truck at the very same crossing the day before.

Frank Bordeaux,Company signalman from Montreal,standing at the crossing,was the first to know it would happen. Senior Engineer L. Langabeer,at the throttle of TURBO P-201 saw and knew the same thing in microseconds.And at the moment of impact,the picture of the year was snapped by Press Photographer Ernest Lee of the London FREE PRESS of London, Ontario. This was the picture that made the front pages of most Canadian dailies the next morning,and the publicity for Canadian National's TURBO was well and truly launched! And the launch was just as successful as that of Apollo 8,some days later!



PICTURE OF THE YEAR - Ernie Lee's shot from the rear dome of P-201 at the moment when train and semitrailer disputed the crossing at Kingston,Ont., on the press run of 10 December 1968. Photo courtesy London FREE PRESS.

Driver Don MacLean of Kingston,Ont.,who was at the wheel of the first vehicle to get in the way of TURBO,- a semitrailer truck,literally never knew what hit him. He only found that out when he staggered out of the tractor portion,shaken up but otherwise unhurt. Quite accidentally (and no pun is intended),he created the biggest news story that CN could have asked for. But at a price! Adrian Lunny of the Montreal STAR snapped a terrific shot from the front dome of westbound TURBO P-204,as it slowly approached the scene,a few minutes later. Ron Haggart of the Toronto TELEGRAM smiled,"Well,if you must hit a truck on a press run, then the place to be is on Canadian National's bullet-shaped,rock-steady new TURBO!"

And he was about right,too. Without a doubt,if there had been some spare nose-panels stowed away somewhere on TURBO P-201,CN's efficient maintenance boys would have had them out and installed in a jiffy and,all things being equal,TURBO P-201 would have arrived in Montreal a little late and that's all. As it was,this unit was back in service some 36 hours later. But,in the interest of public safety,press,radio and television representatives from Toronto were detrained from P-201 and entrained on P-204 for the return trip to Toronto. The Montreal contingent made the entire round trip. The plaudits were many and loud,- not only for the new TURBO train,but also for CN's excellent handling of the whole episode. The day's events had supplied every element essential to a real good page one story. And that's where the story was printed,- right across Canada .

CN's own house-organ,KEEPING TRACK,described the event as "the best cov - ered and most widely reported minor accident in railway history. All in all,the Company came out of it well. On an occasion such as this, it is undoubtedly best not to have an accident. But,as Mr. Haggart and others of his colleagues intimated,the accident did show the rock-steady TURBO can take it. All that most people on board felt was a slight jar, and it was difficult at first to convince some that anything like hitting a huge trailer truck had happened".

Well,that's the way it was. And it is improbable that, as of this writing,anyone outside of Kingston,Ont.,even remembers the name of the driver of the ill-fated trailer truck. Historically speaking, he was the first Canadian to challenge TURBO's right of way. But it is very doubtful if he or his semitrailer of frozen meat will make Canadian his- tpry books!

What is still being discussed,however,is the effect of TUR- BO's silent speeds at other level crossings along its intercity route. To date,considerable experience in level crossing control has been derived by Canada's railways in the operation of self-propelled cars of the BUDD RDC type. Consequent on this experience,main line road crossings have been adequately provided with every essential protective device.However , with its higher speeds,TURBO has significantly reduced the time interval between closing of crossing flasher and barrier circuits and crossing the crossings.

Nowhere has this been more evident than along the "Lakeshore",- ten to twenty miles west of Montreal. With Highways 2 and 20 closely parallelling both CN and CP along this stretch and with several intersections of heavily travelled streets crossing these two double-tracked main lines,the municipalities have been forced to install manually-controlled traffic lights. These lights regulate traffic crossing the two railway lines,as well as the highway intersections. Normally,when a train hits the crossing protection circuit,the traffic police officer on duty at the control post,first clears the two railway crossings of road vehicles and then changes the traffic lights to red as the half-barriers come down. With normal passenger or freight trains,including those whose speed is somewhat reduced due to starting from station stops,the traffic control officer can count on three or four minutes for this operation, but when TURBO hits the circuit,this time margin is telescoped to single minutes or fractions thereof. And the motorists had better hustle! They probably would,too,if they knew that TURBO was on their tail! But most Mr.Motorists can't tell the difference between TURBO and 6218.

This formidable reduction in crossing clearance time was noted by a C.R.H.A.member on TURBO's inaugural run on December 12. It was particularly obvious on the eastbound trip,when TURBO zipped through the Lakeshore communities after dark,in the middle of the evening. Next morning,information exchanges between civic officials in these cities and Canadian National's St. Lawrence Region Public Relations Department led to conferences,designed to evaluate this new condition. It was established that top train speeds are a matter of Railway Transport Committee regulation. TURBO does not exceed these speeds. However,TURBO does not make any stops in this area (except at Dorval,on one run) and does not have to decelerate for curves,so that point-to-point elapsed times are significantly less than with RAPIDO or freight trains. After all,that's how TURBO gets to Toronto in 3 hours and 59 minutes!

It is hoped that civic authorities in these an other similar communities along TURBO's trajectory will issue the appropriate instructions to their traffic control men,so that the latter will keep a copy of TURBO's schedule at hand,so that when the speedster is approaching their area or crossing,they will clear the traffic from the crossing well in advance of the TURBO passing time,thus avoiding any further mechanical impact tests,such as was conducted at Kingston!

Simultaneously,existing by-laws prohibiting the sounding of TURBO's characteristic warning horn should be revoked,for the protection of the public. Already,consideration is being given to the provision of special flashing lights at suburban stations in both the Montreal and Toronto areas,which will give adequate advance warning that TURBO is coming,somewhere close up or down the lins. In some localities,- notably at the two crossings at Kingston,Ont.,overpasses are being constructed, but until they can be completed,it is evident that Mr. Motorist and Mrs. Pedestrian will have to be specially instructed and totally educated that a completely new form of rail transportation has happened on Canadian National Railways. They'll have to pay closer than normal attention. They'll learn that this new thing doesn't make as much noise as a DC or Apollo 8, but it is just as portentious and will,inevitably,relate much more closely to their every-day experience. Stop,Look and Listen,my fellow Canadians,TURBO is here,-officially as of December 12,1968!

A BEAUTIFUL SHAPE - On page 60,TURBO clips 'em off at 90 plus,flashing by the poles on the way west from Montreal to Toronto.Photo courtesy C.N.R.

