

WHEN RAILROADS HAULED ROCKETS p. 44

Trains

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merchandise train
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California's dreamin'

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◀ **ON THE COVER** Canadian National merchandise train M348, led by C40-8 No. 2131, rolls through Lomira, Wis., on its run to Chicago on Feb. 23, 2015. Photo by Matt Krause



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JIM WRINN

Trains without crews

We live in an age of great technological advances. We can do more with machines than ever. Self-driving cars are just a few years away. As Justin Franz points out on pages 26-33, the ability to run trains without crews is fast approaching. But even if we can, should we?

Ever since the dawn of the diesel era, train crew size has been dropping steadily. From the days of four- and five-member crews, we've gone to three, then two. That was a natural attrition — we needed fewer engine crew members to run diesel locomotives. More unit trains and fewer single-car shippers meant the number of brakemen needed was fewer. Roller bearings, tight-lock couplers, and a whole host of improved safety devices have made it possible to run trains with fewer people on board and more electronic eyes and ears watching out for trouble. Now, with remote technology and cameras everywhere, it is possible to run without any human on board. The engineer in control of the unit coal train moving down the tracks in North Dakota, for instance, could be sitting in a comfortable chair in front of a control stand in an office park hundreds of miles away.

While there are obvious operating cost and job issues at stake here, the biggest concern is what happens when something goes wrong. When that air hose between

cars 55 and 56 snags a crossing timber at 40 mph and puts the train in emergency, who goes back to recouple them and inspect the train? The idea of a fleet of roving conductors in company vehicles moving in to take care of such problems makes sense. But there are still many places on the railroad that are difficult to reach or completely inaccessible from public or company roads. If things go badly wrong, I'd rather have someone there to respond immediately.

The Federal Railroad Administration, of course, will have the final say on crew size. There are already arguments about dropping to one-person crews. I suspect in the not too distant future, we'll hear the case for zero. On that day, let's hope that the decision makers remember that just because technology allows us to operate trains without crews that doesn't mean we should.

Jim Wrinn
editor@trainsmag.com



Is the sun setting on train crews on board? Let's hope not. A Canadian National conductor steps onto the front of his power before lining a switch in Mount Pulaski, Ill. Steve Smedley



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Southern Pacific 4-6-0 No. 9 departs Owenyo, Calif., with her trainload of excited passengers bound for Keeler, Calif., on Oct. 16, 1954. Two photos, Alden A. Armstrong

SOUTHERN PACIFIC NARROW GAUGE

David Lustig's article, "A Valley, History, and Hope" [pages 50-55, November], about California's lost narrow gauge brought back great memories. It is good to know that the Owens Valley of sage and solitude is being rediscovered by a new generation of railfans thanks to the restoration of Southern Pacific 4-6-0 No. 18, the railroad museum at Laws,



Calif., and articles like this one.

The Railway & Locomotive Historical Society of Southern California sponsored a special trip with SP 4-6-0 No. 9 from Los Angeles to Owenyo, Calif., for the end of steam on Oct. 16, 1954. I was only 15 at the time and convinced my mom we needed to be there.

We were in Owenyo in time to see the preparations. This was a big event with speeches made by local and railroad officials and music provided by a local high



Old and new: crew members pose with SP No. 18 and No. 1 on Oct. 16, 1954.

school band. The new 50-ton General Electric diesel switcher, SP No. 1, the "Little Giant," was on display with No. 18. After the speeches, people climbed aboard the waiting train for a trip to Keeler, Calif. They covered the cars and No. 9 in a way that would be unthinkable today. If the dieselization of this remote steam holdout was a funeral for a way of life, that day was its Irish wake.

In his article, Lustig also mentioned movies that took place in Owens Valley. While on a fishing trip in 1965 with a couple of friends, we noticed that Laws was temporarily renamed Abilene for the filming of the movie "Nevada Smith."

*Alden A. Armstrong
Grand Junction, Colo.*

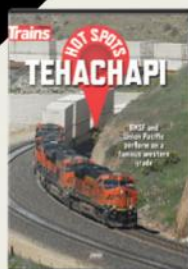
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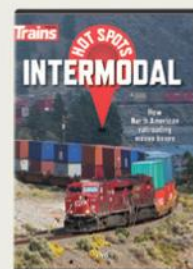
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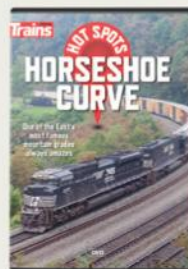
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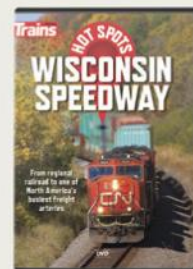
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P31365



A Canadian National intermodal train climbs Byron Hill in Byron, Wis. It's one location on the Stevens Point, Wis.-to-Chicago main line, a line that the railroad is upgrading to accommodate increased traffic between the Midwest and the Pacific coast. Mike Yuhas

Canadian National outpaces all

CN's third quarter traffic was up 11 percent, significantly more than other big Class I railroads

Canadian National is struggling with a problem other railroads would love to have: Traffic grew so fast in the second half of 2017 that it has more volume than it can comfortably handle, particularly between Edmonton, Alberta, and Chicago.

CN's volume surged 11 percent to a third-quarter tonnage record, and executives expected similar growth for the rest of the year. Combined, traffic on the other big five systems was up 2 percent.

Much of CN's growth was centered in western Canada, with some areas seeing volume up by 20 percent. International intermodal traffic soared 29 percent at the Port of Vancouver and 36 percent at the Port of Prince Rupert, both in British Columbia. Frac sand shipments were up 130 percent. Canadian grain, coal, and potash tonnage also rose.

The railroad stepped up crew hiring, pulled locomotives out of storage, accelerated capacity projects, and even turned away short-term crude-oil business. CN will boost capital spending by \$100 million this year, bringing its total to \$2.7 billion as it aims to keep pace with growth.

"To deliver this kind of volume growth, while maintaining service levels consistent

with comparable workloads, and clocking in a sub-55-percent [operating ratio] is truly remarkable," CEO Luc Jobin says.

CN's operating metrics sagged under the weight of record tonnage. Terminal dwell increased 13 percent and velocity decreased 5 percent compared to the third quarter of 2015, when the railroad also handled relatively heavy volumes, Chief Operating Officer Mike Cory says. But train, yard, and locomotive productivity all improved.

CN was caught off guard by the growth.

11 percent:
The amount
that Canadian
National traffic
grew between July
and September, led
by intermodal.

More than 250 new crew members will be qualified by the end of the year, with another 400 ready in the first quarter of 2018.

CN took 100 locomotives out of storage, including 50 accelerated overhauls, and by November received the final units of a 22-locomotive order of General Electric ES44ACs.

CN will look at options to further expand the fleet if necessary, Cory says.

The railroad raced to get more track into the ground before winter set in. Sidings are being added between Edmonton and Jasper, Alta., as well as between Stevens Point, Wis., and Chicago.

Bypass tracks are being built at Fond du Lac, Wis., and the yard in Blair, Wis., is being expanded to handle more frac sand.

Near Toronto, the Brampton, Ontario, intermodal terminal was swamped by record volume this summer. So CN reopened the dormant Malport terminal nearby, and added cranes and track at both Brampton and Malport. The goal of the work is to boost Toronto terminal capacity by 15 percent.

Other capacity projects are being advanced so they are ready to go once spring arrives. — *Bill Stephens*



CSX Transportation's North Baltimore, Ohio, yard, above, is set for a downgrade in ongoing railroad restructuring. Brian Schmidt

CSX's unstoppable whirlwind

Harrison quickens pace of change despite natural disasters, federal regulators, and critics

CSX CEO E. Hunter Harrison's blitzkrieg of change at CSX Transportation continued in the fall, with major operations and management shake-ups that could not be slowed by a pair of hurricanes, the concerns of federal regulators, or criticism from frustrated shippers.

Harrison declared victory over the railroad's summer of service problems. Then he told the Surface Transportation Board and customers at an Oct. 11 listening session that the disruptions were caused, in part, by rolling out operational changes too aggressively. Yet less than a week later, as CSX released its third-quarter earnings, Harrison said, "The organization is ready to go forward at what I might describe as breakneck speed."

And move forward it did.

Eight days later CSX announced the pending departures of its top operating, marketing, and legal officials. Chief Financial Officer Frank Lonegro is the lone holdover from the previous management team.

Veteran Canadian National executive James Foote was named chief operating officer, replacing both Chief Operating Officer Cindy Sanborn and Chief Marketing Officer Fredrik Eliasson. Harrison and Foote have maintained a friendship that dates to their days working together at CN, former colleagues say.

The management changes echoed the moves Harrison made while leading Canadian Pacific, where he brought in people from CN to help implement Precision Scheduled Railroading. But at CP most senior management changes came in a five-month span, not in a single day. "I can't think of another example of such a sweep of top executives," says rail historian H. Roger Grant of Clemson University.

CSX, which operated a dozen hump yards before Harrison's arrival in March, has settled on four core humps: Cincinnati; Indianapolis; Selkirk, N.Y.; and Waycross, Ga. Willard Yard in Ohio was converted to a flat-switching facility on Oct. 19 after more than half of its traffic had been shifted to other terminals.

CSX in October also began scaling back operations at its intermodal hub in North Baltimore, Ohio, which opened in 2011 as the \$175-million centerpiece of a new intermodal strategy. The Northwest Ohio Intermodal Terminal was designed to support CSX's hub-and-spoke

approach to serving smaller intermodal markets. By sorting container shipments at North Baltimore, CSX could build the density required to provide new or more frequent service to places such as Louisville, Ky.

Harrison has jettisoned that strategy. CSX diverted traffic away from North Baltimore, culling many low-volume lanes while shifting others into merchandise service. It's a big revamp: In 2016 the terminal handled 809,000 boxes, or 29 percent of all of CSX intermodal shipments. North Baltimore was to close in mid-November; plans for a similar terminal in North Carolina were scrapped; and the railroad pulled out of a partnership to raise clearances in the Howard Street Tunnel in Baltimore, long a barrier to double-stack service to the Port of Baltimore and on CSX's New Jersey-Florida corridor.

CSX's new intermodal strategy is not clear. Answers were expected at a day-long investor conference scheduled for Oct. 30, but CSX postponed it until February. Despite the drama, industry observers remain confident that Harrison will improve service and transform the railroad into a low-cost, money-making machine. "But for now, I for one, am a bit shell-shocked," says analyst Anthony B. Hatch of ABH Consulting. — *Bill Stephens*



E. Hunter Harrison
R.G. Edmonson

CP intermodal expands to Ohio

Deal with Genesee & Wyoming is similar to a 2013 CN deal with Indiana Rail Road

Canadian Pacific is extending the reach of its international intermodal service into Ohio through a partnership with a pair of Genesee & Wyoming regional railroads that cover the distance.

The Chicago, Ft. Wayne & Eastern Railroad and the Indiana & Ohio Railway will provide CP with a route from the Windy City to an intermodal terminal in Jeffersonville, Ohio, which is within easy striking distance of Columbus, Cincinnati, and Dayton. The 90-acre terminal is owned and operated by a corn and soybean producer, Bluegrass Farms of Ohio.

International containers filled with consumer goods on arrival in North America often return to Asia empty. But the empty containers represent a welcome opportunity for shippers, steamship lines, and railroads who might fill them with U.S. crops, which have seen a spike in demand.

It was not clear when the service would begin or if it would be operated in dedicated run-through trains.

The partnership is a good strategic move for CP, which has lost market share at the Port of Vancouver to rival Canadian National. CN handles about 70 percent of the containers that move by rail to and from the port. With its larger footprint, CN can offer service to a wider number of destinations, including Indianapolis and Memphis, Tenn.

But CP has the shortest route from Vancouver to Chicago, an advantage it seeks to exploit.

“With the volume involved being to and



from Asia, it won't be tremendously service-sensitive but the service will need to be reliable,” says Larry Gross, an analyst with FTR Transportation Intelligence. “Having the ready source of outbound volume is certainly a plus, so the pacing item will be the ability to attract inbound volume.”

Norfolk Southern currently provides international intermodal service to Columbus, Ohio, from the West via connections with BNSF Railway, CN, and Union Pacific, primarily using run-through service via Ashland Avenue in Chicago.

The CP alliance with the G&W railroads is reminiscent of the 2013 deal CN reached with the Indiana Rail Road to provide

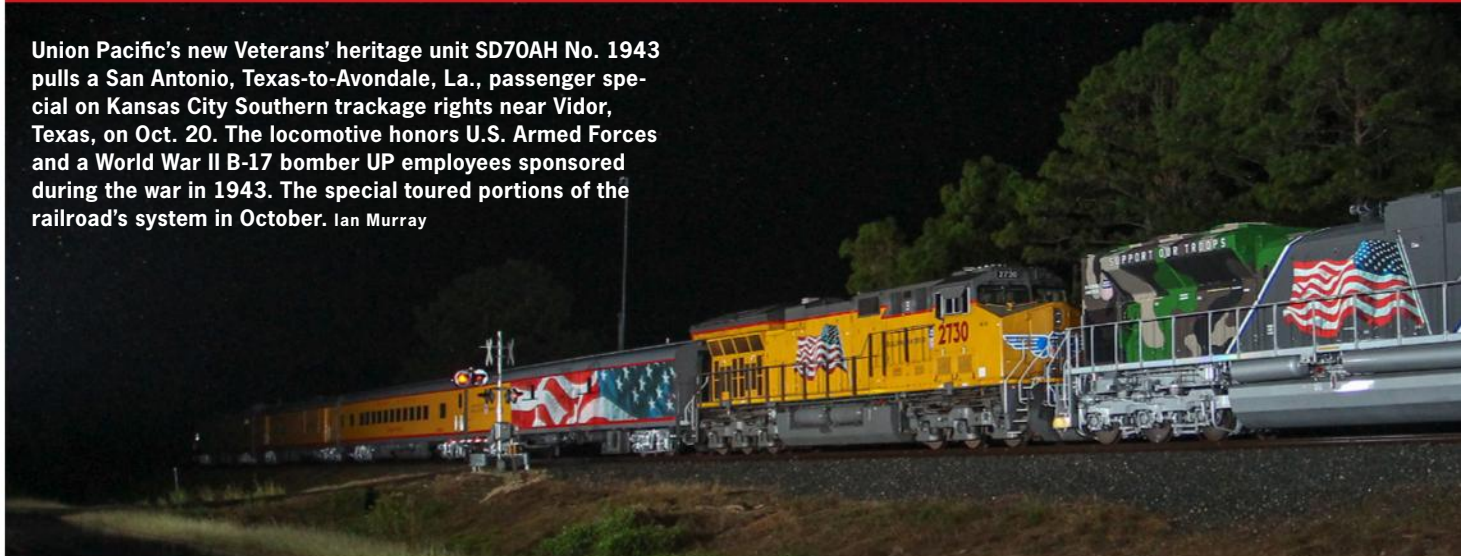
international intermodal service to Indianapolis from the ports in Vancouver and Prince Rupert, British Columbia.

From Chicago, the CP traffic will ride Chicago, Ft. Wayne & Eastern's former Pennsylvania Railroad main line to Lima, Ohio, and the connection with the Indiana & Ohio to Jeffersonville.

The addition of CP intermodal traffic will diversify freight on the G&W lines. The 281-mile Chicago, Ft. Wayne & Eastern currently handles chemicals, farm products, fertilizers, paper, and steel, while the 469-mile Indiana & Ohio carries ethanol, farm products, fertilizers, lumber, paper, and steel. — Bill Stephens

>> Saluting our veterans

Union Pacific's new Veterans' heritage unit SD70AH No. 1943 pulls a San Antonio, Texas-to-Avondale, La., passenger special on Kansas City Southern trackage rights near Vidor, Texas, on Oct. 20. The locomotive honors U.S. Armed Forces and a World War II B-17 bomber UP employees sponsored during the war in 1943. The special toured portions of the railroad's system in October. Ian Murray



» NEWS BRIEFS

NY locals give Alstom OK to build

Alstom's plans to expand and modify its manufacturing plant in upstate New York have taken a leap forward now that more local government officials have given their blessings. The Hornell Evening Tribune reports that Hornell, N.Y., city planning board members approved the France-based company erecting three new buildings on the site of former **Erie Railroad** shops. Those buildings are a 34,800-square-foot test structure, a 27,000-square-foot "end cycle" building, and a 3,400-square-foot expansion to the company's pipe shop. The newspaper reports that workers will complete the buildings in that order as pre-fabricated metal structures within the next 18 months. The newspaper says the company is also working with the **U.S. Army Corps of Engineers** and **Norfolk Southern Railway** to build a new track to accommodate testing the high speed train-sets at up to 184 mph.

The city of Zhuzhou, Hunan, in China is testing the **Autonomous Rail Rapid Transit** train that can carry up to 300 people in its three coaches, with top speeds approaching 45 mph. Instead of using rails, the train runs on virtual tracks marked by white dashes on the street and will operate on a 2-mile route with four stations. The vehicle was first unveiled in June 2017 and is expected to enter service this year.



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"Union Pacific's Texas Chemical Coast mains"

The railroad heart of UP's Texas's Chemical Coast is the two ex-SP and MP directional running rail lines between Houston and Beaumont. This program shows 24 hours of action on each of these main lines between Houston and Beaumont in late April and early May of 2017. Kansas City Southern and BNSF trains have overhead rights on these lines. 2 disk set. 2 hours, 39 min. DVD or Blu-ray \$40.95

"The Alaska Railroad"

Alaska - the land of glaciers, incredible vistas, and the mountain known as Denali. 27 percent of the Alaska Railroad's revenues are from passengers. Yet this railroad has distributed power and CTC. This DVD shows the trains and traffic including all scheduled passenger and freight trains on the ARR between Seward, Whittier and Fairbanks in September of 2016. 1 hour and 19 minutes. DVD or Blu-ray \$32.95

"CSX's S&NA North Subdivision"

This video shows over 24 hours of action on CSX's S&NA North Sub that runs from Nashville to Birmingham, part of CSX's most important north-south traffic lane. Trains were videotaped south of Nashville between Cornersville and Dellrose TN, an area of winding valleys and high ridges. In spite of the train consolidations, the freight train count is triple of what it was 50 years ago. 61 minutes. DVD or Blu-ray. \$30.95.

"The Transcon in Illinois"

The greatest show in freight railroading in this country is the BNSF Chicago to LA Transcon. Traffic is 5 or 6 times what it was 50 years ago. This video shows 24 hours of action on the ex-Santa Fe Illinois Division between Ormonde, 13 miles west of Galesburg, and Fort Madison in October of 2016. And some UP trains use this line also, a condition of the Burlington Northern - Santa Fe merger. 2 disk set. 2 hours, 40 min. DVD or Blu-ray \$40.95

"BNSF Twin Cities to Fargo Mains"

This DVD takes a 24 hour look in September of 2016 at the two BNSF main lines between the Twin Cities and Fargo, North Dakota - the ex-NP Staples Sub east of Dilworth and then the former GN main between Breckenridge, MN and Benson. These two lines are part of BNSF's northern coal corridor and are the eastern outlet for the Bakken crude oil. 2 disk set. 2 hours, 10 minutes. DVD or Blu-ray \$36.95.

"Norfolk Southern's former D&H - a Phoenix Rising"

Norfolk Southern took over the former Delaware and Hudson south of Schenectady, New York on September 19th, 2015. This program shows over 24 hours of action on NS between Delanson where the now truncated Albany main joins the main line and Belden tunnel, 16 miles from Binghamton, in July 2016. 61 minutes. DVD or Blu-ray \$30.95

"BNSF at Perry, Oklahoma"

At Perry, 63 miles north of Oklahoma City, two BNSF main lines run side by side through this town of 5100 residents - the north-south, former Santa Fe, Kansas City to Fort Worth and Galveston line, and the east-west, former St. Louis San Francisco or Frisco and later Burlington Northern Tulsa to Aard line that connects with the California Transcon. This program shows over 24 hours of action at Perry in April of 2016. 1 hour, 52 minutes. DVD or Blu-ray \$34.95.

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NEWS & PHOTOS



VIA Rail Canada F40PH-3 No. 6434 hangs midair in Churchill, Manitoba, on Oct. 18. The railroad shipped two locomotives and five passenger cars to Quebec. Katie de Meulles

Returning to network 'VIA' ocean freight

Passenger consist stranded on Hudson Bay gets rescued by ship

One VIA Rail Canada trainset might have the rarest miles of any that will be moving on Canadian main lines in the near future. Two VIA Rail locomotives and five cars were expected to return to southern Quebec in November after they were rescued from Churchill, Manitoba, in October. Crews loaded the VIA Rail passenger train onboard the MV Nunalik for passage over Hudson Bay and the Atlantic Ocean. The train had been in Churchill since May.

That was when OmniTRAX's Herchmer Subdivision became impassable north of Avery, Man., at milepost 355 due to 19

washouts and five damaged bridges.

Bad weather delayed the ship entering Churchill's port, and also delayed the ship on its journey to the Saint Lawrence River and Valleyfield, Quebec. It was unclear whether the train would disembark at Valleyfield, or earlier at Montreal.

Making the journey south were F40PH-3 locomotives Nos. 6434 and 6402, baggage car 8601, coaches 8105 and 8118, dining car 8418 York, and three-section — eight roomettes, one drawing room, three double-bedrooms — sleeping car 8222 Chateau Richelieu. — John Godfrey

China cars now Boston-bound

First of hundreds of cars set to reach the US before New Year

Chinese-made Massachusetts Bay Transportation Authority Orange Line cars should be on U.S. soil now.

Officials for CRRC MA — the Boston-based arm of the gigantic Chinese rail rolling stock and equipment supplier — say the cars moved from northeast China, where they were made, to the major port city of Shanghai in the center of the country. The first four-car set made a public run in China in October with CRRC, Chinese government, and MBTA officials attending.

The cars are the first of a 404-car order for MBTA, 152 for the Orange Line and 252 for the Red Line, company officials say.

CRRC MA is also building a \$95-million, 204,000-square-foot assembly plant in Springfield, Mass., where the bulk of the cars

will be finished. The final number to be built in the U.S. has yet to be announced.

"These state-of-the-art vehicles provide improved passenger comfort and incorporate technology, including solid state microprocessors, LCD passenger information displays, CCTV cameras, platform gap mitigation, automatic passenger counting, and computer-based training simulators," says Jia Bo, CRRC MA vice president.

The company also has contracts to build cars for the Southeastern Pennsylvania Transportation Authority and LA Metro.

A separate company, CRRC Sifang America, broke ground on a south Chicago assembly plant as well in 2017. U.S. workers in that plant will build up to 846 cars for the Chicago Transit Authority. — Steve Sweeney

CHINA'S CRRC MA IS SET TO PRODUCE UP TO 404 CARS FOR BOSTON-AREA MBTA.

What keeps railroading interesting?

Considering that question made my understanding bloom

Someone asked me a question that set me back a bit. How, he asked, can he make trains interesting again? I hope he won't object if I use his name, Ian Walker from Ottawa. Mr. Walker is a little younger than me, but he remembers the early years of diesel railroading, absorbing every issue of *TRAINS* after seeing his first issue in 1974.

Nonetheless, railroading just isn't interesting these days, he said. "I've been reading *TRAINS* Magazine since 1974 cover to cover monthly," he said. "I literally grew up with DPM [editor David P. Morgan] and John Kneiling and others.

"My problem: I'm not finding trains very interesting any more. A train comes past me now and it's invariably auto racks or containers. I grew up with CP and CN passenger trains, Alcos (MLWs up here) all over the place." There were stations "with friendly agents (and some not so friendly) and lots of engineers, firemen and conductors/trainmen that I knew and knew me. The trains were short with lots of variety (boxcars, tank cars, flats, etc.). There was lots of switching and the power was interesting (Alco or ancient GM). Now it's basically all the same."

I thought a lot about what Mr. Walker said. Eventually, I wrote him a note.

"Tough question," I wrote. "I asked myself the same question in the past while watching Norfolk & Western steam, and decided to travel the world looking for big steam. But that ended when steam disappeared from Inner Mongolia a few years ago. I still watch trains and ride trains, however. I guess the best way to stay interested is to pay attention to how trains and locomotives change year by year. You don't say if you're a photographer, but that can keep things interesting."

That got me to thinking. Railfans come in many ages. Younger railfans have never known much more than today's trains. The 1950s through the early 2010s are like ancient history to them. They are as excited about today's trains as I was about the days of steam. Thank goodness. That means that rail enthusiasm will not die. But what about generations of older fans like Mr. Walker and me? Then something else occurred to me. I found a way to stay excited through this column while still watching and photographing trains. My friend Victor Hand, however, hardly ever writes anything about trains, and he is still enthusiastic. Victor is roughly the same age as me. What feeds his enthusiasm?



