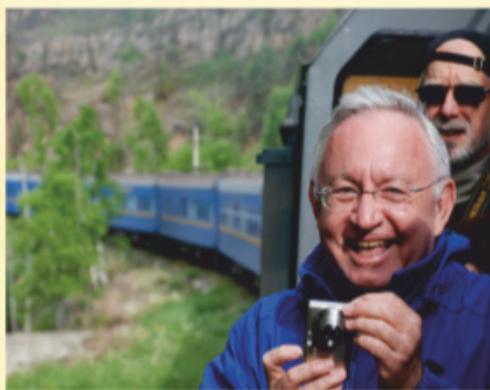




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Trains

THE magazine of railroading

Fred W. Frailey vs. Randal O'Toole p. 16

Bush funeral train p. 6

Modern and spectacular

How an NS bridge blends classic looks with 21st-century technology

p. 38

The other transcons:
Southern Pacific p. 26

All about spikes p. 46

PLUS

Changing face of passenger power in LA p. 36

Alternative view of the first transcontinental p. 24

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Back to basics: spikes and bridges

The foundations of railroading continue to evolve and change, and we'll keep up with them as they do



Jim Wrinn

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We are looking at two of the railroad industry's most basic components this month: spikes and bridges. We do this because, to quote a wise track supervisor I met years ago, without these essential elements, you don't have a railroad: There are no trains to run, there are no fascinating locomotives to study, there is no business to manage.

Railroading's core components are topics we enjoy covering because of the simple fact that none of this technology is static. It is always changing and growing.

To me, it's important from time to time to stop and review the items we see and use every day. They are the fascinating building blocks of the industry we admire so much.

Both spikes and bridges, featured in this issue, have been around from the beginning of railroad history and even before. You can see their evolution in their sizes and appearances. But look how contemporary bridge designers have come full circle to make, for example, Norfolk Southern's impressive bridge in upstate New York look like a classic arch span at the same time it features scores of modern technological advances.

Our story about average, ordinary spikes

plays off this year's fascination with the four (yes, not just one, but four) commemorative golden spikes used to celebrate the completion of the transcontinental railroad 150 years ago in 1869. They've certainly changed as well: The spikes my dad and I collected from an abandoned line when I was a kid are tiny compared to what's out there today. I also suspect they're not made of the same metal today as they have been in the past.

As we look at these two basic pieces of railroad infrastructure, note how they've changed and how they've stayed the same. As always, the railroad business is in constant flux around us. We just have to recognize that what we're seeing is a snapshot in time. These pieces of railroading have changed in the past, and they will do so again in the future.

So, here's to all of our friends in railroading who are involved in track, bridge, and tunnel work. Whether your job is designing, building, or maintaining these foundational items, without your many contributions we'd have no trains to cover. Thanks to your work, our railroad industry is one of the safest forms of transportation on the planet. And to those of us trackside, the next time you admire the infrastructure of a main line, we hope you'll appreciate it even more.

BIG BOY CHASE BUS

We, like many of you, highly anticipate the debut of restored Union Pacific 4-8-8-4 Big Boy locomotive No. 4014. We, also like many of you, want to be there to see this legendary locomotive make its first run in 60 years in May, when it runs from Cheyenne, Wyo., to Ogden, Utah, to celebrate the 150th anniversary of the first transcontinental railroad. And we, like many of you, expect this event will result in large crowds, scarce hotels, and a lot of competition for safe, public places to view this spectacle. Toward that goal, we're offering a TRAINS chase bus that will mimic UP's operating schedule, which at this time is not known. Expect the trip to take place in early May with the westbound journey in the days before the 10th and the eastbound journey in the days following the anniversary celebration. Details at SpecialInterestTours.com

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In this issue

February 2019

Vol. 79, No. 2

Features

Move over Promontory p. 24

Comanche Crossing, now Strasburg, Colo., lays claim to the place where the first transcontinental railroad was finished

Rich Luckin

The southern transcon p. 26

Southern Pacific offered many ways to the West

H. Roger Grant

Changing faces, but no loss of wonder p. 36

Los Angeles Union Station is still a wonderful place for a now-70-year-old man who still loves trains

David Lustig

COVER STORY

Modern and spectacular p. 38

21st-century know-how seamlessly replaces a 19th-century landmark in New York state

Tishia Boggs

Not all spikes are golden p. 46

All you ever wanted to know about railroad spikes but were afraid to ask

Tyler Trahan

Chicago's hidden downtown depot p. 52

Most gems are found underground; Van Buren Street Station is no exception

Fred Ash

In My Own Words: 'It's over when he stands up' p. 56

Body language and brevity are key on the new Illinois Central Gulf

Gene Harmon

Gallery p. 68

Tribute to a railroad photojournalist icon

John Gruber

>> An inbound Metra Electric train departs Van Buren Street for its Millennium Station terminal in March 2010. The classic bilevel cars have since been replaced. Brian Schmidt



In every issue

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News

News p. 6

Into the sunset: George H.W. Bush; R.J. Corman will keep Nashville & Eastern GEs, support steam

Locomotive p. 20

The GMD-1

Passenger p. 22

Brightline partners with Virgin

Departments

From the Editor p. 3

Back to basics: spikes and bridges

Preservation p. 58

Reviving a legend

Train-Watching p. 60

Short line: St. Croix Valley Railroad

Ask TRAINS p. 62

Thermal expansion in welded rail, railroad torpedoes, air-brake function, and more

Commentary

Fred W. Frailey p. 16

Meet the grinch

Brian Solomon p. 18

Future freight railroads?



ON THE COVER:

Eastbound Norfolk Southern train 36T crosses the new bridge over the Genesee River Gorge in Portageville, N.Y., on Dec. 11, 2017. Casey Thomason, Norfolk Southern

On the web TrainsMag.com



CHICAGO DEPOT GALLERY

See additional photos from Van Buren Street Station.
Photo by Nolan Wallenkamp



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News

LOCOMOTIVE P. 20 • PASSENGER P. 22



Into the sunset

Rare special train hauls George H.W. Bush last miles to burial site

▲ The George H.W. Bush funeral train heads northwest through Navasota, Texas. Zach Pumphery

2 The flag-draped casket of former President George H.W. Bush passes through Magnolia, Texas. A U.S. sailor stands guard. Bush was a U.S. Navy veteran from World War II. Associated Press

3 Bush's flag-draped casket appears through glass placed in the Union Pacific car *Council Bluffs* so crowds could see the former president pass. Shane Palus



FOR THE FIRST TIME in nearly 50 years, a U.S. President has been carried to his final resting place by rail. Thousands of spectators lined the route on Dec. 6, 2018, as the 11-car funeral train of George H.W. Bush, the nation's 41st president, traveled from Spring, Texas, to College Station aboard a Union Pacific special powered by a locomotive painted to honor the former president.

In Navasota, Texas, one of the small towns along the 70-mile route on UP's Navasota Subdivision, the crowds stood trackside with a backdrop of buildings decorated with red, white, and blue bunting, along with a sign reading, "President George H.W. Bush. Thank You For A Lifetime of Service."



Students were dismissed from school early to allow what the Navasota Independent School District called "a once in a lifetime opportunity for those that choose to pay their respects along the route." Reports said spectators had traveled to the route from across Texas and as far away as New Hampshire.

A Houston Chronicle article noted that major roadways were closed to allow the train to pass safely, and that spectators — some crying, many waving flags — lined the route even in the most sparsely populated areas.

Following the rail journey, a hearse carried the former president's flag-draped coffin to the George H.W. Bush Presidential Museum and Library at Texas A&M University, where he was



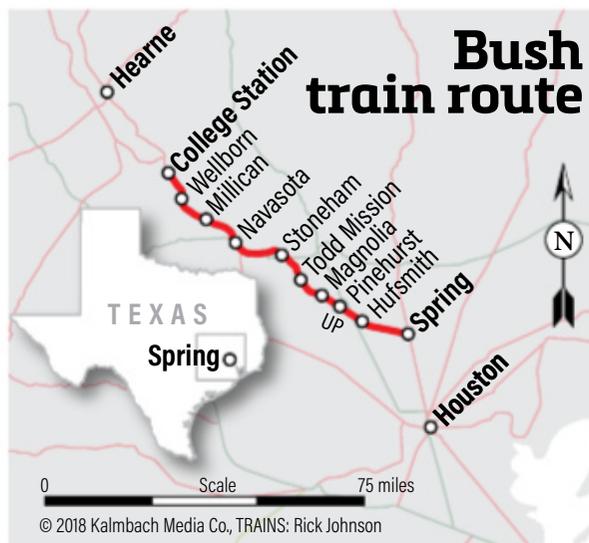
buried in a private ceremony next to his wife Barbara, who had died eight months earlier, and daughter Robin, who died at age 3 of leukemia.

The former president's journey by train concluded almost a week of mourning following his death on Nov. 30 at the age of 94, including a period lying in state at the U.S. Capitol, a state funeral at Washington National Cathedral, and a service for more than 1,000 mourners at St. Martin's Episcopal Church in Houston.

It was after the service in Houston that a 1-hour procession took Bush's casket to a Union Pacific auto loading facility in Spring, Texas. There, his remains were carried by military pallbearers onto the Union Pacific car *Council Bluffs*, a former postal storage car, as a military band played "Hail to the Chief" and "America the Beautiful."

Union Pacific locomotive No. 4141 is the SD70ACe locomotive named for the former president and painted in a scheme inspired by the famous Raymond Loewy design for Air Force One. CNN reported that the locomotive was to be retired at the completion of the trip.

Like the former president, the train's crew members were Navy veterans, ABC News reported. Engineer June Nobles, a 15-year Union Pacific veteran, served nine years in the Navy. Conductor Randy



Kuhanek, an eight-year Navy veteran, is in his 23rd year at UP. The railroad picked the crew members because of their knowledge of the route and their Navy service.

Bush was present in 2005 for the unveiling of the locomotive painted in his honor — created for an exhibition on railroads at his presidential library — and briefly took a stint at the engine's controls.

He reportedly responded with enthusiasm when staff at his presidential library suggested including the locomotive as part of his funeral events. Union Pacific spokesman Tom Lange said that the railroad was first approached about providing a funeral train in 2009. The question now is: Have we seen the last U.S. Presidential Funeral Train? — *Jim Wrinn and David Lassen*

IN BRIEF

Presidential funeral train facts



The casket of former President George H.W. Bush is carried by a military honor guard in Spring, Texas, as it is placed on a Union Pacific train. Associated Press

UNION PACIFIC NO. 4141 is a 2005-built SD70ACe painted to honor former President George H.W. Bush. The railroad dedicated it in a ceremony at the George H.W. Bush Presidential Library and Museum at Texas A&M University.

Bush's funeral consist included: No. 4141 and SD70ACe No. 9096; UP power car 2066; dome car *City of Portland*; dome car *City of San Francisco*; baggage car *Council Bluffs*, carrying Bush's casket; business car *Lone Star*; dome car *Harriman*; diner *Overland*; sleeping car *Portola*; diner *City of Denver*; dome car *Walter Dean*; and business car *Kenefick*. The trip lasted 2 hours, 43 minutes.

Before Bush, **DWIGHT D. EISENHOWER** was the most recent U.S. president to have a funeral train, in 1969. It traveled 2,804 miles from Washington, D.C., to Abilene, Kan., his hometown, over Chesapeake & Ohio, Baltimore & Ohio, Norfolk & Western, and UP tracks.

The first presidential funeral train was for **WILLIAM HENRY HARRISON**. It departed Washington on June 26, 1841, over B&O trackage and a succession of trains and boats to North Bend, Ohio.

New York's Saratoga, Mount McGregor & Lake George Railroad was the first narrow gauge railroad to haul a funeral train. It carried **ULYSSES S. GRANT'S** casket on Aug. 4, 1885.



A MOVING FAREWELL Crowds gather at the Gosling Road grade crossing near Spring, Texas, to say farewell to President George H.W. Bush. The first presidential funeral train in almost 50 years carried Bush the final 70 miles to College Station, Texas, where he was buried Dec. 6 at his presidential library. Two photos, Matthew Holman



CROWDS UPON CROWDS People pay their respects as the train carrying the casket of former President George H.W. Bush passes Dec. 6, 2018, along the route from Spring to College Station, Texas. Associated Press



SOME SLEIGH RIDE Matching Pennsylvania Railroad E8s Nos. 5809 and 5711 lead a deadhead train move over the former Erie Railroad's Starrucca Viaduct at Susquehanna, Pa. Norfolk Southern moved the Marine *Toys for Tots Train* in upstate New York that rolled northeast from Binghamton, N.Y., on Dec. 1, 2018. Casey Thomason, Norfolk Southern



THEY'RE TOAST The Southeastern Pennsylvania Transportation Authority sponsored a last run of AEM-7 locomotives Dec. 1. No. 2306 leads a special train. Patrick Yough

Nashville & Eastern GEs will stay under R.J. Corman

Company bought shortline group in November

EXPECT LITTLE CHANGE when R.J. Corman takes ownership of Nashville & Eastern rail properties.

On Nov. 5, 2018, the two companies announced they had finalized an agreement for Corman to purchase the Nashville & Eastern Railroad Corp.; Nashville & Western Railroad Corp.; Transit Solutions Group, the operator of Nashville's Music City Star commuter railroad; and three related operating entities.

Nashville & Eastern was founded in 1986. William Drunic, founder, worked with partners to lease approximately 110 miles of former Tennessee Central track between Nashville and Monterey, Tenn., from the Tennessee Department of Transportation and the Nashville & Eastern Railroad Authority.

The physical plant was improved and in 2006, the Music City Star commuter rail service began between Nashville and Lebanon, Tenn. Nashville & Eastern operates exclusively with General Electric locomotives, and that will continue under Corman ownership, R.J. Corman Director of Risk Management Todd Bivins tells TRAINS.

"We have no intention of changing power and plan to fully utilize [the railroad's] current fleet," Bivins says.

For steam enthusiasts, the larger question is whether Corman will still support the rebuilding of Nashville, Chattanooga & St. Louis steam locomotive No. 576 in Nashville. The Nashville Steam Preservation Society plans to restore the 4-8-4 to service and operate it on excursions on the Nashville & Eastern. The engine has been on display in Nashville's Centennial Park since 1953.

"R.J. Corman respects and admires the efforts to restore Nashville, Chattanooga & St. Louis steam locomotive No. 576," Bivins says. "As we go through the process of getting acquainted with all the parties involved, we will work to understand better how we can support their efforts."

Restoration of No. 576 is planned to take place at the Tennessee Central Railway Museum on the east side of Nashville.

The museum operates regular diesel-powered excursions over the Nashville & Eastern. Bivins says that negotiations with local groups, such as the museum, are in early stages.

"We have just begun the process of acquainting ourselves with the customers and partners on the line, including the Tennessee Central Railway Museum," he says. "We look forward to working with this group and others to continue to provide economic value to the area."

Why is Nashville & Eastern moving ahead with an acquisition now?

"We had been approached by a number of parties throughout the years about either partnering or taking over operations," Drunic says. "Because there has been so much new activity and opportunity in and around middle Tennessee, we realized that we were simply not sufficiently capitalized to take full advantage of some of these opportunities in order to continue to allow these properties to fully realize their potential. That was the primary drive for initiating discussions with outside parties."

As part of the sale, Drunic wanted to protect his employees, who he commends for their service.

"We attribute much of the growth and success of our businesses to them. It was important that all of their jobs, pay, and benefits be protected and maintained and we have received assurances that will be the case going forward," Drunic says.

R.J. Corman is expected to take over operations of the companies in January. Other regulatory approvals are still pending. — *Steve Glischinski*

Companies collaborate to create short lines in NY, Florida

MORE SHORT LINES are being created from Class I railroad main lines in the near future in New York and Florida.

Pittsburg, Kan.-based Watco Cos. wants to lease Norfolk Southern track running from Sayre, Pa., to Lansing, N.Y., about 48.8 miles. The shortline holding company, according to its Nov. 8 filing with the Surface Transportation Board, controls 38 Class III railroads and one Class II line. Shortline officials say in their filing that

they anticipate no increase in revenue or traffic that would require it to become a Class II or I railroad.

The line is known as the Ithaca Secondary. The railroads have agreed on a lease and the Surface Transportation Board approved the deal in late 2018.

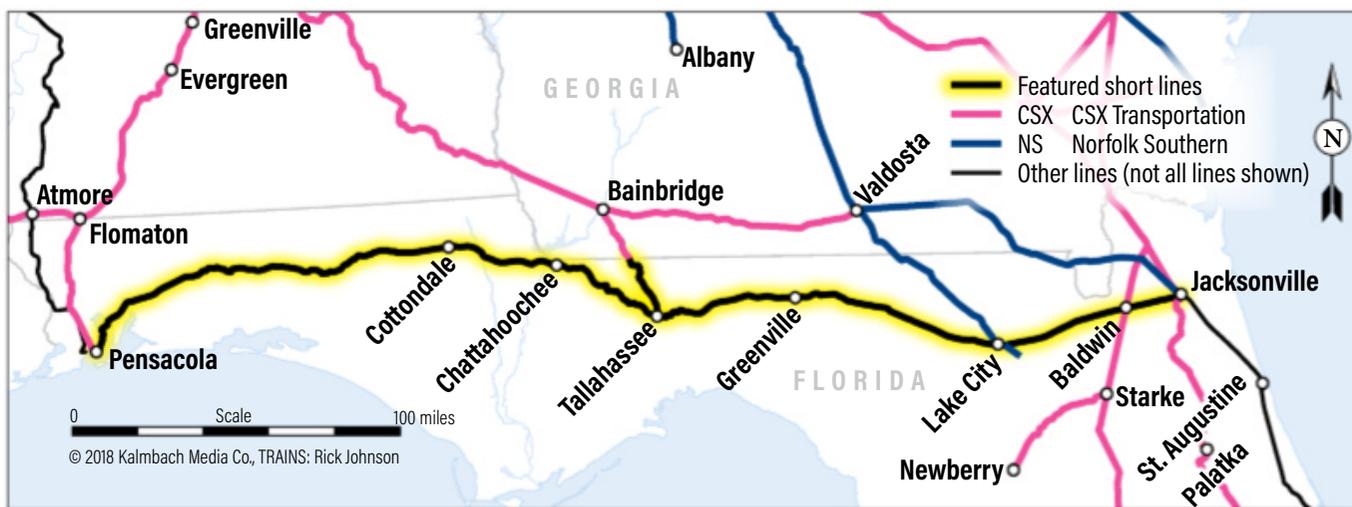
In Florida, the Florida Gulf & Atlantic Railroad will acquire 373 miles of CSX Transportation routes, including the Tallahassee Subdivision between Baldwin and

Chattahoochee, Fla.; the P&A Subdivision between Chattahoochee and Pensacola, Fla.; and portions of the Bainbridge Subdivision between Tallahassee and Attapulgus, Ga.

No startup date was given, but people familiar with the matter say the railroad is likely to begin operations in mid-January. Florida Gulf & Atlantic will hire 37 people in Tallahassee to run the railroad.

The new railroad may roster up to 20 locomotives, mostly GP38s and GP40s, that will wear red, white, and blue paint, a person familiar with the matter says.

The route once hosted Amtrak's *Sunset Limited*, which ran between Orlando and Los Angeles until 2005. — Dan Kittay and Bill Stephens



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Cincinnati Union Terminal reopened with restored art and architecture

ONE OF THE BEST KNOWN ART DECO railroad landmarks in the Midwest, Cincinnati Union Terminal, is open again after a 30-month, \$228-million restoration project.

The building is home to several museums and is a nighttime stop on Amtrak's triweekly *Cardinal*.

The restoration project was funded by a special sales tax passed by Cincinnati and Hamilton County, Ohio, voters in 2014.

"Construction began in July 2016 after a little more than a year of probes and analysis by architects, engineers, and conservators," says Cody Hefner, Cincinnati Museum Center's media relations manager. The museum is the station's caretaker. "We have carried on and protected the legacy of the craftsmen who poured their blood, sweat, and tears into the building during its original construction from 1929 to 1933."

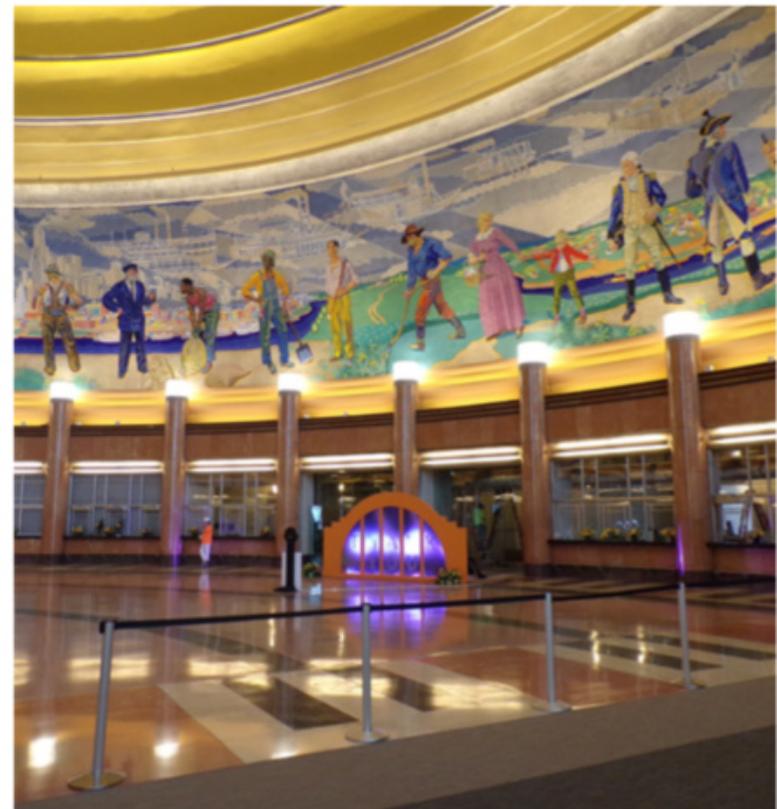
The restoration work was extensive,

going all the way down to the building's substructure, with the intent that the 85-year-old building will be able to last at least another 100 years. The classic murals in the rotunda were painstakingly restored to the way they appeared when the building opened to the public in 1933. Even the classic, neon-lined clock on the front of the building was given a complete overhaul.

"This is a monumental achievement for our staff and volunteers and for the entire community," Hefner says. "Everyone who works here ... has a story about Union Terminal, either as a train station or as a museum. So to be able to restore a place with such a personal connection, and to do so in such a grand, visible, breathtaking way, is really incredible."

During the restoration project, Amtrak moved its waiting room and ticketing facilities to an adjacent building, but service was able to continue uninterrupted.

Amtrak moved back into the Union Terminal facilities during the first week of November. — *David T. Rohdenburg*



Murals inside a restored Cincinnati Union Terminal. The art deco train station had a grand reopening for the public on Nov. 17, 2018. David T. Rohdenburg



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Grand Central Terminal at night. New York City's commuter and transit agency looks to buy the former New York Central Railroad terminus and certain trackage. Mitch Goldman

New York agency may buy Grand Central Terminal soon

GRAND CENTRAL TERMINAL may soon be public property if the Metropolitan Transportation Authority succeeds in buying the landmark building from a private owner.

The MTA proposes purchasing the Hudson and Harlem lines as well as Grand Central Terminal for \$35 million from Midtown Trackage Ventures LLC. The MTA's board of

directors discussed the matter in November.

The seller, Midtown Trackage Ventures, acquired the properties in 2006 from American Financial Group, which had, in turn, acquired the Penn Central Transportation Co., the earlier owner.

The proposed purchase price includes all inventory, operations, improvements, and

maintenance, except for the air rights over Grand Central. By buying the Grand Central building and accompanying land, MTA is able to make improvements for transit developments, engage in public-private partnerships, exercise full operational control of the terminal, and possibly sell the assets at some future date. The Hudson Line continues north to Poughkeepsie, N.Y. The Harlem Line extends to Wassaic, N.Y.

"This was a no-brainer, from a financial standpoint," MTA Chief Development Officer Janno Lieber says. "We had to exercise the option to purchase or remain a tenant for another 270-plus years."

Lieber also says the deal would give MTA control on developing properties along the Harlem and Hudson lines, which may be used to foster transit-oriented development projects.

"By becoming the true owners of the infrastructure that we have long maintained on behalf of the people of New York, we are asserting Metro-North's permanence as an institution dedicated to public service," Metro-North Railroad President Catherine Rinaldi says.

Metro-North is a subsidiary agency underneath the MTA umbrella. The transactions on the properties are expected to close in 2019. — *Ralph Spielman*

Trains Celebrating 150 years since the Golden Spike

Journey to Promontory

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New from *Trains* magazine, *Journey to Promontory* explores one of the most important events in American history — the building and completion of the first transcontinental railroad in the 1860s. This special issue provides a wonderful historical overview, as well as an in-depth look at the principal railroad companies involved, Union Pacific and Central Pacific.

