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Southbound:
Small on space,
big on action** p.10

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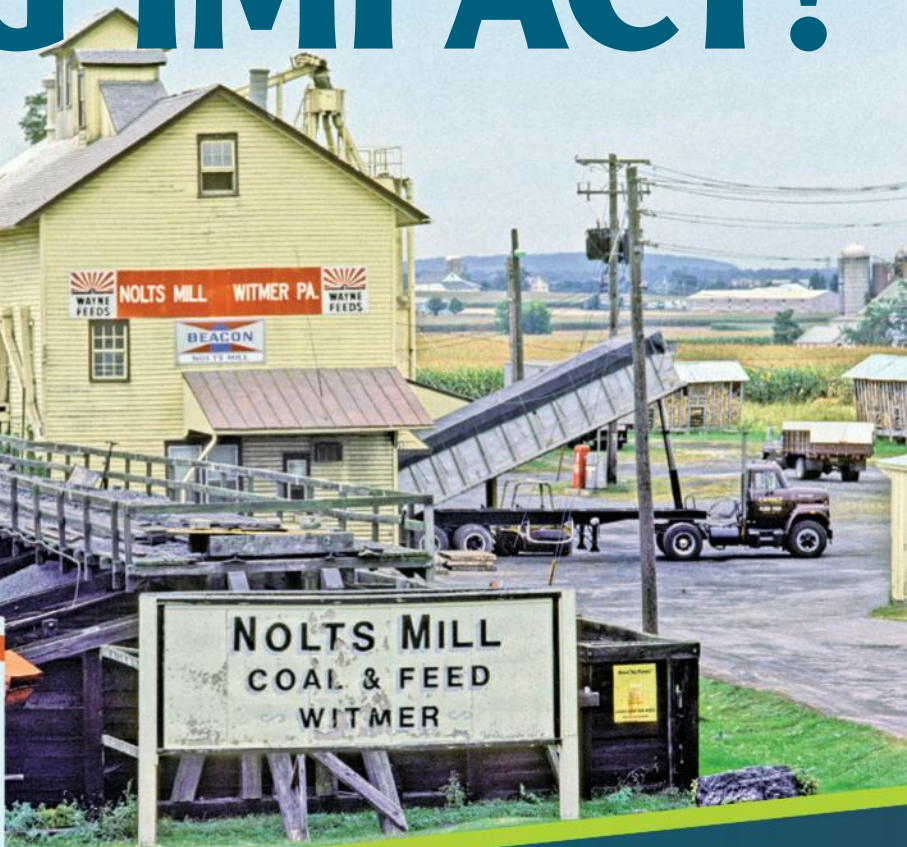
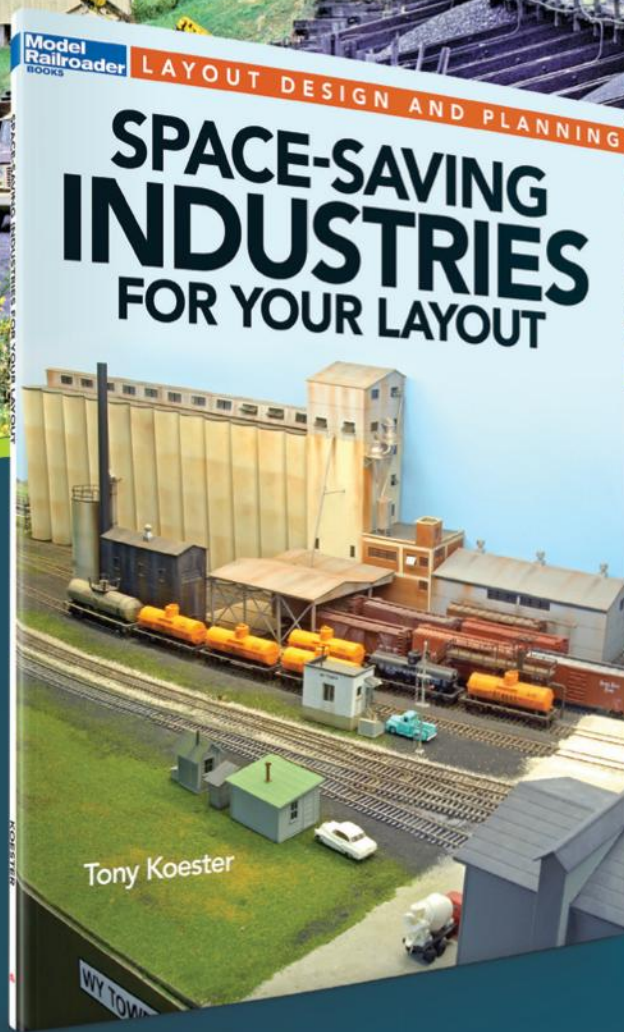
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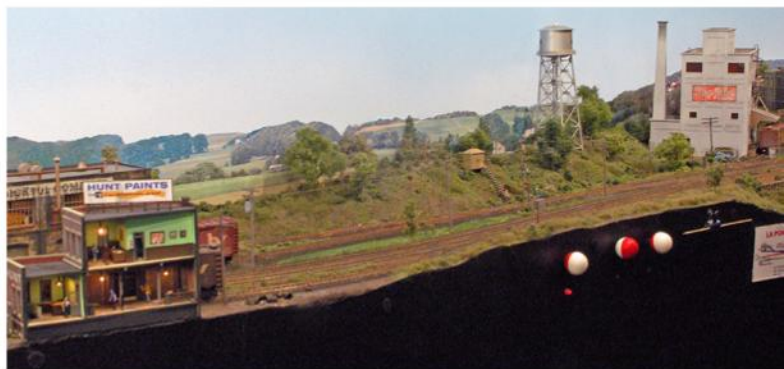
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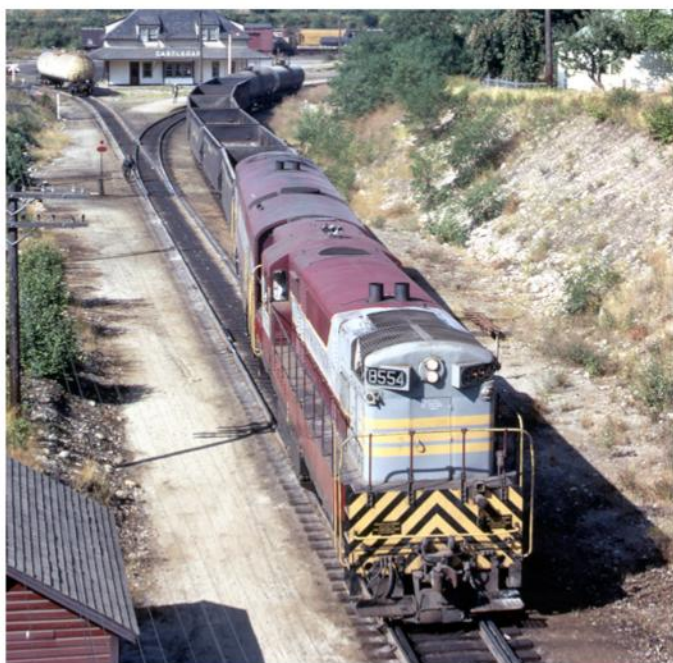
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Model Railroad Planning

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Editorial

Modeling from a model

Modelers who are relatively new to the hobby need all the help they can get. Both railroading and model railroading are complex topics, and it's easy to get overwhelmed as one tries to learn about various scales, eras, control systems, brands, nomenclature, and so on. Imitating someone else's work they admire is usually helpful, and we do our best to share examples of outstanding model railroads in *Model Railroad Planning*, often at an early stage. Even dragging home a 4 x 8-foot sheet of plywood fosters the early conversion from reading about our hobby to actively participating in it.

That said, I've previously cautioned against plopping a large sheet of plywood in the middle of the room, like a Ping-Pong table, as access is typically required on all four sides. You won't win points with other family members by hogging the entire recreation room. It may be a good way to get started, but I recommend choosing a plan that can later be cut in half, lengthwise, with the two strips placed against one or more walls of the room. Setting them atop inexpensive bookcases and shelving units can be win-win.

I'll also caution against being too eager to extensively copy something another modeler has done. It's certainly valid to use other modelers' work for inspiration, but you are likely to discover that your interests and theirs diverge at a surprisingly early juncture. Moreover, as you read about the due diligence other modelers performed before they embarked on their latest projects, you'll typically note that they reported on how enjoyable and rewarding the research phase of a project turned out to be.

The Internet has made doing our homework so much easier than it was only a decade ago. We use it to find flights or book Amtrak or VIA trips and hotels. Using such tools to discover more about a prototype that caught your eye, as David Popp did for the Winston-Salem Southbound layout described in this issue, is an excellent way to ensure that what you plan to do



"When all else fails, read the instructions." Good advice, assuming someone has provided a copy of the instructions. Rick De Candido photo

is truly your own interpretation of a specific railroad or, if you opt to freelance, type of railroading.

No matter how good a modeler someone may be, I like to see information about the prototype on which his or her model is based. That way, I can make my own judgment call about how well the model resembles its full-size counterpart and how I want to interpret that information for my own needs. David's interpretation of the WSS underscores the advantages of looking to the prototype.

To that end, we have tried to provide enough WSS prototype background information for you to make your own educated decisions about how best to model such an intriguing prototype.

Other side of the ocean

Two of this issue's features depict model railroading on the east side of the Atlantic. If you have yet to read the features in this issue, casually flip through the pages to see whether you can spot them. There aren't any obvious clues such as illustrating the railways of the British Isles, though we welcome articles depicting good layout design regardless of location.

These articles pose an unasked question: Why would modelers not



A single photo started MR Video Plus producer David Popp on a journey of discovery that led to the construction of a compact but highly entertaining model railroad, as he reports beginning on page 10. Bill Zuback photo

living in North America model the railroads on that continent? This question often arises in discussions about overseas members of the National Model Railroad Association. (Why it's not called the International Model Railroad Association is a separate question too complex to easily answer here, but I assure you it has nothing to do with U.S. prejudices.)

My wife, Judy, and I have been privileged to travel to model railroad conventions in the United Kingdom as well as Australia and New Zealand. We saw a lot of superb model railroads – um, railways – based on local prototypes, but we also saw a large number of railroads based on U.S. and Canadian prototypes. Many of them were as well done as anything we're likely to encounter in North America.

There are several reasons for this. One is the selection of North American models is much greater because the market is larger. This means the prices are usually lower and availability greater, even from afar. Another is that North American equipment tends to be larger and hence more impressive. A third reason is operational in nature: U.S. and Canadian railroads interchange with each other, often end to end, adding a lot of variation in road names and operational opportunities.

We're delighted that overseas modelers continue to share their work with us through the pages of MRP. We hope you agree.

Final instructions

My Trains of Thought commentary in the May 2016 *Model Railroader*

discussed being proactive concerning the dismantling of our model railroads when we sense our interest is waning in tune with advancing age. Rick De Candido, who described his Fillmore layout that comprises a compact but busy engine terminal in MRP 2015, was thoughtful enough to write a detailed set of instructions for dismantling his railroad, should it not find a home with his modeling friends. A copy of the instructions is posted inside the layout's framework, as show in the photo above left.

Tony



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This photo, taken by Frank Jones in September 1956, shows the very end of the Winston-Salem Southbound's Tar Branch, which included a warehouse complex, a freight house, a cold-storage house, a team yard, a railroad supply depot, and the construction site for the bridge that later became part of Interstate 40 – all rail served. This one image has the makings for a complete small layout. Photo courtesy of Forsyth County Public Library photograph collection, Winston-Salem, N.C.

Modeling a busy **SHORTLINE** **TERMINAL**

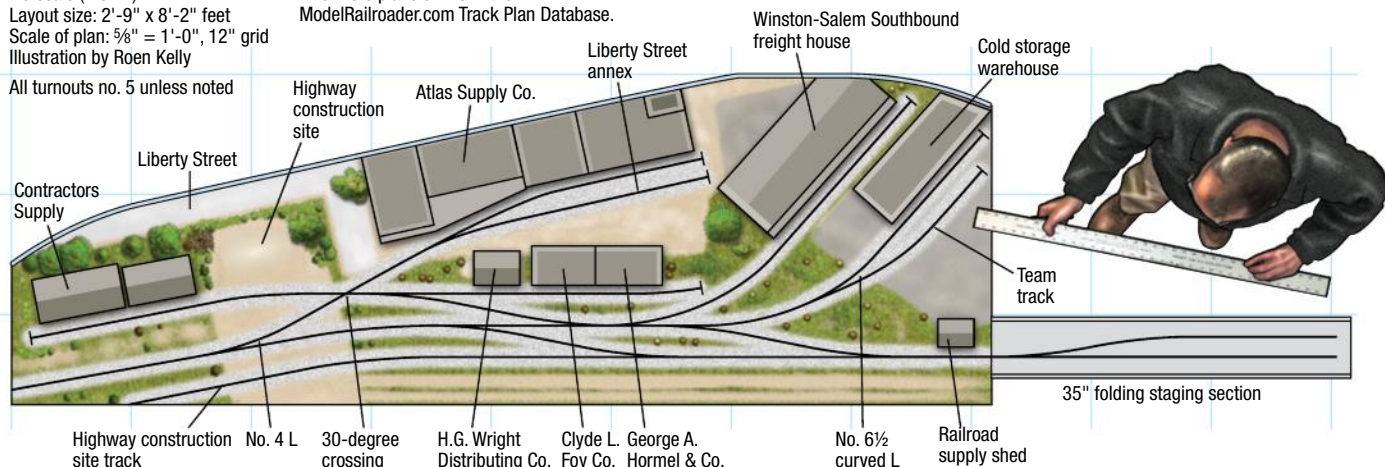
The Winston-Salem Southbound Tar Branch is a compact prototype-based layout that offers lots of switching

By **David Popp**//Model photos by William Zuback

The Tar Branch

HO scale (1:87.1)
Layout size: 2'-9" x 8'-2" feet
Scale of plan: 5/8" = 1'-0", 12" grid
Illustration by Roen Kelly

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ModelRailroader.com Track Plan Database.



During my time at *Model Railroader* and now at *Model Railroader Video Plus*, photos have proven to be my greatest source of inspiration for designing and building new layouts – and often as not, a single picture is all it's taken to get the ball rolling. Therefore it's not surprising that it was a photograph, or at least a small file-folder full of them, that gave the HO scale Winston-Salem Southbound layout its start.

I'd never heard of the "Southbound," as the locals called it, until I'd found the photos. But it didn't take much digging to realize that this railroad would make an ideal modeling subject. It covered a single region, served a variety of industries, had a fair amount of traffic, owned a varied roster of locomotives, and possessed a quirky history – all characteristics I deem necessary for a rewarding project.