This shot of a photo freight near Owosso, Mich., is an example of the "quality instead of quantity" approach that keeps railroading fresh for this columnist. Don Phillips

Then it hit me. We both go for quality instead of quantity. Over the decades we have known each other, we have traveled the world seeking steam, and we have traveled North America seeking diesel and electric locomotives or fantrip steam. We may spend a whole day waiting for one particular shot, or we may drive beside a busy main line such as the Union Pacific in Nebraska or the BNSF out West. We don't waste shots. If the scene isn't worthy, we skip it and look for something interesting or spectacular.

Meanwhile, I got another email from Mr. Walker. I can tell he is a bigger fan than he wants to believe. "Yes I have over 25,000 Kodachrome 64 slides at home gathering dust," he wrote. "I have digitized quite a few with a high-quality slide scanner. That's about a 2- to 3-minute ordeal per slide. Yes I read *TRAINS* still. I no longer have a subscription but read it on the newsstand. I much prefer *CLASSIC TRAINS*. I have a subscription and wish it went to 12 issues per year."

He said his main interest now is railroading history. "That I do enjoy. Plus I travel extensively with my wife. We have visited all 50 states within the past five years with our travel trailer. Of course, much of that was following trains." I have no worry that Mr. Walker will abandon his interest in trains.

I have said it before: Big things that move all have their fans. It isn't just railroads. I am myself a ship fan, although I don't live near a major harbor. There are millions of aviation fans of numerous types — small planes, big planes, racing planes, combat planes, and so on. There are lots of bus fans and even a fair number of truck fans.

I, and a lot of my friends, have traveled the world and we know there are lots of non-transportation things that are interesting. I have visited game preserves in southern Africa, China's Great Wall to its end in far western China, the Hawaiian Islands, and I have discussed politics and cultures all over the world. I bumped into Nelson Mandela at the airport in Cape Town. I have raised a glass of wine (or two or three) with new friends everywhere. I learned that some of the world's cities are unsafe almost anywhere at night, and some are perfectly safe at any time. I have seen cultures change remarkably, including the end of apartheid in South Africa. I spent a couple of years working in Paris where I learned that all educated Parisians suddenly can't speak English and go dumb when tourists are too direct or impolite. (I never had that problem because I am naturally polite.)

So many people never have the opportunities I have had. In the end, it gets back to following railroads around the world. **I**

Don Phillips, a reporter for more than four decades, writes this exclusive column for *TRAINS*. Email him at: d.phillips@trainsmag.com



>> UP TO SPEED Metrolink F125 No. 910 leads a test train through Pomona, Calif., on the San Bernardino line on Oct. 7. The locomotive entered service Oct. 12, after months of testing. Observers expect the remaining Tier 4-compliant units from EMD in service this year. Kevin Bleich



>> DELIGHTFUL DETOUR Amtrak P42 No. 22 leads the *California Zephyr* on a detour through Brighton, Colo., in October, because of Union Pacific maintenance on its Moffat Tunnel Sub in Colorado. Chip Sherman



>> 'F'-ABULOUS The Vermilion Valley Railroad has repainted former Erie Mining Co. F9A No. 4210 in Erie Mining yellow-and-maroon colors. The work was done by the railroad at its shop in Olin, Ind. Jim Montgerard



>> 'L'-EVATING HISTORY Chicago Transit Authority officials celebrated the city's elevated railroad's 70th anniversary on Oct. 1 with special heritage-car runs including 4000-series cars shown above that were running in 1923. Bruce Stahl



>> AMONG THE LAST Colombian mining company Cerrejon ES44AC No. 1023 glides over a bridge at Six Mile Creek near Erie, Pa., on Sept. 25. The locomotive is the latest in a series for Colombia and may be the last units GE Transportation makes for the company in Erie. All Erie production ends this year. Stephan M. Koenig



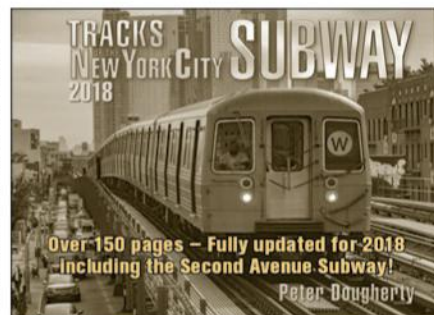
>> ROANOKE DEBUT Oct. 31 marked the return of Amtrak service to Roanoke, Va., for the first time in 38 years. Amtrak Northeast Regional train 176 departed with local passengers taking a short ride east to Lynchburg, Va., with return by bus. Amtrak's Beech Grove business car, shown, joined the inaugural consist. Richard Shell



>> WARBONNET! The Orange Empire Railway Museum in Perris, Calif., has restored Atchison, Topeka & Santa Fe No. 108, an EMD FP45, to its 1967 passenger colors. The unit was expected to operate in November. Elrond Lawrence



>> SPOT OF COLOR Amtrak P42 No. 156 in Phase I colors leads a section of the railroad's two-day, rare-mileage Autumn Express near Tomkins Cove, N.Y., in October along the Hudson River. Daniel Eisenberg



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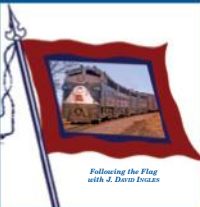
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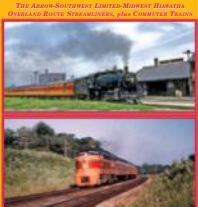


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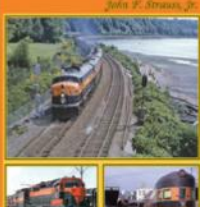
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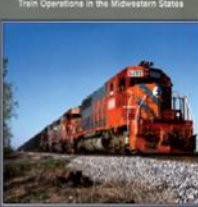
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Canadian Pacific westbound grain train 363-208 heads out of Kensal, N.D., in September. CP's grain loadings fell in the U.S. but broke records in Canada. Craig Williams

CP does well in third-quarter report

Railroad sets grain record in Canada; best-ever operating ratio

Canadian Pacific's third-quarter operating income rose on strengthening volume, prompting the railroad to boost its outlook for the year. CP now expects double-digit earnings per share growth for 2017, up from previous guidance of high single-digit growth. Executives say volume momentum, particularly for Canadian grain, prompted the improved outlook.

CP's operating income rose 5 percent to \$690 million, as revenue climbed 3 percent to \$1.6 billion for the quarter. Earnings per share rose 6 percent, to \$2.90, on an adjusted basis, topping analysts' expectations by 3

cents. Net profit climbed 47 percent, to \$510 million. The railroad reported a record-low, third-quarter operating ratio of 56.7 percent, down from 57.7 percent a year ago.

Traffic grew 4 percent on a revenue ton-mile basis, or 3 percent when measured by carloads and intermodal units. CP's potash, energy, chemicals and plastics; and metals, minerals, and consumer products segments all recorded double-digit carload increases for the quarter. CP set its all-time record for grain loadings in Canada in September even though grain volumes dropped 5 percent overall. — *Bill Stephens*

ECP brake decision imminent

Federal rule based on 1 million flammable liquid carloads

Transportation Secretary Elaine L. Chao had a congressionally imposed deadline of Dec. 4, 2017, to determine the fate of a rule requiring electronically controlled pneumatic brakes on tank cars carrying flammable liquids. She made her decision after press time, but a recent report by the Federal Railroad Administration makes it likely that the ECP brake controversy has come to an end for now.

On Oct. 16, the FRA and the Pipeline and Hazardous Materials Safety Administration published a report that shows the ECP brake mandate was not cost-beneficial. The main reason: Railroads were moving less than half the amount of flammable crude than they were when the rule was in the works in 2014.



Norfolk Southern ethanol train 65K heads north along the Mahoning River valley in Hillsville, Pa., in October. Harry Gaydosz

"I asked one of our economists, where's the break-even point?" says Robert C. Lauby, FRA associate administrator for railroad safety. "When we first did this rule, we were expecting 1 million cars being used in crude oil transportation. The number of cars has dropped off, to where it's in the 400,000 range right now." To make mandatory use of ECP brakes cost-beneficial, FRA's economists estimated that railroads would have to be moving some 850,000 tank cars a year. — *R.G. Edmonson*

GE Transportation has a new CEO

The new president and CEO of GE Transportation is **Rafael Santana**, who has been president and CEO of GE Latin America. He took the post Nov. 1. With more than 17 years of GE experience, Santana has held leadership positions in GE's Oil & Gas, Power, and Transportation divisions before becoming the president and CEO of GE in Latin America. In his previous role, he worked closely with regional business leaders to make Latin America one of GE's largest and fastest-growing regions. Before GE, Santana held leadership roles at ExxonMobil and British American Tobacco. Santana succeeds Jamie Miller, who became chief financial officer of GE.



Rafael Santana

The **Pike's Peak Cog Railway** closed for maintenance Oct. 30, for the remainder of the season for the first time in 10 years. The 8.9-mile cog railway first began taking passengers to the summit of Pike's Peak in 1891. Since 2007, the attraction has been running the trains year-round, weather permitting. The cog railway is expected to reopen by May 2018 after completing work on switches and other equipment.

Owners of North America's last logging railroad say the Vancouver Island, British Columbia, network is permanently closed. Officials with **Western Forest Products** say they closed operations of the **Englewood Railway** on Nov. 7, citing economic concerns. The closure comes about seven months after a train of loaded log cars collided with maintenance-way equipment on April 20. Three railroaders died in the collision and five others were injured.

Connecticut officials opened a new passenger train station at Wallingford, Conn., on **Amtrak's** 62-mile Springfield Line between New Haven, Conn., and Springfield, Mass. The new high-level station initially will serve Amtrak's **Vermont**, Springfield-Washington, D.C., trains, and Springfield-New Haven shuttle runs.

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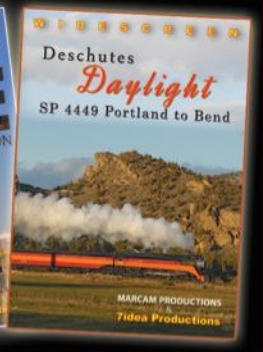
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Good Hunter, bad Hunter

Harrison's ideas for improving CSX had merit. So why couldn't he execute them?

This is about the Hunter Harrison that I've witnessed in two vastly different settings. First, I attended a Hunter Camp, his pulpit for motivating up-and-comers to do their jobs better and smarter. The locale, in 2005, was Taboo Muskoka, a resort in Ontario, when Harrison was chief executive of Canadian National. CN filmed the multi-day session, producing a 10-DVD set it circulated privately. He held these camps regularly while at CN and later Canadian Pacific. At CSX, he put on two Hunter Camps (or four, depending on who you ask), but word is that they have ended because of his declining health. That's a pity, for reasons I will explain.

The Hunter Harrison I saw at Hunter Camp was then age 60 and in the prime of his life. The man loves to talk, to tell stories, and then to explain the meaning behind the stories. In these DVDs, he is always engaging, often funny, sometimes charismatic, occasionally Messianic. A few examples:

Change. "It's tough to deal with. Experience can be your worst enemy. The two most important things I'll talk about here are about leading people and dealing with change. Most of us are very resistant to change. When you ask people to change, you'll be asked why. Often the answer is that what we once did doesn't work anymore."

Service. "Guess why operating people are driven by cost reduction? It's all we hear! I said this is not working. We must provide to customers a product. Good service means doing what you say you're going to do."

Trip plans. "They came about at Illinois Central because I said we are going to quote service to customers in hours, not days. Let's say we have an industrial district with 175 customers. We go out the same time every day and pull cars together. Now we have not 175 origins, but one, and the same at the other end, and the possibilities of origin-destination pairs becomes manageable. From that you can build a trip plan for every car. And if you can schedule cars, you can schedule locomotives. This has powerful effects. It creates market-share gain, improves revenue quality, lowers costs, and improves asset utilization, which further lowers costs."

Unit trains. "Unit trains can be the most expensive trains to operate. They fool the costing system. You've heard me speak again and again about balancing train movements. If you are in Lane A to B and balanced, here comes a grain train going to the port. You run the grain train. Now you've got locomotives and crews and nothing to move back. You deadhead the power and people back. Three or four days later the empty grain train is ready to return. Now you deadhead the locomotives and people the other way."

He explains the five principles of Precision Scheduled Railroading, starting with service. Next comes cost control, "not slash and burn, but control relative to revenues. There is a very delicate balance between cost and the quality of service." That leads to asset utilization, which is key to successful cost control. It boils down to keeping the cars, locomotives, and people moving, which brings you to balance and those dratted unit trains (Harrison likes to run general-purpose trains that can fill to maximum size). Don't let people get hurt, and finally, find, motivate, and promote talented and passionate employees.

You cannot watch the 2005 Hunter Camp without being impressed by his ideas and vitality. In his decade at CN, Harrison built the foundation of what is today the premier railroad in North America. Canadian Pacific, which he captained for four-and-a-half



CSX Transportation Chicago-Waycross, Ga., train Q645-14 is tied down at the south end of King siding on the congested CE&D Sub, at Princeton, Ind., June 16, 2017. Due to the closing of numerous hump yards, there were trains parked everywhere. This train sat here for 36 hours, while hot train Q025-16 flies by. Tim Stevens

years before joining CSX this spring, may be on a similar trajectory.

Now jump to the reality of 2017. I watch Harrison's appearance at a "listening session" put on in October by the Surface Transportation Board, for shippers to vent their grievances at the sorry performance of CSX from June through August. The man seems sick and worn down. Famous for roaming his railroads and climbing the steps of yard towers to ask, "Why is this train sitting here?" he is reduced to breathing from an oxygen tank. Yardmasters at CSX need not fear a visit.

When you put together these two moments in time, a dozen years apart, you begin to understand why CSX went to the dogs. He got there in March. In April and May, key metrics such as on-time arrivals, velocity, and dwell times all went the right direction. Emboldened, in June Harrison threw his whole Precision Scheduled Railroading playbook into the mix and tried to do everything at once, including the closure of eight of the railroad's dozen hump yards.

The failures were caused not by bad ideas but by flawed execution, predictable if you had attended a Hunter Camp. Look at the difference in his energy level. He didn't run a safe railroad, witnessed by the derailment on Sand Patch grade in Pennsylvania caused by a catalog of errors. He didn't take time to find and motivate the right people but instead hired his former CN associates to work under short-term contracts. You sense that CSX folks weren't oriented and groomed to his goals and approach, which is what Hunter Camps did so well. Worst of all, he failed to provide customers good service, the cornerstone of Precision Scheduled Railroading.

People I talk to in the business believe he has stabilized the railroad. Service metrics are again headed the right way. After all the drama of summer, let's see what Hunter Harrison has left in him. "I wish I had gotten off to a better start," he told the STB. So do we all. **I**

**WHEN YOU PUT TOGETHER TWO
MOMENTS IN TIME, A DOZEN YEARS
APART, YOU BEGIN TO UNDERSTAND
WHY CSX WENT TO THE DOGS.**

Fred W. Frailey is author of "Twilight of the Great Trains." Reach him at ffrailey@gmail.com.



Tickets, please!

Modern technology has changed the way we buy tickets, but it doesn't always benefit the passenger

I like traveling by train and make dozens of journeys each year in North America and Europe. Some good news: while individual rail operators' ticketing practices embrace a range of peculiarities, new technology can make buying tickets easier than ever before.

Suburban and regional operators tend toward zone-based pricing with lower-price passes or multiple-ride tickets for regular and daily passengers, often with discounts for children, students, and the elderly. Passenger-friendly rail operators have augmented traditional means of ticket sales (via station-based ticket agents and onboard trains) with automated ticket machines on the platform, and more recently by web-based ticket sales and mobile apps with the option to download tickets to your smartphone. Some operators have also moved toward the use of "smart cards" enabling passengers to purchase and store tickets electronically in place of conventional tickets.

The ability to search and compare fares on the web, and to purchase tickets in advance of travel, can save time and money. However, when electronically procured fares are substantially lower than those obtained via traditional means, it has the unintended consequence of penalizing prospective passengers who are either technophobes or uninformed in regard to rapidly evolving ticketing practices. No smartphone? No discount ticket for you!

Worse is when the technology devised to avail passengers of travel options turns against them by penalizing them for buying tickets via traditional means. Also, good luck if your phone battery dies before you present your ticket!

Technology provides both additional benefits and problems for prospective long-distance passengers. It has never been easier to obtain up-to-date scheduling and train performance information. Many railroads now have their timetables on line along with fare information and train-status pages. Some operators offer mobile apps that allow you to see the location of trains across their networks, with detailed information only a click away. Main station arrival and departure boards are likewise available at your fingertips anywhere, anytime. Amtrak.com has PDFs of timetables in addition to a trip planner and train-status tools. If you are planning a European trip, check out the Deutsche Bahn site at www.bahn.com for train schedules all across Europe. However, if you're not tech savvy, you are at a disadvantage, since many rail operators no longer supply public paper timetables and web-based planners rarely offer a complete picture.

Long-distance ticketing practices have other problems. Amtrak, VIA Rail, and many European long-distance/intercity/high speed operators have adopted the worst passenger-unfriendly, airline-styled fare schemes that too often result in wildly different prices for equivalent seats on the same journey (as distinguished from price variances for different travel classes).

Fares can change dramatically depending on the time of purchase relative to the time of travel. If you desire flexibility, refundability, or need to travel on short notice, you will often pay a much higher fare. This pricing strategy seems to penalize the best rail customers — the frequent business travelers — who must pay higher fares to obtain necessary flexibility and/or may face added complexity by needing to enroll in byzantine loyalty schemes in order to obtain discounts.

Rail operators give variable fare types a host of marketing names. But from the rail traveler's perspective we might identify

these by the following names:

We have the "Unprepared Fare" — the most expensive (and sometimes the most flexible ticket). When you need to travel right away, having had no time to check for discounts and other low-fare options, this may be the only fare available. It also may be the ticket you are stuck with when technological options evade you.

There's the "Indecisive Fare" — you know you want to travel by train and you're prepared to buy your ticket in advance, but you may need to change your plans and/or exchange your ticket to take an earlier or later train. So the rail operator charges you for the privilege.

Want to travel cheap? Try the "Low Cost Fare," which is more of a wager than a ticket. If you are willing to gamble weeks in advance that you will travel on a specific train, the rail operator may sell you a cheap, inflexible ticket. If you change your mind, decide to take a later train, or for any reason can't travel, you may lose all or most of the price of the ticket. However, if low fares aren't available via traditional means, doesn't this put technologically challenged passengers at a disadvantage?

It's understandable that, like airlines, long-distance rail operators want to maximize their per-seat revenue, but complex customer-unfriendly ticketing has long-term disadvantages, since it seems to discourage walk-up rail travel, alienating potential new travelers while making rail less competitive with a private automobile.

If you opt to drive your car, whether you plan two weeks in advance or decide to leave on the spur of the moment doesn't incur a cost penalty. You may alter your plans in regard to traffic, but the basic price of the trip is the same. To make rail travel more automobile-competitive, shouldn't operators make it easy to obtain reasonable rail fares at any time and not make their customers suffer additional charges for changing plans on short notice?

By succumbing to airline-style fare practices, rail operators are putting themselves at a disadvantage by discouraging rail travel. If long-distance trains are routinely packed to capacity, as they are on Amtrak's Northeast Corridor, on busy British routes, and in some Continental countries, it's obvious that more service is needed, so rather than beat up on prospective travelers, perhaps rail operators should seek means to add seats. **I**



Among the disadvantages of e-tickets, like this early morning SNCF fare from Brussels, is the lack of a souvenir. Brian Solomon

LONG-DISTANCE RAIL OPERATORS WANT TO MAXIMIZE THEIR PER-SEAT REVENUE, BUT COMPLEX CUSTOMER-UNFRIENDLY TICKETING HAS LONG-TERM DISADVANTAGES.

Brian Solomon grew up in New England and divides his time between the U.S. and Ireland. He produces a railroad photography blog at briansolomon.com/trackingthelight.



Finding something in common

What models are the most prevalent today?



A Union Pacific intermodal train heads through Joliet, Ill., with an ES44AC and AC4400CW for power. Together, these two models represent 2,717 locomotives on UP's roster, or 32 percent of its fleet. Look for them on a main line near you. Chris Guss

Most railroads across North America have one or more locomotive models that dominate their roster. Economies of scale and price breaks when making new locomotive purchases, standardization of locomotive types, and ease of maintenance are factors that can drive a company to purchase hundreds if not thousands of the same locomotive over the course of years or decades. Take, for example, Canadian Pacific, which received its first SD40-2 in early 1972 and its last almost 13 years later in early 1985. The gap widens to more than 16 years if you count the SD40-2F, a cowl version of the popular model that CP took delivery of in late 1988.

While locomotive production spans have been reduced over the years, large purchases of the same locomotive model have become common, with builders offering fewer models to North American customers. Let's look at the four most common locomotive models on the continent right now.

By a large margin, General Electric's ES44AC is the most common locomotive in North America today. With more than 4,500 produced, including the four-trac-

tion-motor derivative ES44C4, the model is operated by all Class I railroads in North America. The ES44AC is the only modern locomotive model that can make that claim, which occurred when the model helped to usher in the A.C. era on the last two Class I holdouts that were previously D.C. traction-only, Canadian National and Norfolk Southern. The first ES44AC was produced in 2005 and officially ended in December 2014, though ES44ACs are still being built today. GE utilizes emission credits accumulated before 2015 by the use

of fuel saving technologies to build ES44AC (T4C) units which are Tier 3 locomotives with emission credits applied to them, bringing them up on paper to current Tier 4 standards. Emission credits will eventually run out and railroads will only have the ET44AC or ET44C4 to choose from when ordering from GE.

Following behind the ES44AC is another GE product, the Dash 9-44CW. First produced in 1993, the model generated an impressive quantity of locomotives, with almost 3,500 constructed in its 12-year production span. One railroad stands out as the dominant customer for this locomotive, BNSF Railway. The company was firmly behind the Dash 9-44CW, purchasing more than half of all locomotives built with a roster that boasts 1,700+ copies.

Rounding out the top three is the predecessor to GE's ES44AC, the AC4400CW. Produced alongside the Dash 9-44CW between 1993 and 2004, the six-axle A.C. locomotive was GE's alternative to ordering D.C. traction. GE produced better than 2,600 copies, helping to provide an A.C. locomotive foundation across North America that dominates all new freight locomotive production today. Similar to BNSF's commitment to the Dash 9-44CW, Union Pacific operates more than half of all AC4400CWs produced. While most were purchased new by UP, slightly more than 400 were added to the UP roster from merger partners Chicago & North Western and Southern Pacific.

EMD's GP38-2 is the fourth on our list of most common locomotives, with almost 1,800 still in service on Class I railroads from a production run that totaled 2,222 units over 15 years. First constructed in 1972, the locomotive can still be found on every Class I railroad today, and seemingly everywhere else across the country as well. The locomotive has become such a standard in the industry that many overhaul programs over the years rebuilt other models to its mechanical equivalent. From Union Pacific's E9 fleet to hundreds of older four-axle units rebuilt to the GP38-2 standard, the tradition continues today, albeit with newer Dash-3 control systems typically being installed in lieu of the Dash-2 equipment.

Believe it or not, one day every locomotive above will be in the minority, downgraded in status or replaced by something newer that will form the new backbone of a railroad's locomotive fleet. Until that day comes, enjoy these while you can.

>> Production drops

Most common locos

Model	Years built	Quantity in service today	Biggest owner
ES44AC/ES44C4	2002-2014	4509	BNSF Railway
Dash 9-44CW	1993-2004	3429	BNSF Railway
AC4400CW	1993-2004	2661	Union Pacific
GP38-2	1972-1986	1741	Union Pacific

Back to original garb

Clinchfield's first diesel looks great in 1948 colors



CSX's Huntington, W.Va., shop used original paint diagrams to repaint F7 No. 800 back into its original gray-and-yellow paint scheme from 1948. The storied cab unit has led a long and celebrated life hauling freight, passengers, and executives. Seaboard Coast Line 2024 temporarily became Clinchfield No. 3632. Top photos, Ron Flanary; bottom, Mark Ragan

To commemorate the 75th anniversary of the Clinchfield Railroad Santa Train, CSX repainted F7 No. 800, Clinchfield's first diesel locomotive, in its original paint scheme. CSX's Huntington, W.Va., locomotive shop was responsible for the makeover in CRR gray and yellow and did so with the help of 1948 paint diagrams. The railroad also readied Seaboard Coast Line SD45 No. 2024, also in the collection of the Southern Appalachian Railway Museum in Oak Ridge, Tenn., for use on the train as Clinchfield No. 3632, evoking seven ex-SCL SD45s that were transferred to the CRR.