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NEWS BRIEFS

SP narrow gauge steamer shows off in New Mexico



SOUTHERN PACIFIC 4-6-0 No. 18, on loan to Durango & Silverton Narrow Gauge Railroad in Colorado from its California home, tests on a short train Nov. 28. It is in Colorado for crew training on oil-burning locomotives. The 1911 Baldwin from the Carson & Colorado Railway in Independence, Calif., was trucked to Colorado, where coal is the normal fuel, but the railroad needs oil burners to continue to run during high fire season. SP used the engine on its isolated narrow gauge line in eastern California until 1960. The locomotive was restored to service by volunteers with the nonprofit Carson & Colorado Railway. It is expected to be in Colorado until June 2019. D&S is also converting Denver & Rio Grande Western K-37 No. 493 to oil firing. Jerry Day



AMTRAK P42 No. 177 leads a positive train control test train with two cars and another Amtrak engine as it crests the top of the 2-percent-plus grade at Tacoma, Wash., on the Point Defiance Bypass route on Nov. 11. PTC testing is continuing along the route that has been closed to through Amtrak service since Amtrak train No. 501 derailed in December 2017. **SOUND TRANSIT** commuter trains use this route daily between Tacoma station and Lakewood, Wash. Robert W. Scott



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An artist's rendering shows a new office tower to be built on Amtrak land, as well as a single-story penthouse to Chicago Union Station. Goettsch Partners

Chicago Union Station hotel, redevelopment plans approved

CHICAGO'S UNION STATION, best known for its imposing columns and majestic Great Hall, will be the heart of a \$900 million redevelopment which, to the relief of preservationists and railroad traditionalists, will not detract from its neoclassic beauty.

That's the pledge being made by Amtrak, Union Station's owner, and developers it hired for the remaking of the historic building and adjacent property. The plan represents the "revitalization of a Chicago landmark," says John O'Donnell, CEO of Riverside Investment & Development.

The Chicago City Council approved plans including a 50-story office tower and plaza on adjacent land now occupied by a parking garage. The station's Beaux-Arts head house will be renovated and topped with a single-story penthouse, which developers said will not be visible from the street or detract from the building's profile.

The penthouse would encircle, but not block, the station's 219-foot barrel-vaulted skylight soaring above the Great Hall. Upper floors will house two hotels with a combined 400 rooms. Ray Lang, an Amtrak senior director, says the goal is "to activate the upper floors of the head house building to unlock the value of that asset for the benefit of the neighborhood and the Amtrak network."

There are no immediate plans to remake the station's Concourse, which sees 120,000 Amtrak and Metra passengers each week day. — *Richard Wronski*

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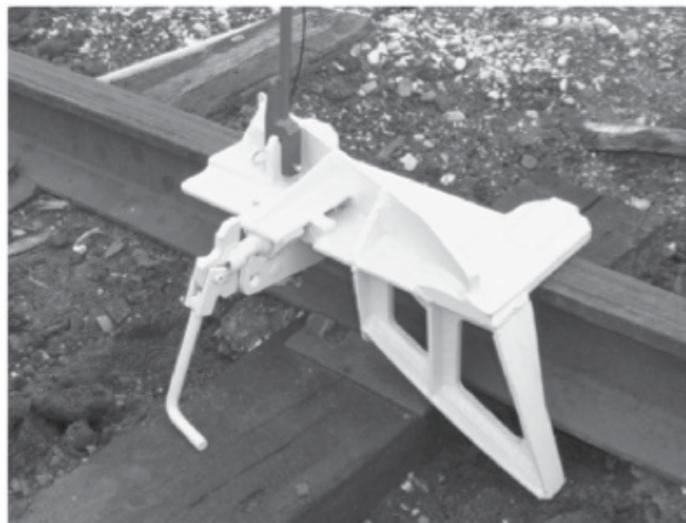
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Amtrak cars offered at 'yard' sale

Passenger railroad selling equipment; accepting donation requests

AMTRAK ANNOUNCED THAT IT intends to sell 139 previously sidelined cars and locomotives on a competitive-bid basis. The rolling stock includes the five ex-Santa Fe hi-level lounges that operated as Pacific Parlour Cars on the *Coast Starlight* until early 2018, 59 heritage baggage cars replaced by Viewliner II cars, and 23 locomotives in various states of disrepair.

Attracting particular attention are 19 heritage dining cars, which once ran on Southern Railway, Burlington Northern, Southern Pacific, Northern Pacific, and New York Central streamliners.

Ten diners were built in 1948 or 1949, making them 70 years old.

Most of the equipment is located at Amtrak's Beech Grove Heavy Maintenance Facility near Indianapolis and was available for inspection from late October to mid-December as a part of two different sales offers.

The sale notices indicate Amtrak is entertaining donation requests from preservation groups and museums but asks that the organizations specify how the equipment would be used. A major caveat: the bid price is "as is ... where is;" the extra expense of making the cars and locomotives roadworthy and getting them off the property are the responsibility of the winning bidder. — *Bob Johnston*



Amtrak's Pacific Parlour Car logo. Bob Johnston

AMTRAK EQUIPMENT FOR SALE

	No.	Built
Dining	19	1948-58
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Hi-level lounge*	5	1954
Crew dorm**	18	1949-50
Baggage	59	1946-62
P40 locomotives	12	1993
P42 locomotives	3	1996-97
F40 locomotives	8	1987
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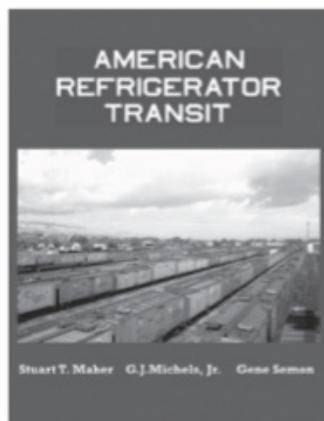
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Meet the grinch

Randal O'Toole is the fellow so many of us love to hate. What's he really saying?



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In the Rock Island District, a southbound Metra train departs LaSalle Street Station from Roosevelt Road in Chicago, Feb. 19, 2017. Author O'Toole ponders whether Chicago needs trains. Bruce Stahl

The reviews have been ... well, not complimentary. Pete Hansen in *Railroad History* says, "A cynic, wrote Oscar Wilde, knows the cost of everything and the value of nothing. He might have been describing the author of this book." Kevin Keefe's *CLASSIC TRAINS* blog is more charitable: "I'm not a transportation economist, so I'm not qualified to go hammer and tongs after O'Toole's numbers, but they are terribly one-sided." David Peter Alan in *Railway Age* gets right to the point: "According to Mr. O'Toole, trains and rail transit comprise only a corrupt, wasteful exercise in incompetent or malicious urban governance." I refer, of course, to "Romance of the Rails: Why the Passenger Trains We Love Are Not the Transportation We Need." Across America, railfans are sticking pins in dolls named after its author, Randal O'Toole, a senior fellow of the Cato Institute.

Me? I enjoyed it, even when it made me uncomfortable and though I didn't always agree with what I read. And I said to myself, I'd like to meet someone who can make this many people so upset. You see, O'Toole is a contrarian — a libertarian, sort of — and also clearly a railfan. The thesis of his book is contained in these 15 words: "I still love passenger trains, but I don't think other people should subsidize my hobby." It so happened that O'Toole had ventured from his home in Camp Sherman, Ore., for a book tour. So we spoke by phone as he drove through Northern California.

FRED: The Randal O'Toole I always imagined, from your commentaries, was a mirthless, humorless man with a distaste for trains. Maybe you breathe fire, too.

RANDAL: My writing tends to be dry. I stick to the facts. But the reality is, of course, I've always loved passenger trains, ever since I took that first ride when I was 5 years old, on the *Western Star*, from Grand Forks, N.D., to Portland, Ore.

FRED: That was one of the pleasures of reading your book, to discover you are a lover of trains and railroads, and that you marry this with a contrarian way of thinking. Do you take perverse pleasure in that combination?

RANDAL: Oh, not at all. To me, it's really sad. I wish I could support passenger trains, and I do support them as far as riding them. But I know enough about government subsidies to know that they reduce overall productivity and usually end up taking from the poor and giving to the rich. The people who are riding the *Acela* are not people in need of government handouts. The people who are riding light rail and things like that are not the poor, by and large.

FRED: What is the future of long-distance trains?

RANDAL: The role they fulfill is giving people access to scenery they can't see in any other way, and really, it ends up being something for the wealthy. I think the *Rocky Mountaineer* model is the future of long-distance trains, and if you look at the United



Author Randal O'Toole has fond memories of riding one of these Great Northern Railway trains as a young boy. Here westbound and eastbound *Western Star* streamliners meet along Whitefish Lake near Whitefish, Mont., in the 1950s. Great Northern Railway

States, where can we have a *Rocky Mountaineer*? Certainly, Oakland to Denver, probably Oakland to Los Angeles, and after that, it gets pretty iffy. They would become cruise trains.

FRED: You seem almost as uncharitable toward the short-distance passenger trains.

RANDAL: Amtrak does its best to deceive people about how well these trains do, for example, counting state subsidies as "passenger revenues," in order to make itself eligible for more subsidies. I wouldn't mind short-distance trains if they worked, but the *Cascades*, the California service, those trains aren't really doing anything. A lot of money is spent carrying not that many people.

FRED: What galls me, Randal, is that you think Chicago, of all cities, may not need commuter trains and CTA subways. I lived there decades ago, and it was a nightmare. Matters haven't gotten better.

RANDAL: We always hear that the rail line can move as many people as an eight-lane freeway. But the people who calculate that use very deceptive numbers. They assume that every single car on the train is packed with people, whereas the automobiles on those freeways hold one person. If you compare a rail line to a two-lane dedicated bus line, running 500, 600 buses an hour, there's no way the rail line can carry as many people as the buses.

FRED: I see your economic message, but do you understand that streets in Chicago, and the expressways, are jam-packed? If you ran hundreds more buses into the Loop, there would be gridlock.

RANDAL: That's true. You've got New York with 2 million jobs downtown, Chicago

with half a million, Washington, D.C., 400,000. The question is, where is the dividing point between where buses can handle it all, and where we need to start having trains? Maybe we shouldn't have that kind of job density anywhere. It causes all sorts of problems, including office costs.

FRED: It seems a lot easier to subsidize commuter trains than level downtown Chicago.

RANDAL: OK, but look at the history of our cities. In 1950, most cities had jobs concentrated downtown. There's been this huge diaspora of jobs leaving downtown as people moved to the suburbs. Because of its subway system, New York never got that

job diaspora. If the subway and commuter rails were well-funded, and operating well, it wouldn't be a problem, but New York has a \$60-billion maintenance backlog and Chicago admits to \$16 billion. So we cannot seem to pay for the rail systems we have.

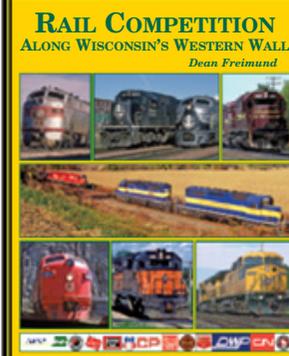
FRED: Statistics of yours that struck me are that public transit paid 90 percent of

operating costs in 1964 from fares and just 32 percent today. Why not try to make the rail part of public transit more viable? You don't address that in your book.

RANDAL: You can't make it more economically viable, simply because buses are so much better in every respect than rails. If you take the rail lines, and pave them over, and turn them into busways, you'll be able to move more people, faster and cheaper, and with far lower maintenance costs. Even if you could make the rails pay for themselves, since the buses are so much cheaper, why would we bother?

FRED: You seem most upset at places like

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Orlando and Dallas and Nashville, where commuter rail or light rail began but so few seem to ride. Is this money thrown to the wind?

RANDAL: I think so. Why is it that we allowed steam to change to diesel, sailing ships to steam ships — all these different technological evolutions to take place — but when it came to passenger rail, we said, “Halt, we don’t want more technological change.” The answer is threefold. It’s nostalgia. It’s people who are making money from wasting money, such as contractors — crony capitalism. And it’s accidents of history. The accident of history affecting urban rail transit was in 1973. Governor Francis Sargent of Massachusetts asked Congress to let cities substitute capital investments in transit for interstate highway grants. Congress said yes, but you can’t spend that amount of money on new buses. Instead, cities such as Buffalo (N.Y.), Portland, and San Jose built new rail lines with money from cancelled freeways because they are expensive and could use up those federal dollars. That’s what started the light-rail revolution, not because it was cheap, but because it was expensive.

FRED: Should the Northeast Corridor be paved over?

RANDAL: No. But be aware that the next technological revolution is not going to be high speed rail, but driverless cars. Driverless cars are going to do a lot to relieve congestion, in the early stages by 25 percent or more. Eventually, they may double, triple, or quadruple highway capacities.

FRED: That raises the question, does true high speed rail have a role anywhere else in the United States?

RANDAL: I don’t think it has a role anywhere in the world. High speed rail has made an inroad into low-speed rail and into buses, but not really affected how much people drive or fly.

FRED: What about HSR built without public money, such as the

Texas Central, between Dallas and Houston?

RANDAL: I’ll believe it when I see it.

FRED: One last question. Pretend you’ve just become president of Amtrak. What do you do?

RANDAL: I would first try to contract out operations to private operators. When public transit contracts out bus service, they typically save almost 50 percent on operating costs. I would go after corporate sponsorships, to replace cars and locomotives that are worn out. Let’s have the *Amazon Empire Builder*, the *Microsoft Coast Starlight*, the *JPMorgan Chase Acela*, so that train riders pay only the operating costs. Then there’s the Northeast Corridor, where Amtrak has a \$51 billion infrastructure backlog. Most trains on the corridor are commuter trains, and I would insist that the commuter railroads and Amtrak, together, share those infrastructure costs amongst their passengers. The only taxes that I think ought to go to support those trains would be taxes from property owners who benefit from the density that the trains support.

FRED: Should the Randal O’Tooles and Fred Fraileys who drive cars everywhere pay for the roads they wear out?

RANDAL: Absolutely. We pay for our roads, largely, with gas taxes. Still, the subsidies for roads have increased, to I believe \$79 billion last year, which comes to about a penny a passenger mile when you include the ton-miles for freight. Compare that to about 25 cents a passenger mile for Amtrak. Let’s get rid of all subsidies. My home state of Oregon is experimenting with mileage-based user fees. I think it’s working.

FRED: Randal, it’s been fun talking to someone who tells me things I’d rather not hear. We need to take a train trip together.

RANDAL: Let’s do that. **I**

Future freight railroads?

Combined changes could break the chains that have confined rail freight for a century

Too often railroads anticipate the effects of a change in isolation, while implementation of a combination of changes often has unexpected results. Four big changes combined to transform North American railroading in the 20th century: dieselization, centralized traffic control, deregulation, and consolidation. These contributed to vastly improved worker productivity facilitating operation of long freight trains, moved by powerful diesel-electrics, and dispatched remotely from regional control centers. Taking advantage of economies of scale, the lion’s share of rail freight was concentrated onto primary trunk routes, leaving just seven major players moving the majority of tonnage. Related changes stemmed from the industry’s continued desire to improve productivity. Meanwhile, modal competition reduced rail freight primarily to the long-distance movement of bulk commodities and intermodal shipments, while leaving the larger share of freight, including most short hauls, small shipments, priority freight, and other high-value movements to trucks.

Looking forward, how might three of the big changes facing

freight railroading today combine to again transform the industry?

Some may cringe at the mention of automated operations, advanced emissions-free motive power, and open access, so for this discussion let’s disregard the inevitable dismay of implementation. Let’s accept that at a future date these changes have been successfully implemented to the satisfaction of all stakeholders, including railroad management and labor, and public authorities. They have adequately addressed safety and regulatory concerns, and all parties have agreed on details of safe and efficient day-to-day operations.

Historically, economies of scale have led railroads to move greater amounts with fewer hands, but too often this made operations of smaller trains economically unappealing, if not impractical. Automated operation can change this model, as labor costs shrink while increasing flexibility. Changes to railroad motive power, such as those alluded to in my December 2018 article “Diesel Demise,” may obviate the practicalities and cost advantages now inherent to high-horsepower diesel-electrics and result in smaller power denominations using emission-free motive power. Lower-output motive power



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Podcast: TrainsMag.com



Open-access arrangements and short train lengths are characteristic of modern European cross-border point-to-point freights. A Euro Cargo Rail EMD diesel leads a compact intermodal freight at Tüßling, Germany. How might freights like this benefit the U.S.? Brian Solomon

may suit the operation of shorter freights without cost penalties. Railroads may still be able to operate enormous freights where it offers cost advantages, but may also operate shorter trains without fear of wasting labor, track capacity, or motive-power resources.

Advanced signaling and control systems may allow greater fluidity on main lines. Technological advances building upon positive train control, such as floating blocks and sophisticated automated traffic management, could maximize track space by fleeting short trains and minimizing delays at meeting points, while taking the greatest advantage of shorter braking distances, offering previously impossible degrees of operational efficiency. Where it suits operations, trains could be remotely combined and separated. For the long haul, trains could be operated together, while drops could be made en route at junctions without the need for complicated and time-consuming switching moves: Locomotives could be assigned to blocks of cars and located appropriately within consists to automatically bring the cars to their destination.

Automation may also transform terminals; automated cranes could load/unload containers from trains to trucks. Low labor costs and the ability easily to relocate or transfer loading equipment would mean that any siding with tarmac and road access could be established as an intermodal terminal. This could facilitate smaller-scale facilities that are better suited to accommodating smaller trains with minimum investment.

Open-access arrangements, comparable to those in place in Europe, could allow for more effective and competitive freight railroading by eliminating historic paper barriers, complicated and time-consuming interchange arrangements, while combined with infrastructure improvements/connections would allow for a more effective use of the North American railroad system as an integrated

SOME MAY CRINGE AT THE MENTION OF AUTOMATED OPERATIONS, ADVANCED EMISSIONS-FREE MOTIVE POWER, AND OPEN ACCESS.

network. Depending on negotiated arrangements, incumbent railroad operators/route owners would be able to continue providing service, while being able to charge open-access operators equitable track-access fees based on tonnage, operating path, train speed, or similar formula to ensure operations sustain infrastructure while benefitting the owning railroad without discouraging traffic. Open-access operators might be other large railroads, but also short lines, or third-party operators such as logistics/transport companies.

Automated operations would remove most historic complications based on the needs for qualifying crews, and presumably, locomotives and other equipment would be certified and inspected to ensure compatibility and safety standards.

Open-access operators would be able to provide point-to-point services to shippers across the network, either from sidings or from intermodal facilities, which would minimize terminal delays, while being able to bypass intermediate yards and congestion. Smaller and more agile train consists would be able to accelerate and brake more quickly and navigate the network easier. The result would be faster services, better equipment utilization, and better use of the whole network.

These changes combined would give railroads ability to operate trains of varying sizes and to load/unload where it suited traffic demands. Greater flexibility and fluidity would allow railroads to better compete for short-haul, high-value shipments, without facing the delays and costs that have historically limited their ability to access and move this traffic. Secondary routes would be more able to handle through traffic and may be well suited to offer choke-point relief. Railroads would have greater incentive to improve infrastructure as a means of enticing future traffic and not merely to accommodate existing business so the industry as a whole would benefit. **I**



The GMD-1

Uniquely Canadian, the model soldiers on after 60 years in service

▲ Northern Plains GMD-1 No. 1410 sits at the railroad's shop in Lansford, N.D., on July 22, 2018. Built in August 1958 for CN, this locomotive was moved to a refinery near St. Paul, Minn., for service in late 2018. Erich Linser

IN THE LATE 1950S, General Motors Diesel, the Canadian subsidiary of Electro-Motive Division, built the GMD-1.

This was a Canadian-only model sold to just two customers from late 1958 to early 1960. It was designed primarily for branch line and passenger service. The model had only two original customers, Canadian National and Northern Alberta Railway, which bought 96 and five, respectively. The GMD-1 was designed in two configurations, the first was a six-axle design, using A1A trucks under the locomotive with the middle axle unpowered. This enabled the locomotive to spread its weight across two additional axles and was perfect for the hundreds of miles of light-weight 60-pound rail branch lines on the Canadian prairies.

The second design used two-axle Flexicoil trucks under the locomotive and was equipped with a steam generator in the short hood for use on passenger

trains. CN bought 78 A1A trucked GMD-1s numbered in the 1000 series and 18 B-B trucked GMD-1s in the 1900 series while Northern Alberta Railway bought five with the A1A trucks in the 300 series. Northern Alberta would become part of CN in 1981, making CN the sole operator of

the model in the decade.

By the time the units were requiring modifications in the early 1980s, the need for a sizable fleet of A1A-trucked locomotives had decreased. CN retrucked many A1A-trucked GMD-1s with two-axle Flexicoil trucks from retired Canadian National GP9s, larger fuel



Canadian National sold 20 GMD-1s to Ferrocarriles de Cuba, with many receiving A1A trucks under the long hood end, such as No. 51203 at Santa Clara, Cuba, on March 1, 2017. Joe McMillan

KCS honors the armed forces



Freshly painted Kansas City Southern SD70ACe No. 4006 displays the red, white, and blue (and some green) on train MKCSH-15 at Cove, Ark., on Nov. 17, 2018. The locomotive, unveiled on Veterans Day, is from a 2005 order and is maintained at Shreveport, La. The idea came from Assistant Vice President System Mechanical Chris Mitchell. Ian Murray

tanks, and other upgrades along with new 1100-series road numbers. CN would rebuild a small group of A1A trucked GMD-1s in the late 1980s for continued branch-line service, placing them in the 1600 series. The 1600s were a more extensive upgrade, with larger fuel tanks, upgraded air brakes, changing operation to short hood forward and other modifications. CN's 1400-series rebuilds would be the final rebuild for the model, mirroring all the upgrades found on the 1600 series, but changing the trucks from A1A to Flexicoil. Most passenger-equipped 1900 series would be retired, though a handful were rebuilt and placed in the 1400 series, with their steam generators removed during rebuilding.

Over the years, CN would begin to sell off many GMD-1s, with the largest group of 20 sold at once to Ferrocarriles de Cuba in Cuba. The railroad found the four-axle GMD-1s to be too heavy and purchased many of the discarded A1A trucks removed from GMD-1s years ago to be reinstalled. Many would receive only one A1A truck under the long hood end, creating a unique A1A-B locomotive, while others received two A1A trucks.

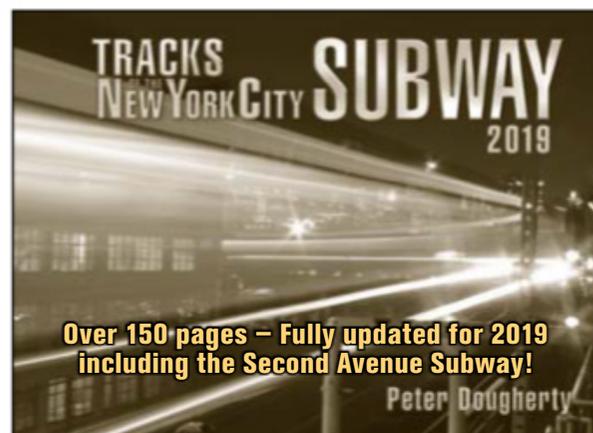
Today, many GMD-1s remain in service across North America and Cuba, primarily on short lines, grain elevators, and industrial switching facilities. CN still has 15 GMD-1s on its roster. With CN's current motive-power shortage, many remaining GMD-1s have been placed back into service. As of late 2018, 11 of the 15 were operating. — *Chris Guss*

LOCOMOTIVE BRIEF

Metra acquires rebuilt, secondhand power



METRA's recently acquired F59PHIs Nos. 73 and 77 are transferred to the Western Avenue shops for final prep work prior to being placed in service in late 2018. These two are part of a group of 21 former **AMTRAK** F59PHIs in *Pacific Surfliner* and *Amtrak Cascades* paint purchased by the Chicago-area commuter railroad to carry road Nos. 73-93. The agency has also acquired three additional F59 locomotives to be numbered 94-96, which will join three F59s already on the roster as Nos. 97-99. The F59s are expected to arrive in early 2019. Metra is also acquiring two GP23ECO from **PROGRESS RAIL** later in 2019 to be numbered 10 and 11, using PRLX GP40s Nos. 6637 and 4036 as cores. Chris Guss



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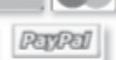
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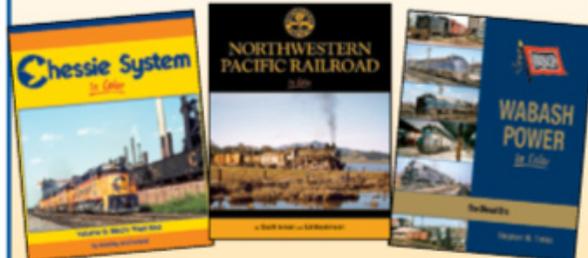
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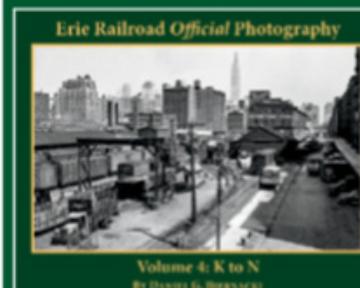


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Brightline partners with Virgin

Stock offering, worldwide name recognition drive alliance, rebranding

▲ A Brightline train crosses Fort Lauderdale's Middle River on Feb. 1, 2018. The passenger operation is being rebranded as Virgin Trains USA, reflecting its new business partnership.