TURBO - day, 1968

D.W.Spencer

The day was Thursday,December 12,1968. The occasion was the first official run of Canadian National Railway's TURBO train,- TURBO for short. T-hour was 1245 hours,Eastern Standard Time.

1235 hours:

The platform is alive with press representatives,television crews and cameras,film cameramen,photographers,arc lights,celebrities and some very pretty hostesses,acting as guides. Montreal's Mayor Jean Drapeau strolls up and down and through the new train with Canadian Nationals President,Mr. N.J.MacMillan,Q.C.The crowd on the platform grows. Reporters scribble,flash-bulbs pop and cameras and tape-recorders whirr.

1238 hours:

Mr. MacMillan and Mayor Drapeau complete their tour of the new train. Dr. Nicholls,President of the Canadian Railroad Historical Association,joins them. More pictures are taken. Thirty excited members and friends of the C.R.H.A. join the crowd on the platform. No,- by actual count,there are only twenty nine. One ticket has had to go begging,in spite of the valiant efforts of Mr. Walter Bedbrook to give it to some deserving person in the crowd in the Concourse of Central Station.

T-DAY 1968 - Minutes before departure,CN's President N.J.MacMillan,C.R.H.A.'s President Dr. R.V.V.Nicholls and Montreal's Mayor Jean Drapeau discuss the donation of the first TURBO to the Canadian Railway Museum. Mr. Lorne Perry, CN Public Relations and C.R.H.A. member is in the left background.
Photo courtesy Canadian National Railways.

CN Turbo

Inaugural Week

Commemorating the introduction of Canadian National's Turbo—the fastest and most luxurious inter-city passenger train in North America. The Turbo heralds a new era in land transportation, speeding between Montreal and Toronto in only 3 hours and 59 minutes —downtown to downtown.

CN Turbo

Semaine inaugurale

Le plus rapide et le plus luxueux des trains de voyageurs inter-villes d'Amérique du Nord, le Turbotrain des Chemins de fer Nationaux du Canada marquera l'histoire du rail. Il ouvre une ère nouvelle des transports terrestres et relie Montréal à Toronto en 3 heures 59, de centre à centre.

CN Turbo

form formule 1

fare prix $ 7.65 No 3448

between entre Montréal

and et Toronto

car voiture 6309

train 63 date Dec 12/68

time heure 12:45h.

endorsements remarques Group Fare.

issued with suite au

Important
If you cannot travel, please cancel your reservation
property taken into the car will be entirely at the owner's risk

passenger's receipt not valid for transportation

Important
si l'on ne peut faire le voyage, prière d'annuler la réservation
le CN n'est pas responsable des effets personnels des voyageurs

coupon reçu ne peut servir de billet

TURBO TICKET 3448 - held by M. Claude Blais,P.Eng.,for CN TURBO's inaugural run on 12 December 1968,Montreal-Central Station to Toronto-Union Station.
Courtesy M. Claude Blais,P.Eng.

1240 hours:

Within touch-distance of the platform stands the silent,sleek,cigar-shaped vehicle; colours of cream and gray. World's newest example of high-speed rail travel. TURBO - powered by aircraft turbojets, - turbojets powering an aircraft on wheels! And on steel rails! The man in the pilot's compartment of the front TURBO dome wears a business suit and a snap-brim felt and a lapel badge. Black background and white letters spell TURBO-3. Watch in hand,his steady blue-eyed gaze sweeps over the powder-blue lights of the control console. Redirected,it encompasses the platform and the crowd and the ceremonies. The control compartment is silent. The noise and celebration on the platform below is entirely sealed out.

1242 hours:

In the passenger seat,immediately behind the engineer's position,is the observer,- a professional mechanical engineer,watching intently. In the centre of the aisle,looking through the open glass doors of the control compartment,another interested passenger stands talking to the man in the business suit. The former is the C.R.H.A.'s Honorary Auditor. The latter is the project engineer from United Aircraft Company of Canada.

1243 hours:

With a final,fleeting look at the platform crowd,the television cameras and the arc-lights,the man in the business suit with the TURBO-3 button makes a decision. Seating himself in the senior engineer's seat,he reaches for the telephone,cradled low down on the control console. Speaking into it,he establishes communication with the rear dome of the train. Quiet orders are given. Trackside auxiliary power is available. Touch of a button and the familiar,rising whine of a starting turbojet engine is just audible. Majestically,the whine climbs upward through the frequencies. A deeper note as the ignition button is pressed and the turbines ignite. On the other side of the glass,the crowd suddenly stirs. Eyes turn from friends and relatives to the faintly vibrating gray tubular shape,now the focus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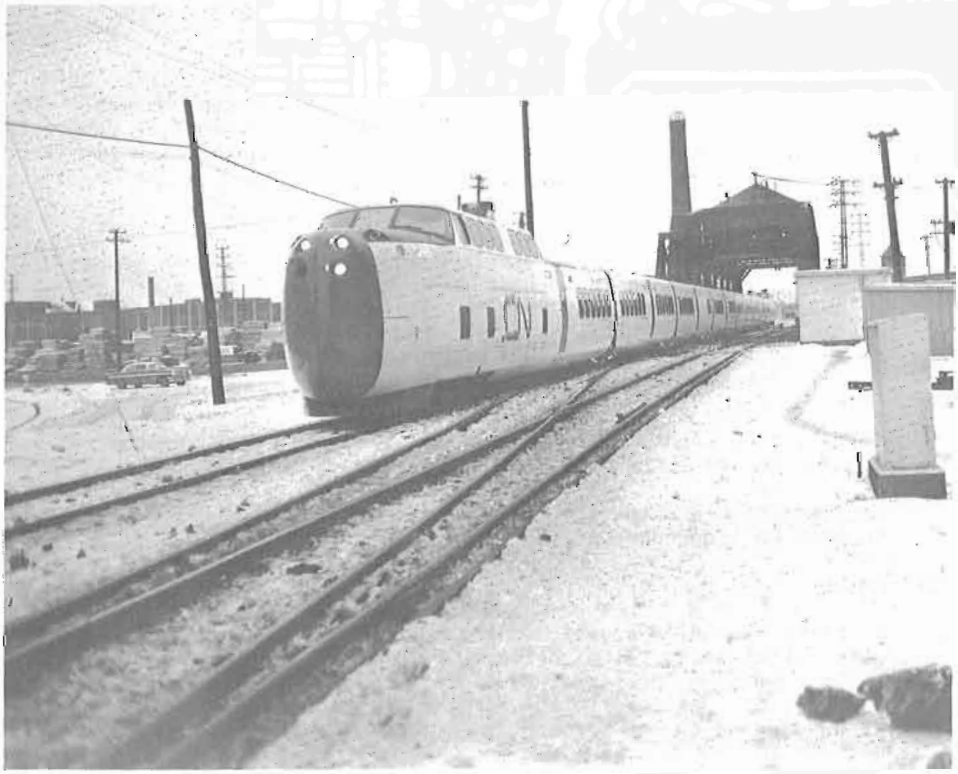


MONTREAL T

of attention. Invisible hands separate trackside connections. The last fixed earth-ties are free. A ripple of excitement,of uncertainty,passes through the spectators. A quiver of expectation is mirrored on the faces of the crowd.