No. 800 was built as an F3 and was upgraded in 1952 to F7 specs. Repainted black in the early 1970s, it saw service on passenger specials and inspection trains. No. 800 was repainted into Family Lines' gray, yellow, and red in 1979. By 1980, all four of Clinchfield's last covered wagons were assigned to the coal-field terminal of Dante, Va., for mine run service. No. 800 and FP7 No. 200 were repainted in the new Seaboard System scheme in 1983 and re-

numbered 116 and 118, respectively.

When Seaboard System folded into the Chessie System and emerged as CSX Transportation in 1986, No. 116 was repainted into an early version of gray and blue. In 1988, all four of the F units were assigned to a test operation for General Motors RoadRailer service between Detroit and Atlanta. By 1990 the "bright future" CSX blue, gray, and bright yellow nose/trim was applied to all four units. Later the units were used briefly on American European Express' luxury Chicago-Washington, D.C., service before going to MARC for use on commuter train service out of Baltimore and Washington.

No. 116 was donated to the Chesapeake & Ohio Historical Society and leased to the Potomac Eagle tourist railroad in West Virginia, where it ran as C&O No. 8016. It was traded to a private owner for a former Union Pacific E9 to be repainted C&O. Look for more coverage about No. 800's role with the Santa Train in TRAINS' February issue. — Ron Flanary

>> LOCOMOTIVE BRIEFS

GE upgrades units for Canadian Pacific



General Electric tested the first **Canadian Pacific** AC44C6M at its Erie, Pa., locomotive plant on Oct. 17. The unit is part of an order to upgrade 30 units in which the original AC4400CW receives modern electrical gear, a revised cab, and positive train control. After this unit at Erie, the other 29 units will be rebuilt in Fort Worth, Texas. No. 8100 was originally CP 9669. Stephan M. Koenig

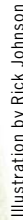


Louisville & Indiana is leasing two SD40-2s in a special paint scheme honoring U.S. veterans. No. 3001 was built for **Union Pacific** in 1979. The second unit will be No. 3002 and was originally built for **Southern Pacific** in 1967 as SD45 No. 8855 and rebuilt to SD40-2 standards in the 1990s. These are the line's first six-axle units in Louisville & Indiana's Pennsy-inspired scheme that debuted in 2013. Mark Mautner



Madison Railroad repainted EMD repowered Baldwin VO1000 No. 5 in this unique green-and-yellow scheme. Built in 1943 for **Nashville, Chattanooga & St. Louis** as No. 30, the locomotive later became part of the **Louisville & Nashville** roster and ended up at the **U.S. Navy** base railroad at Crane, Ind., before the 26-mile southeastern Indiana short line acquired it in 2017. The railroad is a unit of the city port authority on the Ohio River. Mark Mautner

Experts share with TRAINs how to measure noise



Staff at Wilson Ihrig, an acoustical consulting firm, provided TRAINS with typical decibel — or noise measurement unit — ranges for transit vehicle sounds and sound-deadening products and solutions.

Causes of rail noise

- Wheel/rail rolling noise, especially when there are flat spots on the wheels (75 to 85 decibels)
- Wheel impact noise on rail imperfections, joints, and switch frogs (90 decibels)
- Wheel squeal on curves (100 decibels)
- Mechanical systems (motors, brakes, electrical systems, HVAC) (65 decibels)
- Aerodynamic noise for trains at higher speeds (90 decibels)

110*maximum output of digital audio
players, model airplane, chain saw

106gas lawn mower, snowblower

90subway, passing motorcycle

80-90blow-dryer, kitchen blender,
food processor

70heavy traffic, vacuum cleaner,
alarm clock

60typical conversation, dishwasher

50moderate rainfall

40quiet room

*All numbers in decibels

Source: American Speech-Language-Hearing
Association www.asha.org

Source: American Speech-Language-Hearing Association www.asha.org

Connecting the ... future

Chief digital officer outlines GE Transportation's digital vision



GE ES44AC Tier 4 Demonstrator No. 2024 is shown at GE's test track near Erie, Pa., in 2016. Most new units include the company's most advanced software. Stephan M. Koenig

To the edge — that's where GE Transportation officials say they want to take rail-roading, specifically, to "edge" computing.

GE Transportation's Chief Digital Officer Laurie Tolson tells TRAINS that locomotives, parts, and wayside infrastructure will one day be interconnected.

"What I see from a digital perspective — there's a lot of transformation going on," she says. And, Tolson adds, ultimately railroads, shippers, and receivers, will see a "highly optimized, highly visible ability to be predictable and more cost efficient."

That vision is the natural progression from GE announcements in October that its EdgeLINC software is being deployed on 1,000 locomotives of a Class I railroad's fleet. EdgeLINC plugs into GoLINC, which is a mobile data center that newer GE locomotives use to monitor performance, diagnose problems, and report back to onboard locomotive engineers, or back to a central computer for railroad or GE technicians to review.

EdgeLINC takes computing a step further by doing more of the diagnostic work for humans.

Edge computing is the next generation of cloud computing — an infinite array of computers and processors that compile and process data for later or instantaneous use. Rather than sending information back to the Internet "cloud," edge computing software takes data from closer to the source on the cloud's edge — a locomotive's onboard computer, for instance — to spot malfunctions and wear-and-tear issues.

Similar software is being developed for

use in wind turbines, electric generating stations, and autonomous vehicles to give users advanced notice of potential problems or ways to enhance performance.

GE officials say they're not directly involved in Australian mining company Rio Tinto's work to harness technology for driverless trains, but that GE software can further the goal.

"It's of interest to other customers that we're talking to the North American market and the Class I [railroads]," Tolson says. "There's a desire to get ... to fully autonomous. ... [T]hey're working through it very carefully and watching and working with Rio Tinto and talking and going down and seeing what's going on with the tools that they're using from GE."

One GE software tool that Class I and other heavy-haul railroads already use is Trip Optimizer, which Tolson describes as a fuel-saving "cruise control" for locomotives. The company celebrated 10,000 Trip Optimizer orders in October.

"We've got it certified through the [Environmental Protection Agency] at 10-percent savings," she says of the software. "On average, that's 900,000 gallons of fuel per week [worldwide]."

And, Tolson says, with time, edge computing and EdgeLINC may shift applications such as Trip Optimizer into more train handling and guidance work now done by human crews.

"We're not at the beginning, but we're definitely not at the very end. We're probably a third of the way I think it will go," she says. — *Steve Sweeney*

>> TECHNOLOGY BRIEFS

Sound Transit makes 'best of' list

Popular Science has issued its "Best Of What's New" award to the plans to build a light rail bridge across Interstate 90 in Seattle. **Sound Transit's** East Link project across Lake Washington is slated to open in 2023 and where it crosses the lake, will feature the world's first floating light rail bridge. Sound Transit officials say that the design will compensate for six different ranges of lake motion. **Popular Science** selected the design as one of 100 entries in 11 different categories. When completed, the light rail extension will add 14 miles of track and 10 stations to Sound Transit's network.

New York-area commuters can soon expect to use a credit card-like fare card or a smartphone instead of a swipe card at turnstiles and on buses. **Metropolitan Transportation Authority** officials announced in October that the agency will retire "MetroCards" and replace them with technology developed by **Cubic Transportation Systems**, according to the *New York Daily News*. New York MTA officials plan to have Cubic's technology in place on buses and in subway stations by 2020; roll out a new tap card by 2021; and end use of traditional magnetic-stripe fare cards by 2023. Cubic already works with transit agencies including Chicago, where its technology powers the Ventra smartphone application used by **Metra**, the **Chicago Transit Authority**, and **PACE** suburban bus users.

Germany-based **Siemens** and Bolingbrook, Ill.-based **Wi-Tronix** officials say that the German company has made an undisclosed investment in Wi-Tronix in order "to move the industry toward the objective of 100-percent availability of safe, efficient service." Wi-Tronix products offer remote monitoring, video analysis, and predictive diagnostic systems for rolling stock and rail infrastructure, making critical data available to operators in real time through its software-as-a-service solution. Approximately 12,000 locomotives, mostly in the U.S., Canada, Mexico, and Australia — are equipped with Wi-Tronix technology.



Amtrak's Michigan-sponsored *Pere Marquette* makes its way out of Holland, Mich., on Sept. 23, 2017. Four photos, Bob Johnston

Where is Amtrak going now?

Operating plan for 2018 reveals obsession with cost control, load factor management

Less than 10 months after former Norfolk Southern Chief Executive Officer Wick Moorman reorganized responsibilities from the previous eight years that Joe Boardman captained the Amtrak ship, incoming CEO Richard Anderson is beginning to make his mark. But the jury is out on whether his tenure will result in:

A) utilizing the dwindling rail passenger service institutional knowledge remaining after being whipsawed by two administrations at a company where some entrenched, cost-obsessed department heads are impervious to change, or

B) attempting to remake Amtrak by bringing in outside help, mainly from a transportation business with which he is intimately familiar.

Ideally, it will combine both approaches.

Although the former Delta Airlines head was announced in early July as a co-CEO with Moorman through December, he eased slowly into the saddle during the next three months in much the way his predecessor did at the end of 2016. During that period, Anderson met with — and generally impressed — most of the Amtrak managers *TRAINS* contacted as someone who is detail-oriented and genuinely interested in growing business by paying more attention to travelers' needs.

Following Anderson's post-Labor Day media interviews in which he stressed Amtrak's "no middle seat" creature comforts over air travel (while dispelling any suggestion that legroom would be compromised) and the need for more infrastructure invest-

ment, the company announced a nearly \$17 million "extensive [interior] overhaul" of 40-year-old Amfleet coaches used in the Northeast and on Midwest state-supported routes. The rehab, the third and least extensive in the 400-plus-car fleet's history, promises redesigned café car galleys facilitating modular food-inventory control, as well as new curtains for business class, LED lighting, carpeting, and seat cushions.

An internal engineering task force had



Amtrak co-CEO Richard Anderson speaks at the National Association of Railroad Passengers 50th Anniversary gathering in Chicago on Nov. 2, 2017.

studied a more comprehensive rebuild that would have rectified doorway-width accessibility deficiencies and inadequate seating for handicapped passengers. Without funding to execute such a massive project or consider purchase of Siemens single-level coaches like those built for Florida's Brightline, Amtrak opted for window dressing and a quick fix. Left unaddressed

is the need to accelerate periodic rebuilds of similarly aging Superliner long-distance equipment that would bolster customer satisfaction, reliability, capacity, and revenue in that category [see "Long-Distance Strong in 2017," page 23].

In marketing, the company launched a "Breaking the Travel Quo" advertising campaign primarily on social media, utilizing "programmatic digital buying" to target potential Amtrak customers with video extolling the comfort and convenience of train travel compared with universally understood air and highway shortcomings. Anderson then hired a new chief marketing officer, Tim Griffin, who brings in 40 years of airline and loyalty-program experience.

Organizationally, Griffin oversees "passenger experience" and the "business development" aspects of the Northeast Corridor, state-supported, long-distance, and product-support divisions now helmed by experienced rail managers. He does not directly supervise the operating and mechanical line employees delivering the product; they continue to report to Scot Naparstek, the executive vice president and chief operating officer elevated to that post under Moorman.

Countless Amtrak restructurings have wrestled with this inherent dichotomy but interdependence between marketing and operations; in president George Warrington's administration, even road foremen were given "customer service" titles. *TRAINS* has attempted to determine chains of command, but an organization chart is apparently still in development.

Hints of where Amtrak is going are contained in a “Fiscal Year 2018 Annual Plan” released at the end of September. Its goal is to reduce the operating loss to \$165 million by spending \$2.1 billion on capital improvements, increasing ridership 2.4 percent and revenue by 3.3 percent “with a 4-percent revenue stretch goal.” The report says this will be attained in part by achieving a “10-percent year-over-year load factor growth” and managing “controllable expense growth at minimal levels.”

The company expects host railroad on-time performance to improve throughout 2018 by 6 to 18 percent, depending upon the service line, even though those trends plummeted in the opposite direction during fiscal 2017. And it’s not clear how increasing long-distance trains’ load factor from 59 to 69 percent “driven by lower or shifting capacity” will comfortably serve more patrons if resulting higher fares keep them away.

Remaining unchanged are opaque allocations, which funnel administrative expenses to state-supported and national network operations without charging the Northeast Corridor with the incremental capital investment expense required to operate *Acela Express* and *Northeast Regional* trains at speeds that command the higher ticket prices that make them “profitable.”

Responding to a hostile question about Amtrak’s least profitable route at a Washington, D.C., congressional hearing in October, Moorman admitted, “It would be one of our long-distance trains between Chicago and the West Coast. Again, the [lack of] profitability there is because of all allocated costs rather than direct costs.” This is the same message Moorman gave to the City Club of Chicago in May when he said, “long-distance trains break even if you just take direct fuel and crew costs, but after allocating expenses according to a formula developed by the Volpe Institute on rational types of things like passenger miles and train starts, [they] end up with about a \$500 million loss.”

Anderson told the National Association of Railroad Passengers in Chicago, “The real question is how do you cut overhead to get the allocations as small as possible.” He says having a “laser focus” on expenses “will hopefully give us more credibility when we go to our regulators and Congress.” The former Delta executive has a wealth of point-to-point pricing, load factor, terminal facility, and on-board hospitality experience that may point his new company in a different direction. But maximizing service to all of the intermediate communities Amtrak serves on every short- and long-distance route will require a set of skills developed by those who have been working on that challenge since May 1, 1971.



A stimulus-funded P40 locomotive pilots Amtrak’s leading long-distance ticket-revenue producer, *Auto Train*, south through Pierson, Fla., on Feb. 11, 2015.

Long-distance strong in 2017

Sleeping-car fares contribute to robust cash flow

Year-over-year comparisons are always tricky when analyzing Amtrak’s strengths and weaknesses, but slight nationwide increases among all categories during the fiscal year ending Sept. 30, 2017, mask the reality that the company’s cross-country workhorses continue to perform above their weight class.

Cancellations resulting from hurricanes Harvey and Irma skewed year-end results (though Amtrak declined to provide TRAINS with September details at press time). But 12 of the 15 long-distance routes showed revenue gains through August, a month when they generated \$5 million more in sales than the 29 state-supported routes.

Conversely, regional trains (with end points less than 750 miles apart) carried three times as many passengers (13.8 million versus 4.4 million for long-distance), as well as more travelers than all *Acela Express* and *Northeast Regional* corridor trips (11 million).

The overnights’ high revenue-to-ridership ratio can be explained by the fact that they generate 40.6 percent of Amtrak’s 6.5 billion annual passenger-miles, compared to 29.1 percent in shorter routes and 30.3 percent in Northeast Corridor categories. Amtrak furnished fiscal 2016 annual route-specific passenger-miles data at TRAINS’ request, but does not report it monthly.

Every long-distance train except the *Capitol Limited*, *Sunset Limited*, and *Auto Train* augments travel offerings in at least

one state-supported corridor, or serves locations that could benefit from additional frequencies, such as the *Empire Builder* between Chicago and the Twin Cities or the *Texas Eagle’s* Dallas-Fort Worth-Austin-San Antonio, Texas, city pairs.

A key component of their revenue is the high percentage of income from meals-included sleeping-car accommodations (see table below). High sleeper prices are largely a function of demand. Fares might be lower but patronage higher if Amtrak had more rooms to sell, so it misses the 25 new Viewliner II sleeping cars and 10 baggage-dormitory cars delayed until at least 2019 by production problems for carbuilder CAF USA.

It clearly is essential to these trains to keep passengers who generate sleeping-car revenue happy and coming back. Doing so has been a 47-year struggle,

given political overseers who point to food-service and sleeping-car “losses” as if there is no connection to overall revenue. One response is decreased staffing, leading to slow service and the inability to handle more customers. Another is attempting to transfer more sleeping-car revenue to the kitchen’s ledger with entrées like the \$36 steak and shrimp “Field and Sea Combo” that debuted with the April 2017 menu. Whatever approach is used to keep the long-distance network intact, the trains have demonstrated proven — if under-appreciated — value to the traveling public.



“Field and Sea Combo” on the *Texas Eagle*.

TOP 5 LONG-DISTANCE TRAINS RANKED BY TOTAL REVENUE			
2017 (through August)			
Service	Route	2017 revenue (\$ millions)	Percentage of revenue in sleeping cars
Auto Train	Lorton, Va.-Sanford, Fla.	\$66.65	+41.1%
California Zephyr	Chicago-Emeryville, Calif.	\$49.07	+53.9%
Empire Builder	Chicago-Seattle/Portland, Ore.	\$48.49	+46.5%
Southwest Chief	Chicago-Los Angeles	\$39.98	+44.5%
Coast Starlight	Seattle-Los Angeles	\$36.41	+44.5%

Source: Amtrak



Tri-Rail moved to the Miami Intermodal Center in 2015, but Amtrak's adjacent head house remains vacant. Five photos, Bob Johnston

Miami awaits new Amtrak home

Airport complex has hosted Tri-Rail and transit since 2015, but Amtrak still calls elsewhere

Imagine arriving at a fully functional train station with excellent commuter-rail connections to the surrounding metropolitan area, and a people mover to parking, rental cars, intercity Greyhound and Megabus motor coaches, plus domestic and international airline flights.

For 40 years, that's been only a dream for Amtrak passengers headed to or from Miami. They have been exiled to a station the company built in 1978 for its convenience in an industrial area adjacent to the Hialeah Maintenance Facility, about 10 miles northwest of downtown Miami and even farther from popular Miami Beach. Yet 2018 might be the year the *Silver Meteor* and *Silver Star* may finally move to the pristine but empty Amtrak concourse at the Miami Intermodal Center, a Florida Department of Transportation-

funded facility adjacent to Miami International Airport. Or maybe not.

Railroads started the exodus to city extremities as their 1960s passenger offerings withered, in a bid to shed costs of centrally located but aging buildings and unneeded trackage in communities like Albany, N.Y., and Charlotte, N.C. Cost pressures on a skeletal network prompted early Amtrak management to continue the process by building smaller stations to a uniform design on cheaper land in places such as Minnesota's Twin Cities, Cincinnati, Buffalo, N.Y., and Miami. Recently, municipalities seeking to increase mobility not dependent on cars and create more regional connectivity have reversed the trend, leveraging local funds with federal and state grants to lure private development around newly energized transit hubs.

Florida's Department of Transportation planners recognized such an opportunity a decade ago when they began reconfiguring highways around Miami's airport. Commuter service Tri-Rail, which initially used a makeshift station in a parking garage that also served as a rental car facility, moved into the intermodal center in 2015. The \$2 billion station was erected utilizing Florida DOT-arranged funding with a separate ticketing, baggage handling, and waiting area concourse for intercity passengers designed to Amtrak specifications.

It is a sweet deal. Amtrak paid next to nothing to build the strategically located facility, and is assessed only a common-area maintenance cost based on use of six parking-lot spaces and occupancy of its exclusive head house, according to Florida DOT spokeswoman Ivette Ruiz-Paz. She tells TRAINS a dollar amount has been agreed upon, "but [cannot] be disclosed since negotiations are ongoing," and adds, "lease terms are pending, specifically terms of cancellation, [but] Amtrak can cancel without penalty from FDOT."

Although the state transportation agency is negotiating with Amtrak, the intermodal center's operation will be conveyed to the Miami-Dade Transit Agency once the Board of County Commissioners vote to sanction the move; approval is expected this January, Ruiz-Paz says. She notes that Amtrak can begin using the station before



A short Tri-Rail train prepares to cross 25th Street north of the station. Traffic signals will reroute autos three blocks north if Amtrak trains block the crossing.

the takeover “if Amtrak and FDOT agree to lease terms and Amtrak is able to make the move.” An Amtrak spokeswoman confirmed that negotiations are continuing but declined to speculate further.

There was one problem: Amtrak signed off on platform tracks that were 200 feet too short to hold a peak-season-length *Silver Meteor* without blocking busy 25th Street on the station's north end. That issue has been resolved at the state's expense by constructing a highway bypass north to the 28th Street crossing. Now when a train too long for the platform approaches the station, highway signals automatically trigger a traffic reroute.

Logistically, moving *Silver Star* and *Silver Meteor* boarding to the intermodal center will require a 4-mile deadhead move for each train after its evening arrival and before its morning departure. This could prompt schedule changes or alteration of crew assignments that almost certainly would add operating expense compared with the minimal time and effort now needed to execute those functions at Hialeah. Until that happens, passengers on those trains can still access the Miami Intermodal Center's convenient regional connections by changing to or from Tri-Rail service at either Fort Lauderdale or Hollywood, Fla.

Amtrak's reticence to move in Miami is not only about waiting for ownership papers to be signed or traffic-signaling solutions to be implemented. Rather, it's symptomatic of the company's pervasive

focus on costs at the expense of generating additional income or making its offerings more responsive to the traveling public's needs. Cost savings can be measured, and ticket revenue increases are only projections. For almost five decades — with the exception of then-CEO Tom Downs' mid-1990s product-line structure that armed managers with genuine “spend money to make money” responsibility — Amtrak's top-level management and board of directors have yet to find a way to incentivize growth.

The cornerstone of Brightline's soon-to-launch Miami-West Palm Beach, Fla., intercity service with eventual continuation to Orlando is locating its multimillion-dollar downtown Miami Central Station near Metrorail transit and Miami people mover customers. Amtrak will have even better connectivity at the airport whenever — or if — its management decides to commit to the new course of action.



Two Talgo Series 8 trainsets sit idle on Aug. 29, 2016, at Amtrak's Beech Grove (Ind.) Heavy Maintenance Facility. They have been stored at Beech Grove since May 2014.

Talgo orphans still homeless

Trainsets remain idle a year after *Surfliner* corridor shows interest

Two spiffy trainsets originally purchased by Wisconsin for its Chicago-Milwaukee *Hiawathas* that might help solve a nationwide intercity railcar shortage continue to languish while officials from all involved parties attempt to consummate a lease deal.

The plan, disclosed more than a year ago by California's LOSSAN Rail Corridor Agency Managing Director Jennifer Bergener [see “Talgos Attract Attention,” “Passenger,” December 2016], would have had the Talgos replace aging Horizon coaches that the *Pacific Surfliner* corridor currently leases from Amtrak. But snags

have developed in hammering out contract terms, which include adapting Amtrak's Los Angeles Redondo Junction maintenance facility, modifying the trainsets' cafés, possibly reconfiguring some cars for business class, and equipping cab cars with appropriate automatic train stop and positive train control signaling equipment.

With the possible acquisition of Siemens single-level coaches developed for Florida's Brightline — substituting for the bilevel cars Sumitomo was unable to build — stalled over compliance issues, the hope is that funding and contractual arrangements can be worked out soon.



A concourse-door promise on Feb. 29, 2016.

>> 'Downeaster' eyes extension



Flashy ex-New Haven FL9s, shown here at Rockland, Maine, waiting to board North Atlantic Blues Festival concertgoers in 2007, hauled seasonal streamliners on the Maine-owned Brunswick-Rockland route before the state replaced operator Maine Eastern in 2016. Those trains won't be back, but now the Northern New England Passenger Rail Authority is exploring a pilot program that would extend Amtrak-operated *Downeaster* weekend round trips, with Amfleet cars and P42 locomotives, from Boston past Brunswick to Rockland from Memorial Day through Columbus Day in 2018. Logistics are to be finalized following public outreach sessions and Amtrak negotiations.



TRAINS WITHOUT CREWS

FANTASY OR THE FUTURE?

BY JUSTIN FRANZ

Is the day approaching when there will be no one in the cabs of mainline freight trains? Some say it will be sooner than later. Charles Marshall





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2



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1 SkyTrain equipment heads toward Vancouver on the guideway passing over the system's Operation and Maintenance Centre yard in Burnaby, British Columbia. The system operates without onboard crews. Ian Smith

2 The lack of an operator is clear on this train at Waterfront Station, terminus for all three SkyTrain lines. Since opening in 1985, SkyTrain has had no accidents involving trains in regular service. Mike Bjork

3 The 42nd Street Shuttle was the New York subway system's test bed for automated trains in the 1960s. A current train, with an operator, is shown at Grand Central Terminal, where a fire ended the test. Joseph M. Calisi

4 The Iron Ore Co. of Canada's Carol Lake Railway is an 8-mile electrified and automated mine railroad near Labrador City, Labrador. It features four trains running in a continuous loop. Andy Cummings



4

Every day, just before 5 a.m., dozens of Vancouver SkyTrains roll out of storage yards across the city in British Columbia and go to work. The rapid-transit trains flood a system that stretches for nearly 50 miles from downtown to New Westminster to the waterfront. Stand at one of its 53 stations during the morning rush hour and you'll see a train pull in every 100 seconds, carrying hundreds of thousands of people to work, school, sporting events, or even just the grocery store.