After conducting some research on the WSS – and admittedly, there wasn't much to go on – I focused on one small piece of it: the very tip of an industrial branch line. The result is a design for a shelf-style layout that will fit along an 11-foot wall, which can also be expanded as time and space allow.

A bit of history

The Winston-Salem Southbound was built as a bridge line extending south from Winston-Salem, N.C., and ending just above the South Carolina state line at Wadesboro, N.C. Col. F.H. Fries dreamed up the idea for the railroad and secured the initial charter to build the line in 1905. Construction began in 1910 with Col. Fries' brother Henry at the helm.

To build the line, Henry Fries negotiated a deal with the Norfolk &

Western and the Atlantic Coast Line, the two railroads connecting at the northern and southern end points, respectively, to jointly pay for the construction. The 87-mile route was completed by December 1910, and the line was open for business in early 1911. It was jointly owned by the N&W and ACL – both companies holding 50 percent of the stock. The Southbound's prime purpose was to haul coal from the N&W coalfields to the ACL's port at Charleston, S.C.

In the agreement, the N&W oversaw equipment and right-of-way maintenance. The ACL arranged and managed the traffic on the line. The Southbound had its own employees and train crews, and Henry Fries remained president of the WSS until his death in 1949. The presidents of the N&W and ACL then took turns serving as the line's president on an every-other-year basis.

The Southbound also had its own steam engines and freight cars. Major work on the equipment was done by the N&W in Roanoke, but this was moved to the N&W's North Yard in Winston-Salem in 1926. Steam left the Southbound in the spring of 1957, when the WSS acquired four GP9s.

Though never a stunning financial success, the Southbound did manage to make enough money to keep running. It still exists today due to good management and new customers and is now owned by its parents' successors, Norfolk Southern and CSX.

What to model?

Even though its main line is just 87 miles long, that was still too much railroad to attempt to model – particularly for a project railroad. I needed to find a nugget – something that would lend itself well to representation in

The layout at a glance

Name: The Tar Branch

Size: 2'-9" x 8'-2"

Prototype: Winston-Salem Southbound Ry.

Location: Winston-Salem, N.C.

Era: mid-to-late 1950s

Style: can be freestanding or shelf

Minimum radius: 20"

Minimum turnout: no. 4

Maximum grade: none

Train length: 4 feet

Benchwork: L-girder

Height: 46"

HO scale and could be built for a video series on *Model Railroader Video Plus*.

Fortunately, Kalmbach's David P. Morgan Memorial Library had a copy of the only book to my knowledge ever written about the Southbound. Page 13 of *The Winston-Salem Southbound Railway*, published in 1996 by Dr. Jeff Miller and Jim Vaughn, held exactly what I was looking for – a captivating photo around which to design a layout.

The image (on the opposite page) showed the very end of the Tar Branch, a WSS branch line built to serve a number of industries on the southwestern side of Salem (many of which just happened to be owned by Henry Fries' family members). Taken in the mid-'50s near Second and Liberty streets, the picture shows WSS 2-8-0 no. 711 threading a maze of tracks to switch a highly concentrated set of industries. Among them are the WSS freight house, team tracks, and cold storage terminal, as well as a particularly large warehouse complex belonging to the Atlas Supply Co., purveyor of plumbing, heating, and mill supplies.



Atlas Supply Co. sold plumbing, heating, and mill supplies. The large complex had multiple buildings and spur tracks, making it ideal to be the heart of a switching layout. Careful scrutiny reveals a wealth of detail on the covered loading docks, including dozens of steel drums. Photo courtesy of Forsyth County Public Library photograph collection, Winston-Salem, N.C.

As a final selling point, the foreground of the photo showed construction in progress for a major highway that later became part of Interstate 40. As it turns out, the WSS delivered carloads of cement and rebar for the construction project, some of which appear in the photo.

The book contained several other key details I needed for the project. It had a track map of the Tar Branch, a handful of additional photos, and a brief description of how the Tar Branch operated. The book also included an elevation drawing for the WSS freight house, which also served as the railroad's main office building until 1985. The collection of material was so complete I couldn't help but feel that Dr. Miller and Mr. Vaughn knew I would need it one day.

Three city blocks in just 8 feet

Even small railroads are big things. While the plan for the layout reflects the photos and track map for just three city blocks, it's still not a direct copy. Consideration for reach (no deeper than 32") and desired length (8 feet or less) dictated the need for some compression. I started by designing the

layout we would eventually build for MR Video Plus (see page 17), what we'll call the single-wall version of the Tar Branch.

The right side (southern end) of the layout features the WSS yard tracks and structures along Liberty Street, which included the team tracks, cold storage terminal, and freight house. The yard and structures lay at a 60-degree angle to the street, adding visual interest. There were seven tracks in this yard, but I've included just three on the plan – one each for the WSS freight house, cold storage terminal, and team track. To keep a workable reach, the yard tracks and accompanying buildings had to be shortened.

If I had even another foot to work with, I'd have added more team tracks. Team tracks offer an amazing variety of cars and loads, so they provide a lot of operating interest. The prototype photo on page 14 shows a large loading dock and a simple gallows crane, and both would be great to include in a larger yard. And from the image, it appears everything from boxcars of bricks to hopper cars of sand and all manner of things in between were spotted there for transfer to trucks.

The largest industry on the layout is the Atlas Plumbing Supply complex, a set of multistory brick buildings along Liberty Street. Behind Atlas was a D-shaped driveway that was called the Liberty Street Annex. It had two tracks running through the middle of it, and they served both Atlas and a group of single-story warehouses. The prototype photos show plenty of trucks and freight cars along this busy roadway scene.

The warehouses in front of Atlas Supply were also rail-served, and all were related to the food and beverage industry. The brick peaked-roof building on the north end was the H.G. Wright Distributing Co., Winston-Salem's exclusive distributor of Miller beer. There was also the Clyde L. Foy Co., a food broker, as well as the George A. Hormel & Co. wholesale meat cold-storage warehouse.

Just north of Atlas is the highway construction project. The track plan depicts the site as it appeared in the 1950s photo, complete with the in-progress grading work and the partially poured concrete pillars for the overpass. There's a spur at the front edge of the layout that is

The Tar Branch II – L-shaped plan

H0 scale (1:87.1)

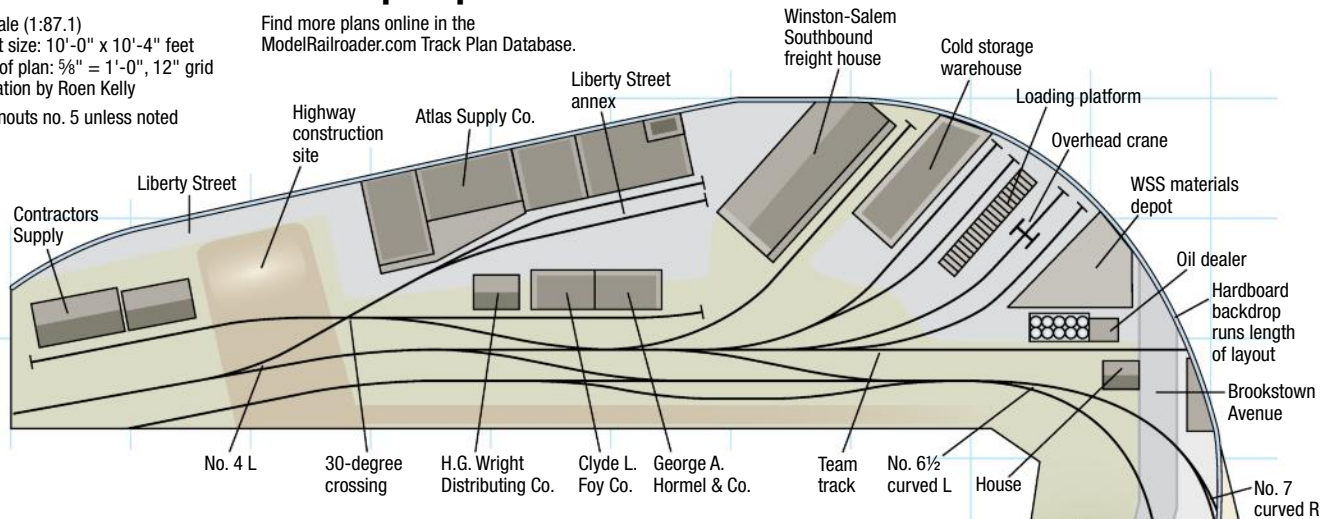
Layout size: 10'-0" x 10'-4" feet

Scale of plan: 5/8" = 1'-0", 12" grid

Illustration by Roen Kelly

All turnouts no. 5 unless noted

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designated for cars of concrete, rebar, and other construction materials.

I was unable to find out much about the structure at the end of the branch until very late in the project. It appears as a footprint labeled as "contractors supply" on a Sanborn fire insurance map from the early 1900s. On a 1950 Sanborn map, it's listed as the Brown & Williamson Tobacco Corp. Its spur tunneled under Second Street to reach the company's loading docks. By 1957, however, the space it occupied was covered by ramps for the coming Interstate. All photos I found of the building showed just the southwest corner of a large, nondescript shed. Not having the room to model the tunnel and the larger plant, I decided to revert the shed to its contractors supply roots, marking it as a small lumberyard on the plan.

More space, more Tar Branch

It won't take much extra space to build an even better Tar Branch layout. The second design, called Tar Branch II, is for an approximately 10 x 10-foot railroad that fits in one corner of a room and incorporates plenty of additional railroading.

Although the Tar Branch terminated as depicted in the first plan, it had its own mini branch that ran several blocks to the west. The run began as a switchback just south of the freight house, then headed down Brookstown Avenue and Wachovia Street to serve three cotton mills before ending at the Brigg-Schaffner Iron Works several blocks away.

The L-shaped layout uses much of the single-wall plan as its starting point. The differences begin around the team tracks, which are expanded by two more tracks. I've included the

The layout at a glance

Name: The Tar Branch II

Size: 10'-0" x 10'-4"

Prototype: Winston-Salem Southbound Ry.

Location: Winston-Salem, N.C.

Era: mid-to-late 1950s

Style: around the walls

Minimum radius: 20" (18" at Indera Mills)

Minimum turnout: no. 4

Maximum grade: none

Train length: 6 feet

Benchwork: L-girder

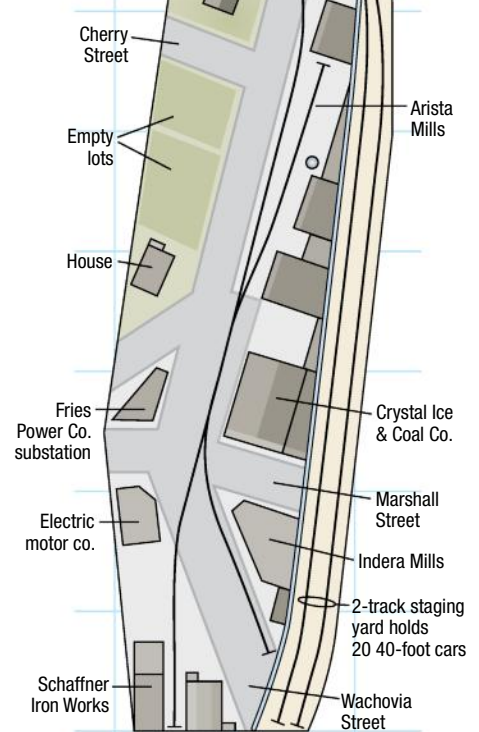
Height: 46"

prototype's loading dock and overhead gallows. The yard also includes the WSS storage depot, a triangular single-story brick building that sat at the corner of Brookstown Avenue and Liberty Street. Alongside was a small rail-served fuel oil dealer.

The final addition to this area is a short runaround track in front of the team tracks. I didn't include the runaround on the version of the Tar Branch we'd built for MR Video Plus, but I wish I had. Instead, I wrapped the runaround into the lead for the Liberty Street Yard to save space, and the result is that it causes a bottleneck if you have too many cars sitting on the staging tracks.

Better staging

From the runaround track, the branch line continues south through the backdrop to connect with the rest of the Winston-Salem Southbound. The L-shaped plan provides space for two 5'-6" staging tracks, and they can hold approximately twenty 40-foot cars,



which is much more generous than the original plan's fold-up staging section. More staging tracks could be added, depending upon the available space.

If the layout is built on casters, the railroad can be swung away from the wall to allow access to the staging area during operation. By adding shelves to the back of the backdrop, the staging area can also be used as a fiddle yard, allowing cars or trains to be swapped during an operating session.

Run to the mills

Despite trying to compress five city blocks into 10 feet in the larger plan,



Winston-Salem Southbound's freight house was on Liberty Street just south of Atlas Supply. The second floor served as the railroad's offices until 1985. Photo courtesy of Forsyth County Public Library photograph collection, Winston-Salem, N.C.



The Tar Branch included some stretches of street running. In this 1967 photo, crews are repairing tracks laid in Wachovia Street, three blocks from the WSS freight house. The triangular building in the background is the Fries Power Co. substation. Photo courtesy of Forsyth County Public Library photograph collection, Winston-Salem, N.C.



Next to the freight house, the WSS maintained an active yard of team tracks. A cold-storage warehouse (left), as well as a railroad supply depot (right), flanked the team tracks. The yard featured a dock as well as a gallows crane to facilitate unloading cars. Photo courtesy of Forsyth County Public Library photograph collection, Winston-Salem, N.C.

I did manage to fit pieces of two cotton mills, the iron works, a bit of street running, and various other signature features into this part of the Tar Branch. With some careful internet detective work, I came up with enough historic and present-day images to get a good picture of what the area would look like in model form.

After curving off the branch line on the switchback, the line runs down the south side of Brookstown Avenue. As shown in the photo at top right, the road around the track was originally paved with brick. The tracks passed in front of Arista Mills, a part of the Fries family's collection of industries. This large rail-served cotton mill covered most of the block. The mill complex featured three-story brick structures,

and it still stands today, beautifully restored, housing the Winston-Salem visitor's center and a hotel. The images on Google Street View, as well as historic images found on a simple Web search, would make this complex of brick buildings fairly easy to model.