Three photos, Bob Johnston

THE INITIAL MOVE WAS UNEXPECTED AND PUZZLING.

Why, after years building a distinctive identity, visually and in onboard service, would Brightline choose to abandon that identity? Why, after doing so much independently, would it join with a company whose rail franchises in the United Kingdom have had varying degrees of public acceptance?

The answer came hours after Fortress Investment Group's Florida passenger service announced its partnership with Richard Branson's U.K.-based Virgin Group, which includes airlines and hotels as well as rail operations. Later that same November day, the new company, Virgin Trains USA Inc., filed an initial public offering document with the Securities and

Exchange Commission.

Imminent plans to expand Brightline's footprint to Orlando, Tampa, and the Las Vegas-Southern California market [see "Brightline Bets on Vegas," "Passenger," December 2018] require significant money to build new track. Fortress has been attempting to raise it through wide-ranging methods including private activity bond sales, federal Railroad Rehabilitation and Improvement Financing loans, or digging into Fortress' asset portfolio. Selling common stock, if the SEC application is approved, injects another source of funding that allows those ventures to begin earning revenue sooner.

Attaching the Virgin moniker provides not only immediate worldwide recognition among potential investors, but also facilitates marketing partnerships the company will need to grow business beyond its Miami-West Palm Beach, Fla., startup. As noted in Brightline's announcement, "Virgin Group has more than 60 companies focused on its core consumer sectors of travel and leisure, telecoms and media, music and entertainment, financial services, and health and wellness."

However, Virgin's stewardship of its U.K. rail franchises has been a mixed bag, often dependent on the routes and

equipment it has been dealt. Brightline management succeeded in designing a passenger-friendly environment literally from the ground up, with new track and dispatching regimens, Siemens cars and locomotives, striking South Florida stations, and distinctive onboard service and online promotion.

In contrast, inherited crews, equipment, and aging infrastructure plagued Virgin Trains East Coast, a joint venture with Stagecoach, after it won an eight-year East Coast Main Line franchise between London and Scotland in 2015. It relinquished the operation in June 2018, the third entity to do so since British Rail privatization. Since 1997, Virgin Trains has also held the West Coast franchise. It is subject to investment decisions by government-run Network Rail, which oversees the right-of-way, that often affected service. A new West Coast agreement will be awarded in 2019; Virgin is a partner in one of the three bidding groups, but the winner won't be in a position to exert quality control the way Brightline has.

Although Virgin Trains USA says it will begin rebranding the Florida service in 2019, it assures investors and customers, "Brightline's current management team will oversee daily operations,



Select class passengers (including one comfortable dog) relax aboard a Brightline train bound for West Palm Beach on May 12, 2018.

engineering, business development and strategy.” The SEC filing reveals that the Virgin Group’s “minority investment” includes the chief investment officer, one of four directors on the new company’s board. Other information in the prospectus, previously shielded by Fortress’ close-to-the-vest management philosophy during the three-year build-out, includes:

- Trackage to Orlando International Airport and to Tampa will be built concurrently. This makes sense, in part because the new maintenance facility south of the airport is on the route to Tampa. Expansion beyond the airport will cost \$1.7 billion.

- Patronage and ticket sales are expected to “stabilize” by early 2024 after a two-year “ramp up.” After that, annual ridership is pegged at 9.5 million with revenues of \$697 million, with fares estimated at \$100 between Miami and Orlando, and \$35 between Orlando and Tampa.

- There apparently will be a “Disney World area” station.

- Siemens trainsets for the West Palm Beach-Miami service cost \$260 million. The equipment needed for the expansion will be approximately the same amount.

- Ridership between Miami and West Palm Beach is not listed. Ticket revenue, however, jumped from \$1.5 million in the second quarter (Miami service began in mid-May), to \$2.9 million in the third quarter. This followed a mid-August increase in service frequencies, and higher ticket prices in Select class.

- Las Vegas-Victorville, Calif., construction will cost \$3.6 billion. Ridership projections were scaled back about 8 percent from those in a “High Desert Corridor study,” because the route will be built to a 125-mph standard rather than 220 mph.

Brightline had previously said it had not yet developed comprehensive plans for service between Las Vegas and Southern California. But another entrant, Las Vegas Xpress, says it will resurrect plans dating from 2012 to launch what it calls X Train. Running on Union Pacific and BNSF Railway, X Train would begin as a once-weekly excursion between Las Vegas and Metrolink connections at San Bernardino, Calif., in mid-2019. Coincidentally, the operating liaison with the two Class I railroads hired by Las Vegas Xpress is not Amtrak, but First Transit Rail, the U.S. affiliate of a major Virgin competitor in the U.K.

Will Brightline’s emphasis on customer focus diminish if trainsets like Bright Pink and Bright Green and the yellow-and-black locomotives give way to Virgin’s ubiquitous red? We won’t know until the transformation begins. But don’t bet against the managers and employees that have poured creativity and pride into the operation they launched in 2018. — *Bob Johnston*



The *Vermont* arrives at Essex Junction, Vt., on June 14, 2018. Amtrak has not yet said what it will require in the way of “risk mitigation” on routes like this one that are PTC-exempt.

Amtrak still faces PTC hurdles

Connectivity, ‘risk mitigation’ issues remain unsettled

AMTRAK SAID IN MID-NOVEMBER it will have “performed and implemented operational risk mitigations” prior to the Dec. 31, 2018, deadline on about 5,000 miles of host-railroad track without positive train control. Those miles have been granted Federal Railroad Administration waivers from PTC requirements (about 1,500 miles) or delays in implementation.

Exactly what form these “risk mitigations” might take — and who will pay any resulting costs if they are needed on a state-supported route — has not been spelled out. They likely will depend upon the type of dispatching and/or signal system on routes not required to have PTC. In New England, the *Vermont* and *Ethan Allen* have run safely for years under track-warrant authority over portions of their route without automatic block signals. Maine’s *Downeasters* require PTC in high-traffic Massachusetts Bay Transportation Authority commuter territory, but not north of Haverhill, Mass., on Pan Am Railways’ signaled right-of-way.

Except for 1.5 miles of slow-speed track in the Chicago area where PTC is of dubious value, Amtrak says its “owned or controlled” track will be operational. This includes Amtrak’s Advanced Civil Speed Enforcement System in the Northeast and Michigan’s Incremental Train Control System.

Still in limbo are situations where a route will require PTC, but the host railroad

doesn’t meet the deadline to have equipment installed, tested, and interoperable with Amtrak’s “back room” at its Consolidated National Operations Center in Wilmington, Del. For such cases, Amtrak submitted an application on Nov. 16 to the FRA for “an alternative schedule [read: delay] to allow for interoperability testing with our freight and commuter partners and for the potential for ... technical issues to arise during testing.”

Amtrak has moved from the view expressed earlier in 2018 by CEO Richard

Anderson, who said “I doubt we will” operate on lines without PTC. In September, Executive Vice President and Chief Operating Officer Scot Naparstek promised no discontinuances on New Years Day.

The same month, in an interview with

TRAINS, FRA Administrator Ron Batory said he reminded Anderson, “Gravity is not as potent on the ground as it is in the air. So the degree of risk assessment up there may not be the perfect formula for what’s down here.” Batory believes PTC is “nothing more than a risk-reduction system [often] overlaid on a signal system. It’s the right thing to do, but it’s not to overshadow what a good job the 250,000 people in the U.S. that maintain and support our railroads dedicated to their safe operation every day are doing.” He said he told Anderson, “Richard, if it’s unsafe, you don’t wait until Dec. 31, 2018.” — *Bob Johnston*

AMTRAK PTC IMPLEMENTATION PROGRESS*	
	Percent (quantity)
Fully PTC-operable locomotives	Amtrak-owned: 84% (370 of 443)
	State-owned: 60% (68 of 114)
Amtrak-owned track in operation	67% (607 of 900 route-miles)
Host railroad-controlled track	Percent unavailable (approx. 16,000 route-miles)
Radio towers	100% (144)
Hardware installation	100% (not provided)
Employees trained	100% (not provided)

*—As of Nov. 8, 2018. Source: Amtrak

Comanche Crossing, now Strasburg, Colo., lays claim to the place where the first transcontinental railroad was finished

by Rich Luckin

Everyone is familiar with the completion of the first transcontinental railroad at Promontory Summit in Utah on May 10, 1869. But few know the story of a place in Colorado that challenges that claim of being the first transcontinental. It's a location you've probably never heard of, either: Strasburg, Colo., formerly known as Comanche Crossing. And the debate over which one is truly the first is a sticky one.

Here's how the tale plays out: While the driving of the Golden Spike in Utah took place in 1869, the route did not create a true transcontinental route because of one significant omission.

Passengers coming from the east had to detrain at Council Bluffs, Iowa, take a ferry across the Missouri River to Omaha, Neb., and board a Union Pacific train to continue their journey west. There was not a continuous rail passage here until March 22, 1872, when the first railroad bridge between Council Bluffs and Omaha was completed.

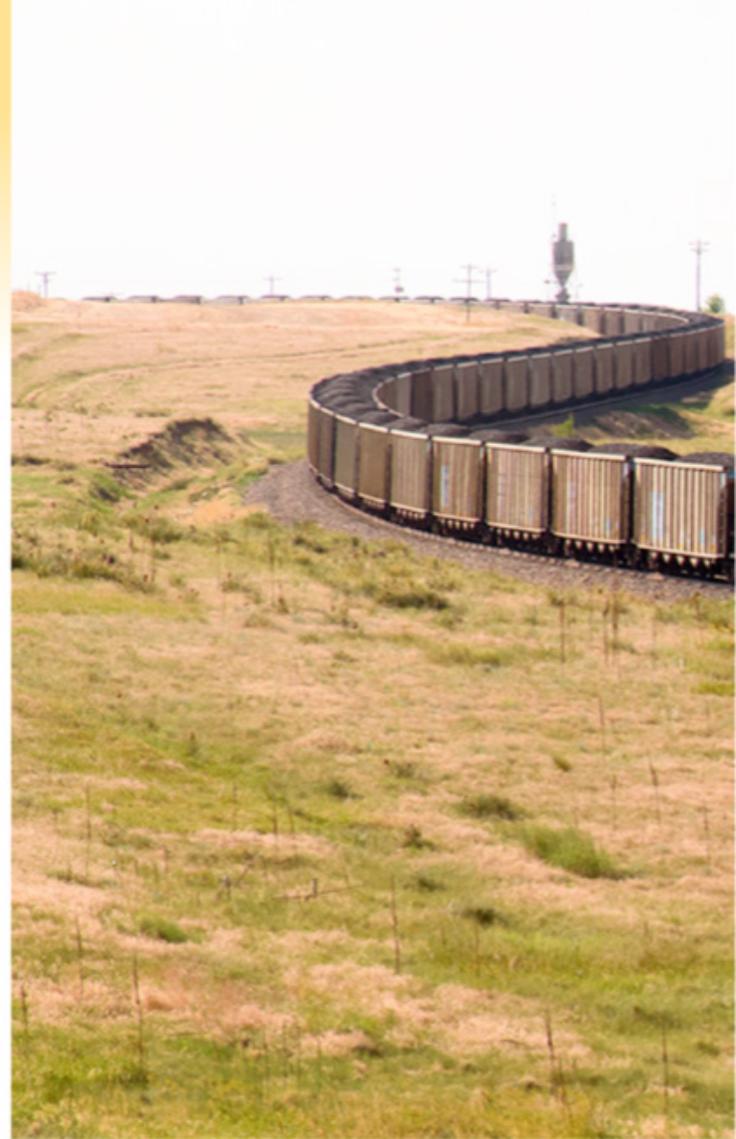
Meanwhile, Kansas Pacific started construction west from Kansas City, Mo., in 1863 and completed its route to Denver at Comanche Crossing, some 40 miles east of Denver on Aug. 15, 1870. That route included the Hannibal Bridge over the Missouri River, begun in 1867 and completed in 1869 at a cost of \$1 million. From Comanche Crossing, it connected to UP via the Denver Pacific at Cheyenne, Wyo., a little over 100 miles. If you wanted to go

coast-to-coast entirely by rail, you had to go through Kansas City until 1872.

The word "transcontinental" is defined as "across the continent." It doesn't specifically state the starting point or ending point. The concept of the first unbroken rails from the Atlantic to the Pacific is a different definition.

During the building of the Union Pacific-Central Pacific transcontinental railroad, Denver was bypassed, much to the disappointment of Denverites. Dr. Thomas Durant, vice-president of the Union Pacific, pronounced Denver "too dead to bury." Colorado Territorial Gov. John Evans declared: "Colorado without railroads is completely worthless." They were right.

So here is Denver and Colorado's revenge: The Comanche Crossing twist in transcontinental railroad story. Of course, the further irony is that both the Kansas Pacific and Denver Pacific became part of the UP in 1880 under the direction of Jay Gould. Even the UP has acknowledged the site, marking its centennial in August 1970 with a ceremony in which UP Executive Vice President John Kenefick spoke. Today, UP's Kansas Pacific line is an important route. The line was upgraded in the early 2000s to handle Colorado coal traffic. Coal traffic boomed in the 1999 to 2015 period. It dropped off in the following years but still is a major route for remaining coal traffic. The KP is also a vital link for defense train traffic.



An eastbound UP coal train rolls through Strasburg, Colo., on June 25, 2017. The line is a busy route from Denver to the East. James West

Fort Riley, Kansas, annually moves unit trains of vehicles via the KP to the National Training Center in California. Grain train traffic is seasonal and still a bustling commodity moved over the Kansas Pacific. Unit grain trains originate from Byers and Cheyenne Wells, Colo.

Kyle Railroad (ex-Rock Island) connects with UP's Limon Subdivision. UP provides service twice a week out of Denver to Limon, Colo. Kyle sends loaded boxcars of roofing material on a regular basis to the hectic Denver construction market.

So, in the end, here's an important route that raises an odd question in transcontinental railroad history: Which one is the true transcontinental? It's a quandary that

**MOVE
OVER**

P R O M O N T O R Y

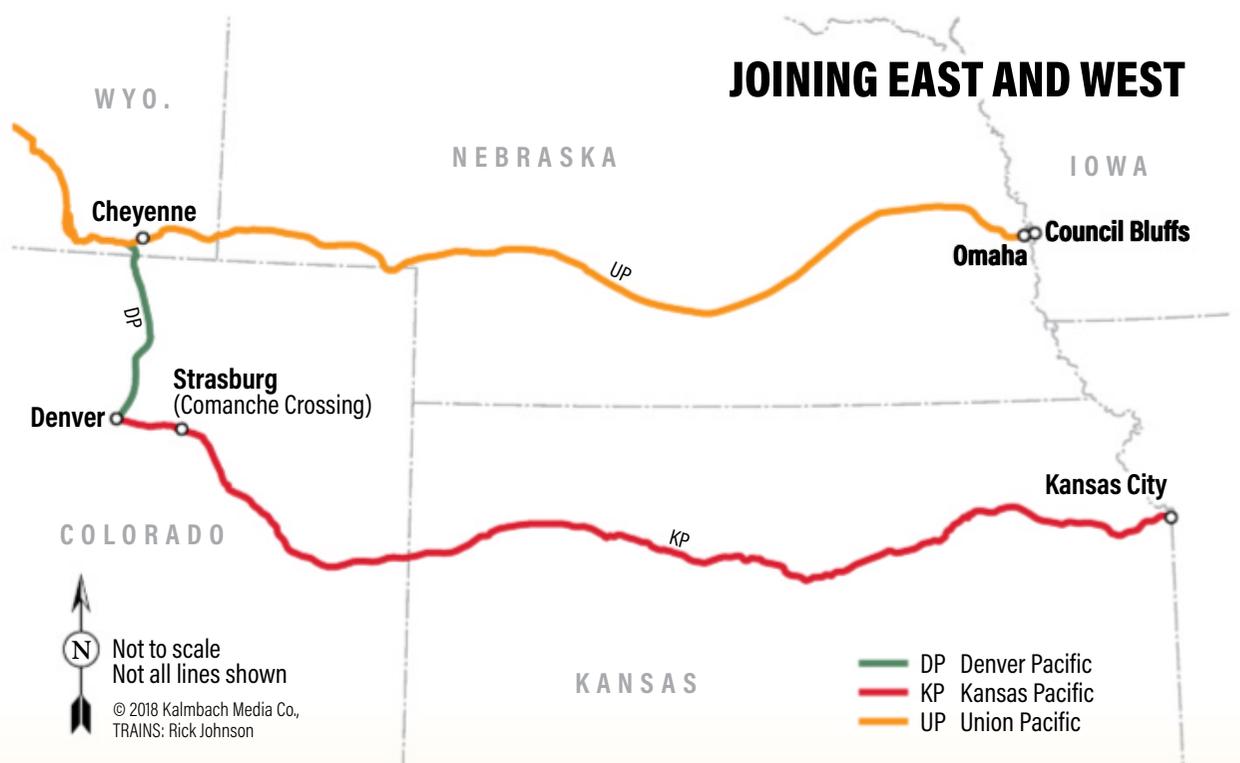


has been lingering for 150 years, and, we suspect, it will go on for another 150 more, maybe even longer.

So, in 2019, you can celebrate the Golden Spike ceremony on May 10, and if you're up for an alternative view of history, you can party again on Aug. 15, 2020, and raise a toast to the good folks of Comanche Crossing, now better known as Strasburg, Colo. **I**



UP placed this marker in August 1970 to recognize the route through Strasburg, Colo., as the first all rail line across the U.S. Rich Luckin



ON TORRY

THE OTHER TRANSCONS

The Southern

Southern Pacific offered many ways to the West

by H. Roger Grant

Transcon

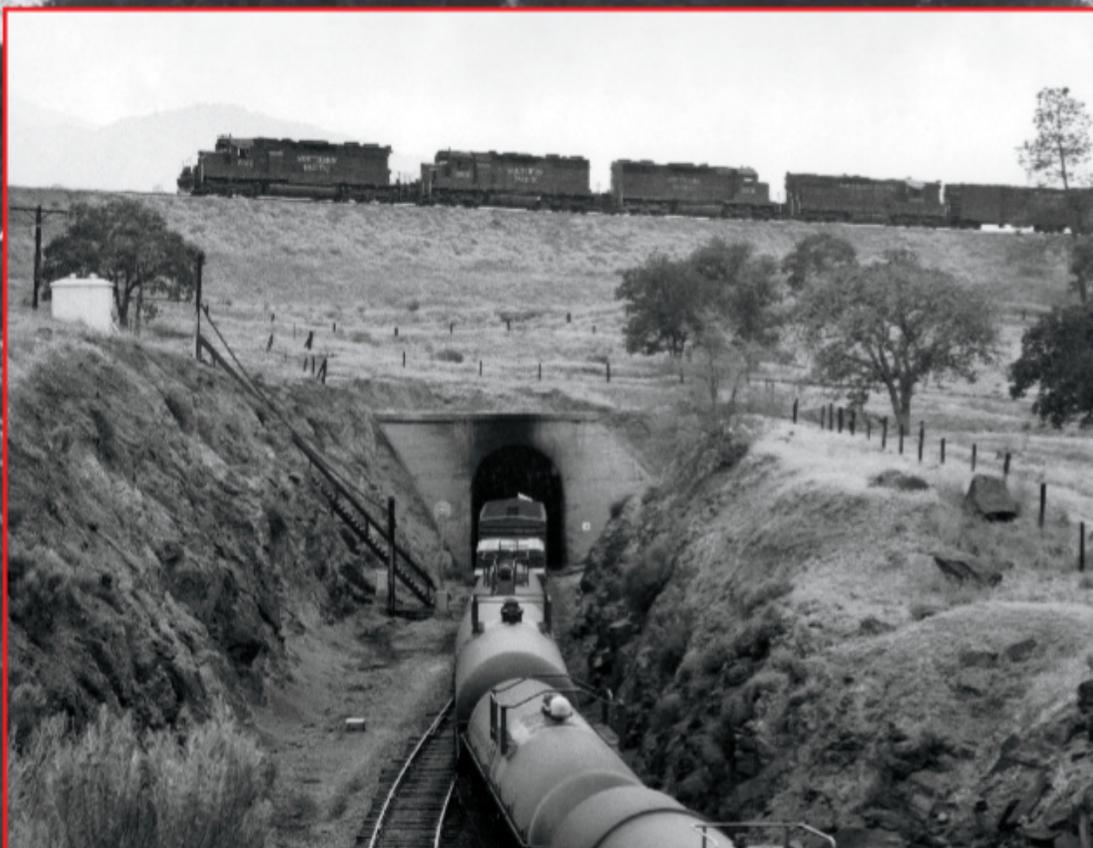
Editor's note: As the United States celebrates the 150th anniversary of the first transcontinental railroad, TRAINS is taking a look at the other American transcons. This is the second article of five in the series.

JUST AS WAGS BRANDED the Illinois Central the “wrong-way transcontinental,” marking it an odd directional railroad, the Southern Pacific claimed the distinction of being the only transcontinental carrier that built from west to east. What’s more, it did so twice, as part of the original transcontinental railroad, and SP’s own southern route across the country.

Before predecessor Central Pacific and connector Union Pacific Railroad succeeded in 1869 in spanning the vastness between Sacramento, Calif., and Council Bluffs, Iowa, the assumption had been that transcontinental carriers would head westward toward the Pacific Ocean.

During the antebellum years, Americans looked forward to creating dependable transportation in the West, especially throughout the trans-Mississippi West. At an amazingly early date, visionaries proposed exceptionally long railroads that could shatter the tyranny of distance. In 1829, William Redfield, the first president of the American Association for the Advancement of Science, called for building a railroad from the eastern seaboard to the Mississippi River valley. During the 1830s and 1840s, there were other suggestions for inter-regional carriers, including the 700-mile Louisville, Cincinnati & Charleston Rail Road.

It would be Asa Whitney, a merchant who had traveled widely overseas, who became the first individual who tirelessly pushed for a transcontinental project, specifically a railroad from Lake Michigan to the Oregon Country. At the time Whitney did more than any contemporary to seek a Pacific railroad. Public interest mushroomed;



A Central Pacific train and locomotive pose on the Tehachapi Loop in 1876. Southern Pacific Inset: 96 years later, in a view from the same location, four EMD locomotives lead a Southern Pacific train crossing over itself. Jim Zwernemann



A stagecoach, steam locomotive, and F7 in SP's "black widow" paint scheme gather at a "Rail to Trail" pageant in Sacramento, Calif., celebrating the 100th anniversary of SP's earliest predecessor, the Sacramento Valley Railroad, which began operation in 1856. Southern Pacific

more citizens no longer considered such advocates to be lunatic thinkers or obsessed dreamers. The realization grew that animal-powered conveyances and those on water were impractical for long distances, the former being limited in capacity and the latter in scope.

Selecting a route

If a transcontinental railroad were to be constructed, the question was where would it be located. Routing debates became linked to the growing sectional tensions that swept the country by mid-century, heightened by passage in 1854 of the Kansas-Nebraska Act. A year before this controversial measure, the U.S. Army Corps of Topographical Engineers had undertaken five parallel surveys that dissected the West from north to south. Also in 1853, Washington negotiated with Mexico for the acquisition of a strip of territory located in the southern part of present-day Arizona and New Mexico to allow for the 32nd-parallel route. At a cost of \$10 million, this Gadsden Purchase provided a low-grade passage for rails to the Pacific, something that pleased defenders of slavery.



Theodore Judah

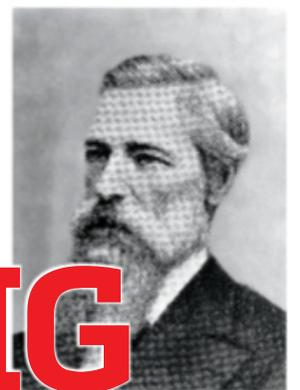
There would be other Asa Whitneys. Notable was railroad builder and civil engineer Theodore Judah. He, too, believed that iron rails would span the nation, namely from the "Gold Rush State" to the rapidly expanding rail network of the East. In the mid-1850s, Judah moved from New York state to Sacramento to work as chief engineer for the gestating Sacramento Valley Railroad. After two years, this little carrier reached nearby Folsom from Sacramento. Even before this accomplishment, he had emerged as an avid transcontinental rail advocate. Judah then spent several years exploring and surveying the best route across the central Sierra Nevada Mountains, becoming convinced that such a passage was feasible. But he did more. Called by some "Crazy Judah," he lobbied hard for a federal land-grant measure that would enable construction through more than 2,000 miles of sparsely settled wilderness. Judah also spearheaded an important railroad convention held in Sacramento in 1859, generating more grassroots enthusiasm for extending rails eastward.