What you won't see is an operator.

Autonomous vehicles, once the stuff of science fantasy, are now entering the mainstream. In recent years, ride-sharing services like Uber have experimented with driverless cars, and Ford executives say they are making "great progress" toward a fully self-driving car. Even aerospace giant Boeing is testing a self-flying plane.

But while the automobile and aerospace industries are still testing the waters, automated technology has long been used on transit systems around the world, from short airport shuttles to complex systems like the one found in Vancouver. Some even say driverless freight trains are next.

"The technology is there," says one of the top autonomous rail researchers in America. "Driverless freight trains are feasible within 10 years."

EARLY DRIVERLESS EFFORTS

Seventeen years after Henry Ford sold his first Model T, the Houdina Radio Control Co. demonstrated the first driverless vehicle down Broadway in New York City in 1925. The vehicle was controlled with radio waves from a second automobile that followed closely behind. Although the contraption worked for awhile, its initial demonstration ended with a crash into another vehicle full of photographers to record the event.

Thirty-five years later, New York was also the site where the first driverless train in North America was tested, on the 42nd Street Shuttle in the early 1960s. New York City Transit Authority Chairman Charles L. Patterson first suggested building an automated subway train in 1959, and the concept was briefly tested in 1960 on a short stretch of track in Brooklyn. A New York Times story about the tests announced that the train could do "everything but answer riders' questions." The train utilized an "electronic dispatcher" to send orders through electronic relays that controlled acceleration, deceleration, braking, and operation of the doors.

In 1961, the Transit Authority took what it had learned in Brooklyn and put it to use on the short shuttle service between Grand Central Terminal and Times Square. At the time, Patterson suggested that if the

tests were successful and driverless trains were implemented on the wider system, the authority could reduce the ranks of its motormen by 90 percent. But the plan to use a driverless train angered union bosses, who quickly called for a strike. Michael J. Quill, president of the Transport Workers Union, said the plan to run a "zombie" train was "insane."

The Transit Authority and the union eventually settled their differences for the tests by agreeing to have a stand-by motorman on every run. With the union in reluctant agreement, the "first fully automated train in the world" left the station on Jan. 4, 1962. The three-car train attracted the interest of people all across the city, although the first day wasn't without its hiccups. During one of the inaugural trips, Mayor Robert F. Wagner and a number of reporters nearly lost their footing when the train jerked to a sudden stop. The mayor later said that it had been a "very fine ride," and that he expected any problems would be soon ironed out.

But Transit Authority officials began to lose enthusiasm for the automation plan. Because of the agreement to keep a stand-by motorman, the city realized few savings from the test. Officials also concluded that while an automated train could be operated on a short run between two stations, it would be harder to implement on the wider system without drastic investments.

The automated train continued to operate until April 21, 1964, when it was destroyed in a station fire at Grand Central. The Transit Authority decided not to repair the driverless system, and New York's automated train was gone as quickly as it had jerked into the station.

Through the 1960s and 1970s, a handful of industrial railroads experimented with automated trains, but their use was generally limited in North America. Among the success stories was the Iron Ore Co. of Canada, which constructed an automated and electrified mine railroad near Labrador City, Labrador, that continues to operate today. The 8-mile-long Carol Lake Railway features four 18-car trains that run in a continuous loop, bringing raw ore to the processing plant.

Vancouver was the first major driverless metro system in North America when it opened a 13-mile route in 1985, just in time for the 1986 World's Fair. Today, TransLink's SkyTrain has three routes stretching almost 50 miles around the city. Chris Morris is SkyTrain's director of engineering assets and has been there since the beginning of autonomous operations.

Unlike traditional trains that operate within fixed signal blocks, SkyTrain's system features moving blocks that stay with each train. That means that trains can op-

"THE TECHNOLOGY IS THERE," SAYS ONE OF THE TOP AUTONOMOUS RAIL RESEARCHERS IN AMERICA. "DRIVERLESS FREIGHT TRAINS ARE FEASIBLE WITHIN 10 YEARS."

erate with more frequency and speed than a route using a traditional signaling system. Morris says the system allows for 25 percent more trains than a regular system.

The network relies on a number of computer systems that are in constant communication to ensure the safe operation of trains, Morris says. Each train has an on-board computer that receives and sends data through the rails to a lineside computer. The wayside vehicle control computer ensures that each train is moving at the correct speed and is not running too close to another. Finally, there is a system management computer that operates the entire network, ensuring that each train is on the correct route. "There is a lot of redundancy built into the system to keep it safe," Morris tells TRAINS.

The entire system is overseen by a command center that usually has just five or six people in it at any given moment. In 2017, SkyTrain had nearly 1,000 employees, 90 percent of whom were in a union.

Morris says one of the best aspects of the system is that managers can quickly respond to ridership needs. If officials miscalculate how many people are expected to use the system during a major event, additional trains can be dispatched with a few clicks of a button. "We can respond to ridership changes much faster than a traditional system, because we don't have to call up additional operators," Morris says.

In more than 30 years of operation, the Vancouver SkyTrain has never had an accident involving a regular-service train, Morris says, adding that the only time any SkyTrain has been involved in a derailment has been when it is being manually operated in a yard or maintenance facility.

"That simple fact is a ringing endorsement of automated train systems," Morris says proudly. "It's proof that driverless trains do work."

Although some rapid transit systems utilize automated technology, there are no true driverless metros in the United States,

"A LOT OF THE TECHNOLOGY YOU NEED FOR DRIVERLESS IS ALREADY ON THE SHELF. WE REALLY DON'T HAVE TO INVENT OR DESIGN ANYTHING NEW."

aside from a handful of airport people movers. For decades the Washington, D.C., Metro utilized an automatic train operation system that controlled the movement of the train without human intervention, while the train operator simply operated the doors, made announcements, and oversaw the train. But in 2009, nine people were killed when two Metro trains collided. A National Transportation Safety Board investigation found that a faulty track circuit failed to warn an oncoming train that another train had broken down up ahead. Following the incident, all trains were operated manually while the Metro undertook a system-wide infrastructure rebuild. Officials were hoping to reinstitute automated train control, but in April 2017 shelved those plans indefinitely.

Despite incidents with computer-run trains in Washington, D.C., many experts say automatic train operation technology is safe because it eliminates the possibility of human error. That, along with cost savings, is one of the reasons the Honolulu Authority for Rapid Transportation is building the country's first driverless transit system. When complete in the 2020s, Honolulu's 20-mile route will have 21 stations connecting the west side of Oahu and Pearl Harbor with downtown Honolulu.

Justin Garrod, who at the time of his interview was the transit system's deputy director of core systems, says autonomous technology will mean a shorter headway between trains, because each one will be operating in concert with the others, versus manually run trains that accelerate and decelerate at different rates based on the operator. Officials say autonomous operations will enable an estimated 100,000 passenger boardings per day during the first year. Passengers will also have a bit more room, because there will not be an operator cab.

Like Vancouver, the Honolulu system will be operated and overseen from a centralized command center where a handful of employees can see the entire system on closed-circuit cameras. Managers will also be able to talk to passengers via intercom.

There will also be field operations employees roaming the system, available to respond to any situation aboard a train or at a station.

While the Honolulu system will cost more up front — it was initially projected to cost \$5 billion, but by late 2017 the figure was more than \$10 billion — Garrod says once it is up and running, it will cost 50 percent less to operate than a traditional system, mostly because of labor savings.

Garrod, who has been with the project since 2014, says one of the questions he is asked the most is if the autonomous system is safe from hackers. In recent years, transit agencies have fallen victim to cyber attacks; in 2016 San Francisco's Muni was crippled when hackers attacked its fare system. Garrod says the No. 1 safeguard against hackers is that the Honolulu operating system is isolated and not connected to or reliant on other networks.

While Honolulu's driverless transit system may be a first in the United States, it probably will not be the last. "I think a lot of people in the industry are watching to see how this all works," Garrod says.

Whether North American freight railroads look to Honolulu for inspiration is yet to be seen. Morris, the director of engineering assets in Vancouver who has worked with autonomous trains for more than three decades, says in his opinion applying it to freight rail would be "tough." Unlike a transit system, the freight network is much less secure, the trains are often longer and heavier, and grades pose a significant operating challenge.

AUTONOMY DOWN UNDER

Don't tell that to the Australians.

In 2018, mining giant Rio Tinto expects to start operating the world's first heavy-haul autonomous freight railroad. The effort to automate Rio Tinto's mining railroad through the remote Pilbara region of northwest Australia is part of its "Mine of the Future" initiative. Rio Tinto has been working on the project for a decade and, despite some delays, began testing in 2014. In October 2017, Rio Tinto successfully operated an ore train for 60 miles with no one on board the locomotive. The train was closely monitored by company and government officials. "This successful pilot run puts us firmly on track to meet our goal of operating the world's first fully autonomous heavy-haul, long-distance rail network," says Chris Salisbury, chief executive of Rio Tinto's iron ore group, "which will unlock significant safety and productivity benefits for the business."

The entire automation project is expected to cost more than \$518 million.

Brad Howard, a mechanical engineer for New York Air Brake between 2013 and

2016, worked on the operating system for Rio Tinto's autonomous trains. Like some of the autonomous transit systems, Rio Tinto's freight trains will run in a moving block. Each train utilizes a simulation-based operating system, Howard says. As the train travels, the computer processes data about the train's route, speed, length, and weight. The computer produces up to five potential simulations — what would happen if the throttle was increased or decreased at a specific point on the rail line, or what would happen if the brakes were applied — and picks the best possible scenario. Howard says the computer uses GPS information so that it always knows where it is and what the gradient is of the track ahead. And, he says, a secondary computer aboard the train also runs through potential simulations as a check on the main system.

Researchers are undoubtedly anxious to see how Rio Tinto's experiment goes. But David Clarke, director for the Center for Transportation Research at the University of Tennessee, says Rio Tinto will probably prove what he already believes: that driverless trains are a "technological slam dunk."

"A lot of the technology you need for driverless trains is already on the shelf," he says. "We really don't have to invent or design anything new."

Clarke says that positive train control — the government-mandated technology designed to prevent head-on collisions or speed-related derailments — was one of the first big steps to building a driverless freight rail network. Once PTC is implemented nationwide, Clarke says, it wouldn't be hard to take the next step, if the industry was interested in making the big investments to make it happen.

Another recent technological advance that could lend itself to the implementation of autonomous trains is GE Transportation's Trip Optimizer. The autopilot technology is used by most North American Class I railroads to operate locomotives more efficiently. Like the systems used by Rio Tinto, Trip Optimizer takes data about the train and the route and finds the best possible throttle position to maintain speed while also using the least amount of fuel. (New York Air Brake offers a similar product called LEADER, for Locomotive Engineer Assist/Display and Event Recorder.)

Sam Al-Ibrahim, head of the Federal Railroad Administration's Train Control and Communications Research Division, says PTC and Trip Optimizer have provided the "building blocks" for driverless trains. Al-Ibrahim has been in the rail industry for 30 years and for the last decade has helped lead the development of PTC. These days, Al-Ibrahim is researching ways to make grade crossings safer, as well as how the industry could implement autonomous trains.



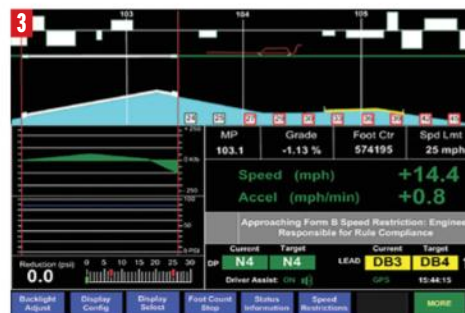
1 Washington, D.C.'s, Metro Silver Line, shown at its opening in 2014, is part of a system that originally had automated operations. That ended after a fatal accident in 2009. Sol Tucker

2 New York Air Brake's LEADER, shown here in a locomotive cab, is, like GE Transportation's Trip Optimizer, a system intended to help trains operate more efficiently. Both companies are involved in autonomous-train technologies, with New York Air Brake working with Australia's Rio

Tinto on its driverless-train effort. Two photos, New York Air Brake

3 This screen shows information displayed as part of the LEADER train-control system.

4 The Rio Tinto mining railroad in a remote portion of Australia is aiming to have all mainline operations automated by the end of 2018. It recently announced it had operated a train for 60 miles without a crew. David Arnold





1 The crew of a Norfolk Southern local receives a briefing before going to work in the yard at Taylor, Pa. Even if railroads are able to perfect crewless operation, it is more likely to be aimed at mainline operations than these sorts of jobs. Michael S. Murray

2 A westbound empty unit coal train, bound for Wyoming's Powder River Basin, passes for a crew change at BNSF Railway's yard in Galesburg, Ill., on a sub-freezing January day. Unions representing railroad workers question the safety of crewless trains, but also have an eye on employment in an industry that has



eliminated more than a million jobs since 1950. Steve Schmollinger

3 Driverless technology could make trucks more competitive with trains. Here, Freightliner introduces its Inspiration self-driving truck in an event at Nevada's Hoover Dam in 2015.

Associated Press: John Locher

4 A Union Pacific coal train passes through Kansas City, Mo. Railroad workers say the complexity of freight operations are a far cry from the passenger services that currently feature autonomous operation. Jason Greashaber



Although the FRA is currently considering a rule that would require two crew members aboard all freight trains, Al-Ibrahim says rules and regulations can be changed in the years to come. "It's our job to look into the future," Al-Ibrahim says of the work happening in his office.

Al-Ibrahim says driverless trains could take a number of different forms. One might be totally autonomous, where the train drives itself with no human intervention. Another might be remote trains, where the operator is actually hundreds or thousands of miles away controlling the train from a remote location, much like a military drone. Having the operators in one location means it would be much easier to relieve crews; railroads wouldn't need to taxi crews to the train, they would just hand the keyboard over to the next person.

So far the FRA's research has found that the biggest obstacle to driverless trains is a lack of internet broadband. In order for an autonomous or remote system to work, the trains would have to be able to communicate information to a centralized control center. "There are dozens of pieces of information that would need to be transmitted," he says. "The condition of the locomotive, the train's speed, its location, and so on."

But like most researchers, Al-Ibrahim says these are only temporary roadblocks. "We are continuously working on this," he says. "Driverless freight trains are feasible within 10 years."

Some companies, like GE, are keeping a close eye on the development of autonomous technologies. Spokesperson Tim Bader says his company has already supplied autonomous train systems for customers in Canada, Brazil, and Australia over the past 20 years, and that GE is ready for whatever the future brings. "We are following the test and introduction of autonomous vehicles in other modes closely and with great interest," he says.

CONVINCING THE INDUSTRY

While researchers say driverless trains are possible, the technology would still have to prove itself to railroad executives and the general public. "The railroad industry is very interested in driverless trains, but it's also a very conservative industry and they're not just going to jump on something like this," Al-Ibrahim says.

Howard believes that advances in driverless automobile technology will help the public accept other autonomous transportation systems. A survey by the Consumer Technology Association in 2016 found that 70 percent of Americans were willing to try an autonomous automobile. "People will have to develop a trust in this technology," Howard says. "I think eventually we will get there."

But not everyone is convinced that driverless trains are a smart idea. "Railroads would have to do a lot of work to convince regulators and the American public that driverless trains are safe," says Ron Kaminkow, general secretary of Railroad Workers United, a coalition of railroad workers from different unions. Kaminkow says the argument against one-person crews is the same as it is for driverless trains: freight trains are long and heavy, and two trained and qualified crew members need to be present to get them safely over the road.

John Risch, national legislative director for the Transportation Division of SMART (the International Association of Sheet Metal, Air, Rail, and Transportation Workers), says railroad crews do numerous tasks every day that could never be replaced by a computer, such as splitting a stalled train at a crossing or being a point of contact with emergency responders in the case of a derailment. He also says the argument that driverless technology would work for freight rail, because it has worked on some transit routes is like comparing apples with oranges.

"Driverless freight trains are a terrible idea," he says. "It's one thing to have a driverless airport tram traveling 200 yards; it's another having a driverless freight train traveling thousands of miles across the country."

Risch says technology like PTC is supposed to be an additional safety measure, not a tool to reduce crew sizes, and that removing crews eliminates the gains in safety. He also says that reducing crew sizes — or eliminating them altogether — will also lessen the amount of institutional knowledge on the railroad.

"You learn a lot more from your fellow crew members than you ever do in a classroom. So if you reduce crew sizes you lose a lot of that knowledge about how things are really done out there," he says. "The safest way to train is with a certified conductor and a certified engineer."

But there's another reason why unions and railroaders are likely to be against autonomous trains: employment. With the loss of steam locomotives in the 1950s, five-person crews in the 1970s and 1980s, and mergers and takeovers in the 1990s, the ranks of railroaders have thinned dramatically in the last 70 years. In 1950, there were more than 1.4 million employed by the railroad industry in the United States. In 2017, there are just over 200,000 railroaders nationwide.

"Workers don't want driverless trains, society doesn't want it, and shippers don't want it," Kaminkow says. "The only people who would want this are the shareholders who only see dollar signs."

Even some executives have shuddered at the thought of single-person crews or driv-

"DRIVERLESS FREIGHT TRAINS ARE A TERRIBLE IDEA," RISCH SAYS. "IT'S ONE THING TO HAVE A DRIVERLESS AIRPORT TRAM TRAVELING 200 YARDS; IT'S ANOTHER HAVING A DRIVERLESS FREIGHT TRAIN TRAVELING THOUSANDS OF MILES ACROSS THE COUNTRY."

erless trains, including CSX Transportation's E. Hunter Harrison, who in early 2017 said he did not think it was "good business" to push for reduced crew sizes. Risch jokes that if the unions and Harrison are in agreement, they must be onto something.

But rail and intermodal consultants like Larry Gross say the industry must begin to look at ways to better compete with truckers who have even more to gain from autonomous technology. Currently, truckers can only work for so many hours, so many loads spend hours and hours parked while the driver rests. But if there were more autonomous trucks, those loads could keep moving around the clock. Autonomous trains would help the railroad industry cut costs, Gross says, but autonomous trucks would help that industry increase productivity as well.

Gross says where autonomous technology could help the railroad industry the most is moving single-carloads and local freight, the types of service some railroads have turned their back on in recent decades because of the costs related to switching out industries or lightly used branch lines. Researchers say while the technology is there to move unit trains without an operator, autonomous trains that are able to switch and service industries are still the stuff of fantasy. But Gross says if the industry was able to figure out a way to use autonomous technology to increase traffic and service, it would be "transformative."

"Autonomous technology really could change the way railroads work in the future," Gross says. "[This is good] because the competition is only going to get more rigorous." **I**



OCEAN



TO



Ice and snow cling to
the window of VIA Rail
Canada LRC coach
No. 3471 as train
No. 65 races from
Montreal to Toronto.

A SESQUICENTENNIAL CELEBRATION OF CANADA ABOARD VIA RAIL PASSENGER TRAINS

STORY AND PHOTOS
BY GREG McDONNELL



“I am neither
a prophet,
nor a son of
a prophet,
yet ... I believe
that many in
this room will
live to hear the
whistle of a
steam engine
in the passes
of the Rocky
Mountains,
and to make
the journey
from Halifax
to the Pacific
in five to
six days.”

— Joseph Howe,
Masonic Hall,
Halifax,
Nova Scotia,
May 15, 1851

The inimitable words of Joseph Howe, delivered nearly 167 years ago in a speech to endorse construction of the Intercolonial Railway, drift into a mind lost in quietude of the VIA Rail Canada station in downtown Halifax on a blustery January morning. The icy winds of a Nor'easter rattle the doors and windows of the Beaux-Arts-style landmark built (along with the attached Nova Scotian Hotel) by the Canadian National Railways between 1928 and 1930. Out on the platforms, snow swirls about the stylish stainless-steel lines of *Tremblant Park*, the classic Budd-built dome-observation that punctuates a 19-car train nudged up to the bumper post of the stub-end station. By noon, the station will be crowded with passengers waiting to board the train: VIA No. 15, the Montreal-bound *Ocean*.

There's a ticket for the *Ocean* stuffed in my pocket. It's the first segment of a three-part, cardstock VIA ticket entitling the bearer to “make the journey from Halifax to the Pacific in five to six days.” Somewhere Howe, the controversial journalist, poet, and politician must be smiling.

Eight days into the year in which Canada marks the 150th anniversary of Confederation — the July 1, 1867, enactment of the “British North America Act” that formed the Dominion of Canada — the timing of this journey is no coincidence. Railways have helped build and define Canada since before Confederation and they unite the nation still. Indeed, completion of the Intercolonial Railway from Halifax to Rivière-du-Loup, Quebec, was a condition of the Maritime Provinces' inclusion in Confederation in 1867, and the promise of a railway to the Pacific was a linchpin in the terms under which British Columbia agreed to join Confederation in 1871. So what better way to celebrate Canada's sesquicentennial than to travel ocean to ocean by rail? It's a sentiment shared by noted railroad photographer and author James A. Brown, who defied bad weather, short connections, and all odds to make Halifax in time to join in

on the cross-country odyssey.

While the clock ticks toward the *Ocean*'s 1 p.m. departure, the journey begins, not at the bumper post of the Halifax station, but a few hundred paces farther east, on the water's edge at the Canadian Museum of Immigration at Pier 21. Opened in 1928, Pier 21 welcomed nearly a million immigrants to Canada before the dockside immigration facility closed in 1971. Generations of new Canadians disembarked from steamships, were processed through Pier 21, and moved directly to trains at the Halifax station. The elevated passageway that once linked Pier 21 and Halifax station is long gone, but the connection between the two is indissoluble.

The longest continuously operating named train in North America, the *Ocean* has been working the same Halifax-Montreal route since being introduced as the *Ocean Limited* by the Intercolonial Railway in July



Left Mile 0: VIA No. 15, the *Ocean*, gets set to depart Halifax for Montreal with an icy trio of F40PH-2s, 18 Renaissance cars, and Budd-built *Tremblant Park*. **Right** Steelwork of the Quebec Bridge blurs above the dome of *Tremblant Park* as No. 15 crosses the famed St. Lawrence River span after calling at Ste-Foy. **Bottom left** Aging gracefully: VIA *Tremblant Park*, was built for Canadian Pacific in 1955.

1904. The train operated on Intercolonial rails from Halifax to Levis, Quebec (on the St. Lawrence River opposite Quebec City), and through to Montreal on the Grand Trunk Railway. Both roads ultimately became part of the Canadian National Railways, the Intercolonial in 1919, and the GTR in 1923. VIA took over the train along with all remaining CN and Canadian Pacific intercity passenger services nationwide in 1978. Budget cuts have stripped away all other passenger train services in the Maritime Provinces. The *Ocean* is the last surviving Maritime passenger train.

At the stroke of its scheduled departure, VIA No. 15 strode gracefully out of the station, the start all but imperceptible in the dome of *Tremblant Park*. We slid past grain elevators and container terminals, ships (Canada Steamship Lines' Atlantic Huron for one) and a pair of wide-nose CN Geeps hauling a cut of double-stacks into Halifax Ocean Terminals. We caught a first good look at our train, framed in the contoured windows of the Budd dome, an incongruent high-low-high conglomeration composed of three boxy F40PH-2s, 18 low-riding Renaissance cars of British origin, and the elegant *Tremblant Park* bringing up the rear.

Forget aesthetics, the *Ocean* is every bit function over form. The 30-year-old F40s performed flawlessly on the 840-mile run to Montreal. The Renaissance equipment offered a remarkably smooth and quiet ride, the dining-car crew served up delicious fare at comfortable full-service tables, and the lower bunk in Cabin 3 of sleeping car No. 7507 was as comfortable a bed as I've had.

In 2001, VIA acquired the entire 139-car fleet of largely uncompleted coaches, sleepers, and service cars (many of them empty shells), which Metro-Cammell constructed for an intended-but-never-implemented *Nightstar* overnight passenger service linking Britain and Europe using the Chunnel beneath the English Channel. Bombardier was contracted to modify cars for Canadian service and outfit them to VIA standards at its facility in Thunder Bay, Ontario. A total of 64 cars were completed in configurations that included baggage and transition cars, coaches, club, service, dining, and sleeping cars. Traditionalists scowled when VIA introduced the

modified European cars as its Renaissance fleet in the early 2000s. Space is admittedly at a premium in the cars constructed to meet British and European clearance diagrams, but I'll utter not a word of complaint about the ride quality, comfort, or service aboard the Ren cars.