1244 hours:

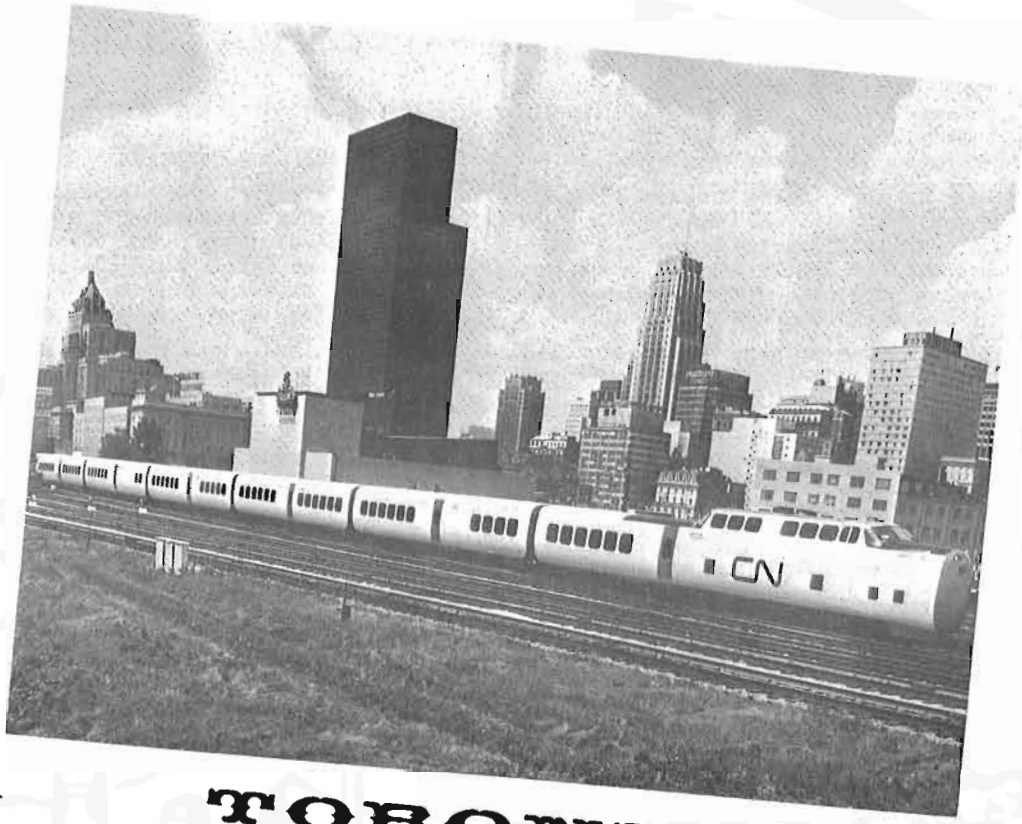
The crowd on the platform recoils slightly. Something so new,so different. A new experience,so near at hand. The uneasiness of standing so near. To see this long expected marvel. This marvel of transport of the Twentieth Century astonishes and silences the observers. Now in Canada,- land of the second century,progress is heralded by the increasing,commanding roar of limitless power,under the engineer's calm control.

"Mesdames,Messieurs. S'il vous plait! Will all those persons not accompanying the TURBO to Toronto please leave immediately".

The conductor's voice,clearly audible,from the announcing speakers in each unit and dome of the train.

1245 hours:

Turbines now whine eagerly. Uniformed train crew,just photographed with officials and dignitaries,quickly leave the platform to take their operating positions,some in the body of the train and two in the control positions in the first dome. Slipping into right and left-hand seats in the forward dome,the senior engineer and his assis-



TORONTO

tant. The senior engineer glances quickly at the man in the business suit with the TUR80-3 button. A questioning glance. All pre-start checks made and satisfactory? a nod. Press a button. Passenger steps the length of the train,in precision-drilled groups lift,turn and so fold out of sight into the smooth gray shape. Orange-coloured doors slide out of hidden recesses,move sideways,then outward,forming an integral,perfect seal. On the control console,a light winks, another goes out.

A nod from the first engineer to the second engineer. Brakes release with no audible sound. Another light winks out. The man in the business suit stands between. Three pairs of eyes look ahead. Green on the dwarf signal. A slight advance in throttle position and a responding higher whine from the turbojets. The moment of action. Then slowly,slowly,but with quickening speed,the platform and the crowd begin their retreat. The control car,- the entire train accelerates. Silently the entire unit moves out,past the platform,from under the canopy,beginning its first official voyage over the three-hundred - odd miles to its terminal westward,- to be accomplished in three hours,fifty nine minutes and no seconds.

The time is 1245 hours. The date is December 12,1968. The place is Montreal,Canada. The long,gray shape,variously decorated with black and orange is Canadian National's TUR80,- first train in the world to make of this idea,reality,- high-speed rail transportation between two great cities. The idea has become the reality. This splendid event marks the new era,- the dawn of the new age of railways in Canada.

PRECEEDING PHOTOGRAPHS

On page 43,THE RESULT OF DISPUTE - Adrian Lunny of the Montreal STAR shot this photo of P-201 from the front dome of westbound P-204, just west of Kingston,Ont.,after the "disputed passage". Photo courtesy Montreal STAR.