Judah would not be the driving force

behind what in 1861 became the Central Pacific Railroad, core of the future Southern Pacific system. Yet he brought together the four businessmen from Sacramento who ultimately made possible his Donner Pass Route: Charles Crocker, Mark Hopkins, Collis P. Huntington, and Leland

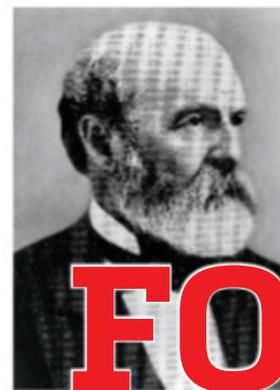


Charles Crocker

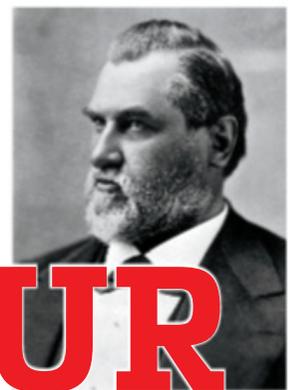


Mark Hopkins

BIG



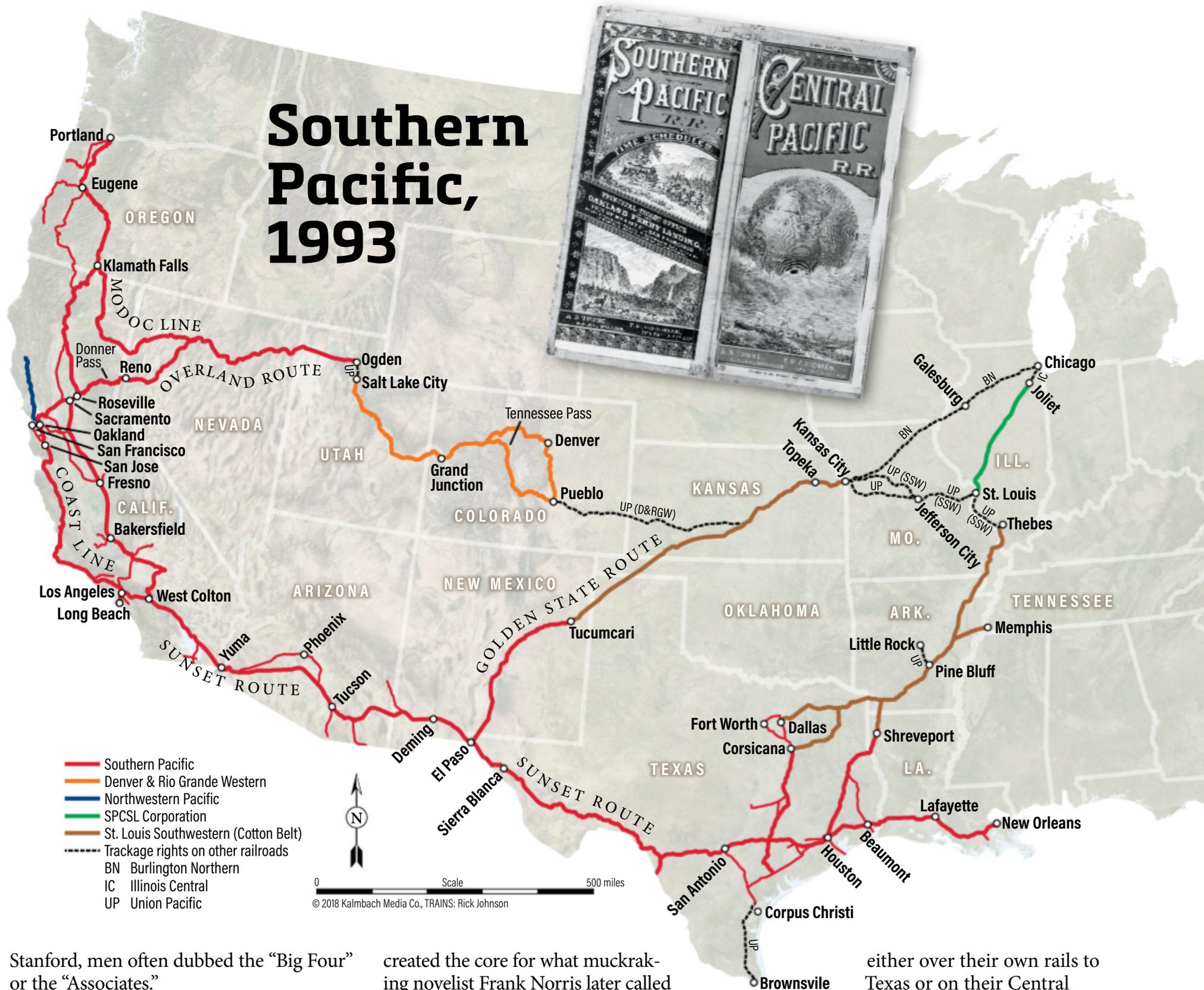
C.P. Huntington



Leland Stanford

FOUR

Southern Pacific, 1993



- Southern Pacific
- Denver & Rio Grande Western
- Northwestern Pacific
- SPCSL Corporation
- St. Louis Southwestern (Cotton Belt)
- - - Trackage rights on other railroads
- BN Burlington Northern
- IC Illinois Central
- UP Union Pacific

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Stanford, men often dubbed the “Big Four” or the “Associates.”

With the outbreak of the Civil War and departure from Congress of backers of a southern transcontinental railroad, lawmakers made it possible for President Abraham Lincoln to sign in 1862 the Pacific Railway Act, designating a route west from Council Bluffs, Iowa, to Sacramento. There was more good news for the Big Four. The recently organized Union Pacific Railroad would not be sole builder; there would be two companies. The Central Pacific would need to conquer the Sierras and the desert country of the Great Basin.

About the time dignitaries hammered down the ceremonial spikes at Promontory, the Big Four members expanded their holdings in California, mostly under the banner of the Central Pacific. Included in their aggressive acquisitions was the San Francisco & San Jose Railroad, which had opened in 1864 between these two municipalities. A year later this firm launched the Southern Pacific Railroad that planned to build south and east to New Orleans. By 1870, the Big Four controlled these companies, having

created the core for what muckraking novelist Frank Norris later called the “octopus.” Within a few years, the SP operated through the agriculturally rich San Joaquin Valley to Los Angeles and was poised for further expansion.

A second route

It would be in the early 1880s that the Big Four (technically the Big Three, since Mark Hopkins died in 1878) forged a second transcontinental connection. The Southern Pacific, marshaled by Collis Huntington, built from Los Angeles through the territories of Arizona and New Mexico toward El Paso, Texas, which it reached on May 19, 1881. Slightly more than two months earlier, March 8, 1881, at Deming, in southwestern New Mexico, the SP connected with the Atchison, Topeka & Santa Fe Railway. Nine days later, the first through train left Kansas City for California. Yet for the Santa Fe, this Deming transcontinental link turned out to be a disappointment. Huntington and his colleagues had no intention to deliver freight to the Santa Fe; rather, they could send it

either over their own rails to Texas or on their Central Pacific to the Ogden gateway, connecting with the Overland Route of the Union Pacific and Chicago & North Western for Chicago and other points. The Santa Fe decided that it would have its own transcontinental outlet, initially making the disastrous decision to forge a route between Benson, Arizona Territory (with trackage rights over the SP from Deming) and Guaymas, Sonora, Mexico, on the Gulf of California. By 1887, however, the Santa Fe had fashioned its own line to Los Angeles, and more West Coast expansion followed.

The Southern Pacific had no intention of keeping El Paso as its eastern terminus. Huntington persuaded owners of the Galveston, Harrisburg & San Antonio Railway, which linked Houston with San Antonio, to build from San Antonio to El Paso, a project completed in early 1883. In time the GH&SA became an integral part of the SP. Then, through arrangements with several additional Texas and Louisiana carriers, which also later entered the SP



A westbound freight from El Paso, Texas, passes through the Rio Grande Valley in New Mexico in 1952. SP's eastward construction reached El Paso in 1881; by 1883, the company had cobbled together a route that reached New Orleans. R.D. McIntyre

fold, a new long-distance artery was cobbled together between New Orleans and Los Angeles. The initial passenger service began on what was dubbed “the Sunset Route” on Feb. 5, 1883. The SP made further acquisitions in the Lone Star State, and developed other ways to serve mid-American railroad centers and those further east. For decades, the SP interchanged with the St. Louis Southwestern (Cotton Belt) to reach the St. Louis gateway, and in 1932 it gained control of this property.

Before the Cotton Belt became an interchange partner, the Southern Pacific connected with still another transcontinental artery. This was the Texas & Pacific Railway, a project Southerners had long fancied. In 1871, the T&P won a charter to build from Marshall, Texas, via El Paso, to San Diego. The coming depression, triggered by the Panic of 1873, stymied construction, but by the mid-1870s the company had managed to install some trackage, including its main line between Shreveport, La., and Fort Worth, Texas. With ownership changes and a stronger economy, the T&P in 1880 resumed construction westward. On Nov. 25, 1881, it reached Sierra Blanca, Texas, 90 miles east of El Paso, and joined up with the SP. This made it the third transcontinental, opening only nine

months after that SP-Santa Fe connection. In 1882, the T&P established service from Shreveport to New Orleans.

Explosive construction during the 1880s meant that the Railway Age had matured. After all, in 1870 the national network stood at 52,922 route-miles, and 20 years later mileage had soared to 163,597. It would be in the 1880s that workers installed about 65 percent of the trackage that appeared during these boom times. The new SP-related transcontinentals contributed to this construction surge.

Other ways west

The public had options for coast-to-coast or other long-distance journeys. They, of course, could reach California via the original transcontinental route, but by the 1880s other options included routes owned or controlled by the Southern Pacific. Nevertheless, such trips usually did not mean frequent service. Take what the SP offered in February 1889. If a traveler were to go from Los Angeles to New Orleans, the only through train eastbound, denoted

The eastbound *Sunset Limited* approaches the Memorial Tunnel at El Paso on March 15, 1952. Born in 1894, the *Sunset* had received its latest upgrade in 1950. TRAINS collection

the *Sunset Express* (predecessor to the *Sunset Limited*), left at 8:10 p.m., arrived in Yuma at 8:25 a.m. the next day and at Deming at 5:50 a.m. the following day. El Paso was not reached until 9:45 a.m. The distance covered was 1,286 miles. Following a time change, this name train left at 12:15 p.m. and reached San Antonio 25 hours later. It steamed into Houston at 11:35 p.m. and the following day arrived in





New Orleans at 3:15 p.m. This made for a 2,495-mile trip. The *Sunset Express* provided a traditional wooden consist for the late 19th century, including diner, chair cars, and Pullman sleepers. Subsequently the SP joined with the Louisville & Nashville, Southern Railway, and West Point Route to promote the “Washington-Sunset Route.” With the advent of direct competition from the Santa Fe, passenger fares dropped during the late 1880s, and these attractive ticket prices triggered a “tourist rush” that



The *Overland Limited*, with Mt-3 class 4-8-2 No. 4344 serving as a helper to one of SP's signature cab-forward 4-8-8-2s, passes through Clipper Gap, Calif., in May 1949. For decades, the *Overland* was the flagship train on the original transcontinental route. David G. Edwards

continued off and on for decades.

If travelers did not care to connect in New Orleans with another railroad, the SP offered a water option. In 1883, the company acquired the Morgan Line Steamship Co., providing passenger and freight connections to New York City and other east coast ports. This rail-water combine provided the SP a system with a global reach.

The Southern Pacific understandably took pride when in 1894 it introduced the all-Pullman *Sunset Limited*. This elegant train offered once-a-week service between San Francisco and New Orleans with a transit time of 75 hours, 58 hours from Los Angeles. “A transcontinental train for travelers of distinction,” crowed the company. If one were traveling from some eastern or Midwestern point, the SP recommended this train because would-be passengers during the winter should not “take a line that will carry you into the heart of the Rockies, and leave you there a week or more, snow-bound.” The SP altered the number of trips and also its routing. During the winter season of 1897-1898 (October to April), for example, the *Sunset Limited* operated twice-weekly service between San Francisco and Chicago. This route involved SP rails to El Paso; T&P to Texarkana, Texas;

the St. Louis, Iron Mountain & Southern (a Missouri Pacific predecessor) to St. Louis; and Chicago & Alton to the Windy City. For all of its trains that connected to northern destinations, the SP continually lauded the salubrious California climate: “The summer way on a winter day.”

Busier than the Sunset Route was the historic Overland Route. During summer 1892, by way of example, the company carded two through trains between San Francisco and Ogden, a distance of 895 miles. Still there was only a single express. But a decade later the SP operated three daily trains, and later increased service on this popular cross-country link.

The 20th century brought faster and more frequent service and also improved equipment on SP's multiple transcontinental

The Southern Pacific understandably took pride when in 1894 it introduced the all-Pullman *Sunset Limited*.



GS-4 No. 4439 leads train No. 40, the eastbound Los Angeles-Chicago *Imperial*, 3 miles north of Corona, N.M., on the Golden State Route, as it nears its handoff to the Rock Island at Tucumcari, N.M., on May 27, 1949. The route was a significant one for the SP. D.L. Ingersoll

routes. If travelers were to select their favorite train that plied SP rails, it probably would be the *Overland Limited*. It was a far cry from the first transcontinental trains, known as the *Atlantic Express* (eastbound) or *Pacific Express* (westbound), or Nos. 1 and 2, which were slow and basic. It would be in 1899 that the SP joined the UP and the Chicago & North Western to operate “the most luxurious and fastest daily train across the continent,” and also boasted: “It’s an Aladdin’s Carpet — three days and nights between San Francisco and Chicago.” Three years later the *Overland Limited* underwent a major refurbishing with modern Pullman equipment. A noteworthy feature was the availability of telephone service, “the adaptation of which to railway trains is entirely original and absolutely unique.”

The upgrade of the *Overland Limited*, and the SP starting in 1906 to acquire all-steel passenger cars, reflected UP control. It would be financier and UP head E.H. Harriman, who took over the sprawling SP in 1901, a relationship that lasted until the U.S. Supreme Court dissolved the combination in 1913. Yet after that controversial decision, crack passenger trains continued to serve the Overland Route.

While the Southern Pacific connection with the Santa Fe in New Mexico never

gained significance, another one did. This would be the forging of the “Golden State Route” with the Chicago, Rock Island & Pacific Railway. During the latter part of the 19th century, this granger road had made impressive mileage gains by penetrating large sections of the Great Plains, but it still remained far from the sea. At the start of the 20th century that changed when the company fell into the hands of the Reid-Moore syndicate. This group of speculators had dreams of a coast-to-coast rail empire. Although the Rock Island failed to reach the Pacific, the company in 1901 and 1902 built rapidly from Liberal, Kansas, through Dalhart, Texas, to Santa Rosa, New Mexico Territory, where it met the El Paso & Southwestern Railroad (in time a SP property). Initially this provided

The railroad in 1886 dispatched its first special fruit train to the East, allowing oranges and other healthy fruit to be enjoyed out of season.

a friendly connection with the SP in El Paso and created a through route between Chicago and California. Later these two companies established their interchange at Tucumcari, N.M. It would be in late 1902, almost exactly 50 years after the first Rock Island passenger train, that the *Golden State Limited* made its debut on a three-day-a-week basis between Chicago, Kansas City, El Paso, and Los Angeles with a St. Louis connecting section. As with most name trains of the era, high-steeping Atlantic locomotives often pulled this joint Rock Island-SP train. Reminiscent of the contemporary *Sunset Limited*, the *Golden State Limited* was advertised as “the Direct Route of Lowest Altitudes.”

Southern Pacific officials surely believed that high-quality, long-distance passenger trains spoke well of their company; in fact, they possessed a marque value. If shippers had pleasant experiences with the “varnish,” they would route their freight over the road. Thousands of freight customers, though, had no other choice of carriers; the SP covered large sections of California like a morning dew. For many Californians the SP had become the scapegoat for their state’s problems and spawned anti-corporate and anti-railroad feelings that led to harsh business controls during



The SP helped stimulate demand for California agricultural products. At left, an early produce special on June 24, 1888. Southern Pacific
Above, a produce train arrives in Tucumcari, N.M., in June 1951. W.G. Fancher

distance travel, with the commercial airline industry in its infancy. The *Sunset Limited* is representative, being what might be considered the paradigm of all transcontinental luxury runs. A daily train since 1913, it offered a variety of deluxe features. In addition to the expected dining car, Pullmans, parlor car, and observation-sleeping car, male passengers could enjoy the services of a barber, valet, and stenographer; female ones had access to a ladies' maid and manicure, and both sexes could take a hot bath. A tourist sleeping car was part of this heavyweight consist commonly pulled by 4-6-2s. The *Sunset Limited*, though, had to adhere to the "Jim Crow" segregation laws of Texas and Louisiana, meaning that the company needed to provide "separate but equal" accommodations for people of color.

The question arises as to who rode on the multiple SP transcontinental routes. Obviously, the well-to-do, most likely businessmen, professionals, vacationers, and stars from the rapidly developing film industry who enjoyed pampering, booked passage on the deluxe trains. The lesser ones more commonly accommodated farmers, ranchers, miners, lumbermen,

the progressive era.

American consumers, who might have little or no knowledge of the SP, experienced the benefit of this transcontinental connector. Notably the railroad in 1886 dispatched its first special fruit train to the East, allowing oranges and other healthy fruit to be enjoyed out of season. The orange no longer was a rare and treasured pleasure and became a breakfast staple. Then in 1906 came the launch of what developed into the greatest refrigerator car line in America, Pacific Fruit Express. A joint operation between the SP and UP, this subsidiary not only pleased customers with a variety of fruits and vegetables, but stimulated western agriculture, especially along SP lines in the Golden State.

Produce left California on SP rails through connections other than the UP. Take the Golden State Route. For decades freight traffic on this SP-Rock Island line was considerably heavier eastbound than westbound. The route's continuing importance was illustrated much later when the SP acquired ownership of much of it in 1980 when the bankrupt Rock Island underwent dismemberment.

While hotshot freight trains pulled by 2-8-2s and 2-10-2s raced along the three SP transcontinental arteries, so, too, did limited passenger trains. They were especially popular between World War I and the Great Depression. This was the time of well-patronized name trains, and railroads like the SP offered the fastest and best long-



The joint SP-Union Pacific-Chicago & North Western *City of San Francisco* crosses the Lucin Cutoff across the Great Salt Lake. Introduced in 1936, the train covered the 2,258 miles between Chicago and Oakland, Calif., in less than 40 hours. Southern Pacific



A troop train passes near Fort Bliss, Texas. The large number of military training camps and bases along its routes taxed Southern Pacific's ability to handle passenger loads, but the railroad took extreme steps, even discouraging travel by the public, to cope. TRAINS collection

soldiers, immigrants, and “drummers.” There were others who “took the cushions,” including educators and politicians. Not to be overlooked were hoboes and tramps who hopped “side-door Pullmans” or “rode the rods” and “blinds.” The SP, of course, did much to “win the West” and to continue its development.

World War II and after

The Depression years of the 1930s, with decreased transcontinental passenger patronage, except for non-paying hoboes, gave way to crowded trains during the era of World War II. California and Sunbelt states had a large number of military training camps and bases, and soldiers, sailors, and their families, along with others, including business and leisure travelers, patronized SP's long-distance trains. Since the railroad became the primary way of transportation for the Pacific War, freight tonnage reached record highs. This unprecedented volume taxed both equipment and crews, yet it was the SP's finest hour.

Following the return to peacetime conditions, the SP, like other major roads, experienced the Indian Summer years for transcontinental passenger service. This would be the time of diesel-electric locomotives and shiny streamliners. Even

before the war the marvel of these trains appeared on SP rails. It was in June 1936 that the joint C&NW-UP-SP *City of San Francisco* dashed between Ogden and Oakland on its Overland Route journey. Soon this train sported 17 cars and three diesel engines, and became a harbinger of things to come, although it began with only five round trips a month. On the eve of Pearl Harbor the railroads supplemented the *City* with another trainset, and the UP proudly announced that “there will be fast 39¾-hour service every third day from each terminal [Chicago and Oakland].” The train became daily in 1947.

After the war, Southern Pacific patrons saw the upgrading of all of the name trains, including those on the *Sunset* and *Golden State* routes. Those who traveled the former lauded the newly equipped, extra-fare *Sunset Limited* that made its maiden trip on Aug. 20, 1950. The SP, however, did not follow through on introducing what had been the highly touted *Golden Rocket*. Although in 1946 the SP and Rock Island planned and publicized this luxury streamliner, and ordered from Pullman-Standard two 11-car trains, it never ran a mile. The SP became reluctant about this financial commitment and cancelled its equipment order. The Rock Island, however, took delivery of its share of the equipment and assigned it to



The westbound *Sunset Limited* and eastbound *Golden State Limited* – the premiere trains of the *Sunset* and *Golden State* routes – meet near Colton, Calif. TRAINS collection

an enhanced *Golden State Limited*.

The 1950s were a watershed time for SP transcontinental passenger service. Growing automobile and air competition reduced patronage, and the company depended on what had become its dieselized freight operations on these long-haul routes to keep red ink from flowing. The company’s first solely owned mainline diesels had been introduced in 1946, and performed admirably. Passenger train finances worsened as the 1960s unfolded. Ridership continued its downward trajectory, and the loss of head-end business hardly helped.

When Amtrak made its debut on May 1, 1971, this quasi-government corporation offered only skeleton service on the historic Overland Route along with the *Sunset* Route. Somewhat earlier the *Golden*

State Limited had made its final run; the Rock Island was becoming a transportation slum and subsequently entered the corporate graveyard.

The Southern Pacific itself faced increasing problems. One involved the merger mania of the 1960s and later. Feeling the need to strengthen to save itself, the company in 1983 “merged” with Santa Fe Industries, uniting two mighty transcontinentals, but the union was denied by the Interstate Commerce Commission in 1986, a decision it upheld on appeal in 1987.

Ultimately, a faltering SP entered the orbit of Union Pacific in 1996. Fortunately, for the national economy, the three former Southern Pacific transcontinental route continue to bind the nation, not for passengers but for freight, including growing intermodal traffic. **I**

Santa Ana winds kick up a sandstorm as Extra 6268 East passes through Guasti, Calif., near Colton, in 1951. Richard Steinheimer





Changing faces, but no loss of wonder

I WAS BARELY A TEENAGER the first time I visited Los Angeles Union Passenger Terminal. My family had gathered there to see my visiting aunt board the eastbound *Super Chief* on the first segment of her trip home to New York. That would have been in the early 1960s. Putting the time into perspective, John F. Kennedy was president and gasoline was hovering around 25 cents a gallon.

Taking in the wonderment of it all, I remember watching Santa Fe, Union Pacific, and Southern Pacific passenger trains idling at their respective bumper posts with passengers coming home or just beginning their adventures elsewhere. The otherwise clean

station was just a little past its prime, with hints of rust on its distinctive platform overhangs. That slight distraction aside, LAUPT was a wonderful place for a youngster who loved trains.

But to my sadness, I noticed on each succeeding visit over the years, the station was becoming seedier. The number of trains was thinning, and many times the equipment seemed shabbier. By the time Amtrak took over in 1971, there were periods in the day that the multiple tracks resembled a ghost town. The grandeur of a great railroad passenger station was fading away right in front of me. The patches of rust here and there were getting bigger.



Over the next few years, with the coming of expanded Amtrak service and Metrolink commuter rail, the future began looking brighter. And the arrival of light rail and a subway line only enhanced the idea that there was a great future for passenger service — and this terminal, later renamed as a station — in Los Angeles. It was a far cry from the days of an aborted proposal a half century ago to sell the air rights over the hardly utilized tracks for a heliport.

In 2018, improvements have continued to come to the refurbished station, and thanks to the different forms of rail transportation, the station is once again a frenzy of nonstop activity.