That said I doubt there's a finer passenger conveyance than a Canadian Pacific "Park car." The Budd Co. delivered 18 of the one-drawing room, three double-bed-room, 24-seat sleeper-buffet-lounge-dome-observation cars to CP in 1954. VIA holds title to 14 of the cars, and in accordance with standard operating procedure, train No. 15 was blessed with the presence of *Tremblant Park* on the tail end.

We took up position in the best seats in the house before the first wheels turned in Halifax. Save for meals and sleep, the dome was the place to be: a spot to admire the beauty of the Wentworth Valley and

Cobequid Mountains, to watch the F40s and Ren cars kick up the snow as they twisted through the forests of Cumberland County, and skirted the tidal Tantramar Marshes. We stayed up late into the night and returned well before daybreak.

The first hints of dawn were brightening the sky as we rolled across the St. Lawrence River on the Quebec Bridge, one of the great monuments of Canadian railroading. Built by the National Transcontinental Railway (a government-owned CN predecessor), the bridge came at high cost.

The first Quebec Bridge, engineered with a flawed design whose excessively long spans put undue stress on underweight steel, collapsed while still under construction on Aug. 29, 1907. Seventy-five of the 86 workers on the bridge perished. Another 13 workers died when on Sept. 11, 1916, the center span of the second bridge fell into the river while being raised into position.





Completed in October 1917 the new bridge ranked as the longest cantilever span in the world. Following a brief station stop at the Quebec City suburb of Ste-Foy, No. 15's passengers get a second look at the great bridge as the train reverses across it and resumes its westbound journey to Montreal.

The character of the *Ocean* is as eclectic as its equipment: It's part easygoing local, part sightseeing cruise, part medium-distance alternative to flying. "I like it," says

the performance DJ traveling from Halifax, "I can get work done." Alternating between the dome and the diner, he works with headphones, a laptop, iPhone, and spiral notebook to prepare the electronic score for a Montreal gig.

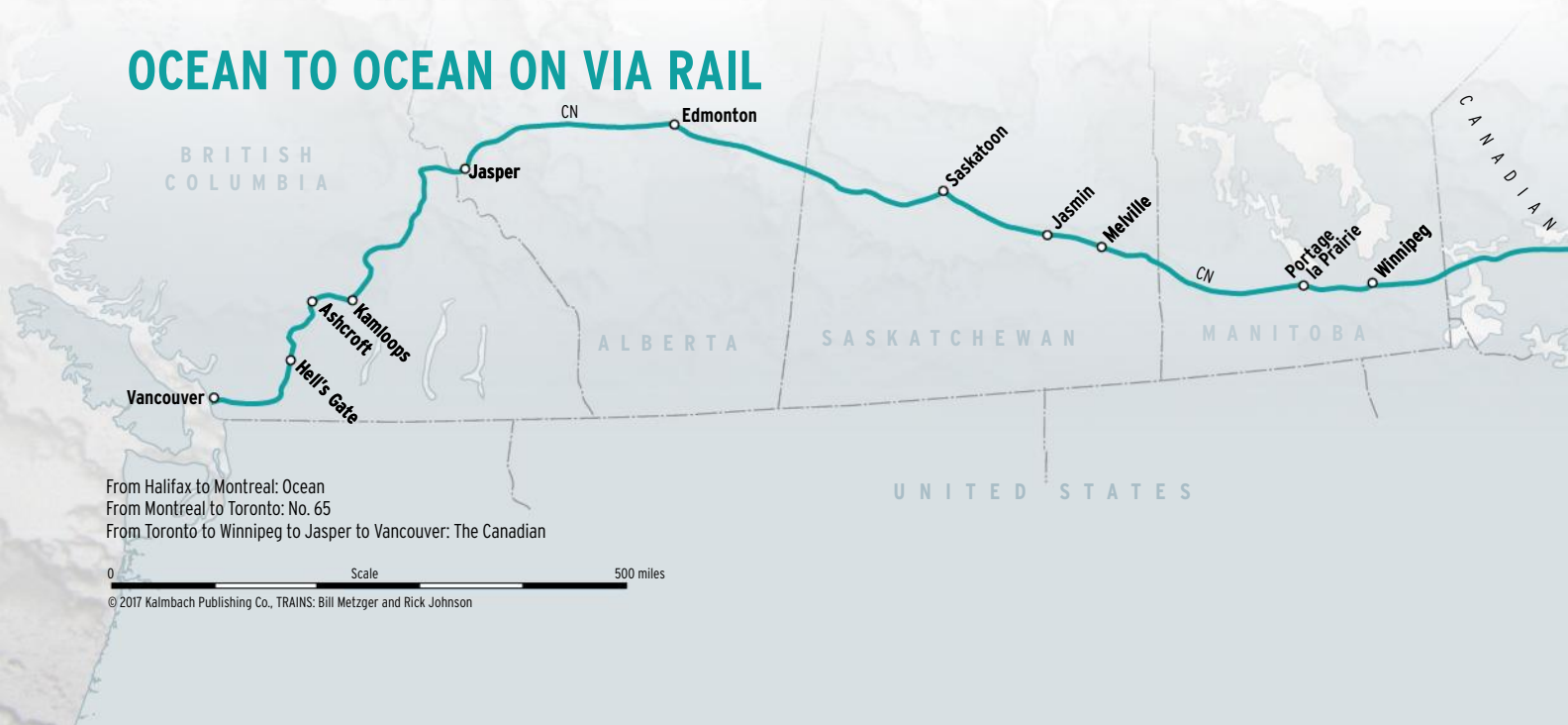
Another historic span, the Victoria Bridge, completed by the Grand Trunk in 1859 and rebuilt and double-tracked in 1897, carries No. 15 back across the St. Lawrence and into Montreal. At Montreal's

Central Station, Toronto-bound train 65 is waiting to provide an across-the-platform connection for through passengers. The timing couldn't be better, but we've got 35 hours to make our appointment with VIA No. 1 in Toronto. Montreal beckons.

LEST WE FORGET

The concourse of Montreal's former CP Windsor Station is bustling with commuters on a cold Tuesday morning, but the

OCEAN TO OCEAN ON VIA RAIL



Left Ready to whisk train 65 from Montreal to Toronto, VIA 6424 pauses beside sister 6405 working No. 33 to Ottawa. **Right** Passengers in the dome of Skyline car 8509 take in the snowy sights of Northern Ontario as Toronto-Vancouver No. 1 *The Canadian*, meets eastbound CN intermodal train Q11251-07 at Osawin, Ont.

tracks and trains are gone. VIA moved Windsor's last intercity trains to Central Station decades ago. The onetime CP "Lakeshore service" commuter trains from Hudson, Vaudreuil, and the West Island, now operated by Réseau de Transport Métropolitain, stop a city block short of Windsor at the new Lucien-L'Allier station, but commuters hurry through Windsor on their way downtown. The tarnished train-arrival-and-departure board that once posted the likes of the *Overseas Limited*, *Alouette*, and *Laurentian*, boat trains, and the transcontinental *Dominion* and *The Canadian*, displays only photographs of better days. However, the spirit of Canadian Pacific, once one of Canada's finest institutions, inhabits the halls. "Angel of Victory," the Coeur de Lion McCarthy sculpture CP commissioned to honor its war dead still presides over the concourse: *To commemorate those in the service of the Canadian Pacific Railway Company who, at the call of King and Country, left all that was dear to them, endured hardship, faced danger, and finally passed out of sight of men by the path of duty and self sacrifice, giving up their own lives that others might live in freedom. Let those who come after see to it that their names be not forgotten.*

VIA No. 65, with F40PH-2 No. 6424 and four LRC cars, was ready to whisk us from the subterranean depths of Montreal



Central Station to Toronto Union when we stepped off the escalator at Track 13. The train wandered through the snowy backstreets of Montreal, made the requisite stop at Dorval, and then the F40 immediately ahead of our VIA No. 1 coach cut loose.

Our speed — measured in kph and monitored in real time on VIA's "moving maps" app — climbed steadily as we walked away from traffic on parallel Highway 20: 100, 120, 130, 150. We slammed past opposing trains with a satisfying whump and overtook freights on the double- and sometimes triple-track main. Ice and snow clung to the windows as we raced through a winter storm, no traffic worries, no de-icing delays, and no runways to be

cleared. Just green signals and flat-out running. If VIA 65 didn't beat the downtown-to-downtown travel times of competing airlines, it had to be close. And the experience topped the alternative hands down. To borrow from John Godfrey Saxe with an irreverent twist, damn, this is pleasant!

VIA 65 got us to Toronto Union with time enough to stretch our legs on the rainy downtown streets, enjoy a leisurely dinner with friends at a King Street pub, and make it back to Union to keep an appointment with what is arguably the prettiest train anywhere.

Ten perfectly matched, rain-dazzled, Budd-built, stainless steel passenger cars glistened in the station lights on Platform





20: a baggage car, coach, and Skyline dome-lounge, three Manor-class sleepers, dining car *Acadian*, another Manor sleeping car, and two Prestige-class cars, a Chateau sleeper, and dome-observation *Glacier Park*. VIA No. 1, *The Canadian*, stood ready to depart for Vancouver.

The timeless beauty of the train belies the passage of 62 years since the stainless steel cars rolled off the assembly lines of Budd's Red Lion, Pa., factory and made their debut on CP's new transcontinental streamliner *The Canadian* in April 1955. Largely the brainchild of then-CP president Norris Roy "Buck" Crump, *The Canadian* remained the flagship (even if an unwanted one in later years) of the "world's greatest travel system" until VIA took over the train in 1978.

In response to crippling budget cuts brought down in 1990, VIA made the still-controversial decision to discontinue the CP-routed *Canadian* in favor of retaining a single transcontinental service on CN. VIA transferred the name and ex-CP equipment to the more northerly and decidedly less-scenic CN route and with the release of a timetable the *Super Continental* became *The Canadian*.

There's a strong sentiment to return the train to the CP route, something that may or may not ever happen. No matter. The

veteran Budds still carry the ghostly outline of the embossed CP beaver shields applied to their flanks in 1955 and regardless of the routing, the spirit of *The Canadian* resides within. Buck Crump's train lives on. And it's Canada's train.

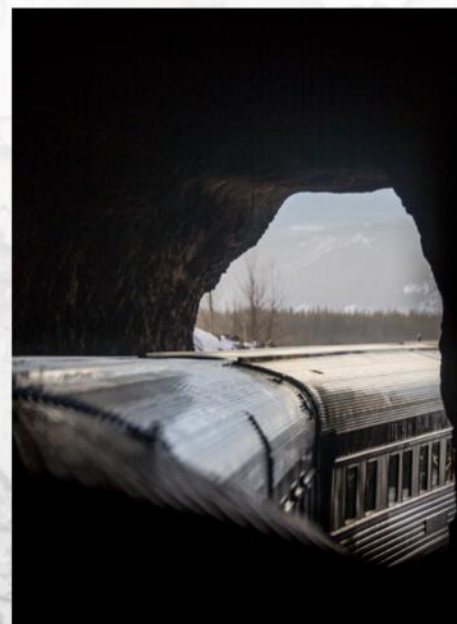
THE VIEW FROM HERE

The lights of the city sparkle through the rain-spattered glass dome of *Glacier Park* as VIA No. 1 slides out from under the Union Station trainshed. Up ahead, F40PH-2s Nos. 6436 and 6426 negotiate a maze of trackage as they exit Canada's busiest passenger station. An inbound VIA train passes with a string of rebuilt "HEP II" Budd coaches, cousins of the cars on the west-bound transcontinental. Streetcars rumble overhead on the massive steel-truss bridge that carries Bathurst Street over the throat of the terminal. For a few moments, the arched glass dome of the Park car takes on the air of a splendid Technicolor cathedral.

An hour-and-a-half later, No. 1 had traded city lights for solitude as we rolled along the frozen shoreline of Lake Simcoe. Meanwhile, we'd exchanged seats in the dome for those of an unoccupied open section in *Hearne Manor*, one of 40 three-section, four-roomette, one-compartment, five-double bedroom Manor-class sleepers in the VIA fleet, and four on our train.

That's right, open section. Where else on this side of the globe (or anywhere) can you book space in the upper or lower bunk of a classic open section? It's one of the true treasures and well-kept secrets of *The Canadian*. We sat up until long after the witching hour watching the snowy Muskoka landscape roll past the window and enjoying quiet conversation before ultimately retiring to Bedroom F in *Cameron Manor* sometime after 1 a.m.

The vastness and beauty of northern Ontario is not to be underestimated. The



Left Dome delights: Sunset from the dome of Glacier Park as *The Canadian* cruises along the CN Caramat Sub east of Longlac, Ont. **Right** Stainless steel glints in the rising sun as the moon sets over the Alberta prairie east of Lindbrook. **Bottom left** Jagged rock frames sleek Budd lines as No. 1 exits a tunnel east of Jasper, Alberta. **Bottom right** All is quiet in Glacier Park as *The Canadian* calls on Jasper.

rocks and snow-laden evergreens of the Canadian Shield were flashing past the window when I opened my eyes sometime before 5 a.m. Twelve hours later as the moon climbed above the trees we were still in Ontario, knocking down the miles on the Caramat Sub somewhere near Arms, still enraptured in the raw beauty of the forbidding landscape.

"Portage and Main fifty below." The line from Randy Bachman's "Prairie Town" was stuck on a loop track in my head as I trudged toward the famous Winnipeg intersection in a fierce wind and raging snow squall. I declined the local bus tour offered to passengers during No. 1's several-hour station and servicing stop in the Manitoba capital, but wasn't about to squander the visit. I stopped in first at the Fort Garry Hotel, just a block from the station at 222 Broadway. Opened by the Grand Trunk Pacific Railway in December 1913, the Fort Garry has hosted Hollywood stars and musicians, monarchs, and other royalty, from Laurence Olivier and Louis Armstrong, to King George VI and Queen Elizabeth, to Gordy Howe (hockey royalty, that is). Restored, renovated, and designated as a National Historic Site of Canada, the Winnipeg landmark retains its grace, ghosts, and the ornate treasure that has presided in the lobby for more than a century: a bulletin board with polished letters reading "The Fort Garry, Grand Trunk Pacific."

Oh, Portage and Main didn't quite live up to the lyrics. The temperature was a balmy -22, wind chill -39. Back in the Park car, a cup of hot tea made everything right.

You'll never count me among those unfortunate souls who find the prairies uninteresting. Not for a second. And if the head count in the dome of Glacier Park as we sped toward Portage la Prairie is any measure, I'm not alone. Seats in the dome were at a premium as we watched code line and searchlight signals and grain elevators and small prairie towns whiz past for mile after mile, hour after hour on that blustery afternoon.

The couple from Los Angeles (making an all-rail LA-Seattle-Buffalo-Toronto-Vancouver-LA circle tour) sipped coffee and took iPhone video. The young autoworker from Hamilton en route to Edmonton for a





hockey game (his 20th trip on *The Canadian*) conversed with the girl from New Zealand as she snapped photos. The grey-bearded, pony-tailed hippy in the flannel shirt looked out quietly while the delightful Swiss woman from upstate New York (a frequent rider on a spontaneous round trip to Jasper) gave an enthusiastic play-by-play: “Look at that church ... there’s a deer ... watch, there’s big trestle coming up just around this curve.”

It’s 30 below zero as No. 1 hurries across the moonlit prairie west of Melville, Saskatchewan. In the far distance, a searchlight signal displays the flashing yellow-over-red of an “advance clear to stop” indication: “Proceed, next signal is displaying Clear to Stop, be prepared to stop at second signal.” It’s a good bet that we’re lined up for a meet at Jasmin, the next siding to the west.

There’s no secret that timekeeping is a major challenge for VIA Nos. 1 and 2 as the trains compete with CN freights for a path on the busy transcontinental route. VIA has padded the schedule to make accommodations for heavy CN traffic, but often, it’s not enough. When a 10-car passenger train encounters a 15,000-foot-long stack train, or a 120-car grain train, there’s but one reasonable decision regarding who should take the siding.

Sure enough, we’re lined to go in at Jasmin. But the dimmed headlight of the waiting train isn’t that of another freight. It’s

No. 2, the eastbound *Canadian*. The extreme cold has wreaked havoc on No. 2’s performance and it’s running late enough that we’ve brought a relief engine crew from Melville to take over the train.

Illuminated in the light of the full moon, the streamliners pause side by side. LED lantern lights dot the darkness as the new crew climbs aboard VIA 6458 on the head end of No. 2. The cool glow from the dining- and sleeping-car windows casts a thin line of light on the snow. Signals at both ends of Jasmin clear, the two trains get underway almost simultaneously. Moonlight catches the distinctive highlights of No. 2’s F40s and dances on fluted stainless steel as 11 Budd passenger cars slide past 10 of their kin. Park cars *Glacier* and *Laurentide* pass in silence and No. 2 fades into the night.

ORDER UP!

I like to think I’ve seen enough railroading to know good dispatching when I see it, and that’s precisely what we were witnessing as we ran headlong into a wave of opposing traffic on the Watrous Sub on that frigid night. Despite the extreme cold, the railroad seemed remarkably fluid. We kept threading the needle, ducking in and out of sidings, dodging, meeting, and overtaking a steady parade of CN freights.

Our good fortune extended beyond the benefits of masterful dispatching. From a passenger’s perspective, a train is only as

good as the people who work it. An onboard crew can make or break the experience. Led by service manager Kevin Williams, the onboard crew that joined our train at Winnipeg and worked through to Vancouver was as good as they come. “I’ve been doing this for 40 years,” says Williams, who started his career working for CP as a porter on *The Canadian*. “These are good people,” he says of his co-workers. “We’re like family, everyone works well together.”

Just out of Jasper, Alberta, the dining-car crew proved themselves to be as good as Williams’ words. A throng of passengers boarded No. 1 in the picturesque onetime





railway town in the Rocky Mountains now better known as the heart of Jasper National Park. At the first of three evening sittings at the neatly set tables in the *Acadian* dining room, Woody, Janet, Amanda, Lana, and Shannon put on dinner for 30.

Tuna steaks sizzle as they hit the hot grill in *Acadian's* galley kitchen. Woody adds a dash of seasoning then turns to the mushrooms, peppers, and onions that are the start of a stir-fry. There's rack of lamb and maple-glazed roast chicken in the oven, baby potatoes, steamed broccoli, and carrots, sauces, and soup on the stove. Salads are built; meals are prepared, plated, and delivered with the precision and synchronization of a symphony orchestra. Everyone knows their part. Everyone works. If there's a single experience that puts *The Canadian* over the top, it's sitting down to a fine meal prepared and presented in a full-service dining car by friendly people with obvious pride in their work.

We were somewhere in British Columbia's Thompson River Canyon when I opened my eyes about 4:15 a.m. and made my way to the dome of *Glacier*

Park. The previous evening's prediction of an on-time arrival in Vancouver had been dashed by a CP derailment in the directional running zone near Ashcroft, B.C. Thanks in part to delays caused by meets with detouring eastbound trains we were 4 hours late. However, CP's misfortune was our gain. The current operating schedule for the westbound *Canadian* puts the train through some of the most spectacular mountain scenery in darkness. Not today.

Daybreak was still hours away but the brilliant moon illuminated the landscape, glinted on Budd stainless steel, and sparkled in the raging waters of the Thompson. Snow-capped peaks jutted into a dark-blue, star-speckled sky. The headlights of VIA 6436 illuminated tunnels, slide sheds, steep walls, and sheer cliffs as we traced the Thompson through Lasha and the White Canyon, and then on down the Fraser negotiating a breathtaking route carved by the Canadian Northern through some of the most forbidding terrain on the continent.

The dome was standing-room-only by

Top left A train is only as good as the people who work on it, and it doesn't get better than this: Chef Woody, assistant Janet, and servers Lana and Shannon prepare first sitting in the galley of dining car *Acadian*. **Bottom left** Crews clean the dome glass of Skyline car 8509 during the stop at Jasper. **Top** It's standing room only in the dome of *Glacier Park* as No. 1 twists through the Fraser River Canyon.

dawn; faces, cameras, and phones pressed against the glass as we rolled through Hicks and Hell's Gate, Komo and Stout.

Service Manager Williams apologized for the delays as No. 1 backed slowly into Pacific Central station in downtown Vancouver, B.C. No one seemed overly concerned.

We stepped off No. 1 and strolled past *Glacier Park* spotted at a bumper post 3,944 miles from the one we'd pulled away from aboard sister *Tremblant Park* in Halifax seven days earlier.

Ocean to ocean by rail, there's no better way to see and celebrate a country built and unified by railways. Joseph Howe would approve. Happy 150th, Canada! **I**



How vintage passenger cars
helped the space shuttle fly

By David C. Lester
and Clark McClure

ROUTE OF THE ROCKETS

Space shuttle
Atlantis lifts off from
launch pad 39A at
NASA's Kennedy
Space Center on
July 8, 2011. The
mission was the
135th and final
launch of the Space
Shuttle Program.
Walter Scriptunas II



At 10 minutes before noon by the bank clock in Bonner Springs, Kan., another east-bound train is coming through town on the route of the old Kansas Pacific, long since part of Union Pacific. But what kind of weird train is this? Two Armour Yellow diesels, a silver passenger car, a Railbox car with three large clearance rings attached, followed by six flatcars with enormous circular yellow or white covers. It's another NASA rocket train.

These trains have been coming through here since 1981, so by now some townsfolk know what's inside. They smile and wave and honk their horns. When Extra 4149 East stops on the edge of town, there will be time for some of the crew to run across state Highway 32 to the Dairy Queen for snacks. Once everyone is back on board, the train will continue its journey to Florida's Kennedy Space Center, east of Orlando. Its trip began near Promontory, Utah. The train is carrying segments of the space shuttle's giant reusable solid rocket boosters, which will help power the next shuttle launch. The space shuttle program is the latest iteration of the American space program, which began 60 years ago.

"Three, two, one: lift off! We have liftoff!" With urgency and glee, these words were broadcast many times over the course of the U.S. manned space program, as large rockets generated enough thrust to overcome our planet's gravitational pull, carrying men and women into Earth orbit, into lunar orbit, and on six occasions, to lunar landings.

The shuttle missions were something new, however. For the first time, equipment was re-used for multiple space flights. Between

April 12, 1981, and July 8, 2011, the shuttle flew 135 missions using five orbiters: Columbia, Challenger, Discovery, Atlantis, and Endeavour. These missions were key to building the International Space Station, but they also focused on the launch, recovery, and repair of satellites, and supported a myriad of scientific experiments in space.

The story of rail shipment of the solid rocket boosters was an interesting mix of inter-generational technology coming together to support one of the most successful programs in the history of the American space effort. Some of the most advanced technology known to man was required to fly the space shuttle. In addition, an older technology — the railroad and vintage railroad passenger cars — was a critical component in getting the shuttle off the ground.

Rail was the only practical way to ship the solid rocket boosters to Florida from their place of manufacture in Utah. Each rocket booster consisted of four segments, each of which was 12 feet, 2 inches wide; and when loaded with solid propellant and covered for shipment, the eight-axle flatcars carrying them weighed 513,000 pounds. Once assembled, the rocket booster stood 149 feet tall. In addition, if one were to ignite, you would have less than 30 seconds to be a quarter-mile away or become toast. The 2,800-mile journey will require four railroads and take from one to two-and-a-half weeks.