Page 47 depicts the drama of T-Hour 1968. Montreal's Mayor Jean Drapeau gives the "highball" to P-204's engineer,from the departure platform of CN's Central Station,Montreal. Time is 12.46.30, 12 December,1968. (CN) Below,FIRST RUN IN REVENUE SERVICE - CN Train 63,otherwise TURBO P-204 , crosses the old swing-bridge over the Lachine Canal at St-Henri,Que., on 12 December 1968 at 12.52 hrs.,on the inaugural run to Toronto.(W.Blevins)

T-TIME 1968: On page 48,unit P-202 anticipates P-204 as it pulls out of CN Central Station on a test run in the latter part of the summer.Photo CNR.

The picture on page 49 shows TURBO'S ARRIVAL IN CANADA'S QUEEN CITY.P-102 on a test run,passes Cherry Street Tower and enters Union Station. P-204 glided past the same spot on 12 December 1968. Photo courtesy C.N.R. Below,TURBO IN THE SUBURBS. CN's alumalloy arrow zips westbound through the suburbs along Montreal's Lakeshore,on the way to a 239-minute rendezvous at Toronto's Union Station.Photo courtesy Canadian National Railways

On page 63,Charlie De Jean captures THE GREAT PUMPKIN=P-100 at Dorval,Que. on 19 October 1968 during pre-inaugural trials.Picture on page 58 portrays TURBO whisking through the eastern Ontario farmlands,west of Kingston.(CN)

TURBO - travel

D.W.Spencer.

In December 12,1968,at 1246 hours,- one minute after Canadian National's TURBO had eased out and away from the departure platform of Montreal's Central Station, the nattily-dressed train conductor stood in the aisle in the front dome. He turned to face the passengers who were seated around the circumference and uttered the time-honored phrase in a well-modulated voice:"Tickets,please". This traditional request was made for the first time in an entirely new environment.

The conductor of CN Train No. 63 reached out for and accepted for validation the first ticket offered,- number 3448,held by M. Claude Blais P.Eng.,member of the Management Team of the world-wide organization of Surveyer,Nenninger & Chenevert,Inc.,Montréal,Canada. As some of us may remember,M. Blais was formerly associated with Hydro Québec and in his capacity with that Company,once stood in an open field at Delson/St- Constand,Que.,with the Association's President,Dr. R.V.V.Nicholls.This was some years ago,when they were planning the main power line and switch-gear which now supplies electricity to the Canadian Railway Museum.

Although M. Blais' company (Surveyer,Nenninger & Chenevert) concerns itself mainly with huge hydroelectric developments and other large commercial projects,M. Blais can still find the time to assist the Association and his Company is still interested in forwarding the Museum project at Delson/St-Constant,Que.

The second ticket punched,number 3449,was tendered by the Association's Honorary Auditor,Douglas W. Spencer. The tickets were collected rapidly and expeditiously,thanks to the positioning of the seats around the circumference of the dome,with the round floor-mounted table centralized. The dome on this inaugural trip was crowded to overflowing,but the conductor nevertheless made his good-natured way among the many passengers. There were twenty eight "assistant engineers" in the dome,- all very attentive,"assisting" from the first official passengers' cab,almost tailor-made for train-watching.

On his way through the train,the friendly conductor collected 210 tickets from TURBOLUX passengers, 66 from TURBOCLUB passengers and twenty from railway officials,making a grand total of 296 riders on TURBO's first official trip.

TURBO will cut rail travel times to Toronto by twenty percent. It thus betters all existing train times between the two cities.Unbelievable but true,part of this "clipping" of times is made possible by a modern hair-styling device,normally found in the modern tonsorial emporium. Used at better than 90 mile per hour speeds,by one of the two engineers, this unique appliance has a very important role to play.

The glass front of the forward portion of the front dome is sloped backward slightly,like the perspex of the modern jet,in order to minimize wind resistance. Directly behind it is a solid half-inch of perfectly transparent unbreakable plate glass. It is mounted on steel brackets that hold it rigidly in place,just millimeters from the main glass panel in

front of the engineers. Thus,any flying objects which might possibly penetrate the main pane of glass will be stopped by this layer of safety glass. An added safeguard for the crew.

With external temperatures at the 20 below zero level at some times, during the Canadian winter,frost spots and fog patches may develop on the glass in front of the two engineers. At a normal,constant speed of better than 90 miles per hour,the temperature on the exterior surface of the glass may go as low as 40 to 60 below zero,when the "chill factor",caused by the fierce wind at that speed,is taken into account.The resulting fog and frost spots on the glass must be removed quickly and completely, if perfect vision is to be maintained.

This is accomplished by means of a hand-held hair-dryer! Normally in constant use in barber-shops and beauty salons,this device dries hair rapidly. It also removed fog and frost spots rapidly. The stream of hot,dry air from the dryer's nozzle is aimed at the frost spot and bingo!, it disappears. A clear view is immediately restored. Right-of-way and signal lights are clearly visible.

Thanks to the ingenuity of some clever CN employee,TURBO roars through the dazzling white of the Canadian winter,keeping closely to its high-speed timing. And this is possible,at least in part,thanks to the humble hair-dryer from the tonsorial parlour!

Picture below - ANACHRONISM. During test run on Nov. 10,1967,TURBO P-100 slows at St. Lambert,Que.,to receive hooped-up orders. Time 13.43 hrs.,as TURBO leaves for Beloeil,Que. P-100 & P-200 were running in tandem. (CN)

TURBO - times & timing

Claude Gareau.

A memorable day among memorable days. A superbe beginning of a new era. A magnificent trip on the day of the glamorous trip of a beauty. This is the way it was, thanks to the valiant labouring of C.R.H.A.'s Special Activities Chairman Walter J. Bedbrook, on the very first run of TURBO to Toronto, in regular service.

From the first minute one entered the concourse of Central Station one could sense the atmosphere of "something special coming up!", what with hordes of people, TURBO buttons, camera-men and a huge illuminated sign indicating "TURBO - Toronto: Cars 01-10",- a real show-case act!

The THE moment came; gates opened, people rushed down the stairs to their respective locations, to be greeted by the most charming and so refreshing hostesses, dressed in smooth beige two-piece uniforms. Camera -men were everywhere. Even Montréal's Mr. Mayor Jean Drapeau came over to give his salute in his own dignified way to this new-born marvel, which was already raising eyebrows in pride. After Mr. Mayor had greeted everybody, he paused for a "photo-stop" and then raised the lantern in a high-ball signal and we were on our way to Fun, Excitement, Speed and Surprises.

Up in the dome of coach 6310, I tried to write a record of the trip as exactly and comprehensively as could be. Here it is,- details, speeds, times and all, for you to peruse and digest,- without bromo, I hope!