A few months ago, I had business downtown and took the train in from my home just north of Los Angeles in Ventura County. As I got off the train, I found a display that included a new Siemens Charger locomotive destined for regional Amtrak service, a Hyundai-Rotem Metrolink cab car, and an Amtrak GE P42DC locomotive on the point of a long-distance train. In the background were more Metrolink trains along with lots of riders. With the slight distraction of a little rust here and there aside, Los Angeles Union Station is still a wonderful place for a now-70-year-old man who still loves trains. — *David Lustig*



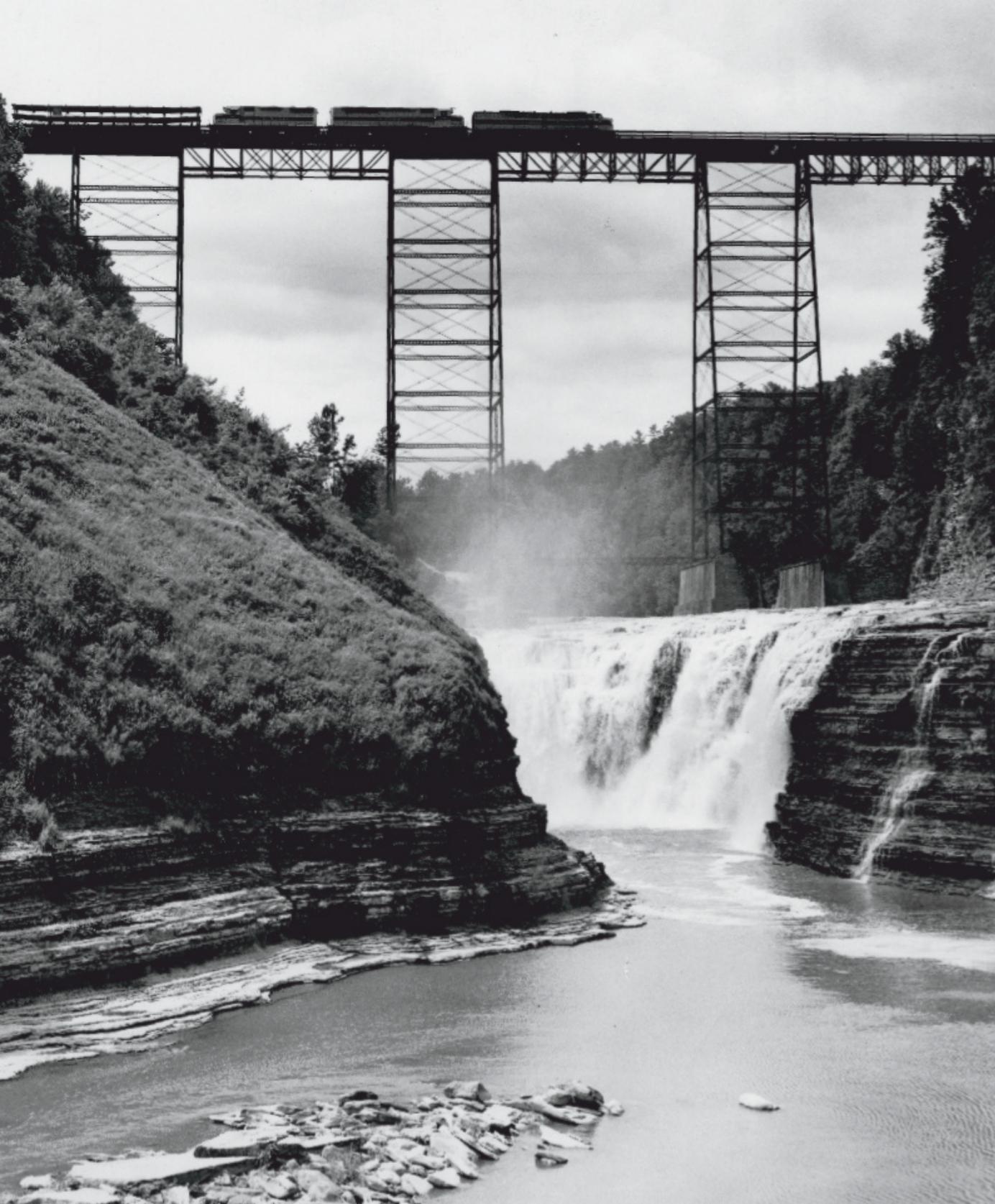
Norfolk Southern train 36T crosses the new Genesee Arch Bridge on May 27, 2018, moving mixed freight from Buffalo, N.Y., to Allentown, Pa. Casey Thomason, Norfolk Southern

MODERN AND SPECTACULAR

21st-century know-how seamlessly replaces a 19th-century landmark in New York state

by Tishia Boggs





An Erie Lackawanna E8 leads a westbound train over the now-dismantled 1875 iron bridge near Portageville, N.Y., over the Upper Falls of the Genesee River in 1974. George A. Forero Jr.

A visit to Letchworth State Park in western New York takes visitors into the shadows of one of today's most visually documented railroad projects in the Northeast: Norfolk Southern's Genesee Arch Bridge. At 963 feet long and 235 feet above the Upper Falls of the Genesee River, the modern arch viaduct spans a gorge steeped in history and abundant natural beauty.

As early railroads expanded, and crossed uncharted terrains, getting from point A to point B was achieved in the most cost-effective manner, rarely considering the impact to nature. The new arch bridge's construction, by contrast, is elaborate, eco-conscious, and sleek.

It is built on an alignment 75 feet south of an older bridge from 1875 and is a single-track crossing with a ballast-filled concrete deck. The main span is a 483-foot-long arch with three 80-foot-long

girder span approaches on each end. The deck rests 235 feet above the Genesee River. The parallel alignment represents years of collaboration among team players to settle on a design and construction scheme that minimized environmental impact.

The new bridge avoids touching the valley bottom below returning the river closer to its natural state than it has been in more than 170 years. Extensive care was taken to minimize impact to the park trails and facilities, and to nesting American bald eagles and rattlesnakes located within sight of the bridge.

The Genesee Arch Bridge is the first true arch built for the railroad industry in North America since the 1940s. The functionality of the new bridge represents a significant upgrade as there are no longer weight or speed restrictions for trains.

Norfolk Southern can now run industry-standard 286,000-pound cars over the new structure, which is an increase from

“BUILDING IN THIS ENVIRONMENT ... SHOWED US WE HAD TO HAVE NERVES OF STEEL.”

— CARMEN GAROZZO, BERGMANN PC

the previous 273,000-pound limit. Trains can run at 30 mph now as opposed to 10 mph across the old span.

Reducing curves at the bridge's ends would have increased speeds further, but would also have increased the project's environmental impacts.

EARLIER BRIDGES

Work on the first railroad bridge to span the Genesee River on the future Buffalo Division of the Erie Railroad at Portageville, N.Y., began on July 1, 1851, and was nearing completion by August 1852. At 800 feet long and 234 feet above the riverbed, Portage Bridge was advertised by Erie Railroad officials as “... the longest and highest wooden bridge in the United States ... if not the world, and one of the grandest views on the Western Continent.”

As with many early wooden railroad structures, the original Portage Bridge was short-lived and already facing certain replacement by the Erie Railroad by the mid-1870s.

In the early morning hours of May 6, 1875, fire claimed the bridge, reducing it to ashes. Erie Railroad officials quickly set to work on replacing the bridge.

Construction of the wrought iron bridge began on June 8, 1875. A mere 86 days after the devastating fire and an unimaginable 53 days after construction began, the new 820-foot-long iron bridge sitting 240 feet above the Genesee River was officially open to traffic on July 31, 1875. Could a bridge built so hastily and inexpensively work? The doubted high bridge stood the test of time and Mother Nature throughout the 20th century, before succumbing to a replacement.

MODERN ARCH BRIDGE

Norfolk Southern started planning to replace the 1875 bridge in 2007. The railroad and government officials completed plans and specifications for the new structure and finished environmental studies and associated paperwork by 2014 in time to award project contracts in 2015.

The new design and construction of the privately owned bridge on the former Erie main that NS calls the Southern Tier Line had to fulfill two competing de-



American Bridge crews install the final beams of the new arch. The 1875 bridge looms in the background. Sam LiPuma, Mott MacDonald Group Ltd.

mands: fitting in seamlessly with the scenic Genesee River Gorge — known locally as the Grand Canyon of the East; and increasing speed and efficiency for goods traveling east and west along NS's network connecting Chicago with New York and New England.

Following the seasonal closing of the Portageville entrance to Letchworth State Park, work on the new steel bridge began Oct. 15, 2015. The exposed shale, limestone,



American Bridge crewmen are seen securing the final beams, being lowered by crane, to build the center of the arch. John Kucko

and sandstone that makes up the gorge walls was weak and weathered. To reach rock of sufficient strength to support the arch, the plans called for excavating pockets in the gorge walls down to sound rock. Building on strong rock at the bottom of the pocket is the backbone to the strength and stability of the entire arch structure.

Each pocket is 110 feet high and 43 feet wide. To reach that depth in the weakened rock, the pockets were excavated in staged areas. They are referred to as benches. Excavation and blasting equipment, as well as the workers, had to be lowered to the working bench by crane. Controlled blasting was used to remove material along each bench. Taking care to not disturb native wildlife and minimize impact to the Genesee River, a limit of three blasts per side were allowed each week. Also of concern was the structural stability of the existing high bridge as it was so close to the blast zone.

To protect nearby nesting eagles and the integrity of the existing bridge, engineers set maximum vibration limits in the construction documents. They used seismographs — scientific instruments similar to ones used to measure earthquake activity

— during blasting. Civil engineers set a vibration limit of a half-inch per second above background peak particle velocity to protect the surrounding area. The velocity measurement gauges particles moving on a surface. To keep within the limit, engineers placed seismographs on the bridge and each blast was modified based on the vibrations caused by previous blasts. The benches created by blasting and removing rock to a desired elevation progressed in phases.

A total of five benches were created each at 15 feet in elevation. Each bench was blasted in three sections. The first section located 120 feet to the south was the farthest away from the existing bridge, the middle section was blasted next, and then the section closest to the existing bridge was blasted last. As each blast occurred within a bench-building phase, the broken rock remained to absorb the next blasts.

Debris removal from each blast did not come without its own skillfully executed design. The layout of the gorge allowed for a haul road on the east end of the work site, but not the west.

Broken rock from each bench blasting on the eastern gorge wall was allowed to



An operator from Maine Drilling & Blasting is seen here removing additional rock layers to stabilize the exposed face of the eastern skewback. Three photos, Sam LiPuma, Mott MacDonald Group Ltd.

tumble to the bottom of the gorge and collect at a containment pile. From that pile, crews loaded trucks to move debris off-site. Bench blasting on the western gorge wall required debris to be loaded into buckets and raised by crane to trucks waiting at the staging area.

Once blasted rock was removed from a completed bench, crews worked to stabilize rock before they blasted out the next bench. Geologists were consulted early on and throughout the excavation and blasting to monitor and re-evaluate the work area. Rock bolts placed at 10-foot centers in both directions were used to stabilize the weakened, weathered, and fractured rock exposed by the blasting. Upon re-evaluation, engineers decided that they needed to alter geologists' original recommendations and used additional rock bolts and

shotcrete — a process of spraying a purpose-made concrete mix into place — to strengthen the fractures and weak underlying rock layers. The shelf contractors built on top of the weak rock was a stronger foundation upon which loosened or weak rocks could rest.

A final round of bench blasting, however, was not an option. The arch foundation would need stable, uncompromised rock. Workers mechanically excavated the area that would hold the unreinforced concrete on each end. These created the

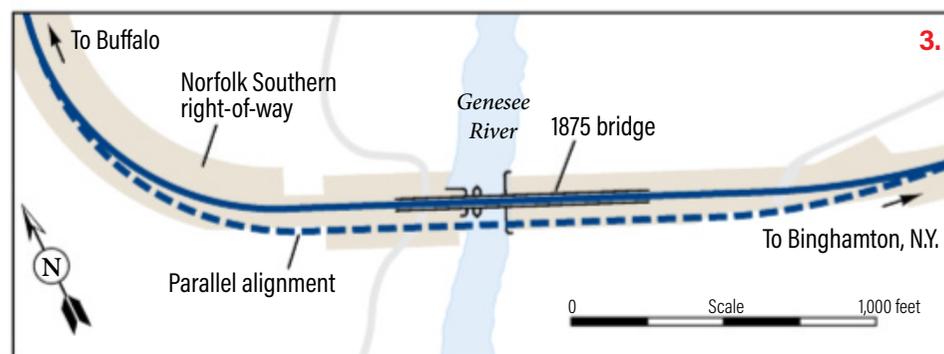
working surface for the main foundation supporting the arch bearings.

As machine operators advanced through the rock, they uncovered a layer of shale that required a change in the excavation plan. The layer of shale was removed and replaced with unreinforced concrete to provide a sturdy footprint for the foundation.

As fall 2016 approached, the project had already encountered more unknowns than anticipated and adjustments to construction plans were implemented flawlessly. The ability of the construction team to switch gears and adapt new plans exhibits the skill level of the team.

Building a scenic modern bridge capable of carrying the industry-standard car weight moving at 30 mph that fit seamlessly into the middle of a state park was the note of pride emphasized by not only Norfolk Southern, but Modjeski and Masters, Bergmann PC, and American Bridge. The engineering was a combined effort of Modjeski and Masters, and Bergmann PC, while American Bridge was primary construction contractor. Team members tell TRAINS they came in each day and were

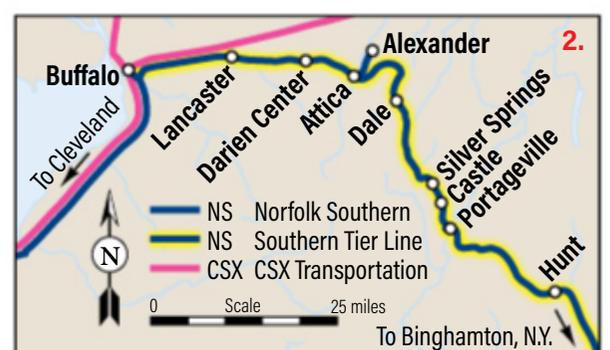
**GENESEE
ARCH BRIDGE:
963
FEET LONG
235
FEET HIGH
16,000
CUBIC YARDS OF CONCRETE
8.8 MILLION
POUNDS OF STRUCTURAL STEEL**



3.



1. Norfolk Southern's connection to New England and New York (via short lines) passes through Portageville. 2. The route uses the hilly former Erie Railroad main line between Buffalo and Binghamton, N.Y. CSX Transportation uses the much flatter former New York Central route. 3. NS erected a new bridge in a narrow right-of-way while maintaining daily service.



2.

awestruck with progress, knowing they were accomplishing their goals.

“We are finally returning the river to its natural state,” Howard Swanson, project engineer for NS tells TRAINS. “The design meets all of the needs of a modern railroad structure while being sensitive to the concerns that were raised while creating the Environmental Impact Statement.”

BUILT UPON ROCK

Temperatures began to cool as 2016 wound down in Western New York. It was time to begin work on the bridge foundation. The face of the pockets were covered in chain-mail-like drape netting to protect the new bridge from falling rocks. Workers progressed to pouring the large concrete anchorages, known as skewbacks, at each end. These skewbacks distribute the load of the arch — and passing trains — to the underlying rock.

The skewbacks are 15 feet, 4 inches high and 15 feet, 6 inches deep, set to support the arch bearings at a 45-degree angle from horizontal.

Both east and west foundations were cast in single 329-cubic-yard concrete pours called mass placement pours.

Construction companies use mass placement concrete pours to prevent excessive temperature variations in the concrete as it cures. Pouring concrete in large quantities creates an environment where heat dissipates more slowly than in thinner applications — such as a sidewalk or suburban residential driveway.

But because of the extra, retained heat, engineers went to work installing a system of plastic pipes into the concrete forms on the skewback foundations.

Water pumped through the foundation tubes removed heat from the concrete, preventing a phenomenon known as heat cracking, while helping the concrete cure evenly. Crews also placed sensors on the exterior faces, back face, bottom, and center of the foundation to monitor heat.

They pumped water through the cooling tubes at a rate to ensure the maximum differences in temperatures among the measurements did not exceed 40 degrees Fahrenheit. Insulation was also used over the forms to prevent excessive heat loss due to the cooler temperatures experienced in the park during fall and winter.

Three approach spans on each end of the new arch bridge are supported on concrete piers, which rested on micropiles.

Micropiles are often used in construction when noise and vibration are an issue, and when building on weak rock. Having a much smaller diameter than larger, driven piles allowed the engineers to create a stable foundation in an environment that was already being monitored for wildlife



Workers from American Bridge prepare formwork that will make up the first lift of Pier 3 on the west end of the new arch bridge. Tubes acting as chimneys helped cool the concrete.



A view of the eastern skewback being prepared for foundation work. The micropiles of Pier 2 (front) and formwork for the concrete pile cap (back) for Pier 1 are on the parallel alignment.



The formwork for the skewbacks is shown in this photo. The bolts will connect the bearings of the arch to the concrete. Two photos: Sam LiPuma, Mott MacDonald Group Ltd.



The arch was built as two arms reaching toward the center. Cables between the blue-colored temporary anchorage and the arch held the arms back. John Kucko

protection and excessive vibration.

The 47-foot-high pier stems were built of mass placement pours as done with the skewbacks. The stems were poured in two quantities, called lifts, of concrete. American Bridge's plan to regulate the core temperatures within the massive stems was successful. Five, vertical, 36-inch, corrugated metal pipes were placed along the centerline of the stems to act as chimneys for the heat of the mass placement to escape the piers.

The shear reinforcement of the piers had to be redesigned to accommodate the

vertical pipes. The pipes were filled with concrete after the mass placement pours reached a uniform temperature. The same sensor system, temperature monitoring, and insulation on the exterior of the forms were used as with the skewbacks. As the stems' two lifts were complete, a third smaller pour was placed on top of the piers and was used to set anchor bolts and to cast the bearing seats.

"Now halfway through the construction process, we were rethinking our game plan and redesigning on the spot as we



The reinforcing steel can be seen here before concrete is poured to form the closed-deck of the new arch. Certain concrete work needed additional, controlled cooling.

encountered variables that we don't normally see," says Carmen Garozzo, Bergmann Associates' National Practice Leader for Rail projects. "Building in this environment, protecting the river, protecting the trains passing by on the old bridge, and trying not to disturb the wildlife showed us we had to have nerves of steel to keep moving forward on time."

With supporting foundations in place, work began on the bridge components. Throughout the first half of 2017, visitors to Letchworth State Park had grown accustomed to the massive cranes high above the Genesee River. Metal for the approach spans was placed at each end of the bridge and the deck was built of concrete. Being poured in much smaller batches, heat displacement was less of a concern on this closed ballast deck bridge. As fall of that year came to an end, the final piece of the puzzle was in place and concrete poured — the arch bridge now had its arch. Workers continued the final steps of placing rail and painting the metal components of the bridge as demolition of the 1875 structure neared.

By Dec. 11, 2017, the iron bridge was entering its final hours. The new arch bridge was now open for business and work began to dismantle the 1875 predecessor. After three months of careful dismantling and debris removal, crews imploded the final tower of the iron bridge on March 20, 2018.

Cleanup continued and road construction was underway to reopen the Portageville park entrance. Keeping with the spirit of public involvement, Norfolk Southern reached out to the public with a social media campaign in an effort to name the new bridge and dedicated it on May 24, 2018, as the Genesee Arch Bridge.

With any luck, visitors who see this new bridge in a hundred years time will look on and marvel at its style and construction — much as previous generations wondered about the old iron viaduct. **I**

Soaring high above the Upper Falls of the Genesee River, vehicle train 28N crosses the Genesee Arch Bridge, en route to Ayer, Mass., from Fostoria, Ohio. Casey Thomason, NS



NOT ALL SPIKES

ARE GOLDEN

All you ever wanted to know about railroad spikes but were afraid to ask

by Tyler Trahan

The Golden Spike of the first transcontinental railroad was but one of millions in the nearly 2,000-mile route between Sacramento, Calif., and Omaha, Neb. Spikes date back to the first railroads in the 1830s and are still the fastener of choice for most North American railroads. Let's take a look at this important hardware.

A TALE OF FIVE SPIKES

The famed Golden Spike was actually one of four, driven into a tie of polished California laurel. The famous golden Last Spike, as it has come to be known, was cast by the William T. Garratt Foundry in San Francisco. It was cast of 14.03 troy ounces of 17.6-karat (73-percent) copper-alloyed gold and is now displayed at Stanford University, Stanford, Calif.

The San Francisco News Letter newspaper supplied a second gold spike that has been lost to history. The state of Nevada supplied a silver spike, at right. Craftsmen forged it from 25 troy ounces of silver. It also resides at Stanford University.



Stanford University

Arizona supplied an iron, silver, and gold spike. It is now at the Union Pacific Railroad Museum in Council Bluffs, Iowa, and is on permanent loan from a museum in New York.

A fifth spike, identical to the famous golden one, was cast at the same time. It was secretly kept by the family of David Hewes, the financier who thought up the Golden Spike, until 2005. This spike is now at the California State Railroad Museum.

Following the last spike ceremony, the special tie and spikes were removed and replaced with standard equipment. Southern Pacific bypassed the area in 1903 and the track was torn up in 1942 with an "Undriving of the Last Spike" ceremony. Everything useful, including spikes, was scrapped to support U.S. efforts in World War II.



SPIKE HEAD

- Fits over the base of the rail
- Is wider than the shank, allowing the spike to be pulled out with a claw bar

SPIKE CHISEL TIPS

- Are perpendicular to the grain of the tie to avoid splitting the wood

Golden spikes are popular, and have long been used as symbols of completing an important railroad construction project. In October 2018, officials drove multiple gold-colored track spikes into a new industrial park track in Kalispell, Mont. Justin Franz

SPIKE SHANK

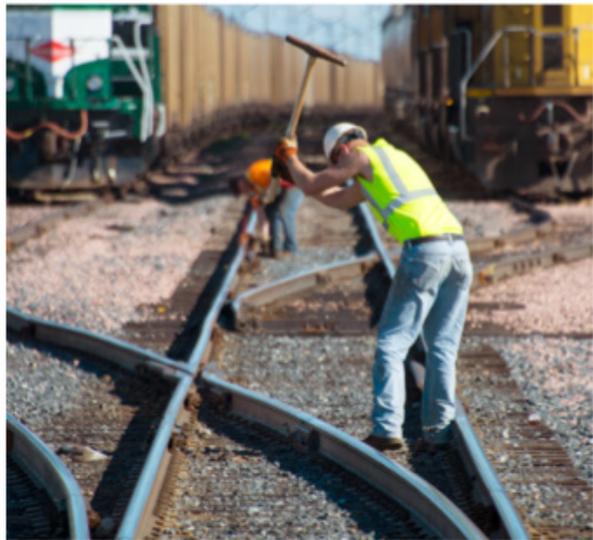
- Square shanks offer greater holding power than a circular shank, and keep the spike from twisting

1830

**RAILROAD SPIKE
INVENTED BY
ROBERT LIVINGSTON
STEVENS**

SPIKING STRATEGIES

DRIVING SPIKES BY HAND is a learned skill. The track worker uses a spike maul, typically 10 pounds with an asymmetrical head, larger on one end than the other. A



A track worker hammers in spikes on a turnout. Steve Smedley

spiking crew can complete about a quarter mile of track per day.

HOW TO SPIKE

1. Grasp the spike maul with both hands like a baseball bat, but with hands slightly apart to prevent rubbing and blistering.
2. Swing the maul down and hit the spike with the larger end of the head, and the handle parallel to the ground. Don't hit the rail. The rail can dent.
3. As soon as the maul hits the spike, flip your wrists and arch your back while bringing the maul over your shoulder for the next hit.

SPIKING MACHINES require two operators, one positioned over each rail, who use joysticks to guide each spike into the hole in the tie plate, then push a button to drive the spike home. A machine spiker can



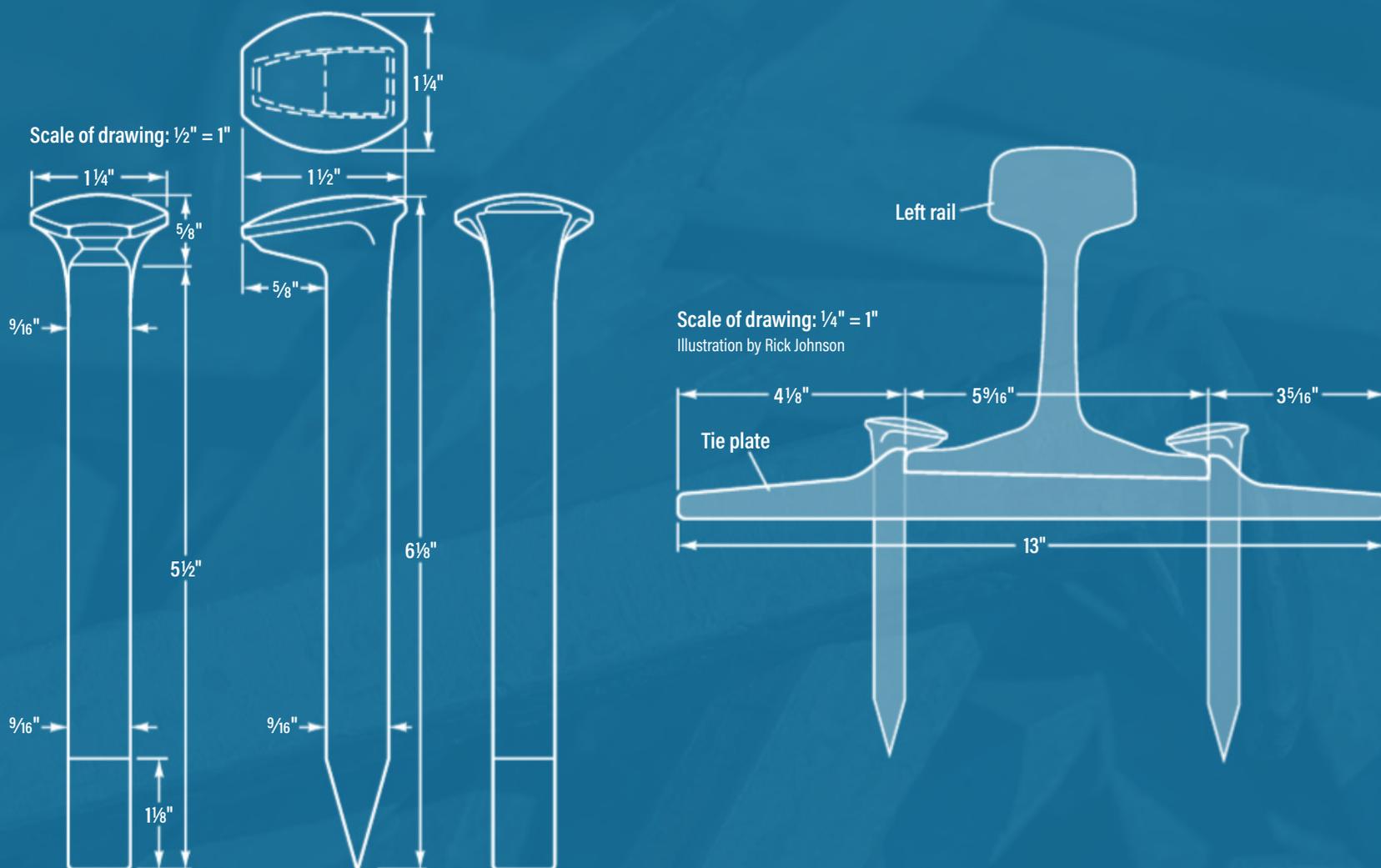
A spiking machine inserts spikes following a rail weld at White River Junction, Vt., in 2011.