On April 12, 1981, Columbia became the first of the shuttles to launch. Thus began a close association between NASA, manufacturer Morton-Thiokol (MTI, now Orbital ATK), and the railroads. Each railroad involved in the movement

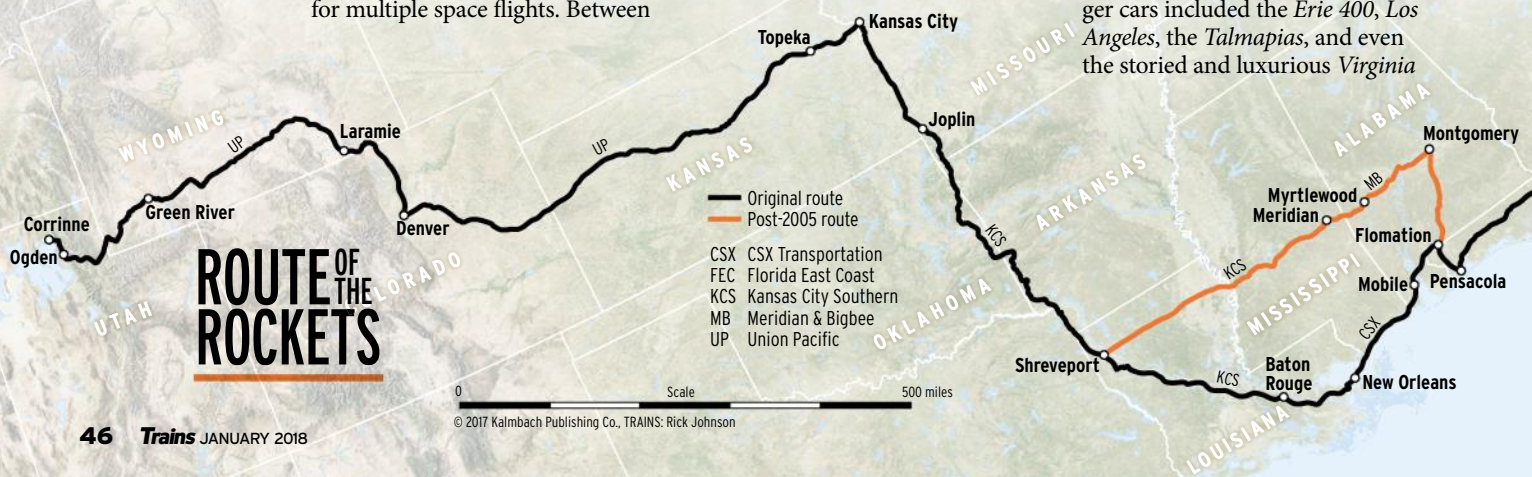


provided six heavy-duty flats for a total of 24 cars. The boosters were transported without incident for five years, until the 1986 Challenger explosion, which occurred 73 seconds into its flight, killing all seven crew members. The Challenger disaster grounded the shuttle program for three years, while NASA managers and engineers worked to revise the shuttle design to prevent a repeat accident.

LEGACY OF THE CHALLENGER EXPLOSION

Prior to the accident, trains hauling the booster segments had only the regular train crew on board. Before the shuttle program resumed, NASA and Morton-Thiokol decided that the boosters should be closely monitored during the trip from Utah to the launch site, and the best way to do this was to add a passenger car to the train for rocket company engineers.

The booster rocket builder approached UP in search of suitable rolling quarters for their monitoring crews. Available private passenger cars included the *Erie 400*, *Los Angeles*, the *Talmapias*, and even the storied and luxurious *Virginia*





City, which had been owned by Lucius Beebe and Charles Clegg. Morton-Thiokol was also referred to the Promontory Chapter of the National Railway Historical Society in Salt Lake City, owners of an ex-UP crew-dorm renamed *Janice L*. News of the private car search spread among owners throughout the West. Doctors Mike Salwitz of Payson, Ariz., and Martin Meacham of Salinas, Calif., were interested. They jointly owned an ex-Seaboard dorm-coach, *Santa Cruz*, and ex-Amtrak sleeper *Hialeah*. The two men saw their chance for some high-iron adventure, as well as a business opportunity. Interestingly, NASA's car search was not answered by a railroad or other major corporation, but by a diverse group of private car owners.

The first test run of a shuttle train took place on Union Pacific's Salt Lake-Green River local. The test went well, but the *Janice L* was coupled behind 10 cars of hogs that were also on the test train. There were no mechanical or other prob-



THE BITNER FILES

Jeffrey Bitner is a transportation analyst with Orbital ATK, the company that made the space shuttle boosters. He made 32 trips aboard the escort cars. He says that the train usually carried a technical staff of three: one to work with the carriers, one in case there were any handling issues, and one who was familiar with the securement of the finished rocket segments. Also on board were a chef and a car manager, usually the car's owner.



Jeffrey Bitner

Before folks began work on the trips they "received escort training to tell them what to do in case of an incident. Some of us took a two-day carman training course at UP, in the shops at Pocatello, Idaho, to help us understand how the cars functioned and how to spot possible problems.

"We kept a logbook of our progress and locations, and delays or problems encountered. When we first started escorting, we would look for water towers with city names on them or find mile markers and compare them to railroad timetables to figure out where we were. This was especially hard in snowstorms across Wyoming in the middle of the night with a flashlight on the vestibule," he says. "We would walk around the cars every chance we got to check for damage and make sure everything was secure. Eventually, we added a GPS system with computers so we knew where we were, and cameras so we could see to some extent without going out on the vestibule."

Crew comfort was a continuing challenge. Bitner says that "the railcars we rode used either diesel or propane-powered generators to provide electricity, heat, and air-conditioning. Most cars also had a backup system in case the main generator had a problem. On various trips, we had to repair broken starting motors, fuel lines, replace fuel filters, and had a few other problems. If the generator quit, the car became too hot or too cold pretty fast. Also, since the generators were our life, we would put fuel in their fuel tanks every chance we got. We had a generator quit once in Florida, so we opened the doors on both ends to get air coming through, but we got locomotive exhaust, too!"

On another trip, "we were stuck on a very high bridge in the middle of the night over a large river. I was really nervous," Bitner says. "We sat there for about 2 hours before they could add a couple of different engines to complete the move. I can still remember the wheels squealing and the train groaning as it started moving. I was happy to hit land again!" — *Clark McClure*



The first trip of the rockets over UP in Wyoming with the Virginia City was documented by those onboard. Note the caboose added behind the booster segments, which only happened once. Wade Pellizzer

The NASA Railroad hauls the solid rocket booster segments through Kennedy Space Center in 1988.

NASA

The Promontory Chapter's Janice L operated on rocket trains in the late 1980s. A truck crack took it out of service. Promontory Chapter, NRHS



lems — just the proximity of the car to a trainload of hogs made everyone aboard think twice about whether they wanted to participate in escort service.

The first three round trips of the rocket train, during mid-1988, were made using the *Virginia City*. This unlikely car was used on the first trains because, says car owner Wade Pellizzer, "NASA wanted to go ... now! We were close by and ready to go." Pellizzer bought the car from the Clegg estate in 1984, and has used it on trips put together by the American Association of Private Railroad Car Owners, along with offering it for charter by individuals and private groups.

First used on the *San Francisco Overland*, the *Virginia City* later ran on the Rock Island as the *Golden Peak*. (Interestingly, Rock Island styled itself as the "Route of the Rockets," after its fleet of streamlined trains.)

The first trip from Utah to the Kennedy Space Center had a Morton-Thiokol crew of four, including Pellizzer and a chef from the Southern Pacific business car fleet. The consist included a UP caboose, with the opulent *Virginia City* bringing up the rear.

On the train's return from Florida, Pellizzer was told that the second trip would start as soon as they arrived back in Utah and

could couple onto the next load of boosters. The 5-hour turnaround meant that he and the crew barely had time to prepare for the return trip and get their laundry done. Later schedules were organized such that these rapid turnarounds were not required.

One of the scariest events on the rocket trains happened on one of the *Virginia City* trips. Rolling through Louisiana, everyone was out on the back platform except the chef. While passing through a cut, four gunshots rang out. Several teenage boys with .22-caliber rifles were standing on the ridge above. The conductor stopped the train, police were called, and everyone inspected the cars. Four windows on the *Virginia City* had bullet holes in them, where some staff had been sitting moments before. A couple of cars carrying the rocket booster segments were also hit, but, Pellizzer says, the bullets could not penetrate the fiberglass material covering the boosters. Thankfully, no one was hurt, and the loads were not damaged.

After the third trip, Pellizzer says that Morton-Thiokol decided that the pageantry of the *Virginia City* did not quite fit the image the

A solid rocket booster is lifted from a railcar, rotated vertical, and moved to a nearby stand inside the Rotation, Processing, and Surge Facility. Walter Scriptunas II



company wanted to present, so the Promontory Chapter's *Janice L* was used for the next several trips. Late in 1989, the *Janice L* suffered a cracked truck frame, so the Promontory Chapter purchased the *Warrior River*, a former Southern Railway 10-6 sleeper, and modified it for rocket-train use. Workers removed the 10 roomettes and added a kitchen and lounge area, plus \$19,000-worth of heavier drawbars and couplers.

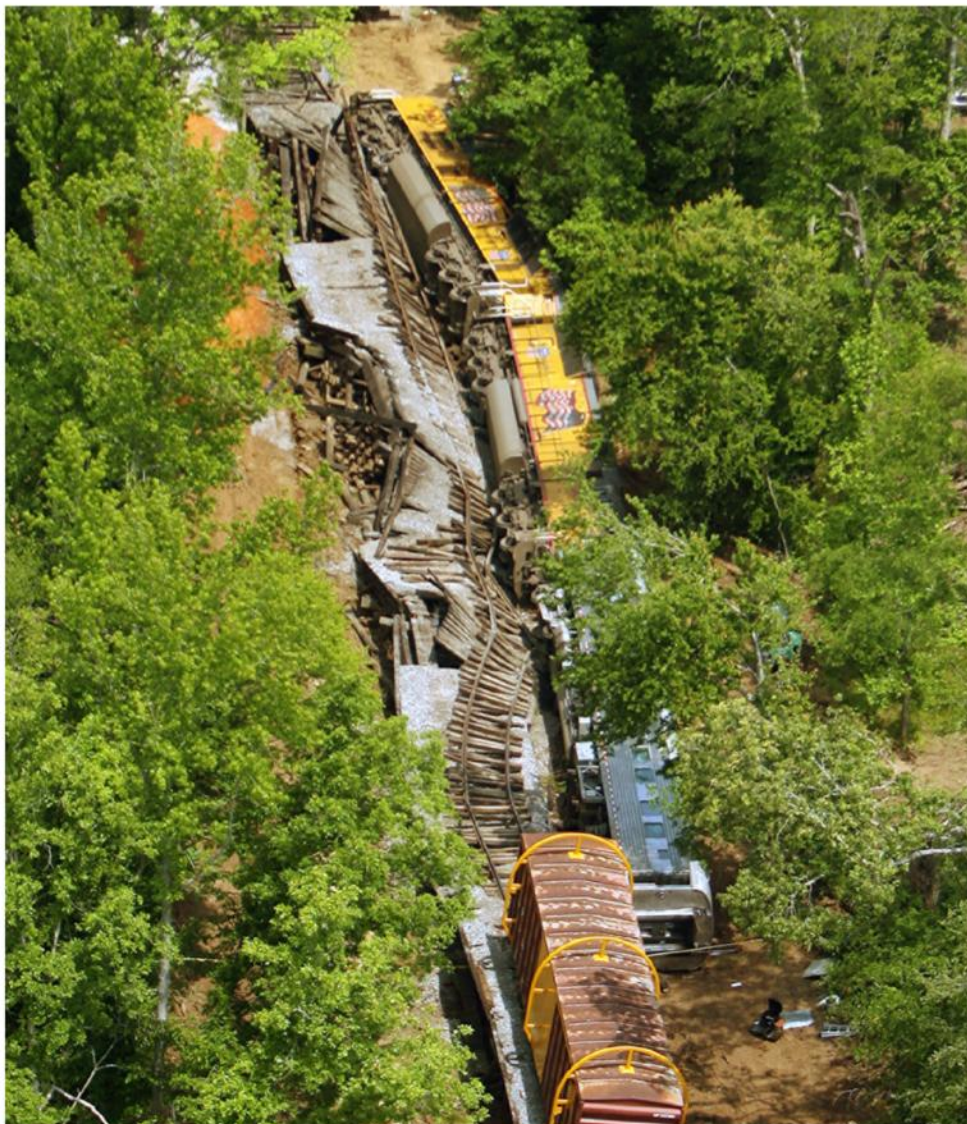
MOVING EAST

As the 1990s began, the *Warrior River* and *Santa Cruz* alternated escort trips. It was fitting that these trips began on the history-drenched rails of the UP, which has played a major part in several significant events in American history. Aside from the Golden Spike ceremony that marked completion of the transcontinental railroad in 1869, UP carried construction materials for Hoover Dam, was instrumental in World War II, and was now the originating carrier for the space shuttle trains.

Retired NASA officials involved in the program say the giant booster segments were trucked 30 miles to the railhead at Corinne, Utah, from the Morton-Thiokol plant in the Promontory Mountains, one ridge east from the Golden Spike National Historic Site. The consist traveled UP's 51-mile Milad Branch to Ogden, then was ready to head east.

Climbing up the fabled Wasatch grade, the heavy cars threaded Weber Canyon. East of Ogden, they passed the site of the Thousand Mile Tree, celebrated by the builders of the transcontinental railroad, because it was exactly that distance back to Omaha, where construction began. A tree still stands nearby, but it is not the original. Crossing Wyoming and nearing Cheyenne, the train moved off of the Union Pacific Overland Route and onto the single-track line to Denver, the same track used by the Cheyenne Rodeo Days steam specials each summer. From Denver, the train used UP's Kansas Division to reach Kansas City, Mo.

The train would occasionally remain on the Overland Route east of Cheyenne, however, passing through Bailey Yard at North Platte, Neb., and then moving onto the Marysville Sub, 108 miles east



TROUBLE ON THE BRIDGE

During the entire time the rocket boosters moved by rail from Utah to Florida — almost 30 years from start to finish, the operation had an outstanding safety record. While there were minor incidents, the only significant accident occurred on May 2, 2007, in Myrtlewood, Ala., when a bridge collapsed on the Meridian & Bigbee, a short line that connects Kansas City Southern and CSX. It became part of the booster rocket route after Hurricane Katrina decimated New Orleans railroads in 2005.

This train was powered by two locomotives, and consisted of nine rocket booster segments, escort car *Warrior River*, a buffer car between the locomotives and the rest of the train, and three boxcars to carry other equipment and to distribute the load evenly over the tracks. Only the two locomotives, the escort car, and one car with a booster segment rolled on their sides, and three booster segments fell with the bridge, but did not tip over. The other cars remained upright. Six workers were injured as a result of the accident, with one having critical injuries, but there were no fatalities. Sadly, the *Warrior River* was scrapped. The wreckage was cleared on May 4, and the line reopened on May 20.

Each railcar containing a rocket booster was equipped with electronic data recorders to receive data from accelerometers during a trip. This data, along with other forms of testing, including a visual inspection, cleared all rocket booster segments for use on future launches. — David C. Lester

This is the aftermath of the May 2007 bridge collapse that led to the scrapping of escort car *Warrior River*. The incident took place on Genesee & Wyoming's Meridian & Bigbee short line.

Michael E. Palmer/
Tuscaloosa News

THE NASA RAILROAD

The NASA Railroad is best described as a short line that served one customer — the Kennedy Space Center. Construction of the NASA Railroad began in 1963 with Florida East Coast building a 7.5-mile connection to the Space Center from its main line, just north of Titusville, Fla. The line crossed the Indian River, which is part of the Intercoastal Waterway, and a drawbridge was needed to enable ships to pass. The railroad had 34 miles of track at the peak of the space shuttle program.

In June 1983, NASA purchased the FEC portion of the rail line. NASA also decided that it was time to upgrade the line, largely due to the hazardous nature of the solid rocket boosters for the shuttle. The track was rebuilt by the FEC track maintenance department using 132-pound continuous welded rail and concrete ties. The track was built to 60-mph standards, which was FEC's mainline speed, but the speed limit on the NASA road was 25 mph in order to maximize safety and reduce maintenance needs.

The NASA railroad owned a series of switching locomotives during its operation. In the late 1970s, the railroad purchased three ex-U.S. Army Alco S2 locomotives, which served the railroad for about five years. Two of the locomotives were eventually sold, and one was donated to the Gold Coast Railroad Museum in Miami. In 1983, the railroad replaced the Alcos with three SW1500 switchers purchased from the Toledo, Peoria & Western. Two of the SW1500s were later sold to shortline railroads — one to the Natchitoches Parish Port in Natchitoches, La., and the other to Madison Railroad in Madison, Ind. And, as with the S2s, one SW1500 was donated to the Gold Coast Museum.

With the completion of the space shuttle program in 2011, NASA has essentially exited the railroad business. The space agency continues to maintain its 17-mile rail network, which branches out to Kennedy Space Center's two launch pads and to the Cape Canaveral Air Force Station.

NASA is already planning the next major program, the Space Launch System, which will make use of the railroad again in the future. This spacecraft is designed for deep-space missions, beyond Earth's orbit. Although the Space Launch System will use rocket boosters similar to those used by the space shuttle, its boosters will have five segments, whereas the shuttle boosters had four. — David C. Lester

EMD SW1500 No. 3 sits outside the maintenance shop at Kennedy Space Center in July 2013. The former Toledo, Peoria & Western switcher is one of three that served the 38-mile short line. Walter Scriptunas II



of North Platte, at a place called Gibbon Junction. From there it was on to Kansas City, still on UP. Out in the flatlands, the train occasionally stopped at an isolated farm road crossing so the crew could buy corn and peas from a farmer's table. Money was left in a jar, the crew reboarded, and it was on to Kansas City, where Kansas City Southern took over. Regardless of the route, UP turned the train over to KCS at Kansas City.

The rocket train followed the *Southern Belle* route south, crossed the Mississippi at Baton Rouge, La., and tied up in CSX Transportation's Gentilly Yard in New Orleans. The train ran from the Big Easy to Jacksonville, Fla., on CSX, with many miles of running along the Gulf Coast. At Jacksonville, UP power that may have run through was removed, and the Florida East Coast took over for the final leg to NASA's Jay Jay Yard near Titusville, Fla., and the Kennedy Space Center. The 4-to-5 million pounds of explosives were picked up by one of NASA's three ex-Toledo, Peoria & Western SW1500s, which pulled the cars across the Indian River to the Space Center. The loads waited there until needed, then were unloaded, stood upright, and readied for final assembly.

The technicians aboard the escort car worked 12-hour shifts, monitoring temperatures, weather conditions, and anything unusual, such as low-hanging branches over the track or the same vehicle spotted at two or three different road crossings. At frequent intervals, the trains stopped so the technicians could check the loads, both visually and with technical equipment.

Georgia Salwitz, wife of car owner Dr. Mike Salwitz, signed on to work several trips as the chef. Her first lunch was served aboard the *Santa Cruz*, and consisted of strawberry soup and chocolate bread. The meat-and-potatoes Utah boys politely received the lunch, but wondered what other surprises would be on the menu during the trip.

Georgia had a sense of humor that kept everyone in good spirits. One day, however, she decided to tag along with a Morton-Thiokol engineer on one of the rocket-booster inspection stops. The engineer she was with inspected one of the nose cones, firmly planted to the floor of a boxcar. As they left the



boxcar, Georgia said, "It was all I could do to not whip out my lipstick and write 'Georgia Was Here' on that nose cone." The Morton-Thiokol engineer's eyes widened as he warned her not to try: Anything like that would require the piece to be returned to Utah at great cost. He even mentioned what she said in his daily report.

There were sometimes long delays in sidings or days-long dwell times in yards, putting a real strain on the car's air-conditioning in the South's summertime heat and humidity. One such two-day wait on CSX piqued Georgia's sense of humor when she spied two track workers walking along the main line. Georgia addressed the track workers by saying, "How can you guys leave women and children out here with no food and water?" Although they had plenty of food and water on the car, and there were no children on board, the CSX team took her seriously. Forty minutes later, four men arrived in a pickup truck with bags of sandwiches and cases of drinking water.



SYSTEM SHUTDOWN

In August 2005, Hurricane Katrina damaged the CSX main line from New Orleans to Jacksonville, so the booster rocket's route was changed to have KCS hand the train over to the Meridian & Bigbee Railroad in Meridian, Miss. The short line took the train to Montgomery, Ala., to connect to CSX. Following a derailment that led to the scrapping of the *Warrior River* (see page 49), the trains dropped the escort cars; they were tracked with GPS instead, and a service was hired to shadow the shipments in a motor vehicle.

Three years later, as the mission of the space shuttle was accomplished with the completion of the

International Space Station, the final shipment of rocket boosters arrived at Kennedy Space Center on May 27, 2010. These were spares — only to be used if a rescue mission were required during the shuttle's final flight. The final train carried various NASA and Orbital ATK officials, and a few tears were shed during the end of the trip.

The final space shuttle flight launched on July 8, 2011, and delivered supplies to the International Space Station. The shuttle *Atlantis* flew the last mission, and on July 21, it touched down at Kennedy's shuttle landing facility. With that final landing, the 30-year shuttle program taxied into history. **I**

Above, the *Virginia City* brings up the rear of the rocket booster train as it transfers from Union Pacific to Kansas City Southern rails at Kansas City, Mo., on the second booster trip in 1988. Wade Pellizzer

At left, a load of rocket booster segments is ready to depart Ogden, Utah, on UP. Rodney J. Sorensen



Car *Warrior River*, rebuilt for rocket escort service, stands ready to depart Ogden, Utah. It was scrapped in 2007 after a derailment. Rodney J. Sorensen



ONCE AGAIN,

FOR
A
S

Icons of one of the nation's
premier railway museums, giant
cab-forward No. 4294 and tiny
C.P. Huntington, command
attention. TRAINS: Jim Wrinn

THE CALIFORNIA STATE RAILROAD MUSEUM IS READY TO REASSERT ITSELF
AS THE LEADING NATIONAL INSTITUTION OF ITS KIND

BY KEVIN P. KEEFE

A large steam locomotive is displayed in a museum hall with large windows. The locomotive is dark-colored with a prominent smokestack and a large boiler. It is positioned on a red carpeted track. The background features a large, multi-paned window that lets in bright light, creating a silhouette effect on the locomotive. The floor is made of dark wooden planks.

DREAMIN'



➤ **Potential powerhouse of a major museum expansion lies in the former Southern Pacific Sacramento Shops.**

Kevin P. Keefe

THE SCENE AT 125 "I" STREET in Sacramento was buzzing. Crowds of visitors gathered at the entrance to a large brick building. Soon, they were ushered in through a set of doors, past small exhibits, and eventually made their way upstairs into a spacious, steeply tiered theater.

After watching a short program, the screen slowly rose to unveil a huge picture window through which they could see an exciting vision: a 19th-century 4-4-0 balloon-stack steam locomotive, its jewel-like surfaces buffed to a high sheen, standing against an imposing rock wall worthy of the Sierra Nevada. As the doors at the bottom of the theater swung open, a docent announced, "Welcome to the California State Railroad Museum!"

It was an invitation impossible to resist. Soon visitors were making their way through a vast interior space, part of it configured like a spacious roundhouse, with tracks and corridors and mezzanine balconies seemingly going in all directions. They were immersed in a world of railroad preservation like no other.

Everywhere they looked prompted "oohs" and "ahs:" that 4-4-0 behind the giant window, Central Pacific No. 1, *Gov. Stanford*, built in 1862; a full-size, cavernous diorama of Chinese workers carving a route through the mountains;

the cozy, rumbling interior of a Pullman sleeper racing across the continent at night; a collection of other showroom-worthy locomotives and rolling stock; and, best of all is Southern Pacific AC cab-forward 4-8-8-2 No. 4294, its two sets of 63-inch drivers at eye level creating an impression of unlimited power. Throughout, the curious visitor was assisted by friendly docents and guided by expertly crafted signs and graphics, designed to help them learn and understand the great American railroad story.

Outdoors, along the Sacramento River and on the cobblestone streets of the Old Sacramento district, they could experience even more at Railfair '81, a huge celebration featuring special guests, including the biggest and best operating mainline steam: SP *Daylight* 4-8-4 No. 4449, Union Pacific 4-8-4 No. 8444, and UP Challenger 4-6-6-4 No. 3985.

By May 1981, there were already a number of respectable railroad museums in the United States, known mostly for collections of locomotives and rolling stock. Some even included the word "national" in their names. But none came close to matching this experience. Here was a museum that transcended genre. Here was a museum that took its place at the front rank of all American museums, regardless of theme.

ROOTS IN THE R&LHS

The California State Railroad Museum was more than 40 years in the making. It traces its roots to 1937, the year the Pacific Coast Chapter of the Railway & Locomotive Historical Society was formed. The chapter was driven by a number of ambitious and far-sighted members who collected more than 30 locomotives and cars, many symbolizing pivotal developments in the railroad history of California and the West. They dreamed of deeding these artifacts to a world-class museum.

The most important moment in the museum's creation legend came on July 13, 1970, when Denny Anspach, a local physician and head of the Sacramento Trust for Historic Preservation, hosted Gov. Ronald Reagan and his wife, Nancy, for dinner. The venue was auspicious: the dining room of the *Gold Coast*, the rococo private car (still part of the museum collection) formerly owned by legendary authors and photographers Lucius Beebe and Charles Clegg. On that night the car was parked at the city's SP station.