Mileages shown on the left are from CN's operating timetable, Winter, 1967, whereas mileposts shown in the middle of the table are the old mileages from Bonaventure Station, via Lachine and Dixie.

Speeds shown in the right-hand column are not averages, but rather the speeds at those precise moments and locations, as indicated. As anyone knows, the speedometer is not completely reliable.

Miles	Time	Remarks	Indicated
000.0	12.46.30	TURBO Train 63 leaves Montreal-Central Station.	
	12.51.30	First ticket punched. Half-mile Dorval-84. First time at 95 mph.	
010.7	13.00.00	Dorval. Slight downgrade. (Note a)	101 mph.
017.5	13.05.00	Beaurepaire	100 mph.
020.8	13.07.30	Ste-Anne-de-Bellevue. Reverse curve.	82 mph.
021.0	13.07.40	First Bridge-Ottawa River	90 mph.
	13.08.30	Second Bridge-Ottawa River. Meet eastbound freight. Bridge speed 70 mph.	97 mph.
	13.10.00	Dorion. Speed restriction. (Note b)	39 mph.
026.5	13.13.30	Cedars.	85 mph.
	13.16.00	St-Dominique.	96 mph.
037.8	13.20.00	Coteau Station. (Note c)	100 mph.
	13.23.30	Rivière Beaudette	96 mph.
	13.24.00	Change control-senior engineer to assistant.	

	13.24.30	The waiter finally made it to the front of the dome!		
	13.26.30	Bainesville.	(Note d)	103 mph.
053.9	13.29.50	Lancaster		95 mph.
		Good curve about 0.75 miles west of Lancaster taken at.....		98 mph.
	13.31.45	Old Mile Post 57		100 mph.
	13.34.00	Meet with freight		100 mph.
065.6	13.37.00	Cornwall East		
068.0	13.38.30	Cornwall Station		95 mph.
	13.43.30	Good curve west of Cornwall		93 mph.
	13.47.00	Ingleside		97 mph.
092.6	13.54.00	Morrisburg		97 mph.
	13.55.45	Meet Train 50		90 mph.
100.2	13.58.45	Iroquois		95 mph.
104.8	14.02.00	Cardinal	(Note e)	90 mph.
		Location where International Bridge to Ogdensburg,N.Y.,can be seen.....		99 mph.
112.7	14.07.15	C.P.R.Junction		70 mph.
113.8	14.08.45	Prescott	(Note f)	60 mph.
	14.10.00	Meet Train 60		75 mph.
	14.13.15	Maitland		
125.6	14.17.00	Brockville	(Note g)	65 mph.
		Very sharp reverse curve about 1 mile west yard limit brockville.....		80 mph.
138.3	14.26.00	Mallorytown		95 mph.
	14.31.30	Lansdowne		97 mph.
153.9	14.36.00	Gananoque		90 mph.
	14.40.30	Old Mile Post 161	(Note h)	104 mph.
	14.45.30	Meet TURBO No. 62	(Note i)	90 mph.
173.0	14.48.30	Kingston		40 mph.
180.4	14.55.30	Collins Bay		88 mph.
188.0	15.00.30	Ernestown		95 mph.
	15.04.00	Old Mile Post 194		101 mph.
198.9	15.07.15	Napanee		70 mph.
	15.12.45	Marysville		100 mph.
	15.15.15	Old Mile Post 211		97 mph.
213.5	15.16.45	Shannonville		99 mph.
219.5	15.20.45	Belleville Yard-east end-reduce speed		
220.7	15.22.00	Belleville		60 mph.
	15.29.30	Picton Junction		100 mph.
232.8	15.30.15	Trenton		95 mph.
	15.33.15	Meet freight		98 mph.
241.9	15.36.45	Brighton		96 mph.
249.5	15.41.45	Colborne		97 mph.
	15.43.45	Old Mile Post 253	(Note j)	100 mph.
264.0	15.50.30	Cobourg	(Note k)	97 mph.
	15.54.45	Port Hope bridge		80 mph.
270.7	15.55.20	Port Hope station	(Note l)	60 mph.
	16.02.30	Old Mile Post 282		96 mph.
290.8	16.08.55	Bowmanville		90 mph.
	16.11.30	Old Mile Post 296	(Note m)	100 mph.
299.6	16.14.25	Old Oshawa Station		96 mph.
300.5	16.15.00	Oshawa Station		98 mph.
	16.17.15	Meet Train 55	(Note n)	102 mph.
304.9	16.17.40	Whitby		97 mph.
309.5	16.20.40	Ajax		90 mph.
311.4	16.21.50	Pickering Junction	(Note o)	70 mph.
	16.23.30	Slow order-30 seconds		35 mph.
317.3	16.26.30	Rouge Hill	(Note p)	70 mph.

321.2	16.29.30	Guildwood		96 mph.
		After bridge,west of Guildwood,a double reverse curve,upgrade,was taken at.....		80 mph.
323.2	16.30.50	Eglinton		90 mph.
325.2	16.32.20	Scarborough	(Note q)	85 mph.
	16.33.20	Old Mile Post 327	(Note r)	100 mph.
328.6	16.34.25	Danforth		95 mph.
332.4	16.37.30	Cherry Street		-
333.8	16.40.30	Toronto - Union Station		-

NOTES:

a Reduce speed slightly at Chemin des Sources Road crossing to 60 mph.,due to slow clearing of the crossing and closing of the two half-barriers and poor judgement of automobiles crossing.

b On Vaudreuil Hill westbound,slow acceleration after speed reduction on Dorion crossing.

c Downgrade; train speed therefore increased.

d Quite a downgrade; track very straight and train accelerating all the time,thus a very good high-speed achievement.

e Cardinal Station is on a long sweeping curve;thus 90 mph. indicated is very good here.

f A freight train was in the process of getting out of the way and therefore the surprisingly low speed here.

g At this point,125.6 miles in 90 minutes and 30 seconds - 83.27 mph. average.

h A good indicated maximum speed. The track is not especially on the downgrade,mind you,but we have an indicated 104 mph. just the same. Fantastic!

i 40 mph. indicated on the sharp,sweeping curve upgrade. Very well executed.

j From the sound of the turbines,the engines were NOT in an "idle" acceleration state or on "deadman" control and yet 100 mph. was indicated on a flat track.

k Considering the curve at the station site,this speed is very good.

l The station location,westbound,is on a good upgrade curve and it was noted that the engineer didn't exactly fool around here!
was noted that the engineer didn't exactly fool around here!

m 14 miles were covered in 9 minutes flat! Average 93.3 mph.

n Heavily downgrade here. No reduction of train speed and no brake application observed.

o Eastern terminus of GO TRANSIT Service.

p Rouge Hill was nicely negotiated,as this is the lowest speed recorded on the whole grade.

q Exactly 10 seconds after,our speed was 98 mph. A splendid example of acceleration capability.

r Would you believe that there was an oncoming curve,downgrade, at this point ?