At the end of Arista Mills, Brookstown Avenue forked at an intersection with Wachovia Street, and both then crossed Marshall Street. At the corner of Marshall and Wachovia was Crystal Ice & Coal Co. Though not rail served, it is called out on the WSS track maps and appears in the 1948 aerial photograph, so I've included it on the track plan. Crystal Ice & Coal had a two-story frame building with a shallow-pitched roof on the corner of Marshall and Wachovia, behind which stood the

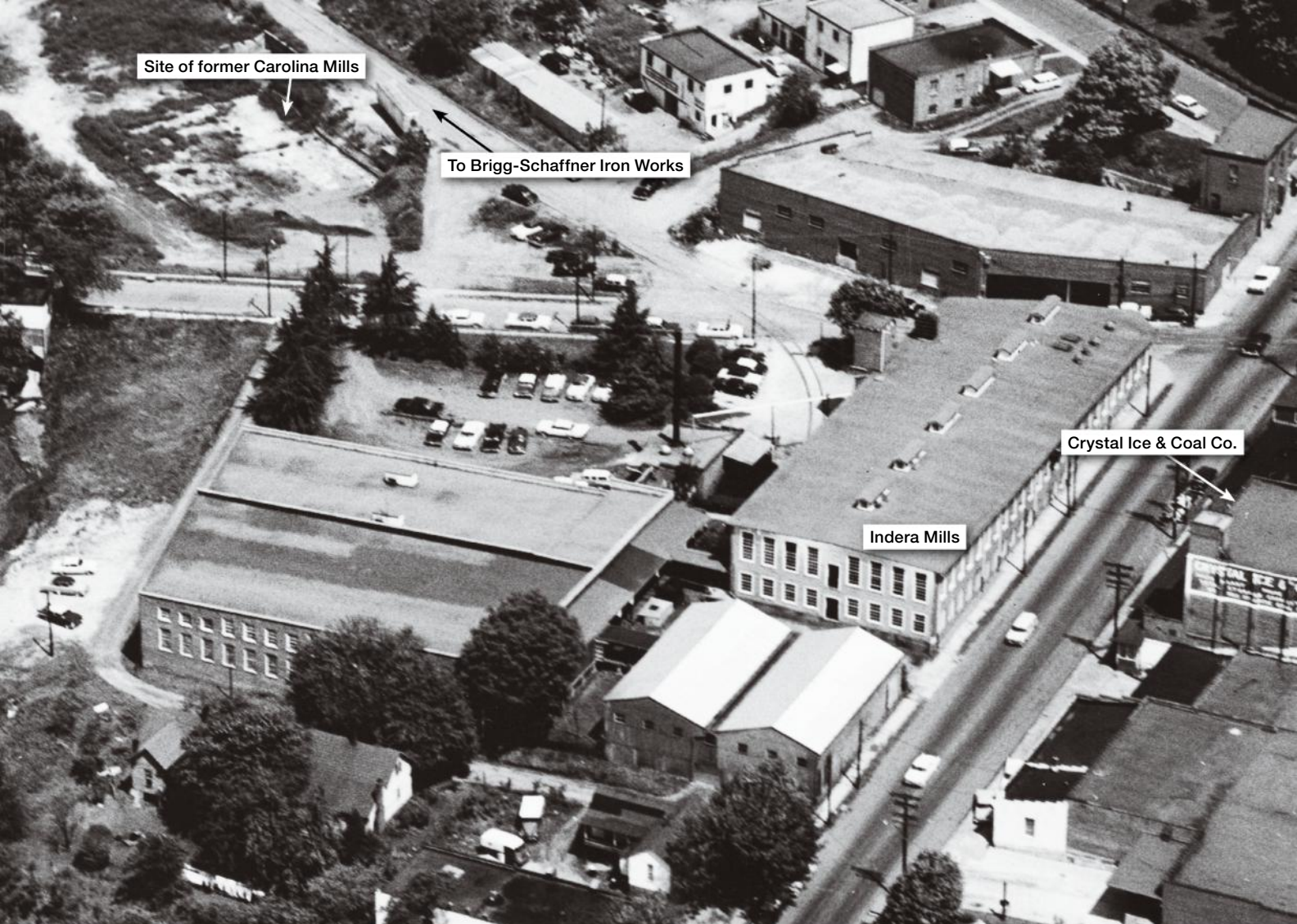
taller, brick cold-storage building along Marshall Street.

Thanks to the Forsyth County Public Library and its digital photo archive at www.digitalforsyth.org, I've discovered enough bits of the ice company in other photos to model the street views. I contacted the library's photo librarian, Molly Rawls, who was able to find a wealth of images for me (many of which appear in this article), making it much easier to model Crystal Ice and many other key features of the Tar Branch. The lesson learned here is just because we live in the digital age, don't overlook the local library and its staff!

Following the fork

The tracks left Brookstown Avenue at the fork to continue down Wachovia Street. Here they passed the Fries Power Co. substation. This was a small two-story brick structure that was nestled into a triangle formed by Brookstown Avenue and Wachovia and Marshall streets. The building still stands today, and it looks very much like it did in the photo (above) I found from 50 years earlier. Because the tracks pass behind it, the building makes a great scene-break, so I've included it on the track plan.

After crossing Marshall Street, the WSS served the Indera Mills (also a Fries family business) before leaving Wachovia Street to head northwest to Carolina Mills and Brigg-Schaffner Iron



The Tar Branch served a number of cotton mills, including Indera Mills (later Arista), owned by the Fries family. The mills were rail-served and accounted for a fair share of the Tar Branch's business. A piece of the Crystal Ice & Coal Co. is visible on the right edge of the image. Photo courtesy of Forsyth County Public Library photograph collection, Winston-Salem, N.C.

Works. Without the space needed for the tracks to ramble to all three, I've included just Indera Mills on Wachovia Street, and then placed the tip of the ironworks at the very end of the layout. With more available space, I'd include the Carolina Mills between Indera Mills and Schaffner Iron. This would be easy to do by building the layout in a U shape.

The photo above provides an aerial view of the Indera Mills complex as well as a piece of the Crystal Ice & Coal Co. A group of two-story brick buildings, along with two peaked-roof warehouses, comprise Indera. A single spur track curved into the heart of the complex through the middle of the driveway. I didn't have the room to do the same on the track plan, so the track parallels Wachovia Street instead.

Like the Arista Mill, a piece of the Indera Mill complex is still there. The brick two-story structure on the corner of Marshall Street has been renovated

into offices, which makes it possible to model the most distinct architectural features of the cotton mill in the absence of more historic photos of the original complex.

The iron works was a sprawling complex of odd-shaped structures. While Brigg-Schaffner is still a manufacturing concern, it has moved, and the original site is now a medical center. I did find a few historic photos of the Salem Iron Works, located elsewhere in town. Since both industries were built about the same time, Salem Iron Works would make a good stand-in for a Brigg-Schaffner modeling project.

Operating the Southbound

Operation on this layout is all about finessing your switching moves in tight spaces. The Southbound ran one branch job up the line six days a week, but even so, operation of either the single-wall or L-shaped plan will provide hours of switching fun.

The single-wall layout was designed for trains consisting of one WSS GP9, a wood caboose, and six 40-foot freight cars. Even with the staging section deployed, the train will still need to start partially on the layout. Operators can work in a team of two – engineer and conductor. Although you could use waybills, a switch list filled out by the conductor is all you really need to work the branch.

One of the trickiest bits of running this railroad includes working the deeper tracks of the Atlas Supply complex. The tail track can accommodate just two 40-foot cars and one engine at a time. Spotting loads and pulling empties will require some careful planning.

And then there are the lumberyard and the construction site tracks. Both need facing-point moves to work them, which will require the use of the runaround. Also, many of the spurs have multiple car spots, such as warehouse row. So during a session,

Southbound engine fleet

The Southbound ran a variety of locomotives, some cast off by the Norfolk & Western and the Atlantic Coast Line and some bought directly by the railroad. From the 1930s to the '50s, it kept a stable of six or seven steam engines at any one time, including 2-8-0s, 4-8-0s, and 2-8-2s. Baldwin built most of the engines.

The biggest engine the railroad ever owned was no. 400 – an N&W class Z1b 2-6-6-2. The engine was acquired in 1941 and pulled a Southbound-record 107-car train from Winston-Salem to Wadesboro during World War II. The engine was retired and scrapped in 1952.

The line hung on to steam longer than most, largely due to the influence of the N&W, but finally replaced steam in the spring of 1957 with four brand new Electro-Motive Division GP9s painted for the Southbound. The GP9s stayed on the line just a handful of years before they were sent back and repainted for their parent roads (two had been purchased by each). The Geeps were replaced with leased power from the ACL and the N&W.

Modeling the locomotives of the Southbound may be difficult. I have found no evidence that anyone has ever offered steam or diesels decorated for the line. In HO scale, I've seen a suitable N&W class W2 2-8-0 in brass on eBay but have found no one offering decals for WSS steam engines. As mentioned in "Building the Southbound" starting on the next page, Cody Grivno modeled our EMD GP9 by starting with an Athearn Genesis engine and adding the appropriate details. Mask Island (www.maskislanddecals.com) offers decal set 87-0107 for Winston-Salem GP9s and 87-0108 for steel cabooses. – D.P.



Winston-Salem Southbound 2-8-0 no. 711 was a regular workhorse on the Tar Branch. Baldwin built it for the N&W in 1905. The engine came to the Southbound in 1920, and it lasted until the very end of steam on June 9, 1957 – a 52-year veteran. LeRoy A. Scott photo, David P. Morgan Memorial Library

some cars will likely need to be moved and replaced to get to other spaces beyond them.

The single-wall layout session ends with the train blocked for return down the branch.

Running the bigger railroad

The L-shaped layout is designed for trains of approximately 10 cars. Even with the additional layout space, the bigger Southbound plan is still a compact urban switching railroad, and without carefully planning the work, the job can turn into a headache very quickly. With the larger layout and greater number of industries, waybills would work well for car routing.

This time the train enters from one of the two staging tracks and pulls onto the layout in front of Liberty Street Yard to work its "trick." Despite the added runaround track, space here is still at a premium. Crews would most likely work an industry or spur to completion before moving on to the next. Spare cars will need to be parked just about anywhere there's space. The expanded tracks at Liberty Street Yard may provide some relief. And although the track in front of the Arista Mill may look like an inviting place to shove cuts of surplus cars, you shouldn't block Brookstown Avenue with them for too long.

At the end of the session, the train heads back down the branch and into staging.

Small is the new big

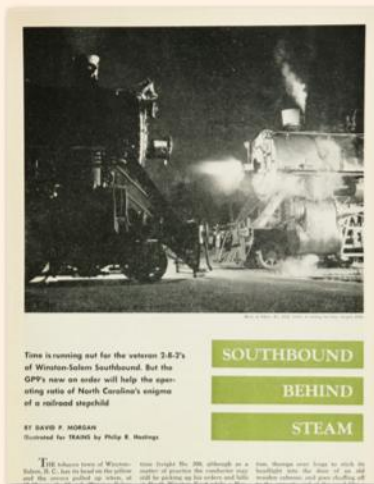
The Winston-Salem project may have started with one good photo, but the ensuing research turned it into a great little railroad. And the best part is that the railroad doesn't have to stay little. The plans shown here cover just the very tip of the Tar Branch, but there were a number of other industries along the line, including the massive Forsyth Chair Co. and the interchange with the Fries Manufacturing & Power Co. electric railroad. Adding on to the layout can be as simple as grafting on more sections as you work your way south toward the main line. This small layout could very well be the beginning of something big. **MRP**

David Popp is the producer of Model Railroader Video Plus and has written numerous magazine articles and several books. He and his wife, Ingrid, live in southeastern Wisconsin, and together, they produce their own children's television program, The Fred and Susie Show.

A great read

Although not specifically about the Tar Branch, David P. Morgan wrote a delightful story about the Winston-Salem Southbound for the March 1957 *Trains* magazine. "Southbound behind steam" chronicles a typical night for the crew of WSS scheduled freight No. 209 on its run from the Norfolk & Western's North Winston Yard down the line to its end at Wadesboro, N.C.

The article paints a romantic picture of steam railroading in its final days and provides some wonderful historic details about the WSS itself. Many of the photos from the feature were some of the first images I found in the folder here in our library. – D.P.





Urban switching railroads can be a great source of modeling and operating enjoyment, particularly when space is tight. The Model Railroad Video Plus staff built this compact HO scale layout based on the Winston-Salem Southbound's Tar Branch in Winston-Salem, N.C., in the 1950s. Compare this photo to the one on page 10.

Building the SOUTHBOUND

This shortline terminal layout combines the talents of many modelers

Part of the fun of my job is that I not only get to come up with new ideas for layouts, but I also get to build some of them. In 2015, the regular MR Video Plus crew and I set to work building the HO scale Winston-Salem Southbound layout, the plan for which is featured on page 11.

The railroad uses standard L-girder benchwork, built with clear pine boards and $\frac{1}{2}$ " plywood subroadbed. I like the flexibility L-girder construction offers, as the joists and supports can be moved if they interfere with under-layout features, such as switch motors. This style of benchwork also makes it easy to build curved edges, such as the gentle arc that runs along the back of the layout.

Much of this piece of the prototype railroad is level, so I attached the plywood to the benchwork as a flat

tabletop. I then used layers of foam insulation board and Midwest Products Cell Foam 88 to build up the gentle contours for the roads and hills. The track is supported on Homasote roadbed from California Roadbed Co.

My design for the WSS layout included a simple backdrop built from $\frac{1}{8}$ " tempered hardboard cut 24" tall. I added 1 x 3 mounting blocks, cut 6" deep, to the ends of the benchwork joists and affixed the backdrop to those with screws. For added support, I glued 1 x 3s to both ends of the hardboard and fastened them to the joists with screws.

In the end, the curve of the layout gives the thin hardboard rigidity, which means it didn't need much additional support to stay put. Everything had worked as planned – that is, until I found the track lights.

I hadn't originally intended to add lighting to this layout, but on a trip to the local home center to pick up more materials, I discovered some tasteful 12" gooseneck track lights in the closeout bin. They seemed to be ideal for lighting the new railroad. Armed with a 4-foot section of lighting track, a power cord, and four lights, I headed back to the shop and started the installation process.

Adding the lighting track to the top of the backdrop was easy. I glued a 4-foot-long 1 x 3 to the back of the tempered hardboard. Next, I used a table saw to rip a 45-degree bevel on a second 1 x 3, and attached it atop the first. I then installed the track along the front edge. The assembly is shown in the photo on page 18.

I mounted the lighting track at a 45-degree angle because it allowed the



The single-wall layout has its own self-contained swing-up staging yard. The yard measures just 35" long, but its two tracks can hold seven 40-foot cars.