Anspach, who continues to serve on the CSRM Foundation board, must have been quite convincing that evening, for Reagan subsequently included an allocation for the museum in the state's budget, making it part of the Department of Parks & Recreation.

Things moved quickly after that. By 1976, the new museum was ready to open its first facility, a replica of the Central Pacific's riverfront depot of 1869, near the historic Milepost 1 of the CP and just down the street from the eventual museum. Five years later, the entire institution opened for business.

The museum has been a must-see destination since then. The collection would gradually expand, especially in 1986 with the addition of Santa Fe's large stash of preserved engines. Two more lavish Railfair celebrations would return to the riverfront, bigger than the first, in 1991 and 1999, the latter possibly the largest gathering of steam power since the 1950s. And the museum staff would become influential in the railroad preservation community, hosting a decade-long series of well-regarded preservation symposia and expanding the museum's prestigious archives.

The museum soon became the No. 1 tourist attraction in the entire Sacramento metropolitan area, regularly drawing more than 500,000 visits annually; in 2016, 578,000 people went through its turnstiles. The people are still visiting.

THE MUSEUM TODAY

No matter how many times you have visited, you're still likely to get a familiar thrill when you come through these doors. While the basic presentation hasn't changed much in 20 years, the parks department keeps its property in excellent condition. Public areas are immaculate, the glass gleams and the brass shines, and the roomy exhibit hall offers a still unparalleled ability to step back and take everything in. It still is, as then-Smithsonian transportation curator John H. White wrote in 1983, the antithesis of "a warehouse for dead elephants."

The museum continues to rotate exhibits in and out of the roundhouse and exhibit hall. On a recent visit, a section of temporary exhibits near the entrance told



▲ More than a rolling stock display, the California State Railroad Museum is about telling the epic story of building a route through the Sierras. TRAINS: Jim Wrinn

the story of Southern Pacific sports teams and offered interactive lessons in non-verbal communications provided by whistles, bells, flags, and lanterns.

There are surprises, too. On the main floor, a full-size mock-up of a Siemens high-speed trainset, all sensuous curves and brilliant, red-and-yellow paint, stands in vivid contrast to black, no-nonsense SP 4-6-2 No. 2467 parked next to it. On the mezzanine level, visitors get a hands-on feel for high speed with a projection-equipped cab simulator loaned by JR East, the East Japan Railway Co.

Yes, the place still works. Yet in recent years there's been a palpable feeling of lost momentum, unrecognizable to the average visitor, perhaps, but sharply felt among staff, those vitally interested in railway preservation, and others close to the museum. Problems in the entire state parks system have hurt, as have the departures of veteran staff. More than anything, perhaps, is the notion that the museum has failed to reinvent itself, something any cultural institution must do to remain relevant. What will it take to regain the magic?

A CHANCE FOR SELF-EXAMINATION

Finding an answer is partly the job of the CSRM Foundation, the independent, fund-raising arm of the museum whose 30-member board of directors includes a number of influential people from Sacramento business and politics. The foundation is a powerful player at the museum — it not only raises financial support for the museum, it operates the Sacramento Southern tourist train, runs the museum's bookstore, and manages the separate, off-site Railtown operation 102 miles away in Jamestown, the historic headquarters of the Sierra Railroad.

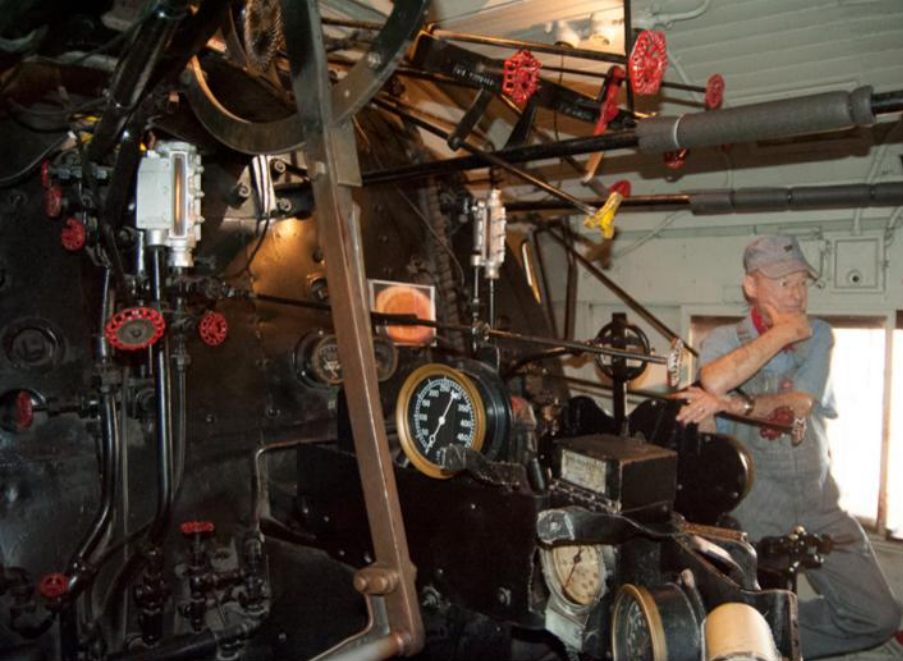
Central to its mission to provide for the museum's future, the foundation hired an experienced consulting team to help plot a revised course: Jim Cullen, a former executive director of the foundation and now a non-profit planning expert based in Calgary, and John Hankey, frequent TRAINS author and veteran railroad preservationist. The California State Railroad Museum's



▲ Ty Smith, the museum's executive director since June 2017, is a parks department veteran who spent the past five years at Hearst Castle. Kevin P. Keefe

40 STAFFERS

THE MUSEUM IS A \$5 MILLION OPERATION WITH SOME



▲ Costumed docents, such as this man in the fireman's seat on the Southern Pacific cab-forward, play a significant role in interpreting railroad work.



▲ Cheryl Marcell became president and CEO of the museum foundation in 2015. Above and

four photos on page 57, Kevin P. Keefe; top and three photos on page 57, TRAINS: Jim Wrinn

Strategic Plan 2017-2022 was principally authored by Cullen, submitted to the foundation and the museum in May 2017, and approved the following month.

As Cullen explains, his 22-member planning team was drawn from museum and foundation staff, state parks, volunteers, foundation board members, and representatives from Railtown. The team, in turn, worked hard to engage more than 40 of the museum's key stakeholder groups. "This was not simply a foundation project," he says. "We built a planning team from across the organization, and its work and recommendations are visible throughout the plan."

The report acknowledges the accomplishments of the museum's first 30-plus years, but also makes stark conclusions across a spectrum of key metrics — stakeholder engagement, public value, audience development, institutional diversity, best practices, among others. "While presenting a consistent but tired public face," states the report, "[CSRMs'] historical ability to rely on a steady stream of tourists and school children and a lack of public value-based performance measures has masked the internal deterioration of its core practices, its nearly hypothermic state and its lack of resilience."

The report goes on to list specific challenges the museum faces. It urges the museum to "refresh key political connections at all levels," stating that the institution has lost touch with the local Sacramento community and "lacks its diversity." It calls for more interactive and "engaging" exhibits. It concludes the institution "no longer reflects museum sector standards nor best practices" in some of its most important operations.

As for the museum's standing in the rail preservation community, the report sees that as a secondary concern. "The museum should [benchmark] itself against admired mainstream museums rather than railroad museums," the report concludes.

Although some of the talking points sound harsh, Cullen is an optimist and recognizes the museum's basic strengths. "How good it looks now is a testament to how well the museum was done in the first place. That's why it's lasted so well," he explains. "Overall the DNA of the beast is really good." But the need for renewal, he says, is urgent.

A WARD OF THE STATE

If the museum has drifted into stasis, some of that can be traced to its status as a ward of the state of California, rocked by a fiscal crisis in 2008-2009. Depending on which source you consult, that year California faced a shortfall of as much as \$11 billion, prompting draconian spending cuts, including forced furloughs and job cuts that affected thousands of state employees. The cutbacks redounded to the railroad museum, where its vaunted curatorial staff shrank dramatically.

Making matters worse was a 2012 parks department funding scandal, in which \$54 million in parks revenue was squirreled away in hidden accounts. The sensational revelation led to the resignation of the parks director, the firing of the chief deputy director, and the creation of a reform commission, called Parks Forward. The commission's 2015 report called for wide-ranging reforms to management. All of which trickled down at some point to the railroad museum.

Meanwhile, the railroad museum lost most of the true believers who led the institution for the first 20 years. In 2007, Walter P. Gray III, former museum executive director and by then the state's chief archivist, died at age 54. Stephen E. Drew, a senior curator and a scholar of western railroading, retired in 2009. Cathy Taylor, a CSR and parks veteran, and also former head of the museum and its foundation, left in 2014. Paul Hammond, Taylor's successor at the museum and a veteran figure in rail preservation, left CSR in 2016 and now runs a nonprofit aviation museum near San Diego. The one remaining key member from the 1990s is Kyle Wyatt, who continues to work at the museum offices and has the title of historian for the park's Capital District, which includes CSR.

BUILDING A NEW TEAM

Now the future falls to a new team on I Street. One of its leaders is Cheryl Marcell, who became president and CEO of the CSR Foundation in 2015. In Marcell, the foundation has someone who knows the Sacramento landscape. A native Californian, she graduated from the University of the Pacific in 1987 and began a career that landed her key jobs in and around the state capital, including with the Sacramento County Airport System 2000-2011. She later worked in airport management in Montreal and San Jose before returning to Sacramento to join the foundation.

It's organization management experience that got Marcell the foundation job, not an affinity for railroading. But she's not a stranger to the railroad museum. "Sacramento's a bit of a small town, and I've always been conversant about what's here," she says. "We often used the museum as a meeting venue, and that background helped me. Everyone knows the museum to be Sacramento's only five-star attraction on Trip Advisor, and it's imperative we keep it that way."

She adds: "I did planes, now I do trains."

The top priority for Marcell and the foundation is to raise more funds from private and public sources, including boosting the foundation's \$2 million endowment. After that come a number of items on her to-do list, including what's been called the Railroad Technology Museum, the original name chosen for a long-dreamed-of expansion into the old Southern Pacific shops just north of the museum.

Another top goal is to expand the museum's

SEVEN THINGS THAT MAKE

There are countless reasons to admire the California State Railroad Museum, and countless reasons to visit. Here are seven that really set the institution apart:

1 Pullman "St. Hyacinthe"

— The decision to equip this beautiful 10-section, one-drawing room, one-compartment Canadian National car with a gentle sensation of movement, including a whistling steam locomotive up front and lights flashing past the windows, was sheer genius. It still causes visitors to squeal with delight. Walking through the cozy sections at night, you might expect Jack Lemmon and Marilyn Monroe to come tumbling out of an Upper at any moment.

2 Santa Fe diner "Cochiti"

— All that's missing from this dazzling example of "dinner in the diner" is a sizzling steak. Built by Budd in 1936 for the original *Super Chief*, *Cochiti* features a meticulously restored galley. Its dining tables are replete with complete settings of railroad china and flatware, including Santa Fe's famed Mimbreno pattern, as well as those of UP, B&O, Milwaukee Road, and many more, all preserved under gleaming Plexiglas.

3 Sacramento Southern —

The 3-mile, 45-minute ride along the Sacramento River is short, but gives visitors a taste of a real steam train. Doing the honors these days is nifty little Granite Rock No. 10, a former Army O-6-OT that sounds bigger than it is. For the best experience, spring for the extra \$20 for first-class accommodations aboard *El Dorado*, a former SP parlor-lounge-observation built by Pullman in 1924.

4 Georgia Northern car 100 "Gold Coast"

— The names Lucius Beebe and Charles Clegg probably don't mean much to the average visitor, but their Gilded Age wooden private car, built in 1905 for Central of Georgia, is essential to the museum's history after its role in winning

Gov. Ronald Reagan over to the cause in 1970. How appropriate, then, that Beebe's and Clegg's priceless negative collection also resides here, in the museum's prestigious archives.

5 North Pacific Coast 4-4-0 No. 12 "Sonoma"

— The museum has a peerless collection of 19th century steam locomotives, but the best might be this one, built by Baldwin in 1876 for the narrow gauge North Pacific Coast. The peripatetic 4-4-0 bounced around northern California and Nevada for years before it ended up in the collection of SP, which fixed it up to look like Central Pacific *Jupiter* for an exposition in 1939. Now this sparkling jewel is back to its original 1876 appearance.

6 SP AC cab-forward 4-8-8-2 No. 4294 —

Nothing says "California" like the 4294, built by Baldwin in 1944 as part of SP's last order for new steam power. The railroad at one point or another fielded 256 of the cab-forward engines, designed exclusively to keep engine crews breathing safely as they slogged through long tunnels and snowsheds. Standing beside its two sets of eight-coupled 63-inch drivers, you want very much to believe that, as museum literature says, No. 4294 is practically ready to run.

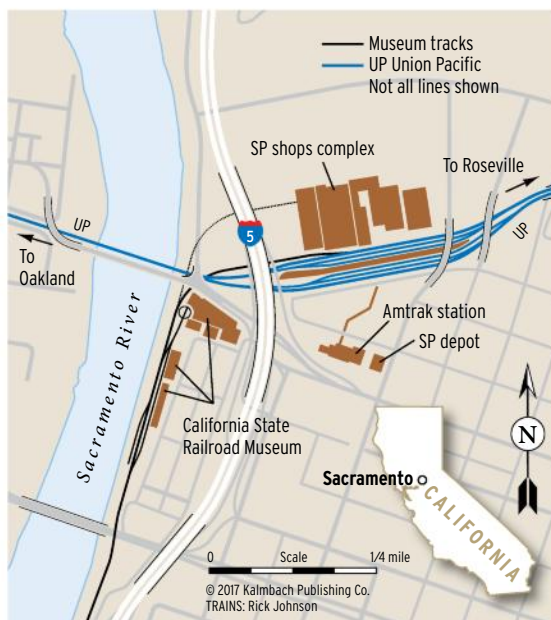
7 Santa Fe 4-8-4 No. 2925 and 2-10-4 No. 5021 —

Although these two splendid AT&SF locomotives don't look like much now — they're displayed outdoors along the riverfront, shorn of jewelry and boiler jackets, cab windows covered in sheet steel — they could be seen to represent the promise of the museum's future and its expansion to the SP Shops, where the 4-8-4 and 2-10-4 could really tell the story of the ultimate in steam. — Kevin P. Keefe

CSRM GREAT



300,000 VISITORS ANNUALLY



constituencies. “Sacramento is a very diverse community, and we need to do as well with young families as we do with schoolchildren and railfans,” she explains. That semi-captive audience of school kids alone accounts for about 300,000 visitors annually.

Also on her list: help the museum become nationally competitive. “We haven’t kept pace with museum technology. Our visitor experiences should be more in line with industry practices,” she says. A challenge will be to find the money to begin to restore the hard-hit curatorial staff, dramatically weakened in recent years. “When you compare us with places like the B&O Railroad Museum or the Oakland Museum, we are undersized.”

A PARKS VETERAN AT THE MUSEUM

Marcell’s partner in making all this happen is the new museum director, Ty Smith, a parks department veteran who moved to CSRM in June 2017 after nearly five years as the chief of interpretation at Hearst Castle, the lavish estate-cum-art museum in San Simeon, Calif. Smith is also a professional historian, with a doctorate in public history from UC-Santa Barbara.

Smith shares the same long-range goals as Marcell, including finally making the Sacramento Shops a part of the experience. But with only a few months in the job, his first priorities are current needs, and how to get them. Although not steeped in railroading, Smith says he was drawn to “the passion and energy of this museum. And this is still a wonderful place — we can’t foreclose on what’s been accomplished here.”

Smith presides over a huge state asset. He must manage an annual budget of approximately \$5 million and oversee a staff with the equivalent of 40 full-time employees, plus a corps of about 500 highly motivated docent volunteers. Two full-time employees work at the shops, along with two more employed by the foundation, supported by as many as 100 volunteers in maintenance-of-way, restoration, and operations.

Meanwhile, the 225,000-square-foot main museum

building, now 36 years old, needs attention. Some aspects of the building’s design don’t work as well as they did in 1981. Other parts of the building need repair. In September, contractors installed a new, much-needed public elevator, a five-figure project.

For Smith, a primary goal will be to put personal experience and engagement at the heart of the museum’s exhibits. “People want to see themselves in history,” he explains. “There’s room for hard science and hardware in what we do, but the real avenue is people and their families. We need to tell a different story, and I have the ability to shape that.”

Smith will need the buy-in of all those volunteers, too. As docents, they are the primary public face of the museum, explaining everything from how a link-and-pin coupler works to giving restroom directions. Some come to work in traditional railroad garb to work in specific exhibits. A separate volunteer group crews the Sacramento Southern trains, which in 2016 hauled more than 81,000 passengers over its 3-mile route south along the Sacramento River.

The museum’s volunteers are a potent force, engaged and knowledgeable. Paul Helman, a 15-year veteran docent, says a recent survey showed that 50 percent of the volunteers have college degrees, with another 50 percent with advanced degrees, with an emphasis on technical careers. “Many on our team come from corporate America and understand the importance of strategic planning,” Helman says. “When we recently presented the new strategic plan, we packed the house. They get what this is about and look forward to results.”

RAIL TECHNOLOGY MUSEUM

As successful as the current museum is, for decades an even more spectacular dream has been on the horizon: incorporating SP’s Sacramento Shops. Sprawled across downtown’s northwest edge, portions of the shops date back to the 1880s. By the early 20th century it was one of the largest such complexes in the West, with a large roundhouse, massive erecting bay and boiler shop, transfer table, and countless other buildings and yards.

The museum’s early organizers always saw an eventual role for the shops and included it in published plans as early as 1973. Momentum picked up in 1995 after new management at SP closed the facility and consolidated heavy locomotive repairs in Denver. Eventually, the railroad completely moved out, but allowed CSRM to use the erecting bay and boiler shop for storage, maintenance, and restoration. Clear to everyone was the implication that some buildings ultimately would be conveyed to the museum.

Then things became complicated. From the beginning, the city had an interest in the shops’ site that went beyond railroading. The entire site came to be known as the Railyards, coveted by developers as well as preservationists. Where the museum saw an opportunity for preservation on a grand scale, developers saw a vast tract perfect for retail, entertainment, and condos and apartments smack in the heart of downtown Sacramento.

The railroad initially sold the property to Thomas Enterprises, an Atlanta-based developer with little interest in the museum or its mission. Thomas had grand

COME FROM SCHOOL KIDS ALONE



plans for moving ahead, but was unable to get much done and lost the property in foreclosure in 2010. Eventually a new developer emerged, LDK Ventures, whose principle, Denton Kelley, was on the CSRM Foundation board. Kelley's company has a good reputation in the Sacramento community; his father Larry redeveloped McClelland Air Force base as a successful business park.

Kelley created a new company, Downtown Railyard Venture LLC, and now — with a massive environmental cleanup largely complete — is proceeding with plans that include a soccer stadium, a Kaiser Permanente hospital, retail development, and housing. The site also is home to the expanded Sacramento Valley Station, which incorporates Amtrak, light rail, and bus service, made possible by the 2012 relocation of UP's main line north of the refurbished 1926 Southern Pacific depot.

The museum's plans to use the shops are supported by a detail buried in 1850 state legislation. That law guarantees title to the state for property considered to be a navigable waterway. This includes the SP property, which occupies fill covering the original course of the nearby American River, which in the mid-19th century was navigable.

There's a long way to go before the shops can welcome visitors. Ownership of the erecting bay is yet to be fully concluded, with the property eventually to go to the museum after investments are made. But after years of paperwork and check-offs by various agencies, this fall the State Public Works Board signed off on the state's acquisition of the boiler shop, triggering the release of \$11 million in bond funding for building repair.

A BRIGHTER FUTURE

Despite its relative state of disrepair, the vast old shops are an appealing place to be on a hot September afternoon. The brick walls, the massive supports, the skylights speak of the authenticity of this place. For a visitor strolling through the vast erecting hall, the promise of the next phase of the museum is obvious.

You could easily populate an entirely separate world-class railroad museum with just what's stored here: Santa Fe Warbonnet F7A 347C, in need of fresh paint but still a proud symbol of the *Super Chief* passenger train; Great Northern Railway Post Office 42, ablaze in Omaha orange and awaiting another rotation onto the museum floor; Santa Fe 2-6-2 No. 1010, the famed locomotive of "Death Valley Scotty" legend and lore; Nevada Copper Belt motor car 21 *Yerington*, built in 1911 by Hall-Scott and reputedly the oldest extant doodlebug; 250-ton SP big hook steam-powered derrick No. 7070; and much more.

The possibilities for telling new stories with artifacts like these are tantalizing, especially for the man who helped kick-start the whole adventure all those years ago in the dining room of the *Gold Coast*. For Denny Anspach, the next phase in the museum's history promises to be as exciting as the first.

"I was 32 when I first doodled a concept for this museum, 36 when I edited the first CSRM plan," Anspach recalls. "Now, at 83, I'm delighted that these thoughts and dreams will now be relegated to the archives, to be superseded by a plan firmly anchored in the 21st century."

California is indeed dreamin' once more. **I**

Keeping relevant: Mock up of a high speed train shares roundhouse space at the museum in July 2016 with a Union Pacific 0-6-0.

TRAINS: Jim Wrinn

Saving the first dome car

TRAINS' preservation award honors America's first dome car, now preserved in Ohio



Original dome car *Silver Dome* was at Lincoln, Neb., in 1963. It was different from production model dome cars with its square windows and corner vents. Jim C. Seacrest

TRAINS magazine has awarded its \$10,000 Preservation Award for 2017 to the Mad River & Nickel Plate Road Railroad Museum in Bellevue, Ohio, for the restoration of the dome portion of America's first dome car, Chicago, Burlington & Quincy's *Silver Dome*.

The award was announced at the Heritage Rail Alliance annual meeting in Minneapolis on Oct. 7.

The grant will sponsor restoration of the dome, specifically focusing on replacement of trim and plexiglass, which have discolored with time. Work on the dome coincides with the museum's effort to restore the entire car, including reupholstery, carpeting, and window sill work.

The award was made from nearly 40 applicants in this, the 18th year for TRAINS' \$10,000 grant. Applicants came from across the country, and included locomotives, passenger cars, freight cars, and archives.

The car's preservation and efforts to restore it, TRAINS panel of judges for the award said, is a tribute to early Mad River members who rescued *Silver Dome* from an uncertain fate in the 1970s.

"The *Silver Dome* is, without a doubt, the most historically significant piece of equipment in our collection and the restoration is sorely needed," says Mad River President Chris Beamer. "TRAINS' preservation award has given us a virtual shot in the arm and will take us a long way toward the end goal."

Cyrus Osborn, a General Motors vice

president, first thought of the concept of a dome car while riding the cab of an F unit on the Rio Grande through Glenwood Canyon, Colo., in 1944.

His idea was incorporated into the four-car GM Train of Tomorrow, completed in 1947. Meanwhile, the Burlington modified 1940 stainless steel coach *Silver Alchemy* at its Aurora, Ill., shops. When the car, renamed *Silver Dome*, re-entered service in 1945 on Burlington's Chicago-to-Minneapolis *Twin Cities Zephyr*, passengers loved



Burlington Route promoted new dome cars with drawings showing the cars following Mississippi River traffic. TRAINS collection

the experience and encouraged the Burlington and about a dozen other railroads to place orders for their own dome cars. And those orders gave birth to an all-new train travel experience that we still cherish today. A monument to the creation of the dome car once stood along the Rio Grande main line and is itself preserved at the Colorado Railroad Museum.

Silver Dome passed into Amtrak hands in 1971, but it soon was sidelined as surplus equipment. Mad River bought the car at auction in 1978 and has since placed it under a shed to keep it from further weather damage.

Mad River officials and TRAINS will provide updates on the work throughout 2018.



At least four Burlington Route dome cars grace this version of the *Twin Cities Zephyr* rolling mile after mile along the Mississippi River in Wisconsin. CB&Q

GP30s lead by example on two tourist lines

Western Maryland stylizes what might have been, while Royal Palm kicks off with an ex-L&N unit



GP30s in familiar and new places: Western Maryland Scenic created a “what if” look on GP30 No. 501 with Western Maryland’s famous circus colors, left, while new Royal Palm excursions in Florida feature an ex-Louisville & Nashville unit. Left, Carlos Ferran; right, Eric Hendrickson

Two eastern tourist railroads fielded the fabled GP30 this fall — one in new colors and one on a new operation.