Summary:

We left Montreal's Central Station 1 minute and 30 seconds late and arrived at Toronto's Union Station 3 minutes and 30 seconds ahead of schedule. The whole run was therefore made in 3 hours 54 minutes,- an average speed of 85.6 miles per hour for 333.8 miles.

The accelerating potential of the train,mainly at high speeds, is

quite astonishing and was used very liberally. Braking power proved very good and quite adequate,but the engineers did not seem to make use of it very much.

The top speed of 95 mph. as shown on the speedometer is,in my opinion,only a "round figure",- an average between 90 and 100 mph. was maintained most of the time on track not necessarily going downgrade.

At meets with TURBO,RAPIDO,passenger and freight trains,no perceptible effects of high velocities were felt.

And so,back to earth,my friends!

As a post-scriptum,let me pass a few comments on this "varnish". First,we did NOT and could NEVER enjoy on TURBO the "ne plus ultra" of a "Canadian",the plush of a Super-Chief,the luxury of a Rapido or the haute classe of the Twentieth Century Limited. These belong to a past age.TURBO is not intended to supply the voyageur with that,but it is intended to be a downright practical train,zooming fast and as comfortable as can be.Taking into consideration its speed,the comfort is there all right! Some critics will hazard the opinion that RAPIDO is far smoother. Perhaps, but then if you were to skip No. 65's stop at Dorval and throw it on the reverse curve at 101 mph.,with the diesels loosening up,- and I will gladly discuss comfort but perhaps from a hospital bed! The smoothness of TURBO's ride is fairly impressing,with the tachometer needle hanging up there in the high 90's,- curves or no curves!

"The whistle is ridiculous,-just plumb stupid",- I overheard. So? Tell me,at that speed,don't you think the one thing that is essential is that TURBO should attract attention.? Well,in my opinion,the TURBO-beep is doing just that. Stopping everybody and making them wonder about "what is coming down there ? What's that thing that just flew by,dammit ?" To make the public turn its head,you need something new,not just an old-time diesel horn.

The view up there in the first dome is just plain fantastic,- for us rail enthusiasts,at least. The decors throughout the train are most of all,pleasing and discrete,and also tasteful. There is a strong resemblance to the modern jet aircraft,from pilot's position to curved windows is very appropriate and achieves a predominantly sales-minded impact. To spartanize and simplify a "consist" and yet maintain its economy,efficiency and appeal is a first-class challenge. CN and UAC certainly rolled up their sleeves and met it head-on and their success is unparallelled and they did very well indeed. However,the one aspect in which something is lacking is the "Gourmet's Section". The facilities for eatables are somewhat disappointing and it appears that some alternative arrangement in the dining facilities is very necessary.

It is very interesting to note that acceleration,in speed bursts, from 60 mph. to top speeds is downright amazing.Not so,however,between 35 and 60 mph.,where speed-up leaves something to be desired.

In conclusion,I propose that TURBO is a very clever innovation,- practical and exciting. All of the members of the "varnish association" must say proudly,after this première,"Not bad,- not bad at all!". Save for a few minor details,TURBO is certainly living up to their expectations in a very acceptable fashion. A vastly different evaluation than those realized on the late,lamented Talgo,AeroTrain and Train X.

Yes,I must say that TURBO is not bad at all,indeed.....

TURBO - premiere

MARY W. ANGUS

Was it a flash of lightning across the beautiful white of the winter's snow, or a white aluminum and steel monster never before seen, racing before the eyes of bewildered spectators on the motor highway?

We could not answer any questions, for we, the members (at least some of them) of the Canadian Railroad Historical Association of Montreal were riding inside the magnificent TURBO train of the Canadian National Railways.

It was TURBO's first run with passengers and the C.R.H.A. had engaged and filled the first car. I have travelled by many means of transportation (but not yet by rocket to the Moon, where the gallant Astronauts have just achieved such glorious and instructive success!). But TURBO is a beautiful train,- all steel, aluminum and white and travels at the rate of ninety-two (92) miles per hour, averaging 84 miles per hour. Our run , and so far TURBO's only route, was between Canada's Metropolis, Montreal and the Queen City, Toronto, which it makes in 3 hours and 59 minutes!

One is whisked along rapidly and very smoothly and pleasantly, like Aladdin on his Magic Carpet. The seats are unbelievably comfortable and roomy and one feels no motion or jarring whatever. This train took about three years to build. It was designed by United Aircraft Corporation and built by Montreal Locomotive Works for United Aircraft and it is rented by the C.N.R. for about three years, after which it will be owned by this Canadian railway.

A unique feature of TURBO is that there are no doors between the cars, so one does not have to pull those great, heavy doors of adjoining train cars, which quite exhausts one! It is the first train of its kind in service in the world and, since it has been such a tremendous success, it will undoubtedly change the pattern of inter-city rail travel, for there is no question it will be copied by many other countries! For it will certainly revolutionize passenger travel!

I never felt nervous for an instant and had perfect confidence in the two most efficient engineers and conductor. Looking ahead, above its "red nose", one saw the glittering track stretching away in the distance , as far as one could see,- a solid, safe, well-built roadbed, miles and miles straight ahead. One felt no fear. One was on solid earth and yet had a sensation of flying. The seats are most comfortable,- the most comfortable I have ever occupied on any train or 'plane. The genius of all those who conceived TURBO, designed it and built it,- they are to be congratulated. The engineers and signalmen, road men and all who made the marvel of this type of travel possible have achieved a wonder of transportation, so far unsurpassed.

It was most gracious of His Worship Mayor Drapeau and Mr. MacMillan President of the C.N.R. to see us off and to come on board and shake hands! Charming, indeed and such courtesies are greatly appreciated.

Good luck, TURBO! Long may you carry on! Bonne chance à tous!

Mary W. Angus.