The layout has its own backdrop and light valance. David used common track-light components and gooseneck fixtures to illuminate the railroad with soft pools of light reminiscent of a partly cloudy day.

gooseneck lights to arc over the top of the layout, yet kept the heads above the finished backdrop. After wiring it all up and installing the lights, the moment of truth was at hand. I stepped back and flipped the switch. Truth can be blinding.

The track lighting provided wonderful soft pools of light on the layout – reminiscent of a partly cloudy day. And they were easily aimed to highlight

specific scenes. I was very happy with how they made the railroad look.

However, the lights were designed to allow the light around the base of the fixtures to leak out the sides. This isn't a concern when they are mounted where they belong – above your head on the ceiling. But I'd positioned those fixtures directly at eye level, and that created a problem. You couldn't look at the layout without

wearing a hat or feeling like you should apply sunscreen.

I resolved the matter with a bit more lumber. I extended the end supports another 6" above the backdrop and installed a single center support that reached out 14" over the layout, as shown in the photo at bottom left. I then cut a 103"-long x 6" strip of 1/8" tempered hardboard (spliced from two pieces) to act as a valance. The valance curves outward over the layout, hiding the lights from view and making the layout comfortable to look at once more.

As a bonus, the valance's outward arc supplies a pleasing counterpoint to the backdrop's curve, giving the layout some serendipitous artistry. And it also makes it very easy to cover the layout with a lightweight plastic tarp to minimize dust or damage when not in use.

Much like the prototype, the layout features a lot of switching in a compact space. However, unlike the prototype, the plan needed somewhere for the branch to go. To give the railroad a bit more running room, I added a small two-track fold-up staging yard to the south end, representing the connection with the WSS's main line.

As shown in the photo at top left, the staging yard is built on a small 35"-long shelf. Although its two tracks can accommodate just seven 40-foot cars, the staging shelf is essential to the operation of the layout, providing some much-needed room for switching cars on the railroad.

Since the layout is meant to be as compact as possible, I designed the staging shelf to fold up under the railroad when not in use. The shelf mounts to the layout with a 2" square hinge and has its own folding leg with an adjustable foot on one end. When the staging yard is deployed, the shelf and leg lock quickly into place with two 1/4" brass hinge pins and a single carriage bolt and wing nut. When not needed, the shelf and leg fold completely out of the way and latch to the bottom of the benchwork with a hook and eye.

The layout is designed to look like a museum diorama when complete, and the fold-up staging section makes the finished layout's appearance acceptable for use in a variety of shared living spaces.

The Winston-Salem Southbound turned out to be a small railroad that was big on modeling potential. Having chosen a historic modeling subject, the staff and I split up the work so we could go that extra mile on detail.



Placing even a few historic structures on the layout add to the sense of time and place. As shown here, the layout includes scratchbuilt models of the WSS freight house and cold storage warehouse, as well as a backdrop photo of the Old Salem Town Hall rising above the freight house.

MR Video Plus associate editor Ben Lake took the photos and elevation drawings for the WSS freight house and set to work building the structure, first in Adobe Illustrator to make mock-ups before later crafting it in styrene. He then used his computer drawings to generate the digital files needed to have online supplier Shapeways (www.shapeways.com) 3-D print the doors, windows, and many of the architectural moldings.

Associate editor Eric White built the cold storage warehouse in Liberty Street Yard. Not knowing much about the construction of the building's wood evaporator tower for the refrigeration unit, he did some research of similar towers still in use in India. He then built the tower for the building from what he'd learned, including the piping.

Associate editor Cody Grivno took the GP9 project under his wing and found a small company (www.maskislanddecals.com) that offered Winston-Salem Southbound decals for the heralds and numbers. He detailed and custom-painted an Athearn model, then painstakingly pieced the stripes together from an assortment of other decal sets to complete it.

Model Railroad Planning editor Tony Koester got into the act, working as our guest to film a segment on how to handlay some of the track. I liked how Tony's track looked so much that I abandoned the idea of using flextrack for the rest, and instead handlaid the remaining track (except turnouts) to finish it up.

MR Video Plus contributing editor Gerry Leone pulled together a small mountain of detail parts and made his own decals for the Atlas Supply Co. He then drove down from Minnesota to shoot a series of videos with us on detailing the layout.

And we even got some help from Molly Rawls, our Forsyth (N.C.) Library contact. Once she learned we needed photos of the old Salem town hall for our backdrop project, she stopped by the building on her way to work one day and shot the photos for us. *Model Railroader* page designer Drew Halverson then stitched the images together in Photoshop to make the print for the backdrop.

In the end, modeling the Tar Branch was a rewarding experience for all involved, and the resulting layout was fun to build and operate. — D.P.

Learning points

- Photos are a great source of inspiration for layouts large and small.
- Check the libraries in the region you are modeling for help when researching a project. Many public libraries have photo collections with dedicated librarians.
- Striving for even a little historical accuracy can provide hours of modeling enjoyment and lend a lot of credibility to a layout.
- Selecting a single industry or a small grouping of tracks can form the nucleus of a satisfying model railroad.
- Removable staging sections can greatly enhance the operating possibilities of a small layout.



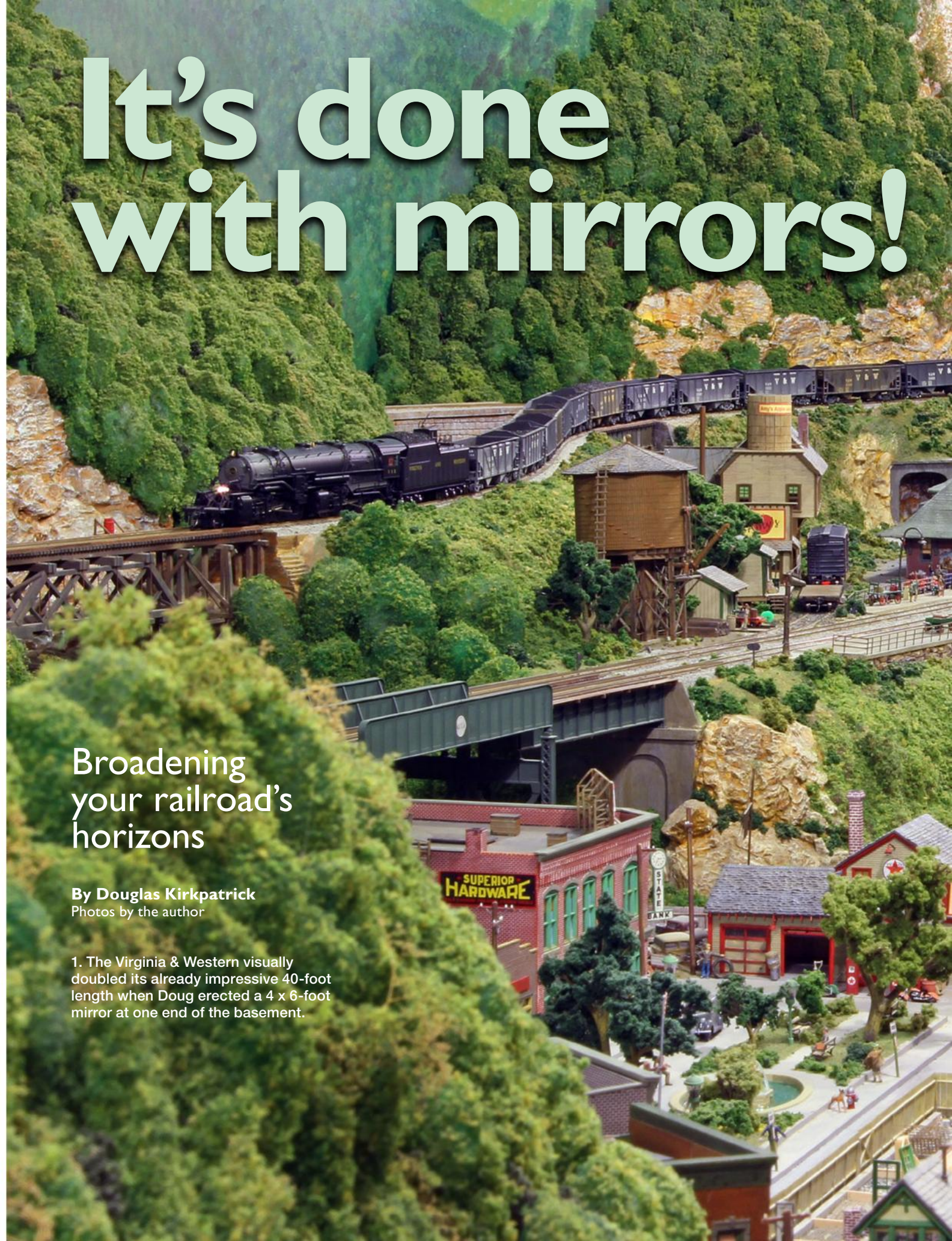
Watch the Model Railroader Video Plus crew build and operate the Winston-Salem Southbound by subscribing to Model Railroader Video Plus at www.MRVideoPlus.com.

It's done with mirrors!

Broadening your railroad's horizons

By Douglas Kirkpatrick
Photos by the author

1. The Virginia & Western visually doubled its already impressive 40-foot length when Doug erected a 4 x 6-foot mirror at one end of the basement.







2. The passenger car directly above engine no. 88 is actually a reflection from passenger cars parked on an adjacent track.



3. A river slowly flows under a triple-arch bridge that isn't quite what it appears to be. A mirror reflects the river under each half-wide arch of the bridge.

On my HO Virginia & Western RR, I placed a high priority on fully developed scenery in addition to reliable operations.

I wanted the scenery to complement both high-stepping Northerns on crack passenger trains and articulated steam engines struggling to haul coal out of the Blue Ridge Mountains down to tidewater. I was fortunate to have a 26 x 44-foot basement that accommodated long mainline runs on a point-to-point railroad.

As in most basements, there were those inevitable obstructions that got in my way during layout construction: heating systems, waste pipes, electrical boxes, and worst of all the columns that hold up the house. I planned around many of these objects with judicious track location and creative

scenery. But I found that in some situations, mirrors could be placed directly next to the offending object to produce the desired scenic effect.

There are 10 mirrors on my V&W, ranging from as small as 6" square to the granddaddy: 4 x 6 feet. The use of mirrors on my railroad falls into three general categories that can apply to almost any size layout: hiding something, continuing the scene, and visually enlarging the railroad.

Working with mirrors

As a safety issue, I always wear gloves when handling mirrors, especially if the edges aren't polished. All the mirrors on my railroad are the typical rear-surfaced mirrors sold at local retail stores, which means the reflecting surface is on the back of the glass. Therefore, any object placed next to the mirror will reflect the

The layout at a glance

Name: Virginia & Western RR
Scale: HO (1:87.1)
Size: 25 x 37 feet
Theme: freelanced Appalachian coal hauler
Locale: central Appalachia
Era: 1948-54
Style: walk-in
Mainline run: 600 feet
Minimum radius: 32"
Minimum turnout: no. 6
Maximum grade: 1.9 percent
Train length: 8 feet
Benchwork: L-girder
Height: 35" to 50"
Roadbed: Homasote and cork
Track: handlaid code 83 main, code 70 elsewhere
Scenery: Hydrocal over screen
Backdrop: mirrors and hardboard with acrylic-painted scenes
Control: Digitrax DCC

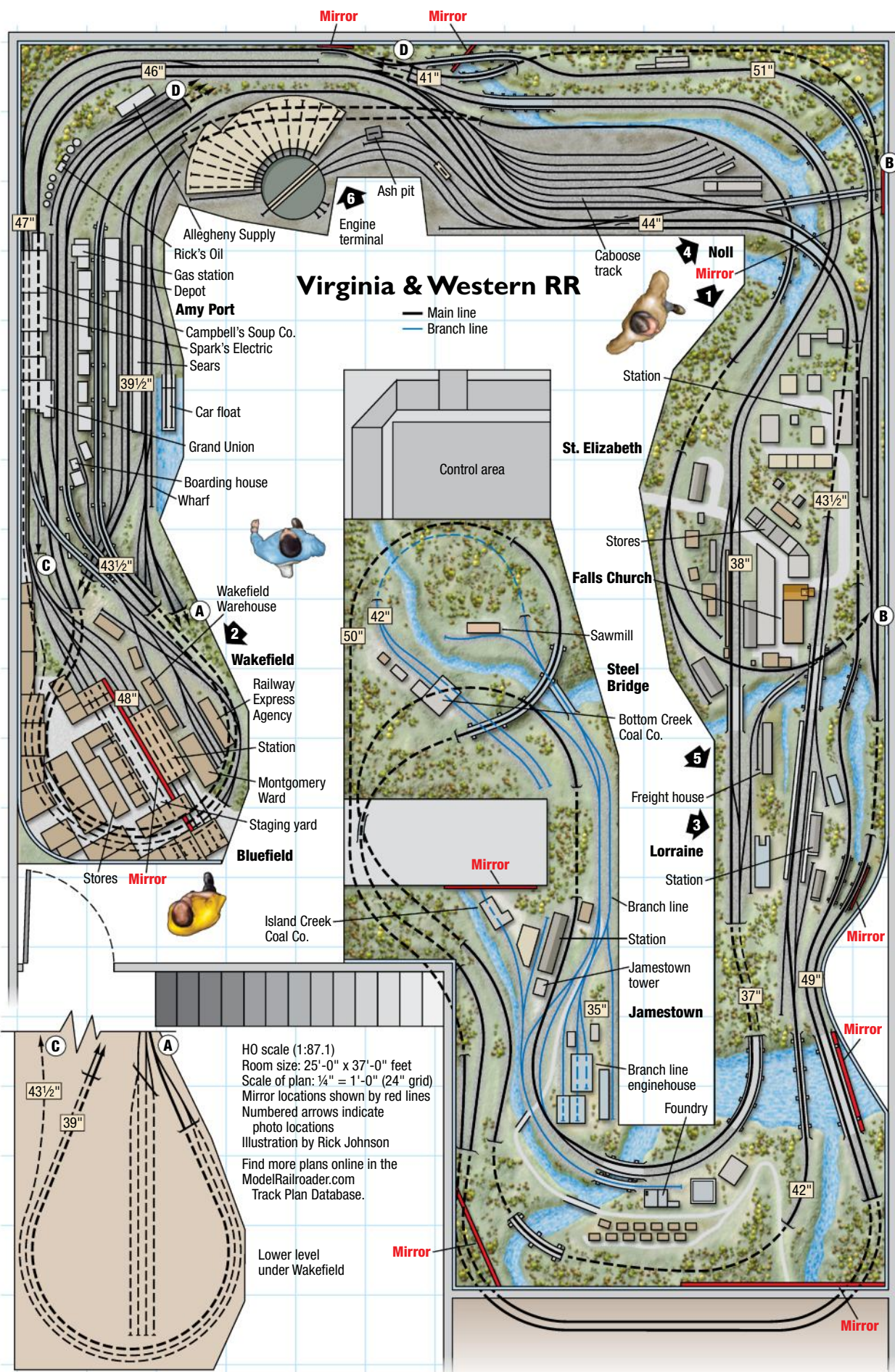
object plus the thickness of the glass. The only way to eliminate the glass thickness is to purchase front-reflective mirrors, which are expensive and subject to scratching.