Kevin Burkholder

complete about a mile of track per day.

Pulling a spike from a new tie can require a series of hard downward thrusts, and represents as much effort as driving a spike. Pulling a spike from an old, decayed tie, by contrast, can be accomplished with a single downward push. Carrying a 27-pound claw-bar is often the more strenuous task. Automated spike-pulling machines can pull spikes at a rate of one every 2 seconds.

A TYPICAL SPIKE IN ACTION



SPIKE DIMENSIONS ARE PRECISE and have been set by such groups as the American Railway Engineering and Maintenance-of-Way Association for decades. Spikes are made of relatively low-carbon steel, which is softer than the steel used in rail and spike mauls. This is important because when a spike is driven, it won't break into flying steel chips, and it will likely stay in place when bent.

EVERY LOT OF NEW SPIKES must be tested to see if they'll perform on the job. To measure this, railroads and spike suppliers can perform metallurgical analysis — to determine proper carbon and alloying element content — and mechanical testing for strength. Mechanical testing requires low-carbon spikes to be bent backward 120 degrees without signs of cracking and stretch at least 25 percent.

WHO MAKES SPIKES?

Companies that advertise making railroad spikes, with their main U.S. office, include:

- **ATLANTIC TRACK & TURNOUT**
Bloomfield, N.J.
- **BIRMINGHAM RAIL & LOCOMOTIVE**
Birmingham, Ala.
- **GERDAU**
Tampa, Fla.
- **HARMER STEEL CO.**
Portland, Ore.
- **KEYSTONE SPIKES CORP.**
Lebanon, Pa.
- **MASTER BOLT & MANUFACTURING**
Elyria, Ohio

WHO INVENTED THE SPIKE?

THE SPIKE WAS INVENTED along with the modern flat-bottomed rail about 1830 by Robert Livingston Stevens, president of the Camden & Amboy Railroad. He designed the spike to anchor these new rails, which were each 15 feet long and weighed 36 pounds per yard. Today the Camden & Amboy is part of Amtrak's Northeast Corridor and its rails are about a hundred pounds heavier per yard. Rails were spiked directly to the ties until tie plates became popular around 1900.

TIE PLATES

AN OFTEN OVERLOOKED track component is the tie plate. It more than doubles the contact area between rails and ties, spreading the weight of passing trains.

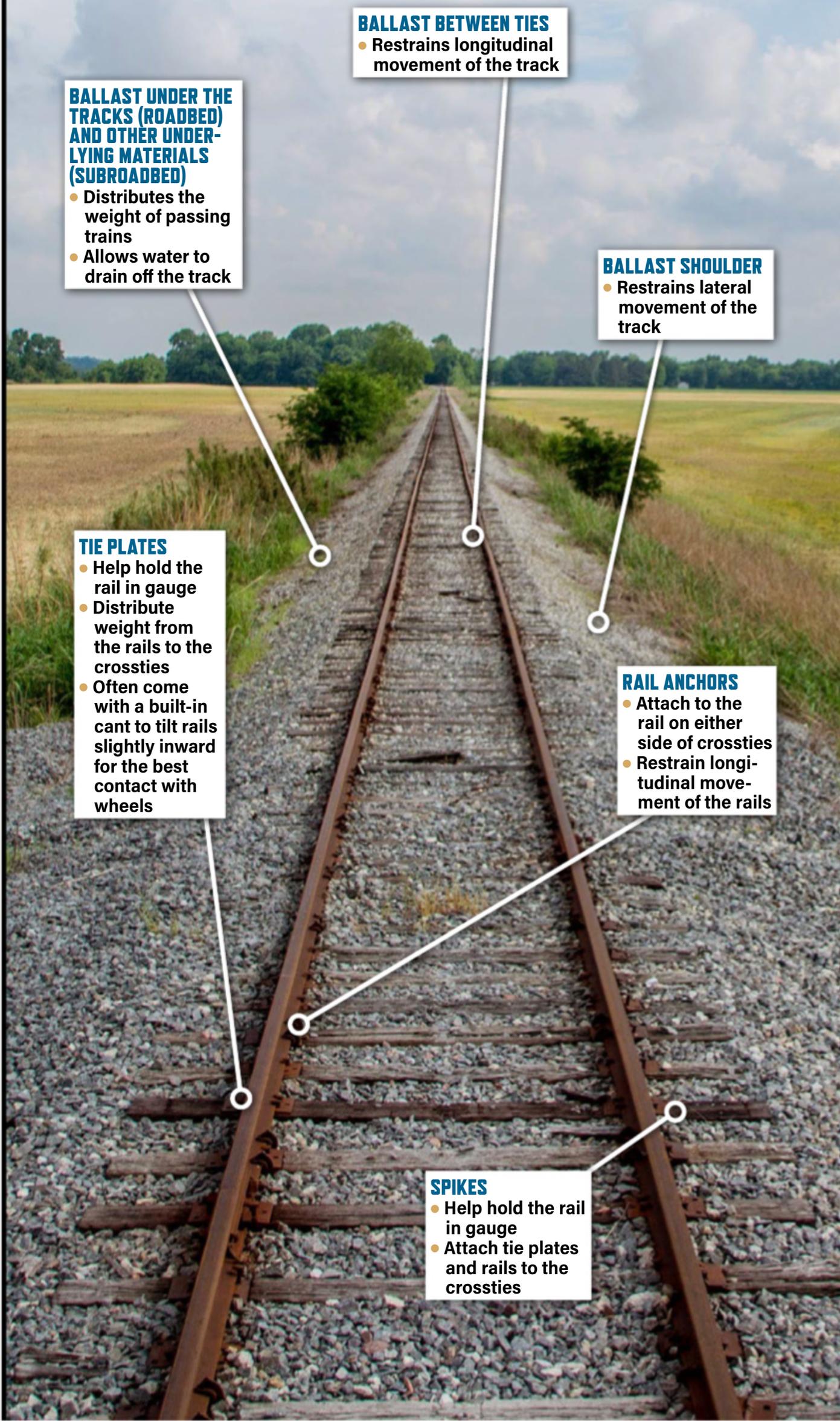
Tie plates are asymmetrical. They are sloped to hold rails at an inward cant, which helps to resist the lateral forces. These forces from passing trains can widen the gauge or rotate the rail, speeding up rail wear or causing rail rollover. This rotation is called dynamic cant, and rail clips resist it far better than spikes. Clips hold rails tightly to ties while spikes are easily pulled out of the ties.

In North America the standard rail cant is 1:40, or 1.4 degrees.

12,672
SPIKES PER MILE

WHAT ARE SPIKES FOR?

QUICK ANSWER? THEY HOLD TRACK GAUGE. Hard though it may be to believe, in track with spikes, the weight of rails is sufficient to hold it in place. Spikes alone, or spikes in specifically designed tie plates, make sure that rails do not move inward or outward (tight or wide gauge) so trains can roll on. This photo shows tangent track on the Union City Terminal Railroad in Rives, Tenn., in 2018. Ryan Robinson



FASTENER COSTS, COMPARED

A TYPICAL 6-INCH SPIKE with a five-eighths-inch shank weighs about 13 ounces and is purchased by the keg. They once came in 100-pound wooden kegs, but today come in metal cans weighing 200 pounds. Other costs that will increase the per-mile figure include labor, grading, culverts and bridges, road crossings, signal systems, and switches. Prices on track components also vary by manufacturer and contract. The values below are estimates from Norfolk Southern and Track Guy Consultants.

SPIKES AND WOOD TIES

(ties 20 inches apart, 3,168 per mile)

Component	Cost	Number per tie	Cost per mile
Spikes	\$0.50	4	\$6,336
Tie plate	\$10	2	\$63,360
Rail anchors	\$1.40	4 on every other tie	\$8,870
Wood tie	\$55	1	\$174,240
Total (before rail, ballast, grading, etc)			\$252,806
Total (with ballast and rail) @ \$700/ton rails and \$11/ton ballast			\$478,438

CLIPS AND WOOD TIES

(ties 20 inches apart, 3,168 per mile)

Component	Cost	Number per tie	Cost per mile
E-clip	\$1.60	4	\$20,275
Tie plate with clip shoulder	\$26	2	\$164,736
Track screws (attach tie plate to tie)	\$1.70	8	\$43,085
Wood tie	\$55	1	\$174,240
Total (before rail, ballast, grading, etc)			\$402,336
Total (with ballast and rail) @ \$700/ton rails and \$11/ton ballast			\$627,968

CLIPS AND CONCRETE TIES

(ties 24 inches apart, 2,640 per mile)

Component	Cost	Number per tie	Cost per mile
E-clip	\$1.60	4	\$16,896
Rubber pad	\$5	2	\$26,400
Insulator	\$4	4	\$42,240
Concrete tie	\$200	1	\$528,000
Total (before rail, ballast, grading, etc)			\$613,536
Total (with ballast and rail) @ \$700/ton rails and \$11/ton ballast			\$839,168

RAIL AND BALLAST

Component	Cost per ton	Tons per mile	Cost per mile
136 lb./yard rail	\$700 to \$800	239	\$167,552 to \$191,488
Rock ballast	\$11	5,280	\$58,080
Total			\$225,632 to \$249,568



CONCRETE TIES AND TIE CLIPS

Concrete ties do not use tie plates. The base of the rail fits into a groove cast into the tie, and the rails sit on top of a rubber pad. Clip fasteners attach the rail to the tie. TRAINS: Steve Sweeney

CLIPS, PADS, AND INSULATORS

- \$32.40 per tie (using E-style clips)
- \$85,536 per mile



SPIKE ALTERNATIVES

SPIKES REMAIN THE FASTENERS OF CHOICE

for North American railroads. A CSX Transportation representative says that the railroad uses spikes on 97.5 percent of its 29,676 miles of track. It uses other fasteners on approximately 41 miles of curves and 700 miles of track with concrete ties.

The primary alternatives to spikes in North America are elastic fasteners — also called rail clips. These fasteners serve the purpose of both spikes and rail anchors in conventional track, restraining the rail from lifting up out of the tie plates and from sliding lengthwise.

Longitudinal movement is generated by temperature change, traction, or braking forces from trains.

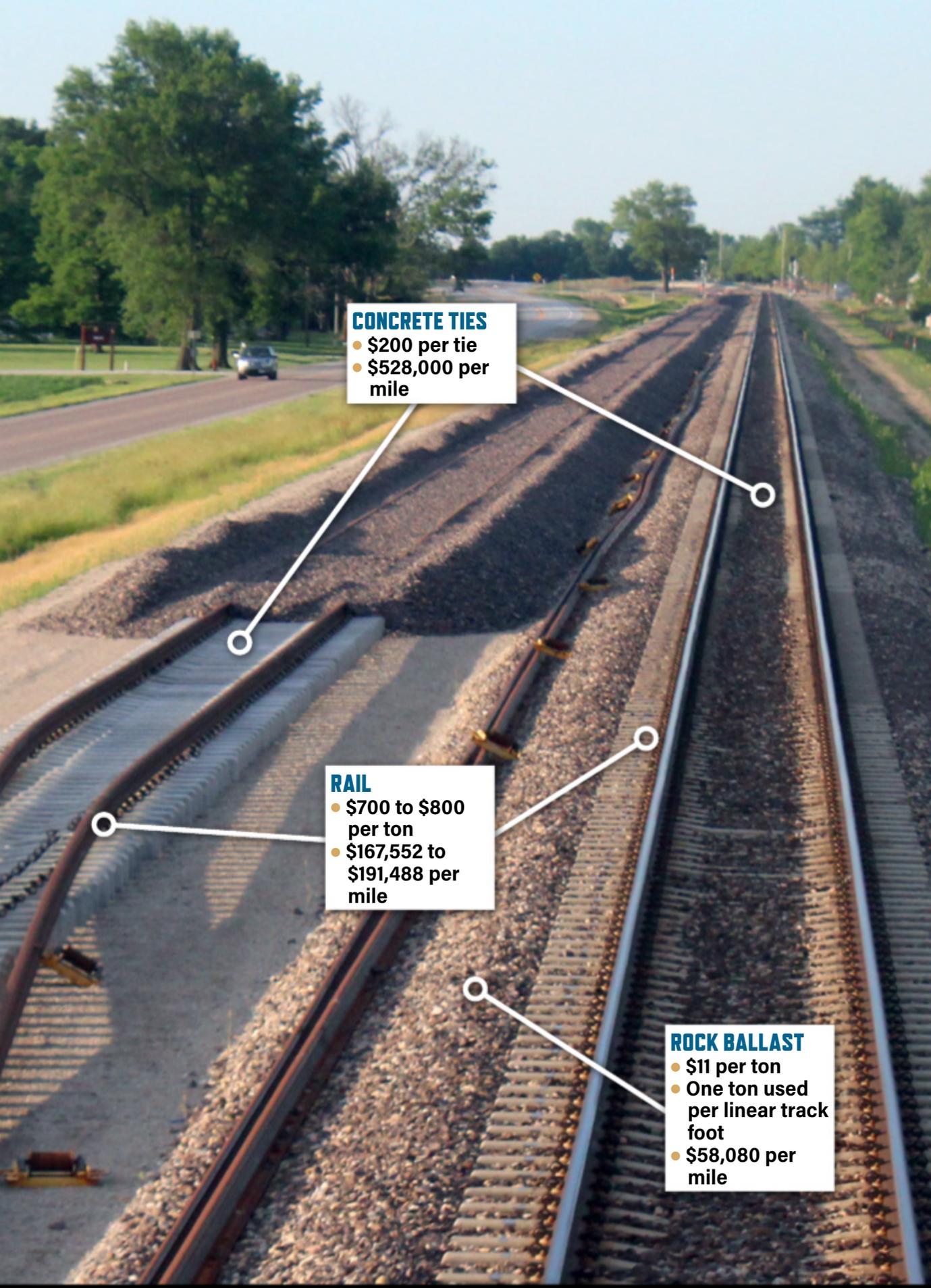
Spikes primarily hold rail in gauge and provide little resistance to sliding or rising rail. Rail anchors restrain creeping, but as the track flexes under trains, spikes slowly lift up and loosen. The spike hole gets larger and water can enter the tie. In the days before manufacturers treated ties with creosote, this shortened a tie's life dramatically.



A track clip shown holding a rail with track screws — another spike alternative — on Union Pacific tracks near Santa Barbara, Calif., in 2016. John Roskoski

SQUARE

NEARLY ALL RAILROAD SPIKES ARE SQUARE TO HOLD THEIR PLACE IN WOOD TIES



CONCRETE TIES

- \$200 per tie
- \$528,000 per mile

RAIL

- \$700 to \$800 per ton
- \$167,552 to \$191,488 per mile

ROCK BALLAST

- \$11 per ton
- One ton used per linear track foot
- \$58,080 per mile



SLAB TRACK

Some transit lines attach the rails directly to concrete slabs instead of ties. These use fasteners similar to ones in concrete ties, with a rubber pad between rail and concrete to cushion impacts from flat spots or out-of-round wheels. The photo above is a close-up image of experimental track slabs being developed in Austria by Rhomberg Sersa. TRAINS: Steve Sweeney

WHERE SPIKES STRIKE OUT: CONCRETE TIES

Concrete ties and rail clips are in abundance for track work in Illinois in 2015. With the precision and stability this type of track laying offers, Amtrak trains on this route can move at up to 110 mph. Bob Johnston

AN AMERICAN PHENOMENON

WHEN THE RAILROAD ARRIVED in the United States in the 1820s and 1830s, it came from the United Kingdom. Other technologies were shared back and forth, but the spike has remained mostly an America staple.

British rail used a “bullhead” profile instead of the flat-bottom rail in North America, and chairs instead of tie plates. Bullhead rails once had similar heads and bases, and early engineering documents describe being able to flip the rail over after the top had worn out. In practice, the rail was indented at each chair and would make for

50¢
AVERAGE COST OF A SINGLE NEW SPIKE

rough riding. Later profiles had a larger top head to reflect its heavier load. Flat-bottom rail is now standard in the U.K. although bullhead rail is used on heritage railroads and the London Underground.

CLIPS & SPIKES

WHERE CLIP FASTENERS are used on wooden ties, they attach to tie plates fastened to the ties. These are often spiked to the ties, or they may be attached with screw spikes or hairpin spikes. Both restrain rail vertically but cost more than regular spikes and are inserted with different equipment. I



Rusty track spikes near Canadian Pacific tracks at Brookfield, Wis., in 2012. Karl Riek



**CHICAGO'S
HIDDEN
DOWNTOWN DEPOT**



Most gems are found underground; Van Buren Street Station is no exception

by Fred Ash

Railroads and cities have love-hate relationships born in codependency. Differing priorities inevitably lead to conflict, and no affair was rockier than that of the Illinois Central and the city of Chicago. It began in 1852 when the city forced the IC and its partner, Michigan Central, onto a curious, unimaginably expensive entry to the city from the south: a mile-long trestle, 200 feet into Lake Michigan and parallel to its shore. The \$1.2-million cost could have built 100 miles of prairie track. Because the IC route incorporated a breakwater to prevent shoreline erosion, it had strong local supporters, despite immediate complaints that it monopolized the lakefront.

By 1856 the IC initiated three suburban trains in each direction from its terminal at Randolph Street and Michigan Avenue to Hyde Park, a lakefront development 7 miles south of downtown. In 1869, however, the Illinois Central; Chicago, Burlington & Quincy; and Michigan Central orchestrated another lakefront development scheme. An act they pushed through the legislature conveyed a square mile of underwater area with infill rights. The Chicago Herald trumpeted, “The Illinois Central spent \$400,000 to ‘boodle’ the legislature.” The potential infill abutted some valuable real estate, so 30 years of litigation followed.

October 1871 saw the Great Chicago Fire incinerate the IC trestle. Afterward, burnt debris filled both the right-of-way and the slack water toward shore. Reserved by the city as Lake Park — with its name changed to Grant Park in 1901 — the reclaimed land provided a station opportunity seven-tenths of a mile south of IC’s Randolph Street terminal. This reflected a southward shift of the business district. An octagonal ticket house, 25 feet in diameter, arose in the park in 1879. IC service was the highest-volume commuter line west of the Alleghenies, despite using hand-me-down coaches and locomotives. Its shoreline route provided a beautiful city entrance that attracted trackside residential growth. The

A train of tenant Northern Indiana Commuter Transportation District uses the eastern of three platform tracks. The mostly subterranean station can be seen at right. TRAINS: Brian Schmidt

corollary was that the lakefront never attracted freight-generating industry.

In 1880, the IC astounded everyone by building two new tracks adjacent to its existing line, exclusively for suburban trains. Operated as a separate division, it expanded local service while freeing capacity for other business. Its goal was the new industrial town of Pullman, near the extreme southwest shore of Lake Michigan, but the IC had a hidden agenda: It needed to protect its unusually wide right-of-way. Competitors such as the Chicago & Western Indiana were attempting to punch lines through the urban grid, and IC feared that a newcomer might appropriate (through eminent domain) a strip of IC land leading into downtown. Preventing this required physical occupancy.

IC investment included dedicated equipment like a 31-ton locomotive, built by Rogers Locomotive Works and dubbed the “double-ender.” The wooden passenger cars, light for the time at 14 tons, featured Westinghouse air brakes and Baker heaters previously unseen on local trains. Their exteriors gleamed bright yellow, then the Illinois Central standard. Service began with 16 daily trains at hourly intervals, soon doubled to half-hourly, a revolutionary schedule.

While suburbanites loved frequent trains, city officials disapproved of locomotive smoke blackening the fresh lake air. The IC’s continued suit for the submerged lands cast it as a perfect corporate villain. It is thus no surprise that the target of the first well-funded attack on air pollution, then known as “smoke abatement,” could be found in a 380-page book published in 1908. It cited the IC as the city’s worst polluter, even though high-sulfur Illinois coal powered and heated the entire metropolis. To deflect scorn, the railroad tried burning anthracite; it also installed various patented smoke-eating locomotive appliances and even built a small coking plant. Nothing proved successful.

VAN BUREN COMES INTO ITS OWN

Chicago obtained a world’s fair franchise in the early 1890s, which again thrust the IC into the spotlight. The original concept for the World’s Columbian Exposition of 1893 was to fill the lakefront near downtown, but the IC claimed that right. So the fair moved 8 miles south, to today’s Jackson Park, a bonanza for the railroad’s direct route from downtown.

Foreseeing mammoth crowds, the IC



Van Buren Street Station was the main terminal for trains shuttling patrons to the World's Columbian Exposition of 1893. Chicago & North Western Historical Society collection

invested heavily. Foremost was construction of Central Station, removing intercity trains from the northernmost mile of the route. Suburban service gained high-level platforms and grade separation. Two additional suburban tracks were laid between the fair and Van Buren Street, which became the terminal for express trains serving the fair. The level of Grant Park west of its downtown tracks rose, creating a shallow cut that somewhat hid rail operations from view. This provided a sloping approach to several viaducts, one of which was an iron truss structure at Van Buren to reach a steamboat pier. In the fair's six-month run, the IC operated 40,116 special trains carrying 18 million passengers. On Oct. 9, 1893, it carried 541,321 passengers, a U.S. record.

The lakefront legal contest, however, continued to work its way to the U.S. Supreme Court, which found that the city's initial land grant was void because the state of Illinois, not Chicago, had owned the land. The IC not only lost the lucrative right to new land, but also the last mile into its most important terminal.

In 1896 the city, state, and railroad came partially to terms. It required the parkland west of the former trestle to rise several additional feet while depressing the tracks several feet. A 20-foot-high retaining wall would separate the two. The improved park allowed no buildings, but a sandstone-lined cut provided a pedestrian ramp down to a new station at the foot of Van Buren Street. The railroad also built new viaducts allowing access to planned parkland east of the tracks. The station was below one of these.

It was required to be invisible in the park, so turf covered the station roof.

Van Buren Street handled more suburban passengers than Randolph Street to the north and Central to the south combined. IC Chief Architect Francis T. Bacon was free to decorate the diminutive depot lavishly. Although 300 feet long, it was only 34 feet wide and 10 feet tall. A platform canopy overhung the east wall, the only facade with windows, so lack of natural light made electric chandeliers crucial. To amplify their effect, Bacon lined the interior in glazed white tiles and pastel polychrome terra-cotta.