CN
CN

TURBO ... temptations

Danny Cauley.

My first look at CN's TURBO was from the Lakeshore highway, near Montreal,when I often saw it going by,during the months when it was being tested,before beginning to carry passengers between Montreal and Toronto. And I kept on wishing I could travel on it.

One night,my Dad came home and asked me if I wanted to come with him on the inaugural run of TURBO,from Montreal to Toronto,early in the month of December and that seemed like a great,early Christmas present to me. I jumped at the chance!

The outside of TURBO looks like speed. It's kind of like an airplane in looks,- all silver,with red trim and with raised observation sections at both front and rear,so you can look out,ahead or back. When you are looking out in front,you can see the track ahead and all the dials and things the engineer has in his compartment. You can see the speedometer that often shows you are travelling ninety miles an hour,or faster. A very new suspension system enables TURBO to take the curves at much greater speeds than ordinary trains can make them,which helps this new train travel from Montreal to Toronto in just one minute less than four hours.

We got food at the snack bar in the TURBO-LUX section on the way to Toronto and ate it on trays that came out of the back of the seat just ahead of us. On the way back from Toronto to Montreal,we had our dinner brought to us,to our seats,in the TURBO-CLUB section of the train. It was very pleasant.

The seats were comfortable and it sure is a nice way to travel. I really enjoyed my trip on the TURBO and hope to be able to go again,soon!

Editor's Note: Mr. Danny Cauley lives in Baie d'Urfe,Que., and is the son of Mr. Al Cauley,Sports Director of Radio Station CJAD,Montreal. The foregoing is TURBO,through the eyes of a 13-year old.

BY F.A.KEMP

TURBO! On-and-off!

Canadian National's long-awaited TURBO trains began operation on December 12th.,1968,after an accident-plagued pre-inaugural "press run " on December 10th.,when one of the trains struck a truck semitrailer on the Division Street level crossing at Kingston,Ont.,nearly half-way on the Montreal-Toronto run. The train sliced cleanly through the semi-trailer body,scattering its cargo of meat in all directions and sustaining some damage to its nose and doors. There was a 25 m.p.h. slow order on the crossing,due to a previous accident. An overpass is under construction at this location,also one at another busy Kingston crossing,that of Princess Street. The passengers were transferred to another train and the damaged unit continued to Montreal at slow speed. Two other TURBO trains began operation December 12th.,- Trains 63 and 62,leaving Montreal and Toronto at 1245 hours,returning as Trains 68 and 69,leaving at 1810. Although the outward trips were made on time,a pulled drawbar on an eastbound freight train at Collins Bay,near Kingston,resulted in delays to both trains,as the line was reduced to single-track working between Napanee and Kingston. Several other trains were also delayed, including "Rapido" trains 64 and 65 and Toronto-Ottawa Trains 44 and 45.

"Rapido" Trains 60 and 61 made their last runs December 12th.For TURBO,during the remainder of the month,various troubles developed which had not arisen during the lengthy test period. Most of these related to the electrical system,including heat,ventilation and kitchen services.To operate these services,power is supplied by a turbine generating unit, which was apparently adversely affected by the fine,powdery snow which is thrown up as the train zips along at its usual 95 m.p.h. Anyone who has seen this train at speed in winter will note that the clouds of snow are whipped up to window level. This may have been the cause of the electrical failures,with consequent delays to TURBOs,with the result that on January 3rd.,it was announced that the TURBO trains would cease operation on January 6th.,and would be replaced by conventional trains,for the period of adjustment. The replacement trains are to leave at the same times (1245 and 1810 hrs.) but will take about one hour longer for the trip,or the same time as "Rapido" trains.

WHEN(and if) TURBO's return to service,within the next three years they are likely to have a new terminal at the western end of their runs.A new combined transport terminal is expected to constitute the first unit of METRO CENTRE - the billion-dollar redevelopment of downtown Toronto terminal area. Its announcement was made jointly by officials of Canadian National and Canadian Pacific,recently. The METRO CENTRE area includes in addition to the present Union Station,CP Rail's John Street coach yard,piggyback terminal and engine house as well as Canadian National' s Spadina Street engine terminal,coach yard and Bathurst Street yard. Much of the trackage would remain in an "underground" condition,similar to

that at Montreal's Central Station. The terminal would provide facilities for inter-city trains,GO TRANSIT suburban trains,the TTC subway and air line limousine services,as well as for suburban and long-distance busses. Other supplementary services,to be built over a 15 to 20-year period,will include office buildings,an enclosed shopping centre,apartment complexes and residential housing units (town-houses,maisonettes,etc.). Present plans for the new passenger terminal call for opening in 1971.

CANADA'S FAR-NORTH NARROW GAUGE RAILWAY,the White Pass and Yukon recently announced a $20 million expansion programme. About $ 5.2 million is to come from a proposed offering of 500,000 shares of a new issue of first preferred stock. Proposed capital expenditures include $ 5 millions for rail and road improvements, $6.2 million for a new ship, and $ 7.1 more for "improvements at Skagway,Alaska and Whitehorse,Yukon".

"ROADCRUISERS AND THE NEWFIE BULLET". Canadian National began operation of its "Roadcruiser" bus service across Newfoundland on December 2,1968. The service consists of a through express and a through local service a day between St. John's and Port-aux-Basques,with other local services between St. John's and Corner Brook,Corner Brook and Port-aux-Basques,Port-aux-Basques and Gander,Gander and St. John's,so that each one of the 31 intermediate stops has three services,each way,daily. The express services (called,would you believe,EXPEDO),numbered 501-502, are timed at 14 hours 15 minutes each way,including 45-minute meal stops at Corner Brook and Gander and 15 minutes at Grand Falls-Windsor. They connect at Port-aux-Basques with the overnight ferry services. They are also "tied in" with local services,allowing transfer to be made at meal stops.Seats on EXPEDO services are reserved. In the summer months,an additional EXPEDO service will operate daily (Nos. 503-504). No. 503 will run thirty (30) minutes ahead of No. 501,while No. 504 will follow twenty (20) minutes behind No. 502.