The compromise is to utilize the thinnest possible mirror that still supports its own structural weight. If all of the edges will be hidden, I have them polished, which involves both smoothing and slight beveling of the edges. If one of the edges is exposed, I forego the polishing operation, which makes it easier to blend it into the surroundings. I don't glue the mirrors in place, because the adhesive may attack the reflective surface.

Hiding that unwanted object

When I designed the V&W almost four decades ago, I wasn't familiar with realistic operations. Not knowing about the concept of train movements beyond the railroad via staging or fiddle yards, I saw no need for incorporating hidden staging at each end of the railroad.

Now that I enjoy operations, I need hidden staging. At Amy Port, the lower terminus, I was able to fabricate four staging tracks and slip the prefabricated assembly into place below the benchwork. The upper terminus, Wakefield, wasn't that easy. Already in place were three long stub tracks to serve my passenger terminal. Room was available behind these tracks for three additional staging tracks that could be connected to the passenger terminal yard throat. I extended the





4. A “pair” of RS-3s with a string of hopper cars waits for an eastbound coal train to come into the yard. But one of the Alcos is merely a reflection.

city footprint over the three staging tracks by installing a 4"-high x 60"-wide mirror separating the passenger tracks from the staging tracks.

Because this particular mirror is narrow and long, the mirror was taped to a 2 x 4 for safer transportation from the glass store to my house. I installed a 1 x 2 on the layout to support the bottom of the mirror. I then fabricated a full-length station platform with a height that matched the door sill of a passenger car, painted it a concrete color, and used it as a bottom stop to position the mirror against. Several wooden blocks behind the mirror secure it firmly in place.

The mirror thus reflects the three passenger tracks in front, making the station appear to be a 6-track passenger terminal while hiding the staged trains. When I select the number of cars for a staged train, I make sure that the length allows just the engine to show outside of the station.

I installed a typical passenger shed roof between the first two passenger tracks. I then split another shed roof in half, lengthwise, and installed it against the mirror. It reflects the other half and looks like a full-width shed.

I normally keep a string of passenger cars on the track next to the mirror to maintain a reflection, even if the other tracks are empty.

Another obstruction I needed to hide was one of the house support columns in the train room. I was able to incorporate one of the three into my Centralized Traffic Control dispatching area and a second behind the walls surrounding the furnace. However, the third was standing out there in all of its glory growing out of the mountaintop to the ceiling. Building the mountain all the way to the ceiling would have overpowered the scenery in the area. Instead I placed an 18" x 60" mirror directly in front of the column from the top of the mountain to the ceiling. The mirror reflects the sky from across the aisle, and the column disappears.

Continuing the scene

There are times when roads, rivers, or tracks run into a wall. I've tried my hand at painting a scene the takes the road or river to the vanishing point – without a great deal of success. I've seen excellent results using background photos that are resized to a modeler's needs. However, there are

spots on my railroad where a mirror placed directly in front of a road, river, or track can continue the scene into the background.

All objects placed against a mirror must be at right angles to it. The drill track (yard lead) at the west end of my yard terminates against the wall with a railroad bridge above it. This is a perfect place for a mirror because all the edges of the mirror can be hidden. I placed a small mirror at the end of the drill track with high scenery on both sides. The track can hold five cars plus a switcher, but even with the yard engineer knowing that the mirror is there, he's been known to forget and try to pull seven or eight cars into the drill track to clear the switch.

The same approach can be used to extend a road into the backdrop. Again, the reflected scene needs to be tailored to obtain the desired results. I often set a van or truck leaving the mirror with the back of the van painted a different color than the front so that it looks like two different vehicles.

I have a wide river on the railroad that is spanned by a three-arch stone bridge. The bridge location is within 5" of the back wall and at a slight angle to

it, and 48" from the aisle. I placed a mirror behind the arches reflecting the river in front. The top of the bridge is sufficiently wide to support two tracks. However, the piers supporting the bridge are only half as wide, since the mirror reflection doubles their width.

Enlarging the railroad

For medium and large layouts, there is an opportunity for deception with the use of mirrors. Large mirrors, 4 x 6 feet or bigger, can double the size of a railroad by reflecting an entire section of the layout. The longest section of my railroad is almost 40 feet and lends itself well for duplication in a mirror.

The first step was to decide in which end of the section to install the mirror. Mirrors at both ends produce the same effect as sitting in the barber chair between two mirrors and seeing your image repeated to infinity.

I installed my large mirror on an interior wall at the end of the 40-foot length. Since access to my basement is from a staircase in the center of the house, visitors enter the train room and walk around to the back of the layout to view what appears to be an 80-foot-long railroad. They perceive that the railroad must go the length of the basement and under our attached two-car garage. If the mirror were on the opposite end, which is an outside wall, a visitor might think that I tunneled out 40 feet to extend the railroad.

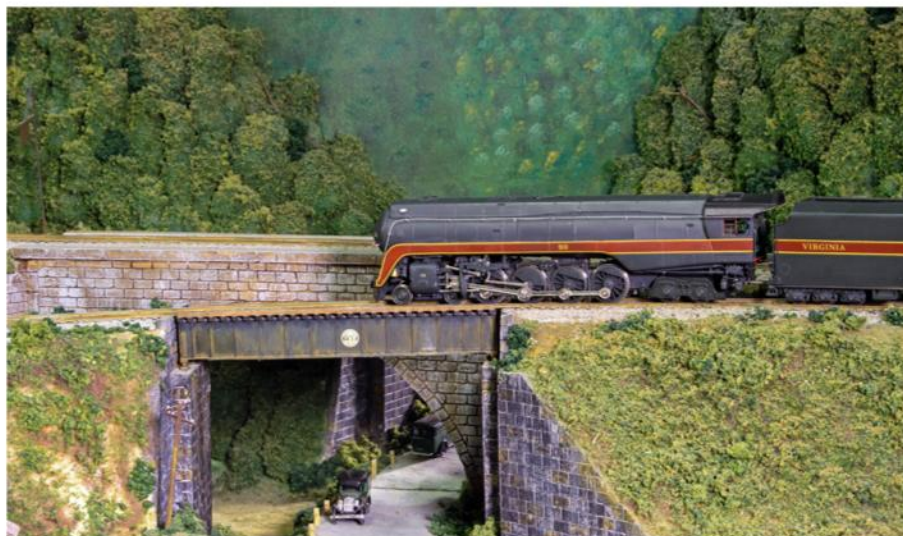
Once I had the location selected, the next step was to determine the mirror size. I planned to have mountains on each side to hide the edges. I selected the width so my reflection couldn't be seen in the mirror no matter where I stood. The height was initially selected to go from the railroad benchwork to the ceiling.

I purchased several 12"-square mirrors and temporarily placed them within the bounds of the proposed larger mirror. To my dismay, the top of the mirror reflected the back of the valance, light fixtures, and associated wire. I reduced the height until I could no longer see these objects. I'm no 6-footer, so I also checked the mirror reflection while standing on a stepstool to make sure that I'd covered the range for some of my taller friends.

I placed one of the test mirrors at the proposed location and walked around the layout room to see if my reflection appeared in the mirror, which is an absolute no-no. I ended up tailoring the mountain contour on one side so I couldn't look directly into the mirror. I now had the final dimension of 4 feet high by 6 feet wide.



5. The daily coal train has just swung around the curve. Look closely and you'll see the arch bridge in the mirror along with the rest of the train.



6. A country road turns a corner and heads under a small arch bridge. The Railway Express van approaching the camera is reflected as a parked truck.

I mounted a 1 x 4 board the length of the mirror to the wall studs using lag bolts. With help, I then placed the mirror up on the board and used small blocks of wood at the top to hold it temporarily in place. Once my plaster mountains were installed against the surface of the mirror, it was permanently locked in place.

As I developed the scenery along this particular length of the railroad, I constantly took into consideration the reflection in the mirror by modifying the height of buildings, changing the shape of a mountain, or placing trees in different positions. I adjusted the valance lighting wherever possible to blend the transition from the real railroad into the reflection.

Overall, I'm quite pleased with the use of mirrors on the Virginia & Western and the effect they've had on visitors and operating crews. **MRP**

Doug Kirkpatrick is a retired senior executive and aerospace engineer with NASA. He and his wife, Lorrie, enjoy gardening. He's an active member of the Northern Virginia Model Railroad Club.

Learning points

- Mirrors have the potential to solve difficult scenic situations.
- Front-surface mirrors are more expensive and prone to scratching than conventional ones.
- Carefully review the reflected image for appropriateness before final mirror installation.
- Lighting on the railroad might need to be adjusted to match the reflected scene.
- Mirrors can also provide unique photo opportunities.



The N scale Mackenzieville Yard & Glendale Junction layout is set up for display and operation with the control panel in the foreground. The layout is illuminated by light-emitting diode (LED) strip lights concealed behind the printed valance.



Although I'm a member of the Erie Lackawanna Historical Society and model the EL in HO, I have always wanted to see what I could achieve in a small space in N scale. I started designing a layout capable of being taken to exhibitions and where the main size constraint was the back of my Volkswagen Golf with the seats folded flat. This gave a maximum size of 40" by 70" to work in.

I've always had an interest in Eastern railroads – especially in Pennsylvania – and have collected reference books for influence. My main interest is the Erie Lackawanna, but I also gathered information on other roads such as the Reading, Lehigh Valley, Lehigh & New England, Pennsylvania, and Central RR of New Jersey.

I was drawn back to three Pennsylvania locations: Bangor, a solely EL site; Rupert, where the EL and Reading interchanged cars; and Westwood Junction in Schuylkill County.

An N scale traveling layout

Bringing staging into the open

By Ian Mackenzie Wilson//Photos by Tony Wright



An empty hopper train arrives from Cressona, Pa., while a work gang is busy installing an electrical cabinet on the access road to Penn Stone. The stone plant is made from a Walthers Cornerstone Glacier Gravel kit.



Removing the valance reveals the staging tracks and the Peco SmartSwitch servo motors that operate all of the staging turnouts. The scenic backdrop is a photo printed on flexible foam board, which allows it to be curved at each end.

Northwest of Philadelphia, Schuylkill County is the heart of Reading Co. hard coal (anthracite) mining operations.

After some deliberation, I chose Bangor as the location for my HO scale model railroad and based the N scale Mackenzievill Yard & Glendale Junction layout we'll discuss here on Westwood Junction.

The prototype location

From Port Clinton, Pa., the Reading's Mine Hill Branch left the main line to Tamaqua and headed north to the anthracite breaker at Minersville. At Westwood Junction, just over 2 miles from Minersville, the Tremont Extension curved sharply away and headed west to Lykens via Tremont.

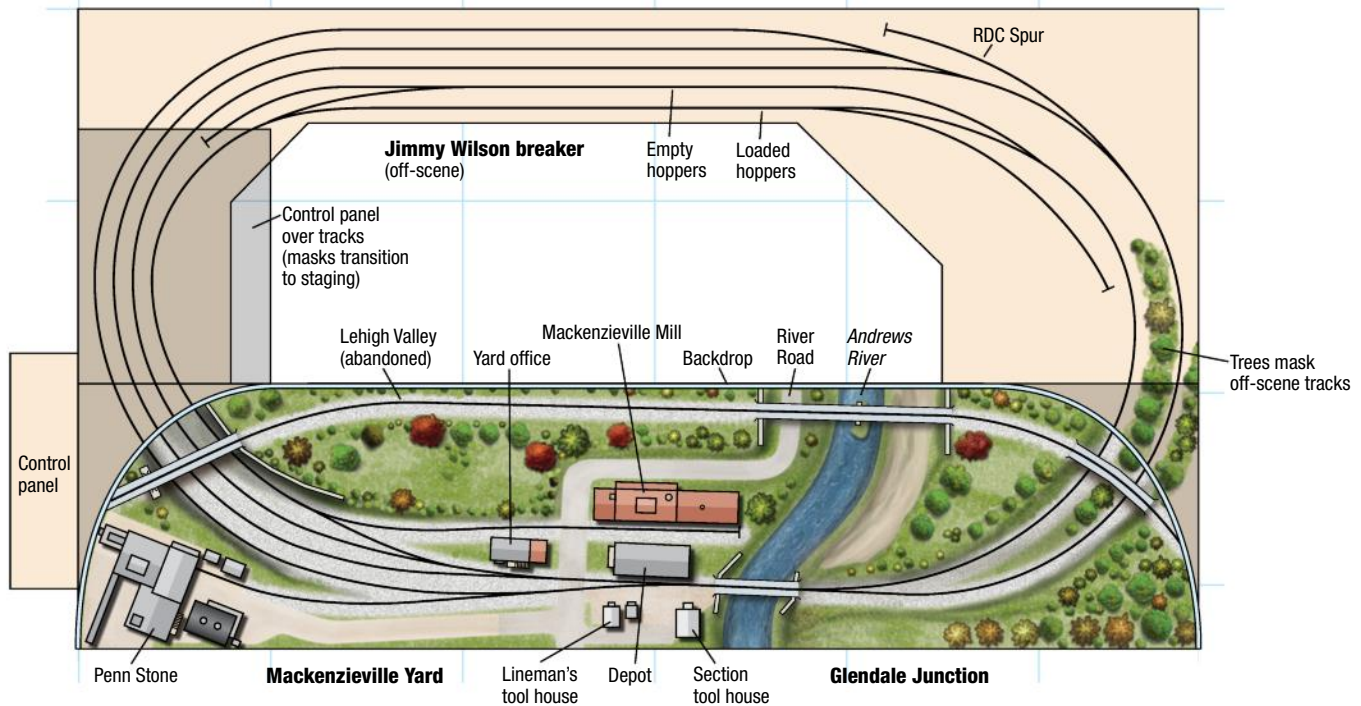
Smaller branch lines left the Tremont line to reach other mines, and at Lykens the branch connected with the Pennsylvania's branch from Millersburg on the Buffalo Line. Traveling 5 miles back toward Port Clinton, trains reached Cressona, where there was a yard.