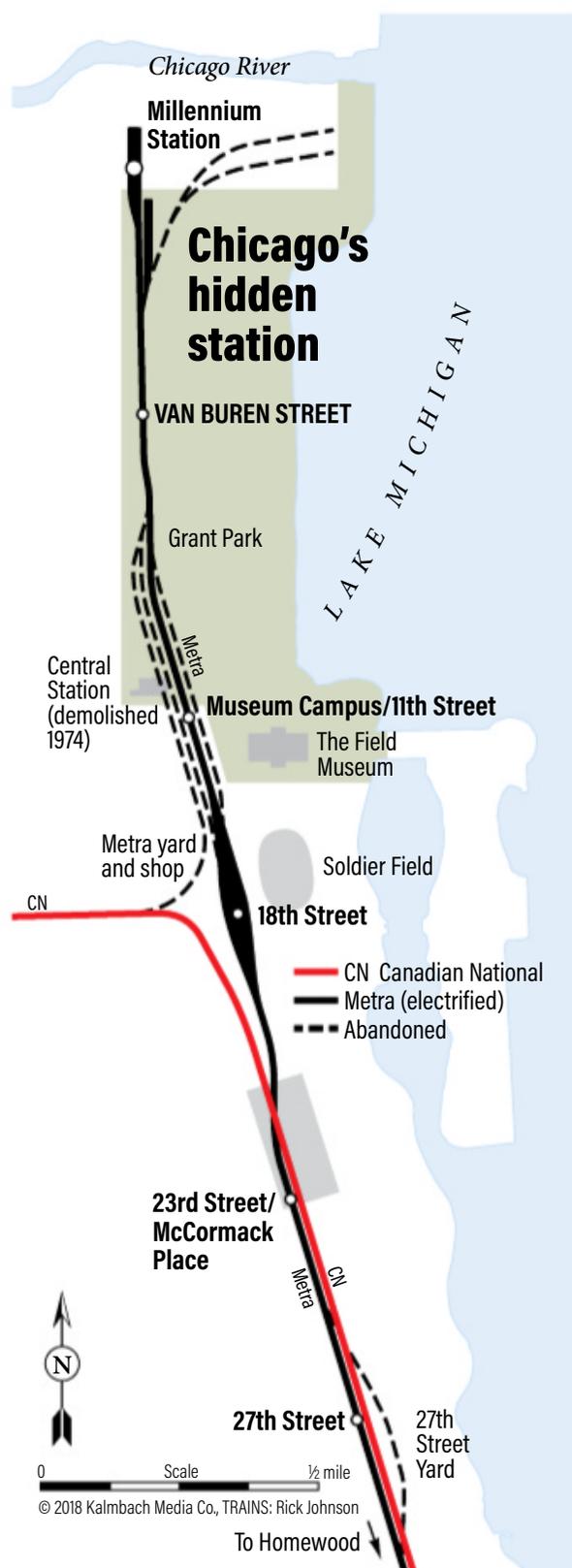
While only outbound (southbound) passengers needed a waiting room and ticket office, there were two sets. Each had a main hall, a smoking lounge, women's waiting room, and restrooms. As a carrier that also served the Jim Crow South, the IC was familiar with separate facilities, but here the divide was based upon which train a passenger used. Local-train patrons were directed to one room; express riders to another. When their respective trains arrived, they reached the platform by filing past agents who punched their tickets. Inbound passengers warranted only the canopy over the high-level platform with stairs ascending to the viaduct that passed over the station. The area west of the depot contained most of Chicago's new skyscrapers, several in succession being the world's tallest. Office density there pushed real estate values to among the highest in the world.

The station cost \$75,000, excluding the mile-long limestone retaining wall, the viaducts, and track work. Originally, suburban tracks ran south though the Central Station train shed. Later they skirted the train shed and crossed back south of 18th Street. This bisected the busy throat of Central Station, but allowed for the elevation of the St. Charles Air Line, connecting the IC to other Chicago railroads.

Resolution of all disputes between the city and the railroad came with the Lakefront Ordinance of 1919. It conferred an easement north of 12th Street and expanded the IC right-of-way to accommodate 14 tracks north of 51st Street. The price for



Inside, support columns are encased in glazed white tiles. Previous passengers have left their mark on station fixtures. TRAINS: Brian Schmidt



these concessions was exorbitant. The railroad agreed to electrify its Chicago operations, build viaducts, and relinquish claims to lands under the lake. By 1926 this cost \$65 million, and the resulting debt service was so high that the company's overall return on investment immediately dropped by half. The financial damage compounded during the Great Depression. Later borrowings covered scheduled bond payments, digging the railroad deeper into debt.

At its 1929 peak, commuter revenues had grown three-fold since electrification, representing 20 percent of systemwide passenger earnings. During the evening rush hour, this required Van Buren Street to move a train nearly every 1 minute, 11 seconds. In all, the station saw 456 weekday trains on the IC and another 67 from the Chicago South Shore & South Bend, which operated on trackage rights. By comparison, Central Station, the home of IC's long-haul trains, hosted 55 daily movements.

APEX AND DECLINE

In 1926, the Van Buren Street entrance cut was replaced with a lengthy passage under Grant Park and Michigan Avenue. The passage provided all-weather access, and it also connected with the station platforms, replacing the viaduct. The IC suburban apex came in 1945 when it carried 49 million passengers. Midday service cuts began in 1949, and 1951 saw more. The December 1963 opening of the parallel Dan Ryan Expressway devastated IC ridership.

Illinois Central installed automatic ticketing in 1966 using magnetic stripes imprinted on tickets. As the world's first such system, it was plagued with problems.

Organized labor blocked planned personnel reductions, and the automatic gates themselves were prone to erupt in flames when touched by cigarettes. Nicotine lovers had to stop smoking on trains after May 1971, when modern air-conditioned Highliners replaced the original car fleet. Passengers thus began to light up upon exiting the trains. Better gates were installed in 1975. Worse was the discovery that patrons systematically evaded the system. A two-week crackdown in 1981 nabbed 618 fare-cheats. The ticketing system lasted until 2013.

The 1974 demolition of Central Station should have allowed straightening of tracks south of Van Buren, but they still swerved to the "temporary" 12th Street depot built in 1920. When metropolitan-area voters approved the Regional Transportation



Van Buren's entrance on Michigan Avenue.



Two modern Metra bilevel trains pass at Van Buren in the shadows of the nearby high-rises. These cars, part of an order for 160, were delivered between 2005 and 2012 and replaced the original 1970s era Highliner cars from St. Louis Car Co. and Bombardier. Two photos, Fred Ash

Authority taxes in 1976, operating subsidies kept local suburban trains running under purchase-of-service contracts. The RTA's Metra operation purchased the IC Electric Division outright in 1987. Since then, more than \$1.6 billion has been invested in catenary, power distribution, stations, and rolling stock. Most evident are 160 double-deck Nippon Sharyo-built Highliner II cars.

Metra now operates 170 weekday Electric Division trains, representing 24 percent of its total movements. The IC once was the busiest suburban service in the area, but the Electric Division now ranks third. Patronage increases on BNSF and UP-West lines mirror the population growth in the western suburbs. At the same time, Electric Division ridership trended downward, reflecting the Rust Belt industrial decline and aged housing stock of its neighborhoods. One otherwise-favorable trend on the Near South Side actually hurt Van Buren Street Station: The conversion of office buildings to residential use. Nearly 100,000 people now live near the station, but tend to walk to work. Homes supplant the offices that were once the destination of commuters.

On weekdays, 38 South Shore Line trains operated by the Northern Indiana Commuter Transportation District also call at Van Buren Street. In truth, no one knows how many passengers use the station because it is no longer gated. Periodic

boarding counts, however, seem to confirm a dramatic patronage drop. The last, in 2016, showed 3,131 boardings, compared with 6,099 in 1989. The estimate is an undercount, as the station serves huge special-events crowds for July fireworks, the Taste of Chicago food fest, and the Grant Park Music Festival. Yet, numbers clearly are down.

After inbound trains reach their Millennium Station terminus at Michigan Avenue and East Randolph Street, many deadhead back for midday storage. The 18th Street Yard, which also contains the Electric Division shops, receives about 34 consists to store. In 2015, three new storage tracks at Van Buren brought the total to seven. Recent track improvements include the replacement of manually thrown switches with an automated system at 11th Place, the point where Terminal dispatchers transition to the North Desk, which extends to Kensington interlocking. On weekends, the North and the Terminal desks are consolidated. The midnight shift has only one dispatcher.

Proposed improvements include installation of positive train control and a fourth main track with an additional platform at Van Buren Street. In theory, the new signal system permits Electric Division track speeds up to 79 mph. Additional tracks to be funded by NICTD would allow a second lead into the upper level of the Millennium Station used by the South Shore. Metra and the city of Chicago also envision restoration of the historic headhouse, but its \$15 million price tag also awaits funding.

For now, Van Buren Street Station remains a diminutive jewelry box hidden in plain sight. **I**



‘IT’S OVER WHEN

Body language and brevity are key on the new Illinois Central Gulf

by Gene Harmon

AUGUST 1972. I was just hired by Carl Leonard, area sales manager at the Illinois Central in Chicago. The merger with the Gulf, Mobile & Ohio to create Illinois Central Gulf was weeks away and my starting date was mid-September, after a honeymoon in Europe.

After completing the six-week sales training program I was assigned a territory on the west side of the city and out toward Glenn Yard — the major former GM&O terminal in Chicago. The merger brought major consolidations and cutbacks in service. Gino Pontello and I had adjacent sales territories, and we were seeing customers fleeing at a sickening rate. It would not be long before both of us were on the street looking for new jobs, unless something was done quickly.

We went to our boss and, after describing the problem, he asked us to put a plan together. We went to Joe Biccichi in service planning and asked for help. By the time we were finished, we identified three options that would add the most value to service improvement. We needed a third-trick yard switcher in Glenn Yard; we

A GM&O-painted GP30 and GP35 roll a train south near Odell, Ill., on the main line connecting Chicago; Springfield, Ill.; and Kansas City, Mo., in July 1980. J. David Ingles



A seven-car piggyback train heads north through Springfield, Ill., for Chicago in September 1975. The author needed improved intermodal offerings to sell rail service to his clients at the ICG. Walter A. Peters

needed to bring back the Soo Line transfer run to Glenn Yard, instead of the recent shift to Markham Yard; and we needed to add a new intermodal and carload train from Glenn Yard to Kansas City, Mo. All of these services had been removed right after the merger. We evaluated the customers and volume we could obtain with this combination of services and committed to the plan with our boss.



HE STANDS UP'

The next thing we knew we were in front of Robal Johnson, assistant vice president of sales, explaining our program. Robal was a short-fuse bomb thrower from outside the railroad industry. He was brought in by Paul Reistrup to shift the sales force to a professional and effective organization, bringing in new and profitable business. Robal liked our plan and made arrangements for us to next meet with Alan Boyd, president and CEO of Illinois Central Gulf. For two green 24-year-old sales guys we were getting in deep, and fast. Robal told us to keep the presentation short, and we would know the meeting was over when Boyd stood up.

The day came and we were nervous, but determined to see things through. We presented our program to Boyd. He asked a few questions and then he stood up. It was over in less than 5 minutes. As he stood, he said he would give us an answer the next day.



Alan Boyd

Sure enough, the next day he gave us written authorization to start the new services and transferred enough budget money to operations to do the job. Within four weeks service began. I know because I went to Glenn Yard the night the

GM&O in Illinois



first new Kansas City train was made up to see it for myself. George Biscan, division superintendent, was there and questioned my presence. He relented when I told him the story relayed here.

The ICG eventually slimmed down enough to make real money. It later dropped the "Gulf" from its name, becoming Illinois Central once again, and was purchased by the Canadian National in 1999. The Kansas City line is now split among Kansas City Southern, Union Pacific, and Canadian National.

I learned from Boyd to keep it short. I always admired his listening to us, and his prompt and decisive response to our plan. To this day, however, he is the only executive I have ever worked with who let you know it was over by standing up. I

GENE HARMON retired in 2013 after 44 years working for railroads including Erie Lackawanna, Illinois Central Gulf, Southern Pacific, and others. For the past 28 years he owned a logistics management business. He lives in Walnut Creek, Calif. This is his second TRAINS byline.





Reviving a legend

TRAINS' annual Preservation Award will help restore Rio Grande Ten-Wheeler

▲ Denver & Rio Grande Western 4-6-0 No. 168 spent more than 70 years on display in a park in Colorado Springs, Colo. Now, with the support of TRAINS' \$10,000 Preservation Award, its restoration is moving toward completion. Above, from left, clockwise: the engine in November; its builder's plate; headlight and stack; replica tender. Five photos, TRAINS: Jim Wrinn



No. 168 will provide a glimpse into early narrow gauge railroading in southwestern Colorado.

TRAINS MAGAZINE HAS AWARDED its \$10,000 2018 Preservation Award to the Cumbres & Toltec Scenic Railroad to complete the restoration of Denver & Rio Grande 4-6-0 No. 168. When finished in late 2019, the 19th-century locomotive will be the earliest example of an operating narrow gauge Ten-Wheeler in North America.

The grant will sponsor restoration of No. 168's boiler jacket — a final touch in the multiyear process that will return the 3-foot-gauge locomotive to operating condition and as it appeared after a 1915 rebuilding.

The award was made from more than 40 applicants in this the 20th year for TRAINS' \$10,000 grant. Officials with the scenic railroad say the award completes their fundraising goal of \$501,000.

"Museums and tourist groups submitted a variety of strong proposals from across the country; locomotives, passenger cars, freight cars, archives — we saw it all," says TRAINS Associate Editor Steve Sweeney, a member of the award selection committee. "We chose to support the Cumbres &

Toltec's restoration of this locomotive so future generations can see this rare artifact in operation."

Philadelphia's Baldwin Locomotive Works built the engine in 1883 for the Denver & Rio Grande. The locomotive continued in service for another 50 years and retired from the Denver & Rio Grande Western in 1938, when it was made a public park display in Colorado Springs, Colo.

"Nothing quite like this has ever happened before," says John Bush, Cumbres & Toltec Scenic Railroad president. "We are taking a Baldwin locomotive that was specifically built for and used on these tracks in 1883, then retired and placed outdoors in a park for 75 years, and now it is being restored to once again steam across the Rocky Mountains."

In addition to restoring No. 168, Cumbres & Toltec workers are also restoring four wood passenger cars from the 1880s to create a complete historic train, just as it would have appeared at that time.

"We have something rare, an ancient steam locomotive, handmade. Its wrought-iron frame

bears the marks of the craftsmen who labored on it. The frame's details show how they forge-welded the pedestal jaws," says Stathi Pappas, the railroad's assistant general manager and head of special projects. "Now, we're adding our own marks, writing more narrow gauge history."

The Cumbres & Toltec is the only organization to twice benefit from the Preservation Award. The first time was in 2005 when the Friends of the Cumbres & Toltec Scenic Railroad completed restoration of the original coal dock in Chama, N.M. The unique wooden structure is immediately recognizable in the railroad's yard.

"It is humbling to have this award join prominent philanthropic foundations and many hundreds of individuals who have contributed," says Jerry Dzedzic, co-chair of the fundraising team for the restoration of No. 168. "Railroading is an important part of the history of New Mexico and Colorado, and now for the first time we will be able to showcase a historic locomotive specifically built for and used on this railroad in the 1880s." — Jim Wrinn



The replica *Pioneer* coach rides a special flatcar at the C&NW depot in Fond du Lac, Wis., on June 27, 1948. Photograph by Harold Nehls from Ray W. Buhmaster, Lake States Railway Historical Association

C&NW *Pioneer* coach replica in the works

Renowned railroad preservationist creates another rail car contemporary to Lincoln

IN 1948 AT THE CHICAGO RAILROAD FAIR,

Chicago & North Western Railway celebrated the 100th anniversary of its earliest locomotive, the wood-burning Baldwin-built 4-2-0 named *Pioneer*. Bought by the Galena & Chicago Union Railroad — the oldest predecessor to C&NW — the *Pioneer* pulled its first westbound train for Galena & Chicago Union on Oct. 25, 1848. The *Pioneer* locomotive and tender, though retired in 1875, were preserved. However, the *Pioneer* coach didn't fare so well.

C&NW built a replica of the coach for the railroad fair and showed it off, along with the engine and four-wheeled tender. After the show and a subsequent tour



Original wooden frames have been replaced with steel to meet safety codes. Although the hardwood floors and wainscoting on the walls harken back to the 19th century, the car has been wired for electricity.

around the Midwest, the set was split up. The locomotive, after some new paint and a dressing up, landed safely with the Chicago Historical Society, where it remains today. However, the tender and the coach were sold off, and they later vanished.

Enter Dave Kloke, the Illinois contractor whose enthusiasm for all things Abraham Lincoln led him to construct replicas of the lost Central Pacific 1868 4-4-0 *Leviathan* and the Lincoln Funeral Car.

"I had been searching for [the 1948 *Pioneer* coach] for about 10 years," Kloke says. The car had been left in the elements for decades and rotted away in many places.

"I couldn't get it out in one piece," Kloke remembers. "We were going to put a steel frame under it anyway to meet Federal Railroad Administration standards."

Between recovering the coach about 1990 and now, Kloke and his team worked on the two replicas. He sold both earlier this year to a special events venue in central Pennsylvania.

Meanwhile, in March 2018, his schedule relaxed, and he decided to dig into the *Pioneer* coach. The car sits three-quarters finished in Kloke's Somonauk, Ill., facility, somewhere between a reconstruction of a replica and a replica of a replica.

"I've repurposed everything I could use," Kloke says, from bolsters to truck components to handbrake wheels. The



Work progresses on the *Pioneer* coach exterior, with putty and sanding on the agenda. The car will be painted yellow with brown trim, the same as the 1948 replica. Two photos, Tim Kidwell

trucks themselves, Kloke explains, had to be reconstructed from steel to meet safety standards and allow the car to transport passengers. Like the trucks, the main structure of the car was rebuilt from steel, though most of it will be hidden from view.

Jerry Mennenga, a colleague of Kloke's and an experienced railroad restorationist, says research is one of the most challenging parts of any restoration. For instance, the 1948 version did not include three ventilation stacks along the roof, which an illustration that dates closer to the 1848 original shows. Their plans, the only ones available, are taken from a C&NW employee bulletin and do not show the stacks. "There's a lot of back and forth," Mennenga says. "A lot gets held up until we can verify what should be done."

The interior will be updated for a modern tourist train with wooden walkover seats and electric lights.

The *Pioneer* coach's ultimate destination is Stone Gable Estate near Elizabethtown, Pa., to join the Lincoln car and the *Leviathan*. "They're going to put it back on the original right-of-way where Lincoln's car came through in 1865," Kloke says. He thinks keeping the *Pioneer* car with the Lincoln Funeral Car makes sense. "It's possible that Lincoln rode on the original 1848 [*Pioneer*] car," Kloke says with a smile at the thought. "We're speculating, but we think he really may have."

So, for the man who brought a historic locomotive and a famous passenger car back to life, there is yet another goal in sight. — *Tim Kidwell*



Short line: St. Croix Valley Railroad

Northern Pacific remnant lives on in Minnesota

▲ **St. Croix Valley's two SD40-2s in SD45 carboodies lead a morning southbound train across the Snake River in Pine City, Minn.**

Steve Glischinski

Editor's note: With this issue, TRAINS debuts its new "Short Line" feature, a visitor's guide to these operations. It will appear every other month.

THE ST. CROIX VALLEY RAILROAD (reporting mark: SCXY) operates the last significant portion of the former Northern Pacific main line from the Twin Cities to the Twin Ports of Duluth-Superior, a 33-mile line from a connection with BNSF Railway at Hinckley, Minn., to North Branch. The railroad is owned by KBN Inc., which also operates the Dakota Northern and Minnesota Northern short lines.

LOCATION: Rush City, Minn.

TYPICAL DAY: Crews go to work at Rush City weekdays at 8 a.m. There are two major customers: the Ardent Mills flour mill in Rush City and the Titan Lansing sand plant in North Branch. Operations vary depending on customer needs and the timing of the interchange with BNSF. Often crews bring cars from Hinckley to Rush City, switch the flour mill, then head to the sand plant for switching and to pick up cars. But operations change from day to day.

TRAFFIC: St. Croix Valley's biggest customer is the sand plant in North Branch. The railroad receives empties from BNSF and takes loaded trains back to Hinckley for interchange (sand is trucked to the plant). Often a set of diesels will be left at the plant to handle switching and make up trains. The railroad also brings in about 1,200 to 1,800 carloads of wheat each year to the Rush City mill, and hauls out flour, much of it destined for Kraft Foods for making pasta.

BEST VIEWING: Old U.S. (now county) Route 61 parallels the entire line.

WHY VISIT? The railroad operates over former Northern Pacific track. Its four diesels wear NP freight colors and a variation of the famous monad logo. They even carry "Radio Equipped" decals on their cabs — just like NP diesels once did.

DON'T MISS: A highway overpass in Hinckley and a former NP depot in Pine City provide good photo opportunities. A wood trestle, the biggest on the railroad, crosses the Snake River just north of the Pine City depot.

NEARBY: BNSF's Minneapolis-Superior Hinckley Subdivision passes through Hinckley. Nine miles north in Sandstone is a large steel trestle carrying the railroad over the Kettle River, easily viewed from Robinson Park or from parallel Route 123. — *Steve Glischinski*

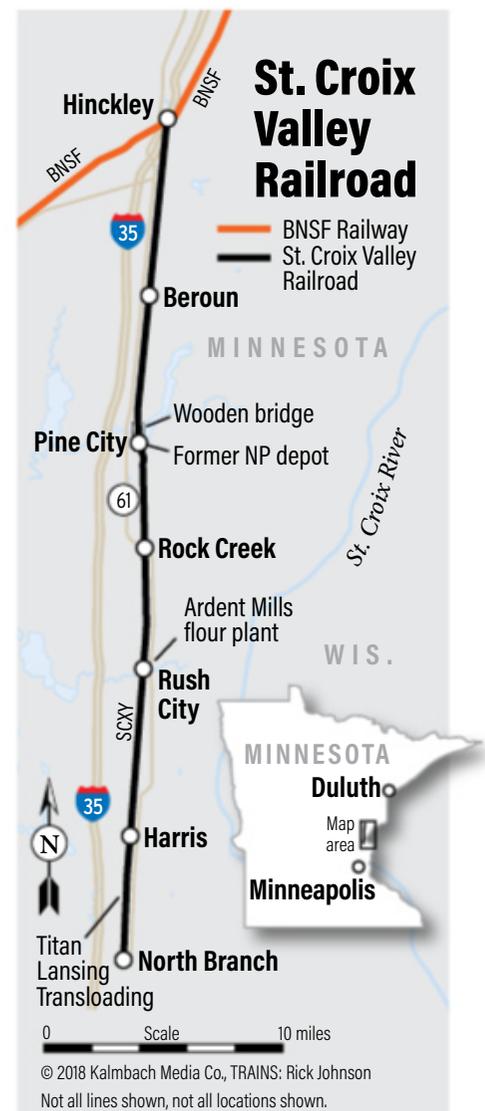
Roster

No. 1352
Model: GP8
Build date: March 1953
Lineage: Illinois Central GP7

No. 1363
Model: GP9
Build date: April 1954
Lineage: Great Northern No. 676

No. 1325
Model: SD40-2
Build date: May 1968
Lineage: Denver & Rio Grande Western SD45 No. 5335

No. 1326
Model: SD40-2
Build date: October 1966
Lineage: Southern Pacific SD45 No. 8840



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Not all lines shown, not all locations shown.

GETTING THE SHOT

Clybourn, Chicago

A different angle on the Willis Tower

CHICAGO'S SKYLINE has long been a coveted backdrop for rail photographers, and the signature building in that skyline is the 1,450-foot, 110-story Willis Tower. Still widely known by its former name, the Sears Tower, it was the world's tallest building at the time of its completion in 1974. Visible for miles, the tower can be incorporated into rail photos all over the Chicago area, but is probably most familiar in shots from train-watching haven Roosevelt Road [see "Chicago's Legendary Roosevelt Road," July 2013].

Lesser known, but also offering Willis Tower as a backdrop, is Metra's Clybourn station, where the Union Pacific North and UP Northwest lines split, and it's possible to get a shot where the building is right behind the train. To me, this combination of Metra train and landmark building instantly says "Chicago."

Clybourn is a busy place during weekday afternoons. In a little less than 3½ hours, starting at 3:28 p.m., Metra sends through 43 trains — 32 outbound and 11 inbound. Not all work for the shot in question, however.

To line up the train and tower, you'll need an outbound on the Northwest line — there are 17 in the time frame mentioned above — running on the western (outermost) of the two outbound tracks. You'll also want to be at the north end of the platform between those tracks. You'll want to crop out the huge and overbearing electronic billboard to the southeast.

Parking in this area is difficult, to put it mildly. Metra is probably the best way to get there — it's just an 8-minute ride from the Ogilvie Transportation Center, and a round trip costs \$8. That's a lot less than the average Chicago parking ticket.

This is not the only good photo at Clybourn. From the southern end of the



The Willis Tower is the backdrop for a Metra train at Clybourn. Two photos, TRAINS: David Lassen

station, you can watch trains pass UP's Tower CY on the four-track main line.

But those aren't as instantly recognizable as Chicago locations. When you include the Willis Tower, it's no doubt the Windy City. — *David Lassen*



Other photo possibilities at Clybourn include this shot of Union Pacific's Tower CY.

MORE ON MRVP

Chicago bound



There's no better place to watch the rush than from K Station.