Patrons of daytime ferry services to and from North Sydney may now make connections as far as Corner Brook by local trips Nos. 515 and 516. All trips are served by 39-passenger Prevost motor coaches,equipped with toilets,but several 43-seat "humpback" vehicles are on order. Built in Ste-Claire,Cté.Dorchester,Qué.,on CN's main line through Edmunston,N. B.,Prevost motor coaches are used throughout Québec but are not often seen beyond its borders. Newfoundland's weather in winter,which can vary considerably over the 573-mile route,has already effected the service. Winter's first blast on the Avalon Peninsula (the eastern end of the Island) did not arrive until January 6th.,but when it did,it brought some 10 inches of snow,delaying the busses for 12 hours. The train service at the same time was delayed 2 hours by the storm,but was not stopped for any appreciable period,while the bus was well and truly immobilized on a remote section of the Trans-Canada Highway. A recent visit to Newfoundland revealed that while some travellers have accepted the buses readily due to faster and more frequent service,many others continue to use the train which,although slower,is more comfortable,provides good meals as well as berths and lounge service. Reserve capacity is also available.It was put to good use during the above-mentioned storm and also at the Christmas holiday period,when some 500 students went home by train and later returned to their classes the same way.

CP RAIL AND QUEBEC CENTRAL RAILWAY have been permitted by the Canadian Transport Commission to remove station agents from 43 stations and caretakers from 14 locations in southeastern Quebec. A "Customer Service Centre" is to be established at Sherbrooke,to serve most places on the Q. C.R. and Farnham Division,CP Rail. This is in line with similar moves in western Canada and central and eastern Ontario,made recently.

CANADIAN NATIONAL RAILWAYS HAS ORDERED fifty 3,000 hp.SD-40 locomotive units from General Motors Diesel Limited of London,Ont. They will probably bear numbers 5076-5125 and will be delivered during 1969.

NATIONAL STEEL CAR COMPANY LIMITED will build 650 specially-fitted newsprint box cars for Canadian National at its Hamilton,Ont.,works,during 1969. They will have cushion underframes and bulkheads,to give a softer ride to the heavy but fragile rolls of newsprint,- a mainstay of Canadian freight traffic.

WHILE PLANS FOR A NEW TORONTO TERMINAL are still being formulated, some of the odds and ends are still being cleared up at Ottawa,which resulted from the relocation of the railway station. The new Hull station is almost completed,but CP Rail trains are still using Hull West,only about 200 feet away. The old Hull station is still standing,but the old Ottawa West station and roundhouse are completely gone and Scott Street is now being extended across the site. A one-room shelter now graces and serves Ottawa's "West End". The Rideau Canal swing-bridge has been removed; all trains run through the tunnel and its rock-cut approach. The latter is equipped with a lunar white signal indication,which is supposed to indicate high water in the tunnel! The old Canadian Northern bridge over the Rideau River (Mann Avenue spur,originally serving the Canadian Northern station at Ottawa) was taken down last November and a contract is soon to be let to remove the Canada Atlantic Railway's three-span through truss bridge (Alexandria Subdivision). The old CPR bridge now carries a pipe line and is apparently to remain in place. Another strange vestige of the not-too-distant past is the old New Yorl Central Railroad enginehouse,which still stands near Mann Avenue and Nicholas Street. Built of concrete blocks,it only dates back to 1953,when diesel locomotives were first seen on NYC trains and the coal shed which housed the steam engines was removed. Now this relict is a mile from the nearest railway track and fifty miles from the PennCentral.

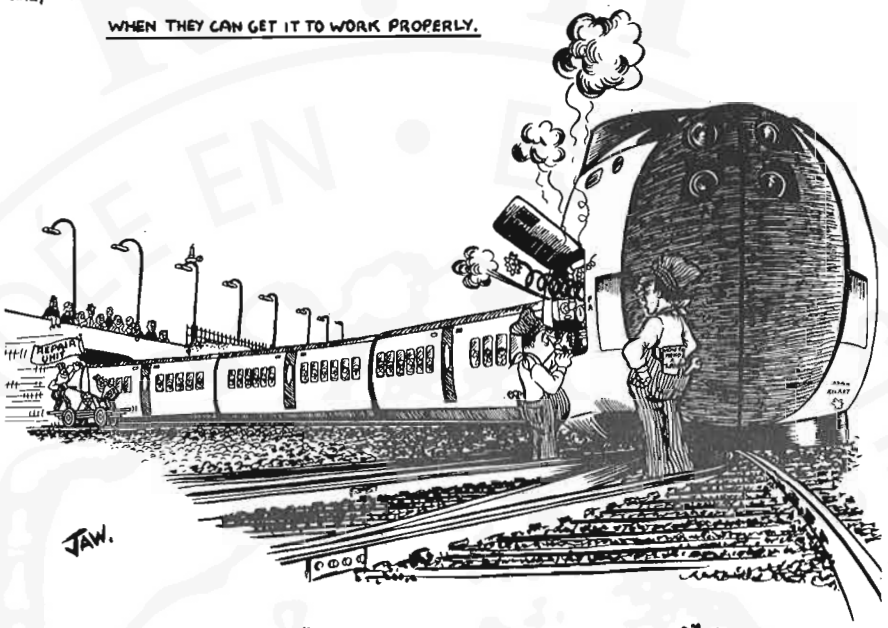
THE NATIONAL MUSEUM OF SCIENCE AND TECHNOLOGY at Ottawa continues to add to its railway and transport collection. Recent arrivals include the former Canadian Government official cars Nos. 1 & 2 - the Governor-General's cars,which have now been restored to their original green colour.C.P.R.'s business car no. 23 (wood,steel centre-sill,open rear platform, ex Q.C.R. "Megantic" and "Beauce"),a C.P.R.caboose have also appeared. The major part of the Toronto Transportation Commission's historical collection,including the first electric car and its horse-car trailer,horse car no.16, two horse omnibuses,a horse-drawn sleigh (reproduction),the "John Thompson" coach (representing pre-horse-car transit) and two "Fifth Avenue " motor buses (one single deck,one double deck) have been acquired.Mention was made of the latter in a recent issue of CANADIAN RAIL.

THE ONTARIO ELECTRIC RAILWAY HISTORICAL ASSOCIATION - OERHA,for short,has also benefitted from the distribution of the TTC historical collection.It has received open car no. 327,which was shipped to their property near Rockwood,Ont.,late last November. They are also to get car no. 4000,- the first Canadian PCC car.

CN's TURBO SERVICE "SOON" (MAYBE?)

LAZY THREE

WHEN THEY CAN GET IT TO WORK PROPERLY.



IF THOSE GUYS COME OUT WITH, "WHAT'S THE MATTER - RUN OUT OF COAL?" I'LL.....

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