Another feature at Westwood Junction was a girder bridge carrying the Lehigh Valley over the Reading, but it was removed soon after the Lehigh Valley abandoned its line in 1953.

Adapting the prototype

From the outset, I decided that the scenic side of the layout would be based on the junction at Westwood, and it would include a girder bridge over a river as on the prototype and the abandoned Lehigh Valley line at a higher elevation. Operation would feature trains passing through from a staging yard on the other side of the layout, and switching – if any – would be kept to a minimum.

As I sketched track plans, an idea came to me: Why not have part of the staging yard visible to suggest a small yard? Departing trains could then pull forward into view before leaving, and arriving trains could stop with their



Mackenzieville Yard & Glendale Junction

N scale (1:160)
 Layout size: 3'-4" x 5'-10"
 Scale of plan: 1" = 1'-0", 12" grid
 Illustration by Kellie Jaeger and Roen Kelly
 Find more plans online in the
 ModelRailroader.com Track Plan Database.

last few cars in view and move off-scene later.

There was room for only three staging tracks on the main line and two more on the branch, so the extra action of arriving and departing trains would give the impression of more yard activity. Three extra staging spurs meant that a Budd Rail Diesel Car (RDC) passenger service, plus local switching turns, could be run.

Construction

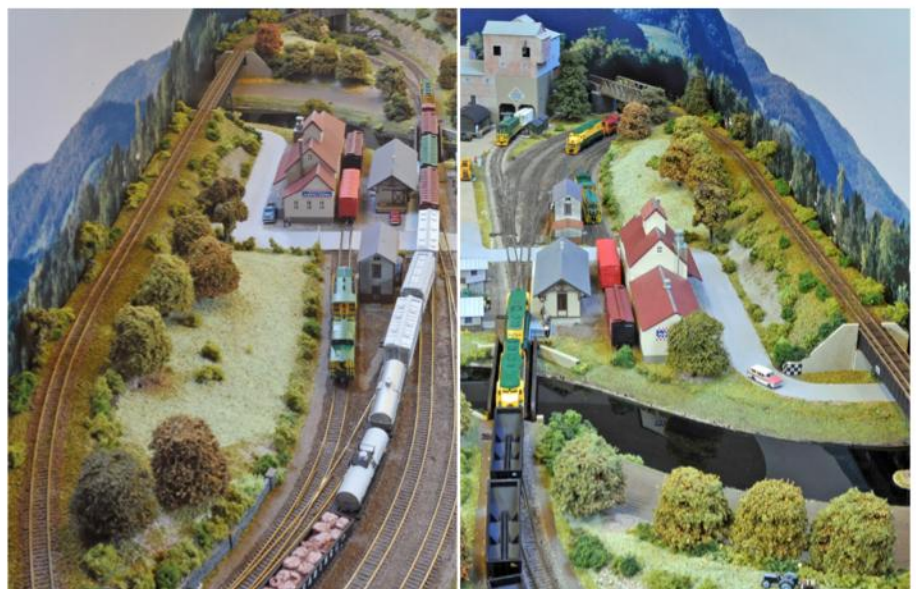
A conventional rectangular frame was built using 1 x 2s for inner timbers and 1 x 4s for the outer frame. This provides sufficient depth to protect the Tortoise by Circuitron switch motors. The frame was covered in Sundeala (similar to Homasote) faced with 1/8" cork sheet.

Tortoise motors operate all the switch points on the scenicked section. Since I originally intended to operate the layout from the central well, I planned to use hand throws on the staging turnouts. However, the introduction of SmartSwitch servos by Peco allowed all switches to be electrically operated by a control panel moved to the outside of the layout – enabling both viewers and me to enjoy seeing the layout from the front.

The layout at a glance

Name: Mackenzieville Yard & Glendale Junction
Scale: N (1:160)
Size: 3'-4" x 5'-10"
Prototype: Reading Co.
Locale: Pennsylvania
Era: early 1970s
Style: one-piece, self-contained unit
Mainline run: 13 feet
Minimum radius: 11.25"
Minimum turnout: no. 7
Maximum grade: none

Train length: 4'-9" main line, 2'-0" branch
Benchwork: Sundeala (Homasote) deck on 1 x 4 frame
Height: 4 feet
Roadbed: 1/8" cork
Track: Atlas code 55
Backdrop: prototype photo on foam board
Control: DC cab control with Gauge-master "W" handheld controllers



These photos show overall views of the scenic side of the layout – with a freight leaving Mackenzieville Yard on the left, and an empty hopper train heading through Glendale Junction toward the yard on the right.



A Reading GP30 and GP35 with empty hoppers from Cressona are holding at Glendale Junction to await a yard track, as is a GP7 with loaded hoppers from the mine branch. The loads will follow the empties into Mackenzieville Yard.



Trackwork

I like the look of Atlas code 55 track and was able to obtain flexible lengths and some turnouts here in the United Kingdom, but I had to purchase additional turnouts and fixed-radius curve sections by mail order. Larger-radius curves were used for the visible yard tracks, transitioning to smaller radii in the staging yard.

Despite the compact size of the layout, I was determined to use nothing smaller than no. 7 turnouts – even in the staging yard – and went larger at the yard throat using two no. 10 turnouts. Curved turnouts were used to good effect off-stage to make the main staging tracks as long as possible.

I painted the cork roadbed earth brown and glued the trackwork in place with contact cement. After ballasting, I weathered the track with a wash of the same earth brown paint.

Scenery and structures

I'd already purchased some structures for the layout – an Atlas built-up Maywood depot and Walthers Cornerstone Sunrise Mill and Glacier Gravel kits – so they provided a starting point for the scenery.

The river is smoked acrylic sheet cut to shape. The Reading crosses it on



Reading second-generation units bring empty hoppers from Cressona past the yard office and into the yard. This cardstock structure kit produced by the author is based on the prototype at Coatesville, Pa., on the Reading's Wilmington & Northern branch.

an Atlas plate-girder bridge, while the abandoned Lehigh Valley right-of-way crosses on a longer Micro Engineering deck-girder bridge. Peco girder bridges take the Lehigh Valley off-scene at each end.

The yard office is based on the Reading prototype at Coatesville, Pa. I'd already scratchbuilt an HO scale model of it for a previous layout and simply scaled down the dimensions for my 1:160 version. I have a lot of background with card-construction kits, so rather than make a one-off structure I designed and printed it as a kit, at the same time producing kits for the track maintenance structures. The prototypes for these buildings were also at Coatesville, and plans of them appeared in the December 1983 *Model Railroader*.

The landforms were built up using Styrofoam coated with an exterior-use filler, which gives a rough texture for scenic powders to adhere to. The photographic backdrop is a shot I took in 1990 while traveling through New York State en route to Buffalo.

Layout control and operation

The locomotive roster is perhaps a little too second-generation for the area modeled, and I really should add some Alco RS-3s in the Reading's dark green livery to power the mine runs. But for now these are handled by Atlas GP7s, with mainline runs handled by GP30s and GP35s, which add color to the layout. Although some of my locomotives are Digital Command Control (DCC)-equipped, the layout is operated in conventional direct-current (DC) mode, controlled by handheld green and red cabs. Toggle switches on the panel assign control to either cab, and separate toggle switches control the turnouts.

I developed a table that shows a typical one-hour operating sequence, with each move color-coded to denote which control cab is used. [See "Now on ModelRailroader.com" below. – Ed.]

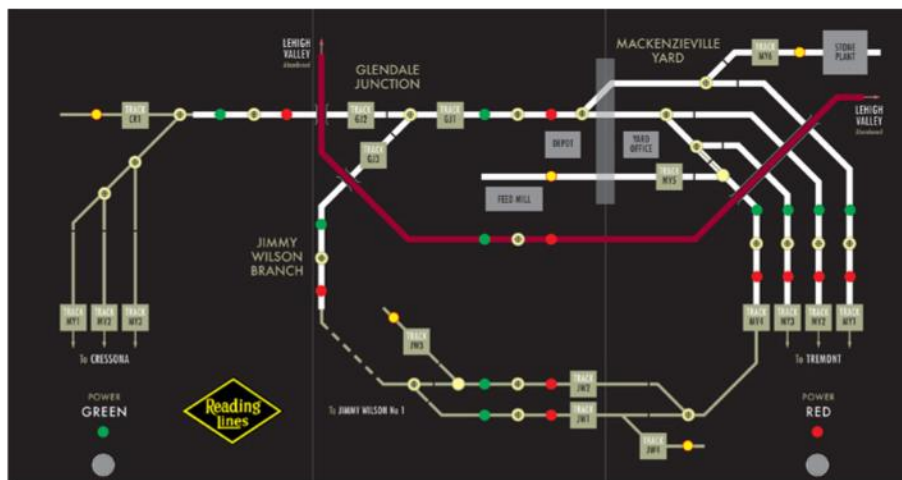
Most trains arriving at the yard stop with their last few cars in view, then move off-stage later. Departing trains initially draw forward into view until it's time to depart.

The Budd RDC passenger service runs from Track CR1 to the depot and then reverses onto the Jimmy Wilson branch, returning to the depot and then on to CR1 later in the sequence.

Local switching moves operate from two staging yard spurs: a caboose hop from JW4 to the yard office at the feed mill spur, and a covered hopper delivery from JW3 to Penn Stone.



A Budd RDC prepares for the short trip up the mine branch. It will return later and reverse for the journey back to Cressona. The Reading Co. track maintenance structures were constructed from plans in the December 1983 *Model Railroader* and, like the yard office, are from Coatesville, Pa.



The control panel schematic shows track occupancy and switch alignment at a glance. Ian moved it to the outside of the layout to facilitate operation as well as to be closer to the audience at exhibitions.

Mission accomplished

My original goal of modeling anthracite-region railroading in a modest footprint in N scale was met. It was a lot of fun to model a different type of railroading in a different scale, an exercise I highly recommend. **MRP**

Ian Wilson, a graphic designer, is the originator of the Prototype Models line of cardstock construction kits. Living in the U.K., he draws the track plans for British Railway Modelling magazine.

Now on ModelRailroader.com

Download Ian's color-coded operating sequence table. Find the link on the *Model Railroad Planning 2017* contents section under Special Issues at www.ModelRailroader.com.

Learning points

- Building a second, compact layout in a smaller scale provides more variety and the enjoyment of another region or prototype.
- Having a portion of an otherwise hidden staging yard visible adds scenic interest and eases train-handling chores.
- Budd RDCs or, in earlier eras, gas-electrics, permit passenger runs without eating up staging track space.
- Authenticity is enhanced by modeling appropriate prototype structures.
- Even a very compact layout can provide an hour or more of interesting operation.



A slice of Wyoming in the U.K.

Peter Kirmond's O scale Union Pacific Laramie, Wyo., Engine Terminal exhibition layout includes a track used to deliver coal to the overhead coal dock. The hoppers are scenery items, as they can't be switched during exhibitions.

Massive O scale Union Pacific locomotives dominate this 3 x 12-foot exhibition layout based on Laramie, Wyo., in the 1950s

By Peter Kirmond//Photos by the author

Why would someone who lives in rural Gloucestershire, England, model part of a Union Pacific engine terminal in Wyoming? For many, a layout is an unashamed trip back to their childhood. On reflection, I guess there's an element of this here: I have a clear recollection of the son of two of my parents' friends

having an HO model of a UP 4-8-8-4 Big Boy, and of being insanely jealous of this amazing beast.

What rekindled this long-forgotten interest was visiting my daughter while she studied at the University of Wyoming in Laramie as part of her American Studies degree at the University of Birmingham, England. An essential part of the trip was a visit to the well-known footbridge over the UP to railfan.

Before this, I'd never quite understood why some people in the U.K. find American railroads so fascinating. I now get it, and I think the key step in this awakening was seeing the real thing first-hand. Mile-long intermodal trains making the ground shake as they passed through at speed. Awesome! I was hooked.

As soon as we got back to her residence hall, I typed "Laramie Union



Pacific" into Google and found Richard Leonard's fantastic collection of Big Boy photos (www.railarchive.net/bigboys/index.html). The images were taken in the summer of 1957 as the 4-8-8-4s hauled the California fruit harvest east over Sherman Hill between Laramie and Cheyenne, one of their final moments of glory. I had no idea that Laramie had been a hub for these great machines, but now that I did, my childhood craving for a model of one was reawakened.

I'd been contemplating my next layout for some time and had already gathered a list of requirements:

For exhibition use only. I really enjoy visiting and operating other people's layouts as well as operating a model railroad at exhibitions. But experience has taught me that operat-



Peter designed the layout to be transported to exhibitions around the United Kingdom in a station wagon. Here, he photographed it after the first phase of construction; more detail work and weathering laid ahead.

ing sessions at home just don't cut it for me.

Pick a prototype location. I've also learned that modeling a specific prototype location is what really interests me.

Small is beautiful. Years of renting vans to take my previous 12 x 30-foot OO (1:76 proportion) exhibition layout to shows had cured me of any desire to continue that. So a fundamental requirement was that the layout needed to pack into my station wagon.

Less is more. When designing a layout, there's a strong temptation to overcomplicate by filling every last corner with detail. This doesn't necessarily result in a better layout, just one that looks crowded. Small and simple enables more attention to detail and, if done well, focuses the attention of the public at exhibitions.

It also means the project is achievable within a reasonable time frame. Over the years I've learned that I'm not a lifetime-project person. After five or six years, I start to need a new challenge.

Build a small part of something big rather than a big part of something small. The temptation when building a small layout is to pick a small prototype – a short line or industrial setting. But what if you model a small part of something big – a corner of a large freight yard or mainline passenger terminal?

Build something different. There are many essentially similar layouts on the exhibition circuit in the U.K., the Great Western branchline (shortline) terminal being the most often repeated.

Wouldn't it be better to model something different?

Build something in a larger scale.

For many years, I'd wanted to build a layout in O scale (1:43 in the U.K., 1:48 in the United States) and have a considerable collection of kit and scratchbuilt stock in Scaleseven (the U.K. equivalent of Proto:48). But the designs for layouts always ended up too big to meet most of the above requirements.