In the mid-Atlantic, Western Maryland Scenic repainted GP30 No. 501 into the red, white, and black “circus” colors of the 1970s Western Maryland Railroad. Former Pennsylvania Railroad No. 2249 is the railroad’s primary motive power for tourist trains between Cumberland and Frostburg, Md. The re-paint is an attempt to attract a crowd while the railroad restores Chesapeake &

Ohio 2-6-6-2 No. 1309, a project delayed and needing significantly more funding.

Meanwhile, a new Florida tourist railroad, the Orlando & Northwestern, launched its Royal Palm Railway Experience with Louisville & Nashville GP30 No. 1030 through a partnership with Walden’s Ridge Railroad Co. that owns the unit and Southern Appalachia Railway Museum in Oak Ridge, Tenn.

The unit started service in September in a faded version of the gray, red, and yellow

Seaboard System paint scheme that only lasted between 1982 and 1986. An L&N re-paint is planned. During the unit’s time in Florida, it will have stylized O&NW/Royal Palm branding to go with the L&N scheme. Royal Palm managers plan to use No. 1030 for six months or longer, if necessary.

Orlando & Northwestern operates out of Tavares, Fla., and runs to Mount Dora and Eustis, Fla., on tracks used by the *Orange Blossom Cannonball* operation until January 2017. — Chase Gunnoe and Tishia Boggs

>> A Pennsylvania Mogul that’s been mended



Strasburg Rail Road 2-6-0 No. 89 returned to service on Sept. 28 after being out of service for its 1,472-day inspection since fall 2015. The 1910 Canadian Locomotive Co. product received new boiler tubes, ultrasonic testing of boiler and firebox thicknesses, running gear work, tender frame repair, and most noticeable, a new paint job, and tender decals. Christopher Pollock

>> PRESERVATION BRIEF

Go west, Polson No. 2, go west

Skip Lichter’s **Polson Lumber** 2-8-2 No. 2 has a new home at the **Oregon Coast Scenic Railroad** in Garibaldi on the former **Southern Pacific** Tillamook, Ore., branch. The locomotive traveled by truck in October from its 35-year home at **Mid-Century Railway Museum** in North Freedom, Wis. It had become the center of a long-running legal dispute between Lichter and the museum board of directors. The museum is where Lichter restored the locomotive to operation over a 10-year period, but he and Mid-Century failed to reach an agreement to run again. The 1912 Baldwin-built locomotive is returning to its Pacific Northwest roots. It began life running for **Saginaw Timber** in Washington state, where it operated for several loggers until 1965 when it moved to Michigan’s **Cadillac & Lake City** tourist railroad.

California's desert secret

Beaumont Hill offers trains and scenery just outside the LA Basin



A field of wind generators make a unique backdrop for this eastbound east of Cabazon on June 10, 2017. The reefers up front add some variety to the otherwise uniform containers.

LOCATION: Just 90 miles from Los Angeles and 120 miles from San Diego is the desert hot spot of Cabazon, Calif., the gateway to railroading's Beaumont Hill. The community is only 10 miles northwest of Palm Springs on Union Pacific's famed Sunset Route main line across California, Arizona, New Mexico, and Texas. Located off Interstate 10 and state Route 111, the line offers many great photo spots.

TRAIN-WATCHING: This area has limitless photo opportunities with the San Jacinto Mountains, San Geronio Pass, and a wind farm each making amazing backgrounds. With an abundance of general freights, auto racks, and intermodal, the main line is almost always alive. Trains often have manned helpers as they climb from Palm Springs to the West Coast.

At Cabazon, eastbound trains are easy to pace on Railroad Avenue, which has places to pull over for that special photo without going onto railroad property. This stretch provides

interesting angles both east- and westbound, depending on the time of day

Coming from Palm Springs via Route 111, there is a ramp onto I-10 after a short jaunt on the Haugen-Lehmann Way exit puts you right in the middle of all the action. There are two great curves as you turn onto Railroad Avenue; from there you can head west towards Cabazon.

Traveling southeast on Route 111 there are angles for photos at Tipton Road. Most trains have UP power, but units from other roads can be seen throughout the day.

Further east, there are countless photo opportunities in North Palm Springs near the Amtrak station. The *Sunset Limited* arrives and departs in the early morning.

If you feel adventurous, you can follow the line east to Niland where the Arizona line and the line to Mexico part ways. The tracks parallel the beautiful, but disappearing, Salton Sea.

RADIO FREQUENCY: Union Pacific road, 161.550



An eastbound UP freight crosses the Pacific Crest Trail east of Cabazon.

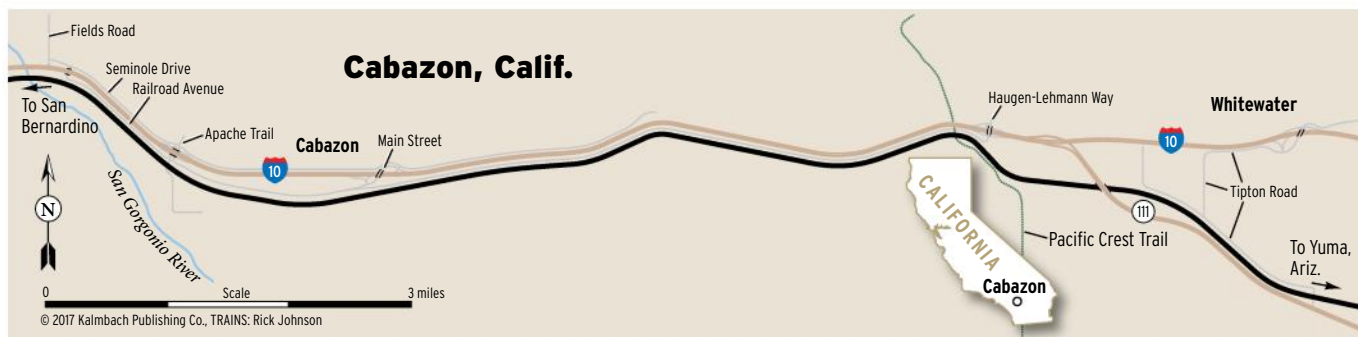
FOR YOUR FAMILY: For shopping enthusiasts, Cabazon boasts two outlet malls, Cabazon Outlets and Desert Hill Premium Outlets. If golf is your game of choice, then Palm Springs is a perfect fit; numerous courses dot the landscape. Joshua Tree National Park is only a few miles north of Palm Springs. The drive east through the park takes about an hour and a half and the scenery is beautiful.

The Palm Springs Aerial Tramway offers a breathtaking trip in the world's largest rotating tram car. The 2.5-mile trip takes riders 8,516 feet above sea level. There are hiking trails, scenic views, food, and libations available at the top.

If you like nostalgia, there are tours to celebrities' homes, with interesting stories that most people don't know. A trip to the Purple Room Supper Club takes you back in time when the "Rat Pack" made regular appearances.



An eastbound UP container train approaches the state Route 111 overpass on June 22, 2017. Three photos, Bruce Stahl



Access to adventure!



What do this month's **TRAINS** feature stories on VIA Rail passenger trains (page 34) and the NASA Railroad (page 44) have in common?

Railroad videos that complement the topics covered in both **TRAINS** magazine articles are available at MR Video Plus, a video-streaming website.

MR Video Plus has nearly 75 railroad subjects and enthusiast episodes that are specifically produced to showcase real railroading and topics of interest to **TRAINS** readers like you.

Start with the latest episode of **Drew's Trackside Adventures**. Hosted by **TRAINS** senior graphic designer and noted rail photographer Drew Halverson, this installment of his series highlights a recent visit to Canadian National's spectacular Yellowhead Pass.

Watch, and you'll experience the thrill of the chase along Mountain Region main lines, the wonder of the Pacific Northwest wilderness, and the sights and sounds of a Jasper, Alberta, station stop for VIA Rail's *Canadian*. At nearly 24 minutes, it's great railroad action with fantastic scenery.

"Watching 'Drew's Trackside Adventures' is a lot like viewing a Rick Steves' travel program coupled with the



rugged authenticity of an Anthony Bourdain show about an interesting place," **TRAINS** Editor Jim Wrinn says. "You feel like you're in the field with Drew and his buddies, and he's giving you ideas for new places to visit."

If you're looking for more railroad action, check out the other great trackside content on MR Video Plus.

Contributor Charlie Conway's series **Taking Care of Business** captures what it's like to run with a

crew for a full day of work on operations that are similar to the NASA Railroad in this issue.

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Drew Halverson, *Drew's Trackside Adventures*



IN THE FEBRUARY ISSUE

Special report:
Our lingering love
for streamliners
continues

Map: Harrisburg, Pa.

Tracking down
derailment mysteries:
From sun kinks to string-line
derailments, we cover
eight common occurrences

Unique bridge:
A Washington state icon

Cross-harbor traffic rebound:
Reviving an NYC
institution

Trains

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Winter 2017 Edition

Santa Fe Goes to War

Line improvements and new locomotives helped a big Western road meet the challenge of WWII traffic

Emergency Surgery on a PA

A retired D&H motive-power man recalls performing a major transplant on a famous diesel

One Train, Two Centennials

How a single set of cars helped West Virginia and Montana mark 100 years

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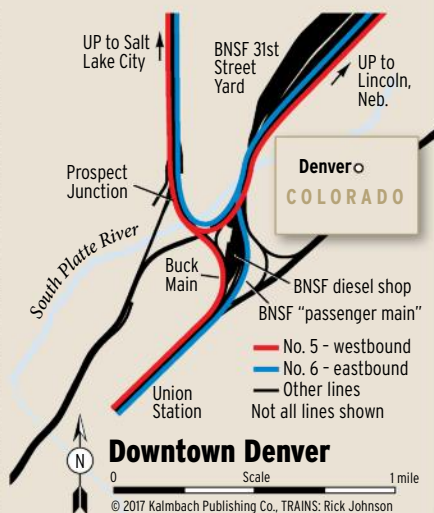
Private car *Silver Solarium* brings up the markers on train No. 5, the westbound *California Zephyr*, at Denver Union Station on March 30, 2017. Chip Sherman

Q I recently visited Denver and stayed at the Crawford Hotel within the renovated Union Station. My room faced the tracks and I enjoyed a wide variety of commuter and light rail, and Amtrak's 'California Zephyr.' I am researching how and where the 'Zephyrs' are turned and backed into the station. Do you have any information that would help? — John S. Trimbur, Poland, Ohio

A There are no through tracks at Denver Union Station as there were back in the Denver & Rio Grande Western days. Amtrak uses BNSF Railway's 20th Street wye between 31st Street Yard and Prospect Junction to access the station.

Train No. 5 backs onto the "Buck Main" over the South Platte River. Departing, it uses the Buck Main via Prospect Junction and Union Pacific's Fox Junction to gain access to that railroad's Moffat Tunnel Subdivision to the west.

In the evening, train No. 6 comes into 31st Street Yard from Prospect Junction and then backs onto what BNSF calls the "passenger main" by the railroad's diesel shop into Union Station. — Chip Sherman



Q At Expo 67 in Montreal, Gordon Lightfoot's classic "Canadian Railroad Trilogy" was introduced not as a stand-alone song, but as the soundtrack to a great video about Canadian railroads. Has that video survived? Can it be seen anywhere? — Andrew Selden, Edina, Minn.

A Gordon Lightfoot's "Canadian Railroad Trilogy" was actually commissioned by the Canadian Broadcasting Corp. in late 1966 for a special commemorating the start of the country's centennial year on Jan. 1, 1967.

Unlike sister crown corporations of the day, Air Canada and Canadian National

>> This Month:

- Access to Denver Union Station
- Canadian Railroad Trilogy
- "Blue train" to Kokomo

Railways, the CBC did not have its own pavilion among the 90 or so spread across the Expo site. However, it is possible that film of the original TV performance was shown in the Canadian Pacific-Cominco Pavilion or the Canadian Pavilion, both of which had sizeable theatres.

The film is available online at various video-sharing websites. — John Godfrey

Q Could you tell me what the jets under the cab of Union Pacific 2-8-0 No. 535 in Laramie, Wyo., were used for? — Rob Cassell, Silver City, N.M.



These water jets under preserved UP 2-8-0 No. 535 removed sand from the rail after the drive wheels passed. Rob Cassell

A This apparatus is a rail washer. It was used when the engine was sanding the rails as it moved forward for traction. The washer was activated to remove the sand off the rail after the drivers had passed since the sand had done its job and now would simply impede the wheels of the rest of the train. As you can see, there are two sets of jets, one over each rail. — Martin E. Hansen

Q Was there a "blue train" that went through Kokomo, or was it just lyrical license? It specifically appears in the haunting version of a 1980s song by Robbie Robertson. The line goes, "Catch the blue train all the way to Kokomo." I looked at all the route maps and nothing was clear. — Phil Googin, Moreno Valley, Calif.

A "Lyrical license" is the likely answer. The song you refer to is "Somewhere Down the Crazy River," by Robbie Robertson, an original member of The Band. Robertson has been quoted as saying the song has associations with Arkansas.

Often evoked by such songwriters as Chuck Berry and Bruce Springsteen, the term "Kokomo" seems to refer to secluded, private places for lovers. Not Kokomo, Ind. If Robertson had a specific place in mind,



Trains still roll through Kokomo, Ind., like this December 2012 Santa special on US Rail shortline trackage. John E. Troxler

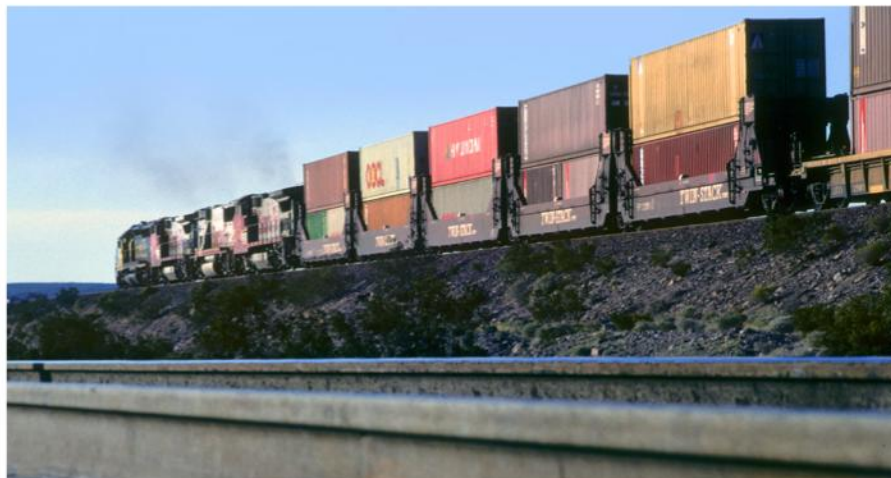
it could have been the unincorporated town of Kokomo, Miss., through which the long-abandoned short line Fernwood, Columbia & Gulf passed. — *Kevin P. Keefe*

Q This device was on the front of a Finger Lakes Locomotive. What is its purpose? — *James M. Battle, Rochester, N.Y.*



This portable control system enables remote operation through the locomotive's multiple-unit connections. James M. Battle

A This is a portable remote-control system for controlling a locomotive from outside the cab. The control unit is placed near either end of the locomotive and has various electrical and pneumatic connections. The locomotive is set up as if it was a trailing locomotive in a multiple-unit consist and would be receiving commands from the lead locomotive. The system allows the locomotive to be controlled from a belt-pack unit by an operator on the ground or outside the cab without the need for anyone to be in the cab. These types of systems are popular with shortline and industrial operators where reduced crew size or safety concerns are important. — *Chris Guss*



A westbound Santa Fe container train rolls through the oddly named Siberia, Calif., on the Chicago-to-Los Angeles Transcon route in March 1993. Ron Flanary

Q I thoroughly enjoyed the article "Intermodal Mystery" in the October 2017 issue of TRAINS. The article states that "All the accidents were happening out West ..." This seems strange, given the tight curvature on many lines in the East. Is there an explanation for this? Further, one of the recommendations to remedy the problem was to "lubricate the center plates ... at least once a year ..." I would have thought that this would have been standard practice for all cars. Is there a reason why this applies only to the double-stack cars? — *John Rozycki, Urbandale, Iowa*

A The major reason all the incidents were happening out West was due to the arid and desert conditions at many of the derailment sites. During the process of investigation it was determined that the rail was extremely dry with little presence of lubrication on the rail surface. Sand doesn't help, either. In the east, there is much more moisture and humidity in the air, which lowers the friction on top of the railhead. As a result of the investigation, it was recommended to increase lubrication in curves, especially the top of the low rail. Severity of curvature was not really a major factor since many of the derailments out West occurred in relatively light curvatures (typically 3 degrees or less).

Association of American Railroads rules 46 and 47 require the lubrication of centerplates when a car is on a repair track and raised off its trucks for any reason. There is no requirement to lubricate annually. The investigation found that unlike conventional freight cars, the centerplates on the articulated connectors are unprotected by the bottom of the car and are open to rain, ice, and snow. The quickest way to destroy a lubricant is to put water in it. It was found that the effectiveness of lubrication may last for only a couple

months on double-stack cars, whereas it may last for several years under a boxcar or flatcar. This finding hastened the development of non-metallic (plastic-type) centerplate liners, which reduced the coefficient of friction and provided wear resistance for a long time. In simpler terms, the plastic liners were "slippery" when compared to conventional steel on steel liners. — *Gary Wolf and David Ibata*

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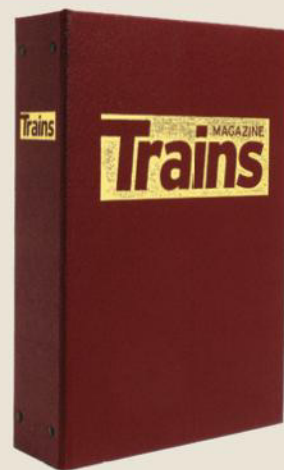
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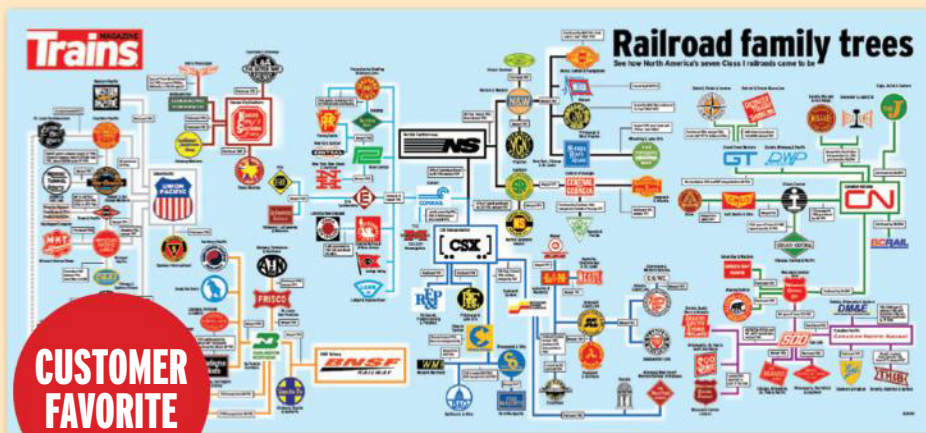


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P29528

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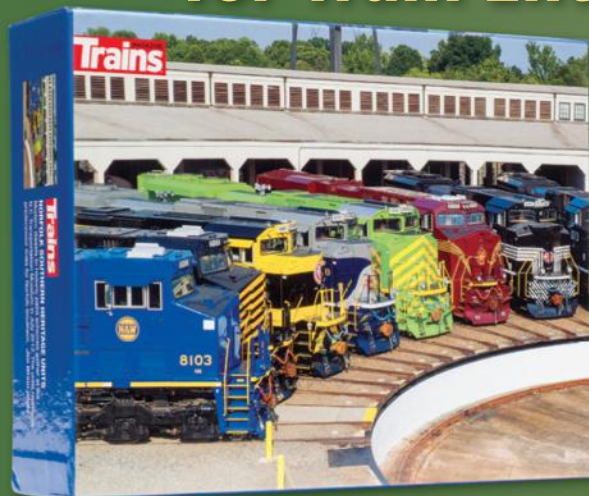
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JANUARY 13-14, 2018 62nd Florida Railfair. Volusia County Fairgrounds, Tommy Lawrence Arena and Townsend Arena, Deland, Florida. Saturday. 9:00am-4:00pm and Sunday, 10:00am-3:30pm. Over 300 tables of railroad artifacts and model train items. Large operating layouts. Miller, 3106 N. Rochester St., Arlington, VA 22213. 703-536-2954 E-mail: rrshows@aol.com

JANUARY 20, 2018 54th Atlanta Model Train & Railroadiana Show. Infinite Energy Center, 6400 Sugarloaf Parkway, Duluth GA 30097. 9:00am-4:00pm. Early admission available Friday PM (19th). Over 300 tables of model trains and railroad artifacts for sale. Free parking. Miller, 3106 N. Rochester St., Arlington, VA 22213. 703-536-2954. E-mail rrshows@aol.com or www.gserr.com

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Trains MAGAZINE

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A BNSF freight train is seen descending a snowy mountain track. The train consists of several orange and black BNSF locomotives pulling a long line of black and white tank cars. The track is covered in a thick layer of snow, and the surrounding landscape is a dense forest of evergreen trees, many of which are heavily laden with snow. In the background, snow-capped mountains rise against a clear sky. The foreground shows a snow-covered ground with some bare, brown shrubs and a large, snow-laden evergreen branch on the left side of the frame.

Gallery

Winter show

A picture-perfect winter scene unfolds as eastbound BNSF Railway ES44C4 No. 6626 descends down the mountain from Moffat Tunnel at Tolland, Colo., with two ES44C4 locomotives and a long train on Feb. 23, 2015. — *Photo by Samuel Phillips*



Morning ascent

The morning light finds a westbound Norfolk Southern manifest train crawling up the east slope of the Allegheny Front on the former Pennsylvania Railroad's main line near the summit tunnel at Gallitzin, Pa., on Nov. 30, 2013. — *Photo by Eric Williams*





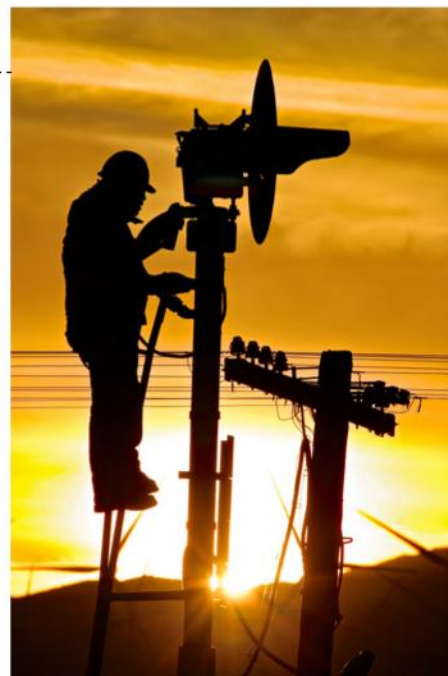


Natural flyover

A perfect meet occurs on BNSF Railway's natural flyover near the upper Mojave Narrows, just west of Victorville, Calif., as a westbound BNSF container train, led by ES44DC No. 7448, crosses over an eastbound BNSF auto rack train on Jan. 28, 2017. — *Photo by Elrond Lawrence*

End of an era

A Union Pacific maintenance-of-way worker prepares to dismantle a veteran Southern Pacific searchlight signal as the sun sets at milepost 379 on the southern end of Tehachapi Pass, Calif., on Nov. 16, 2014, a date that will forever mark the end of an era. New LED "tri-light" signals will take the place of the signals that date back to the days of steam. — *Photo by Alex Gillman*



Frosty action

BNSF Railway Z CHCSEA, led by C44-9W No. 5520, heads west out of the Foss River Canyon on BNSF's Scenic Subdivision at milepost 1729 at Skykomish, Wash., on the frosty morning of Jan. 5, 2014. — Photo by Joel Hawthorn

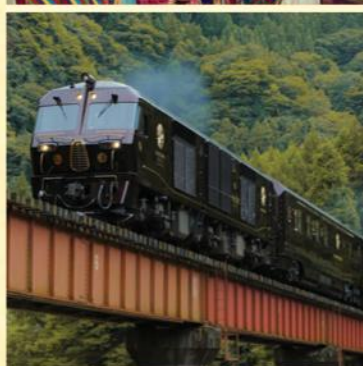




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