WHILE SOME make their way to the Windy City for the music and food, others, like rail photographer Drew Halverson, make the trek specifically to watch a cacophony of railroads weave through this magnificent Midwestern city. Drew found his way to numerous accessible metro locations, where he and his crew set out to capture freight, passenger, and commuter rail action for the 2017 TRAINS special issue, *Chicago: America's Railroad Capital*. But even better, the cameras kept rolling to record what it's like to railfan in a gritty, urban setting. To take in the entire Drew's Trackside Adventures Chicago experience, subscribe to MR Video Plus, and then go to **MRVideoPlus.com/DTA32** where the action begins. — *Kent Johnson*



Roosevelt Road provides plenty of action, rain or shine. Two photos, Drew Halverson

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Q How do railroads accommodate thermal expansion in welded rail? — Leo Verhees, Netherlands

▲ **Welded rail can be joined with hundreds of welds over many miles. Railroaders aim for a rail neutral temperature that minimizes stress from thermal expansion or contraction.** TRAINS: Drew Halverson

A Several readers asked us about this after reading “Six Welded Rail Questions” in December 2018 “Technology.” Traditional jointed rail permits gaps for rail to expand or contract depending on the ambient temperature and amount of sunshine hitting the rail. So, in places where jointed rail is still in use, it’s common to see the rail gaps close on hot summer days.

On railroads that use welded rail, track crews must manage the rail neutral temperature. The rail neutral temperature is the temperature at which the rail is neither in compression or in tension. Certain civil engineers call this state “happy rail.”

The rail neutral temperature is set at the temperature at which rail is welded.

From that point on, the track’s lateral stability, in terms

of ballast, track spikes, rail anchors, track clips, and tie plates are able to keep rails from buckling or pulling part in most circumstances.

More information on this and other rail topics is available at interfacejournal.com. — Steve Sweeney

Q Why do diesel locomotives sometimes accompany a working steam locomotive? — Pat Newton, Stratford, Calif.

A In the 21st century, diesel locomotives are the ultimate backup power for steam. Mechanically speaking, diesels



Rail neutral temperature markings are seen on welded rail near Belmont, Ariz., on BNSF Railway’s Seligman Subdivision in September 2013. Steve Carter



Southern Railway 2-8-0 No. 630 is shown at work at the North Carolina Transportation Museum in Spencer, N.C., in June 2012 with diesel locomotive helpers. Michael Ridenhour

are not necessary for most properly functioning steam locomotives to pull a consist, or to stop safely.

However, host railroads may require a diesel locomotive to accompany a steamer to ensure it can move to a siding in the event of a mechanical breakdown, provide dynamic braking and additional air-braking power in the event of a failure on the steam locomotive, and even to read in-cab signals that a steam locomotive may not be equipped to display.

Every now and then, diesel locomotives provide the necessary “oomph” to help 100-year-old steam machines over grades where stronger locomotives or helper engines might have otherwise been used in the past. Diesels have also been used to conserve a steam locomotive’s fuel supply between water and fuel stops.

— Steve Sweeney

Q A friend from Mexico tells me that railroaders place thin explosive packets on rails, which explode on wheel contact. What purpose would they have?— Bob Christensen, Orange, Calif.

A These are likely “torpedoes.”

Much like the low-grade hand-held fireworks that make a loud bang when they are tossed on concrete, railroad torpedoes are designed to explode and make a loud noise when squeezed between a railroad wheel and a rail.

In days before radio communication was common on the railroad, one of the ways to communicate that a train was stopped or in distress was for crews to place torpedoes on rails.

When another train approached the stopped one, the sound of a detonating torpedo alerted the crew to the situation and required them to stop the train and investigate. — Steve Sweeney

Q I thought I knew how air brakes worked. Air is on, brakes are off. Air comes off, brakes come on. Now, after reading “Air Brakes 101” in “Technology” in the September 2018 issue, I’m not so sure.

— Walt Hughes, Cincinnati

A Entire books have been written about the function and maintenance of air brakes. So any short answer will seem incomplete for those who’ve studied the topic for years.

Your basic understanding — air pressure up, brakes off; air pressure down, brakes on — is a good start.

There’s more to this answer, however.

Modern North American trains pump air into a brake system to a predetermined pressure common to each locomotive and freight car. Air compressors on locomotives maintain that pressure on a train’s journey.

When the air compressors stop, the system slowly leaks air — not unlike a slowly leaking tire on an automobile. Because of their design, air brakes respond mechanically to a specific, relatively fast drop in air pressure on a brake line, often 5 or 10 pounds per square inch (or more for an emergency brake application). The pressure drop creates an imbalance in pressure between the brake line and the brake reservoirs.

Those reservoirs hold a reserve of air gathered from the brake line that pushes brakeshoes on wheel treads when the reservoir pressure is greater than the brake line pressure.

Brake control valves are not designed to be sensitive enough to respond to the slow, minute-by-minute, hour-by-hour leakage of a parked train.

If the systems were that sensitive, it could mean the system would respond to leaks as well as directions from the engineer at the brake handle. — Steve Sweeney

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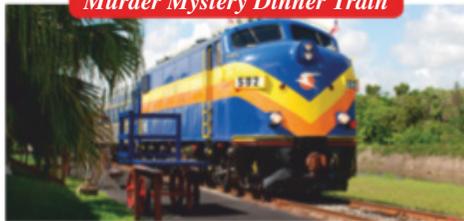
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Borden Perlman.....	14
Dixie Precast, Inc.	13
Dougherty, Peter	21
Finger Lakes Railway	15
Four Ways West.....	17
Greg Scholl Video Productions	13
Keystone Railroad Delights Tour	11
Monte Vista Publishing	15
Morning Sun Books, Inc.	21
Plasser American Corporation.....	2
Railcom.....	14
railroadbooks.biz.....	13
Railroads at War	66
Ride this train! 2019.....	65
Ron's Books	15
Signature Press.....	15
Skookum In Steam.....	67
Society of Int'l Railway Travelers	76
Switzerland 2019 Tour	67
Trains Special Issue	12
Transcontinental Anniversary Items	10
Western-Cullen-Hayes, Inc.....	14
Wheel Rail Seminars	13
Whitewater Valley Railroad	14

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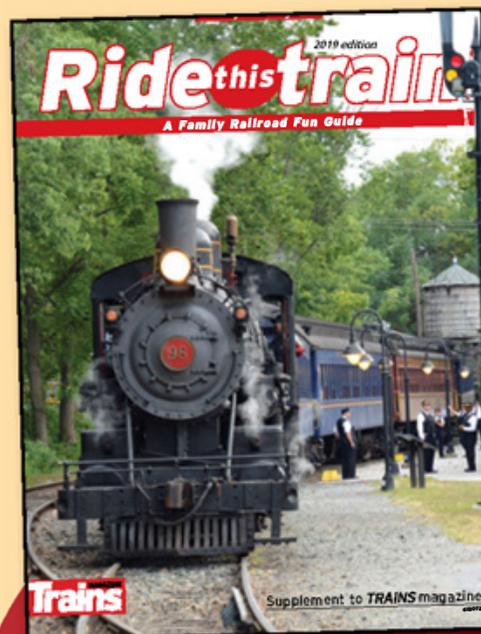
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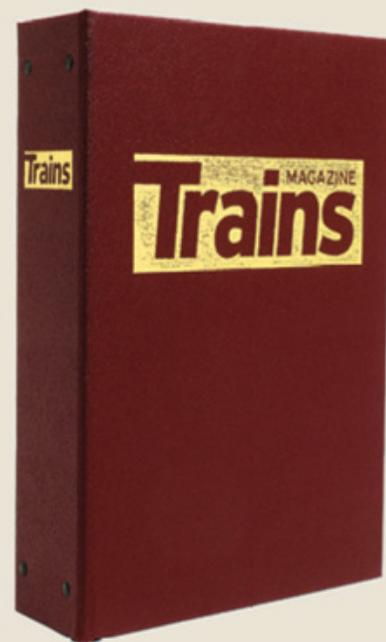
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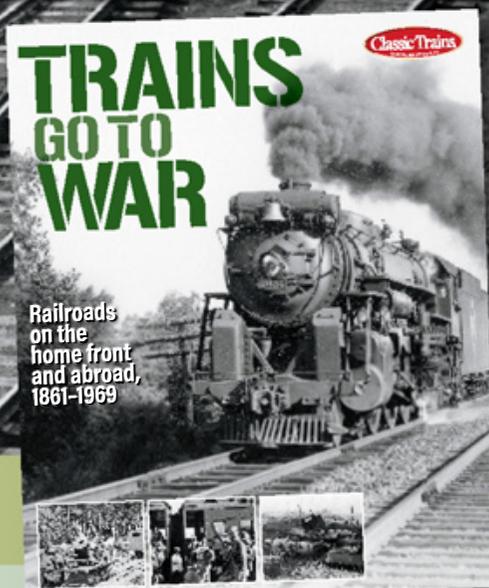
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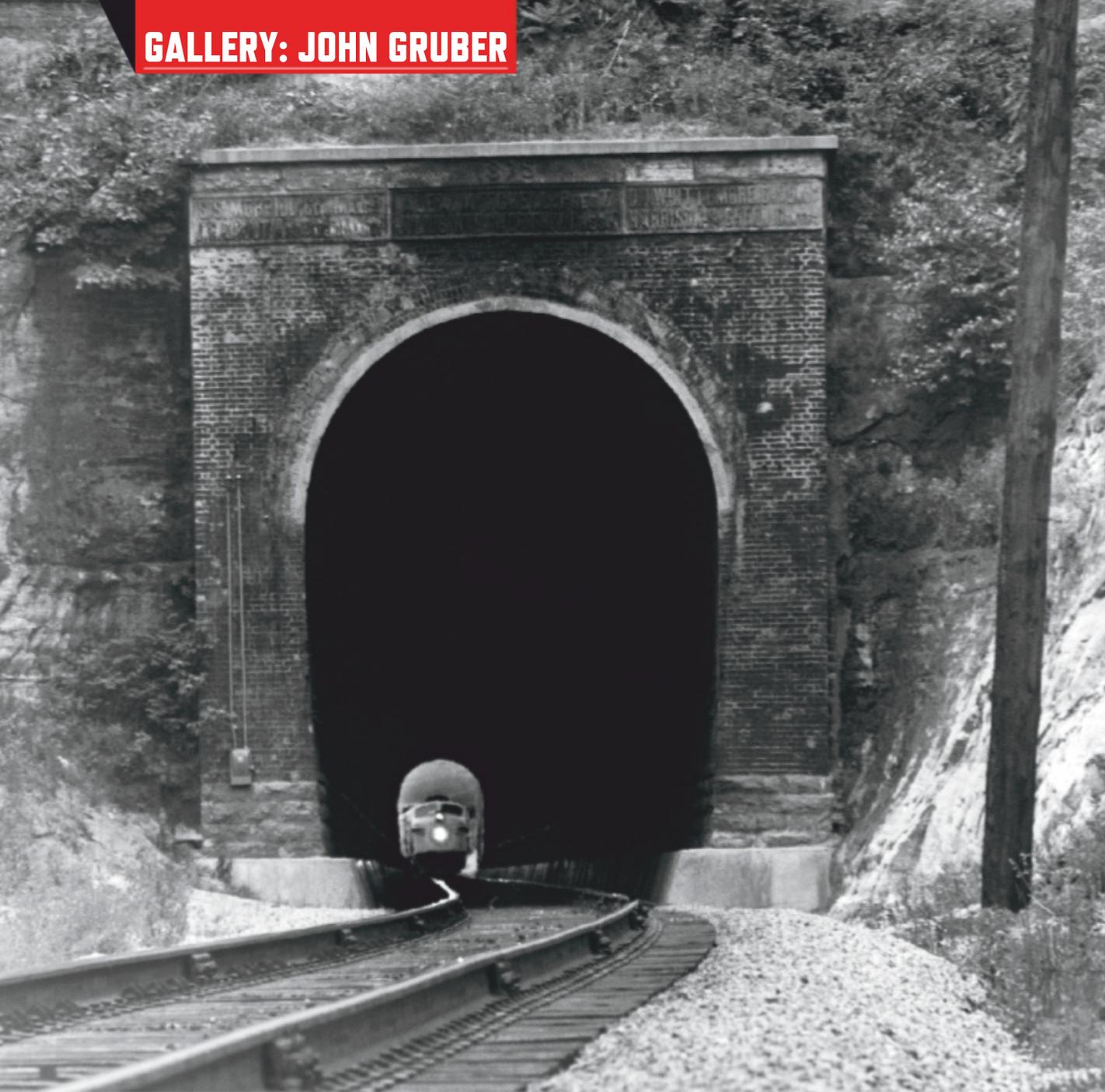
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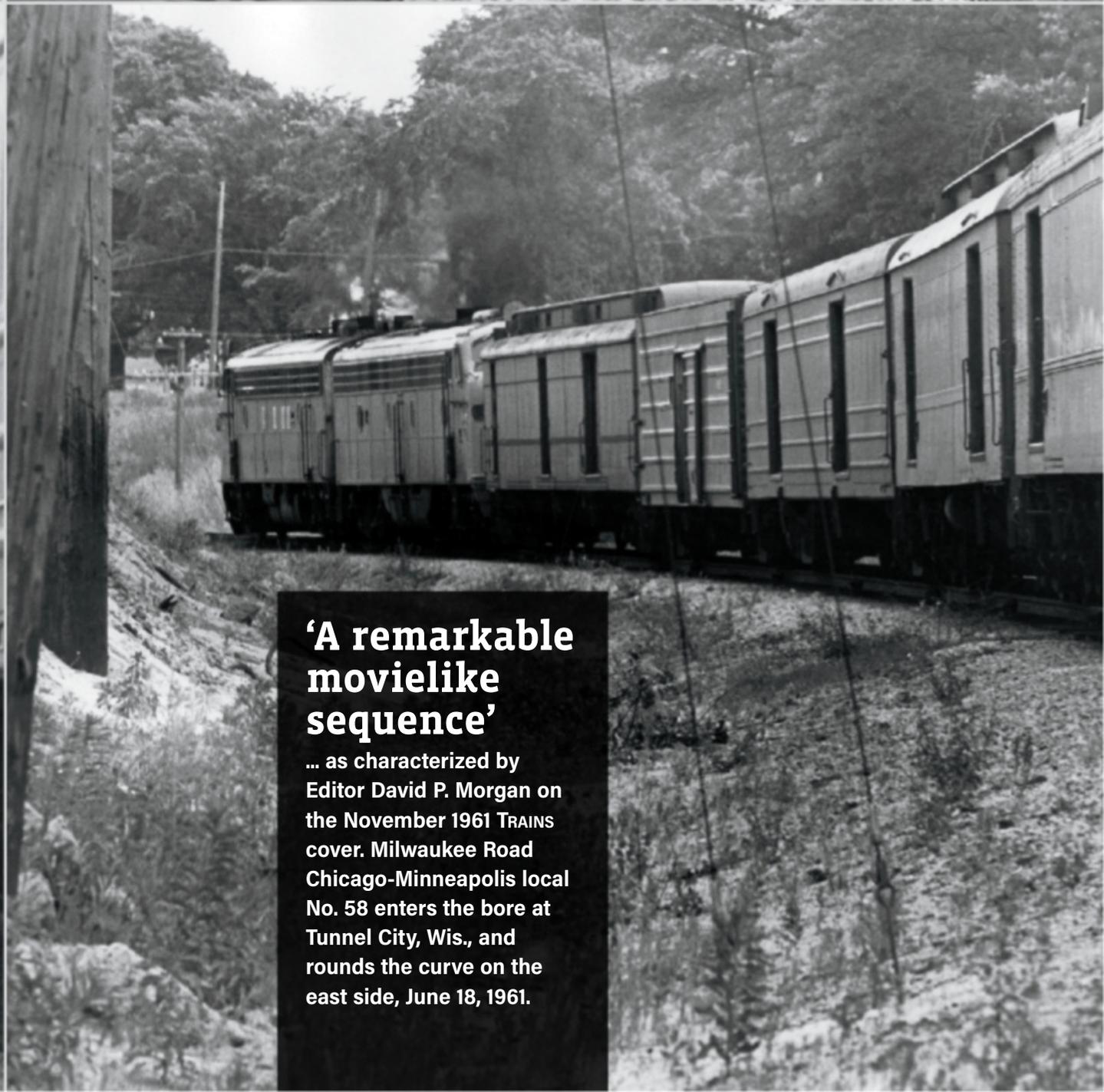




Railfans in their natural habitat

Illini Railroad Club members, riding a Chicago North Shore & Milwaukee Railroad excursion from Chicago to Milwaukee, disembark at a stop to take a photo of a regularly scheduled southbound train at Northbrook, Ill., on Feb. 21, 1960.





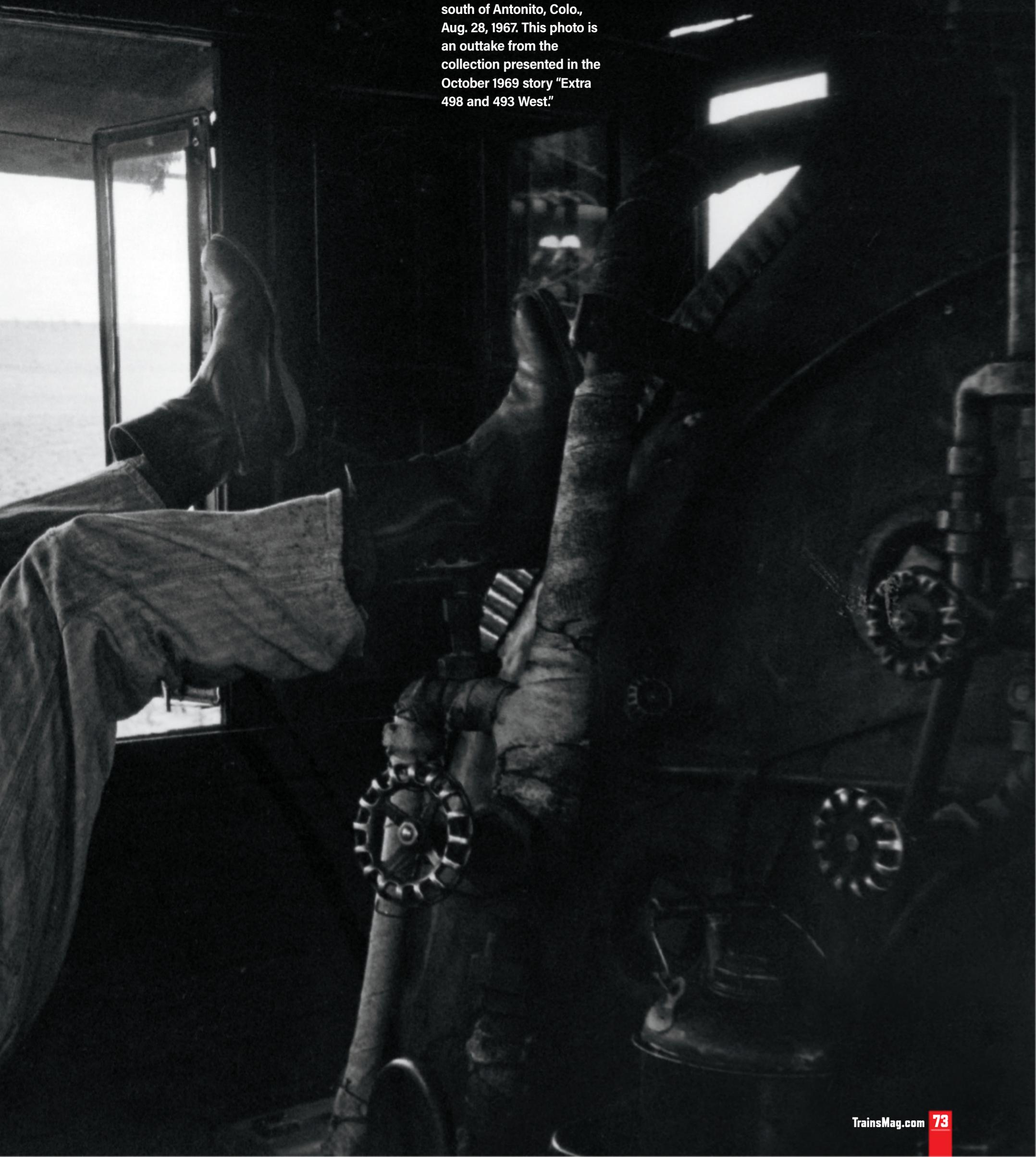
**'A remarkable
movielike
sequence'**

... as characterized by
Editor David P. Morgan on
the November 1961 TRAINS
cover. Milwaukee Road
Chicago-Minneapolis local
No. 58 enters the bore at
Tunnel City, Wis., and
rounds the curve on the
east side, June 18, 1961.



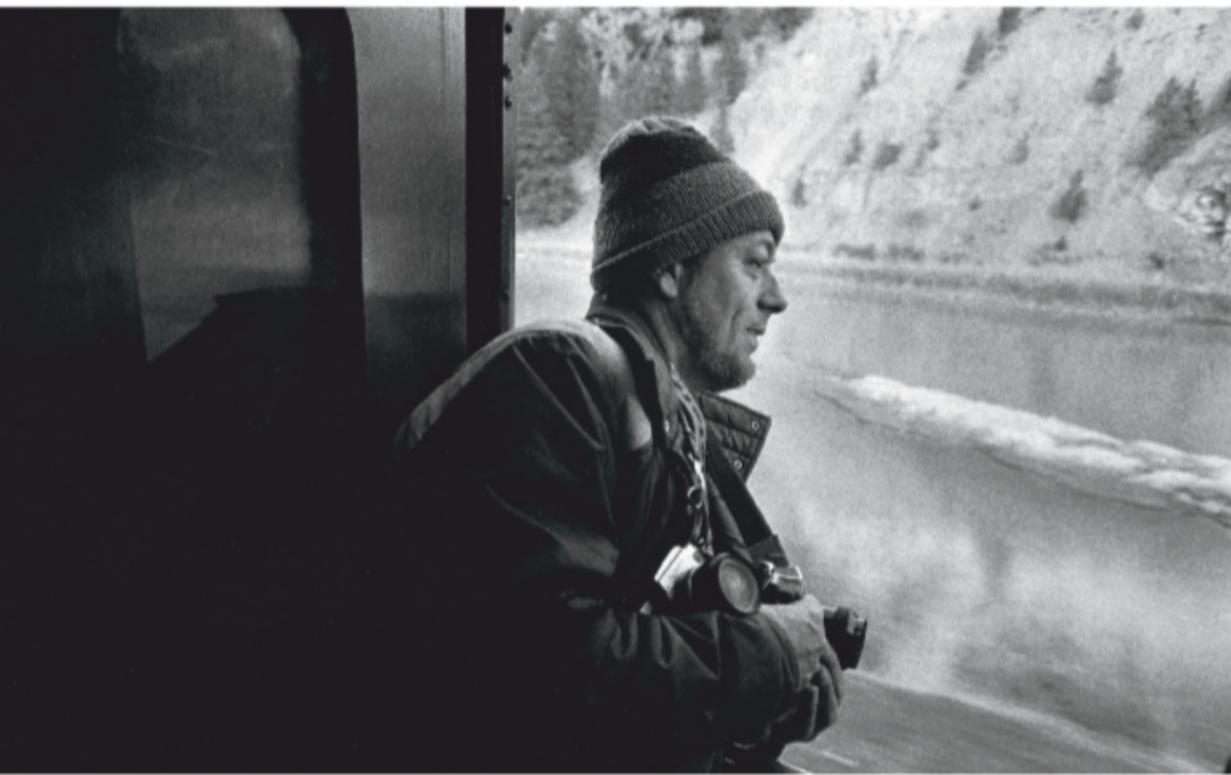
Kickin' back in a kick-back locomotive

A Denver & Rio Grande
Western fireman reclines in
a narrow gauge 2-8-2 cab at
a stop near milepost 287,
south of Antonito, Colo.,
Aug. 28, 1967. This photo is
an outtake from the
collection presented in the
October 1969 story "Extra
498 and 493 West."



It could be a cathedral

A nun walks along the Roman-Doric columns on Canal Street at Chicago Union Station in 1964. This is one of the photographer's most well-known images. He took this photo, among a set, while on assignment for **TRAINS**.



John Gruber 1936-2018

We dedicate these pages to a humble man whose photography evoked emotion from readers of this magazine beginning with his first photo in 1960 (see pages 68-69). When John Gruber wielded a camera, he captured a scene in its entirety, with special attention to the people, particularly the railroaders. He used photojournalistic techniques at a time when they were not applied to railroad photography. In 1997, he made it his mission to preserve railroad images and to bring together those that appreciate them by founding the Center for Railroad Photography & Art in Madison, Wis. Through his travels, books, photos, presentations, gallery exhibits, and so much more, he helped to cultivate a sense of community we will never forget. Photo of John Gruber: Ted Benson

The view from here

Hosted by the Railroad Club of Chicago, a special excursion led by Southern Railway 2-8-2 No. 4501, which began its journey in Champaign, Ill., heads for Central Station in Chicago on the Illinois Central Gulf, June 17, 1973.