From HO to O

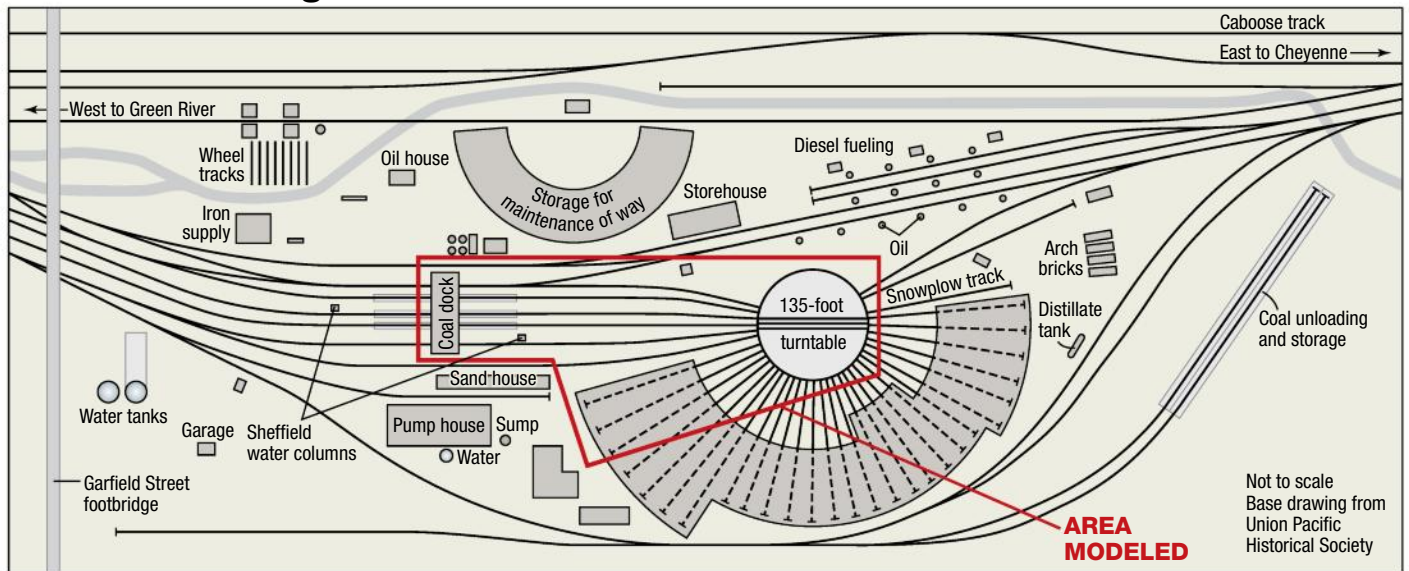
Initial ideas of modeling the engine terminal in HO were soon overtaken by combining all the above thoughts to produce the first "lightbulb moment." Why not build it in O scale? A small part of the engine terminal at 1:48 scale would tick all the boxes.

So I took the plunge and bought an O scale Big Boy. "Wow!" is the only word to describe it – a phrase now heard many times at exhibitions. O scale has a real presence and, at nearly 3 feet long and weighing more than 20 pounds, an O scale 4-8-8-4 has it in spades. The die was cast!

It quickly became clear that the key elements to include in the design were the turntable, roundhouse, and coal tower. But how could I include these in O scale and still meet all my goals?

The second lightbulb moment was realizing that there was no need to model all 27 roundhouse radial tracks; a small sampling would be fine with the rest implied. This would also allow viewing of the interior, potentially a fascinating scene in itself.

UP's Laramie Engine Terminal



Laramie Engine Terminal

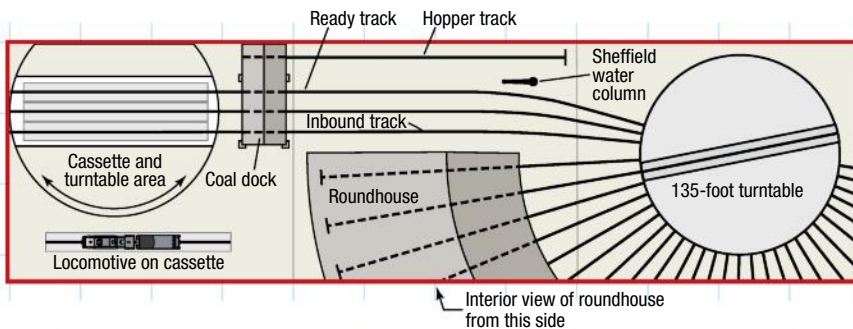
O scale (1:48)

Layout size: 12'-0" x 3'-4"

Scale of plan: $\frac{3}{8}$ " = 1'-0", 12" grid

Illustration by Roen Kelly

Find more plans online in the
ModelRailroader.com Track Plan Database.



Have layout, will travel: The O scale Laramie Engine Terminal was specifically designed as an exhibition layout and is quickly packed and well protected in carrying cases for traveling in an "estate car" (U.K. for station wagon).

Full-size mock-ups

I find it difficult to visualize what a finished layout will look like from a track plan on a computer screen. Throughout the design process, I built a series of full-size mock-ups from whatever materials were on hand. This

helped identify the shortcomings of each design and point the way to improvements. This was a bit of an effort at the time but proved to be the way to avoid wasted materials and potential disappointment in the long term.

The layout at a glance

Name: Laramie Engine Terminal

Scale: O (1:48)

Size: 3'-4" x 12'-0"

Prototype: Union Pacific

Locale: Laramie, Wyo.

Era: 1957-58

Style: sectional display layout

Minimum radius: 78"

Minimum turnout: none

Maximum grade: none

Train length: not applicable

Benchwork: tabletop

Height: 54"

Roadbed: $\frac{1}{4}$ " birch plywood

with $\frac{1}{8}$ " high-density foam

Track: Micro Engineering code
125 flextrack

Scenery: not applicable

Backdrop: not applicable

Control: Lenz Digital Command
Control with Touchcab iPhone
interface

As with all layout designs, the road to what I ended up building was paved with myriad iterations. The tendency always seems to be for any plan to gradually get bigger and more complicated, and that certainly happened with this layout. For a long time I hung

Learning points

- With careful and open-minded planning, out-of-the-box goals can be achieved.
- O scale and even the largest UP locomotives aren't too large to form the focus of a small, portable exhibition layout.
- Editing out everything not essential to the central theme is mandatory.
- Exhibition layouts offer unique rewards to their designers and builders.
- Keep the viewer in mind as the layout assumes its final form.

onto the idea that I should model a section at either end of the roundhouse and have viewing from one side only, views into both sections of roundhouse with the turntable in the middle and the coaling chute somewhere toward the back, and a backdrop at the rear. But, however I tried, it was just too big to fit in my car and too wide to enable full access to all areas, a fatal error in layout design.

There was also the nagging thought that the view of the outside of the roundhouse was a good one. The third lightbulb moment was realizing that the layout should be seen from both sides, allowing both the interior and exterior of the roundhouse to be visible. In one stroke, this would give a whole new vista and double the number of people who could see the layout at any one time. Adequate viewing room is often a problem with small layouts at busy model railroad exhibitions.

The one remaining hurdle was the layout was still going to be too big to fit in my car. So my final lightbulb moment was realizing that there was no need to model two sections of roundhouse; one was just as good. The size problem was solved.

The track plan for the visible part of the layout was now getting somewhere. But there were other problems to figure out:

- How was the layout going to be operated so that it was as prototypical as possible while being interesting enough to keep the attention of both viewers and operators?
- How was the off-stage part of the layout going to work?
- How was the layout going to be assembled and disassembled reasonably quickly and easily?
- How was it all going to fit in my



The offstage area has a three-track docking port/turntable. At right is a locomotive on a cassette. At center is a turntable that accommodates three cassettes (two are shown). The cassettes ease the task of moving heavy locomotives.

station wagon (see opposite page) and be transported with minimal damage?

Plenty of action

Although the track plan is simple, the layout is still interesting to operate and captivating to watch. Arriving engines have real coal added to their tenders, and dummy sand spouts pivot to mimic sand being added. Locomotives then proceed to the roundhouse for inspection.

On departure, the water column turns and the sound of rushing water indicates the tender is being filled. While some of this might sound a bit corny, I hope I've done it well enough to add a certain fascination for the audience and interest for the operators.

Presentation is key, so the track height is 54", about chest high on most adults (see the photo on page 33). A periscope is available for younger viewers and those in wheelchairs. The layout is brightly lit with light-emitting diode strips and neat in appearance with neutral gray drapes below the track level and fascia above, with only a narrow (14"-tall) window to view through.

It's hard to overestimate what an attention-getter an O scale Big Boy is. Nobody takes his or her eyes off one being turned.

A look off-stage

The requirements of the off-stage part of the layout are essentially simple: turn locomotives departing the layout on the departure track so that they can reappear on the arrival track. It took several different designs before I realized that, as usual, the

simplest solution was the best – in this case, hand-operated turntable.

The locomotives are big, heavy, and cumbersome to handle, a problem solved by having them moved on and off the layout on cassettes. Custom built lids fit over each cassette to form a secure, foam-lined case for transportation.

Stringers are made from high-quality ¼" birch plywood with as many weight-saving holes cut as possible. A beam system that folds flat supports the baseboards. Everything bolts together quickly and easily, and the stringers are all crated for the journey from home to venue and back. The fit into the car is tight, but damage so far is nil.

Goals achieved

The evolution from design and construction to exhibition was a slow and, at times, painful process but hugely worthwhile. I now have a layout that meets all my initial requirements, is already a real eye-catcher at exhibitions, and will give me much pleasure as I add detail and operate it over the next few years.

If you thought O scale and even the huge motive power representative of the mighty Union Pacific was beyond the scope of a portable exhibition layout, you may want to allow for a lightbulb moment of your own. **MRP**

Peter Kirmond, a pharmacist, lives in Gloucestershire, England, with his wife, Aileen. He also enjoys cycling, walking, bird watching, and the occasional brew. Peter would love to take his Laramie Engine Terminal layout on a tour of the United States.

ADDING TRACTION to a steam railroad



Caution: Electrified railroading can become addictive!

By Tom Bailey//Photos by the author

Thinking of adding a trolley line to your layout? Well, that can be a fascinating addition to an existing model railroad. It can be simple or as complex as you might want. Just be aware of one hidden risk: A trolley operation can become addictive – sometimes to the point that it becomes more intriguing than a traditional steam railroad.

That's because it can be scaled to your available space more easily than

most other types of railways. Most electric lines were short, with ultra-sharp curves, steep grades, simple but frequent operations, and short trains – often just a single car. Scale-length trains are practical. Adding even more realism is that, like their prototypes, the models are powered by electricity!

Trolley equals traction

The term “trolley” seems to have been seldom used in the industry. The preferred term was “traction” when

talking about the systems, vehicles, and operations, especially in trying to promote construction. And traction usually means a range of operations: streetcars, suburban lines, and interurban (between-city) lines.

The following distinctions may help:

- Streetcars operated in towns and cities. As the name suggests, most ran in the middle of city streets, although there were a few stretches of track not in streets usually referred to as “private right-of-way.”



1. Tom Bailey took this photo of competing modes of transportation inspired by a prototype photo of Niles car 151 along Ohio Route 2 near tiny Clyde, Ohio. Tom shares how he added traction to his steam-era HO scale New York Central layout.

- Suburban lines usually began as streetcar lines but were expanded beyond boundaries as the population grew. They sometimes used streetcar-type vehicles, but often they were a bit larger and heavier.

- Interurbans were a natural outgrowth of suburban lines. They usually aimed at nearby communities at first, but as people got used to them, promoters began to focus on connecting larger cities. Cars were bigger and heavier than local cars, but usually



2. Car 174 is outbound to Iddings, Ohio, while Birney 126, at right, will continue across the street on the figure-8 local line.



3. The downgrade past the bridge is one of the few spots on the line to Augustyn where the interurban isn't alongside a road. The grade here is about 6 percent, which is probably a little more than prototypical, but is visually acceptable.

narrower and shorter than steam railroad cars of the time. The dimensions of the cars were determined by the need to negotiate existing sharp curves, often as tight as 36-foot radius (a mere 5" in HO).

These railroads dated from the late 19th century into the Depression era. A handful of streetcar operations – Pittsburgh, Boston, Philadelphia, New Orleans, San Francisco, and a few others – made it into the middle of the 20th century, and a few of these still run today. Suburban lines hung on a little longer, with lines in San Francisco, Boston, Cleveland, Philadelphia, and Pittsburgh.

Interurbans were the least successful. Today, the former Chicago South Shore & South Bend RR is the sole remaining passenger interurban.

Streetcars, suburban lines, and interurbans shared these common characteristics:

- They were light railroads, usually on standard gauge track, but some-

times mandated to be wider or narrower gauge as city fathers sought to preclude running freight trains along city streets.

- Most were built after the great age of railroad construction, so they were built amid cities that were already established. In cities and towns, the use of existing streets was common. Between towns, existing highways and railroads were often followed, because both went where people wanted to go.

- Power was typically low-voltage direct current distributed by an overhead trolley wire. A few interurbans used a third rail outside the two running rails. Most systems used regular trolley wire in towns and cities for safety.

Choosing a traction line

I'm going to focus on modeling an interurban line. From a pure modeling standpoint, interurban operations use less space and generally fit better with the railroad you already may have.



4. The underpass going south out of Hickory frames one of the more evocative scenes on Tom's railroad. The railroad depot is immediately north of the bridge, and the streetcar in the upper right of the photo – used on the "suburban line" to the car barn – is on a spur at the depot.



5. The track to Iddings goes away from the street at a sharp curve that's also the end of the downgrade. The car barn loop offers a sort of suburban car route, a bit longer than the purely local line.



6. An express car is roadside en route to the Pemberley depot. On the prototype, "roadside" varied from almost on the shoulder of the road, as modeled here, up to 50 feet or more away.

The layout at a glance

Name: New York Central (NYC) and Lake Shore Electric (LSE)
Scale: HO (1:87.1)
Size: 16 x 25 feet
Prototype: NYC and LSE
Locale: northwestern Ohio
Era: late 1930s
Style: single deck
Mainline run: 80 feet (railroad), 73 feet (interurban)
Minimum radius: 25" (railroad), 6" (interurban)
Minimum turnout: no. 6 (railroad), 6" radius (interurban)
Maximum grade: .5 percent (railroad), 6 percent (interurban)
Train length: 75" (railroad), 16" inches (interurban)
Benchwork: open grid
Height: 48"
Roadbed: cork and Homasote
Track: LSE: codes 55 and 100; NYC: codes 70 and 83
Scenery: papier mache over cardboard strips
Backdrop: none
Control: direct current

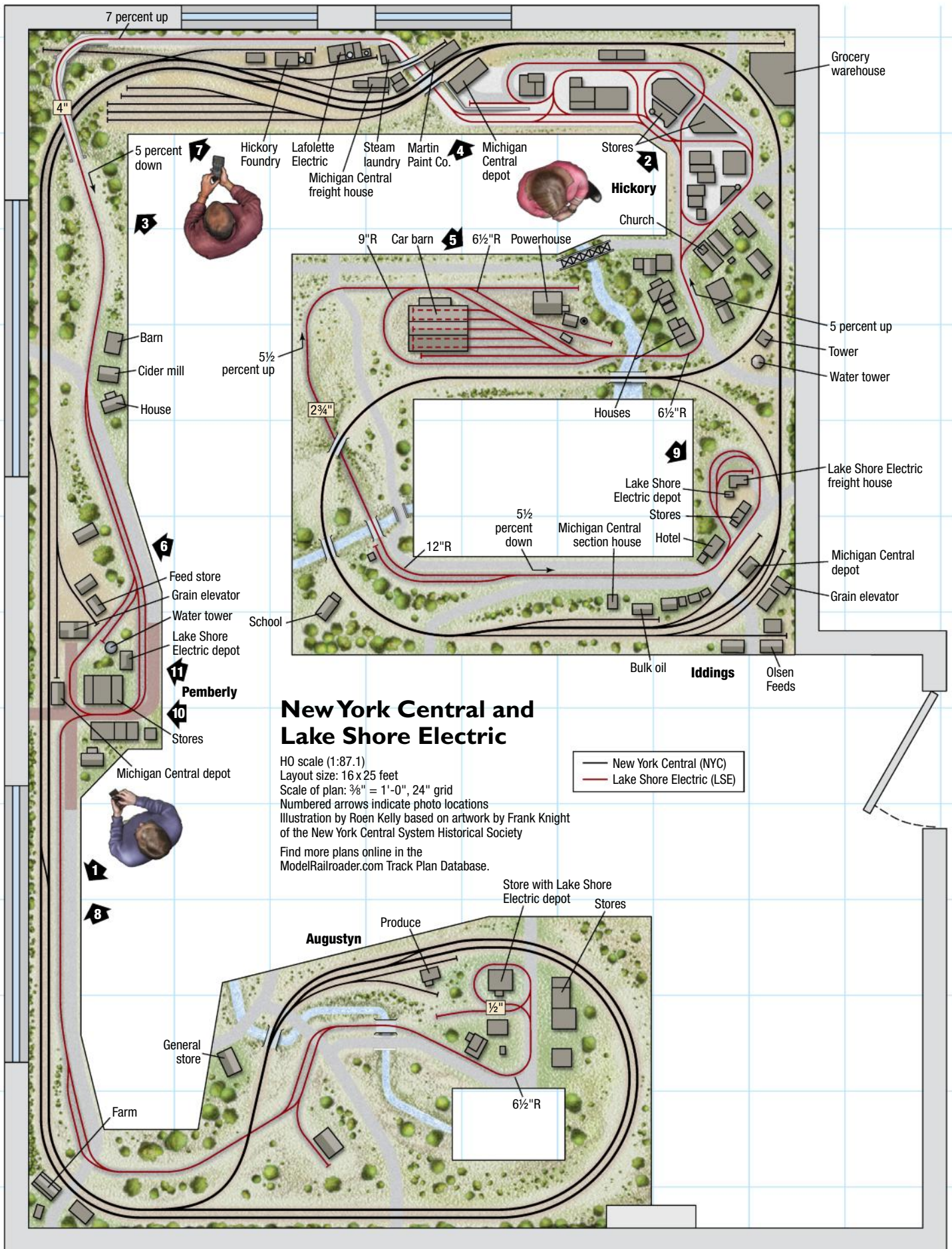
Streetcar lines mean cities, and cities take up space. The more complex the streetcar system you visualize, the bigger the city needs to be, and that's not just area. The buildings need to be bigger to avoid having the streetcars dominate the scene.

Suburban operations are usually a mix between streetcars and interurbans. Unfortunately for modeling, however, suburban lines have the shortcomings of both forms and few of the benefits of either. The route need not be always in the street, but few suburban lines used the variety of equipment common to interurbans, and interurban freight trains seldom operated over suburban systems.

Getting started

The origins of my current layout began after I got married and completed a term of service with the Air Force. We were living in an apartment in Algonquin, Ill., that had little room for a layout, but it did have a corner of our bedroom that could accommodate a 2 x 4-foot layout. That's too small for a mainline railroad, but it could accommodate a circle of streetcar track.

Sometime before, I'd read the best article on HO trolleys I'd ever seen, "Table Top Trolley" by George Sennhauser, in the April 1954 *Model Railroader*. While his layout was 4 feet





8. The railroad, interurban, and road are all sandwiched together on this long, mostly straight stretch. Only the railroad is level; the interurban has some low spots, while the road follows the natural land contours.

square, too big for my space, what he did and why made sense.

I couldn't use George's track plan, but I came up with a reversing loop-shaped plan with a wye at the junction of the loop. I still have that little segment – it's right in the middle of my current layout.

That first segment established most of the standards I still use, especially the minimum curves: 6" radius, 44

scale feet – pretty close to the prototype. I have photos of prototype 61-foot-long wood and steel Lake Shore Electric (LSE) cars going around such sharp curves. My roster has been modified for sharp curves, but most commercial cars won't take them.

I used fine overhead wire with fittings by manufacturer Richard Orr which are almost scale size, but this also restricted use by visiting equip-

7. On prototype interurban lines, bridges and approaches were usually built of timber. Later, as time and money permitted, approaches were filled in and bridges replaced with steel.

ment. The scenery represented the transition from small businesses to residential, using the diagonal street as the dividing line.

Moving on

A few years later, we moved to a new city, Jackson, Mich. I now had a whole basement. The first layout section I tackled was about 8 feet square, and I added a steam-railroad track around the edge.

The reversing loop now fed into the interurban out of town, which paralleled the railroad, but at a lower level. The steam railroad line and yard tracks were the only mostly level parts of the layout. Everything else, including most of the city, is on a grade. This complicates the installation of buildings, but the rewards in appearance are substantial.

The traction line worked out well, but deficiencies in the steam railroad quickly emerged. The main line circled



the perimeter of the layout, which had an open area in the middle.

There was no getting around the fact that when you ran a train, you were going around in a circle.

Moving on – again

Two moves and eight years later, we found ourselves in Commerce, Texas, with a 12 x 28-foot room to devote to a layout with both steam and traction components. Sections of the previous layout were modified to fit the new location. I planned to take advantage not only of the new space but also to correct some of the things that were less than desirable in the earlier incarnations. The New York Central–Lake Shore Electric flavor was retained.

Here, the steam railroad came first. It was planned in a C-shape along three walls of the room, with a small peninsula adjacent to the entry doorway. The design included reverse loops at each end with modest yards and some industry at each end. The reverse loop at the peninsula end included a wye at the junction, forming a circle to facilitate break-in of new locomotives. Curves were set at 30" radius, but the wye connector's radius is closer to 25".



9. Car 42 backs the trailer into the freight station spur at Iddings. Note that the trolley pole is reversed. The overhead isn't tight enough for back-poling, Tom reports. Reversing the pole makes passage through the wire frog more reliable.

Making an electric line fit

Scenery and the fit of the steam railroad and traction line into the artificial environment of a layout are important to me. Railroads, including traction lines, existed to offer service and earn a profit.

An interurban can be modeled as a fully operational, going concern or as a scenery adjunct – non-operational but complete. Or it can be abandoned with some empty grades, traces of bridges, and empty buildings. But even if it's only scenery, it needs to have at least a plausible reason for being. It's evident on a lot of layouts that the builder was thinking about building just a railroad and eye-catching scenery, not a part of a society that could support it.

Regional choices

Choosing a region to model is an excellent starting point. My steam railroad's roster is based on the New York Central Lines (NYC) west of Buffalo. Those are the trains I remember fondly, maybe because my dad usually wound up beside the NYC main line on Sunday family drives just in time to see one of the afternoon passenger trains.

Most traction lines were long gone when I got interested in modeling, but my interest wound up being the Lake Shore Electric, which ran between Cleveland and Toledo, Ohio. This interest was partly because we drove from our home in southeastern Michigan through the LSE territory during annual family visits to northwestern Pennsylvania.

The line died in 1938, but there were carbodies around, plus remnants of bridges, rights-of-way, depots, substations, carbarns, and the like.

If you find electric railroading in any form seems attractive, don't follow my example. Do some due diligence, find a prototype that interests you, and model it.

Adding the traction line

I superimposed the traction line on this general plan. As before, the steam-railroad line is mostly level, with the traction line crossing it in four locations. The traction railroad has little straight or level track.

In retrospect, I wish I'd included at least minimal engine or staging facilities, which means there's no place for any trains except those being used. And that means a lot of unnecessary handling, the bane of carefully detailed models. I plan to correct this.

The beginning traction section, which had become L-shaped over time, is the focus in the largest community,

Learning points

- Base your concept on something you can adapt from real life; avoid modeling a model.
- Try to show that there was some economic benefit to your line – make it look as though it's going somewhere.
- Realize that if you make your construction standards absolutely to scale, you may not be able to accommodate visiting equipment.
- Locate the traction line where you can easily access the overhead for maintenance, but not so close that you regularly get entangled in the wire doing other activities.
- Be careful with having too much straight and level track. It can be visually boring.
- Include some sort of storage or staging track to minimize handling of your equipment.
- Include a place where it's easy to place or remove a car with a trolley pole without tangling with the overhead wire.



10. Leaving Pemberly, the track goes down the center of the street. This is characteristic of many Midwestern interurban lines. The main streets of the on-line communities were where most people and businesses were, and both the towns and the interurban lines thought this is where the tracks should be.

railroad before going upgrade into the much smaller town of Iddings, Ohio.

Here the traction line has another balloon track with a long passing siding before looping back through the town and beginning the return trip. The steam line has a small yard and a couple of industrial sidings at Iddings.

Rethinking Hickory

I imagined Hickory along the lines of Sandusky, Ohio, on the prototype LSE. Sandusky is a modest city that had five local streetcar lines, with the car barn at the edge of town. Standard city cars were single-truck Birneys.

Alas, Hickory is less satisfying than Iddings. The steam road is more appealing than the traction line, but steam is in the background and hard to access if something goes wrong. I got the concept pretty close but missed on the implementation: There's simply too much streetcar



11. This scene at the Pemberly Lake Shore Electric depot is based on the prototype depot at Vermillion, Ohio. The depot is a rough approximation of the prototype, but the sharp curve to the right was dictated by the track plan.

Hickory, Ohio. Going south from the end of the original traction reversing loop, the track veers downhill. At the bottom of the grade, it makes a slightly more than 90-degree bend off the street to parallel the railroad balloon track, but about 2" below and the same distance away from the railroad grade.

The streetcar track buried in pavement is all laid with code 100 rail, either T-rail or grooved girder, and the track on private right-of-way is all code

55. The transition is dramatic but mostly hidden by scenery.

The traction and steam lines both cross bridges over a river that divides the city from the country, which makes the transition. Just past the bridge, the traction line splits around a modest four-track car barn with a loop around the barn to mark the end of a local carline. The traction line then curves back toward the steam railroad on a downgrade, crossing under the



track for a town of this size, which pushes everything too close together.

One thing I do like at Hickory is the arrangement going out of town. Here the traction line is double track going downhill until it curves under the railroad, where it becomes single track and immediately starts up a steep grade to go over the railroad at the end of the railroad yard. The bridge and the setting is loosely based on the LSE bridge over the Nickel Plate Road at a place called Slate Cut.

Immediately after the bridge, the line heads downhill again to the intermediate village of Pemberly. There's a nice little brick interurban station here that looks like the LSE stations west of Sandusky. There's a balloon track around the station to turn cars and a freight station siding.

Ideally, this line needs a passing siding on the bridge over the railroad line, which is at the halfway point, but there's no room for that. Moreover, a single-track interurban company would be unlikely to make it double track.

Continuing out of Pemberly, the traction line follows the main street of town where it turns off the street to again parallel the steam road and a

Interurban operations

While most of my conceptualizing was devoted to fitting the steam railroad and the interurban together, I tried to include provisions for operations. Ideally, I could keep five motormen busy. Because most passenger runs are short and require just a single car, the challenge for multiple operators is to make their runs without getting in each other's way. Here are some options:

Hickory city lines

- There are several options, all using the crossing in the middle of downtown and the cutback outbound to Iddings: Run counterclockwise from the NYC depot, along the railroad continuing to the junction with the outbound track to Iddings. To return, go straight through the crossing and back to the outbound track along the railroad. By turning right at the second intersection inbound, it makes a figure 8 through downtown. And by turning right, it's even shorter.

The suburban line would follow any of the options above, but instead of taking the cutback track, it would continue outbound to the car barn and loop around it to go back.

Interurban

- Hickory to Iddings – from the interurban station on Second Street to Railroad Street following the circulator route as far as the statue on Division, but following the Southside line to the car barn and continuing to Iddings.
- Hickory to Pemberly – from the interurban station on Front Street to Pemberly loop.
- Hickory to Augustyn – same as Pemberly run, but continuing to Augustyn.

For cars, I'd use 4-wheel Birneys for the city runs, an 8-wheel Brill suburban car for the Iddings runs, and interurbans for the Pemberly and Augustyn runs.

A dispatcher? Not required. Most city operations depended on schedule and crew-selected routings.

Freight would be most practical as a single function without all the other activities. Most prototype operations had freight-only hours after the passenger runs had tied up for the night.

The prototype had an advantage that's impossible to model: live brakemen to guide the trolley pole during backing moves. Back-poling – running the car backwards against the trailing pole – or even using a double-ended car – changing the poles for backing moves – is cumbersome with models.

If you want to do freight and passenger operations simultaneously, plan for minimal sharing of track and ensure that the freight tracks are close to the front of the benchwork so you can easily manipulate the poles. – *T.B.*

highway. This was a common interurban practice. The Lake Shore Electric did this in countless locations, either paralleling the NYC or the Nickel Plate and numerous roads and highways.

While the line into Pemberly needs a passing siding, the line out has two. Both sidings use spring switches at each end and work pretty well, but they are visually too close together.

Making tough choices

I thought hard about incorporating the key elements of many prototype interurban lines: closely paralleling railroad lines, side-of-the-road running, and going through the middle of on-line communities on the streets with sharp curves and often steep grades, all features I associate with Midwestern interurban lines.

I'm pretty happy with how it has come together, but I plan to try to

improve some of the places I've identified as being less than satisfying. I've learned that it's important to think first of what's important about the traction line you might add. It wouldn't even have to be operable and, if you favor modern mainline equipment, could be only the remnants of a line here and there along your existing railroad.

If there's one lesson I've learned, it's a classic: More isn't necessarily better. Most places on my layout are satisfying – except where there's just too much. **MRP**

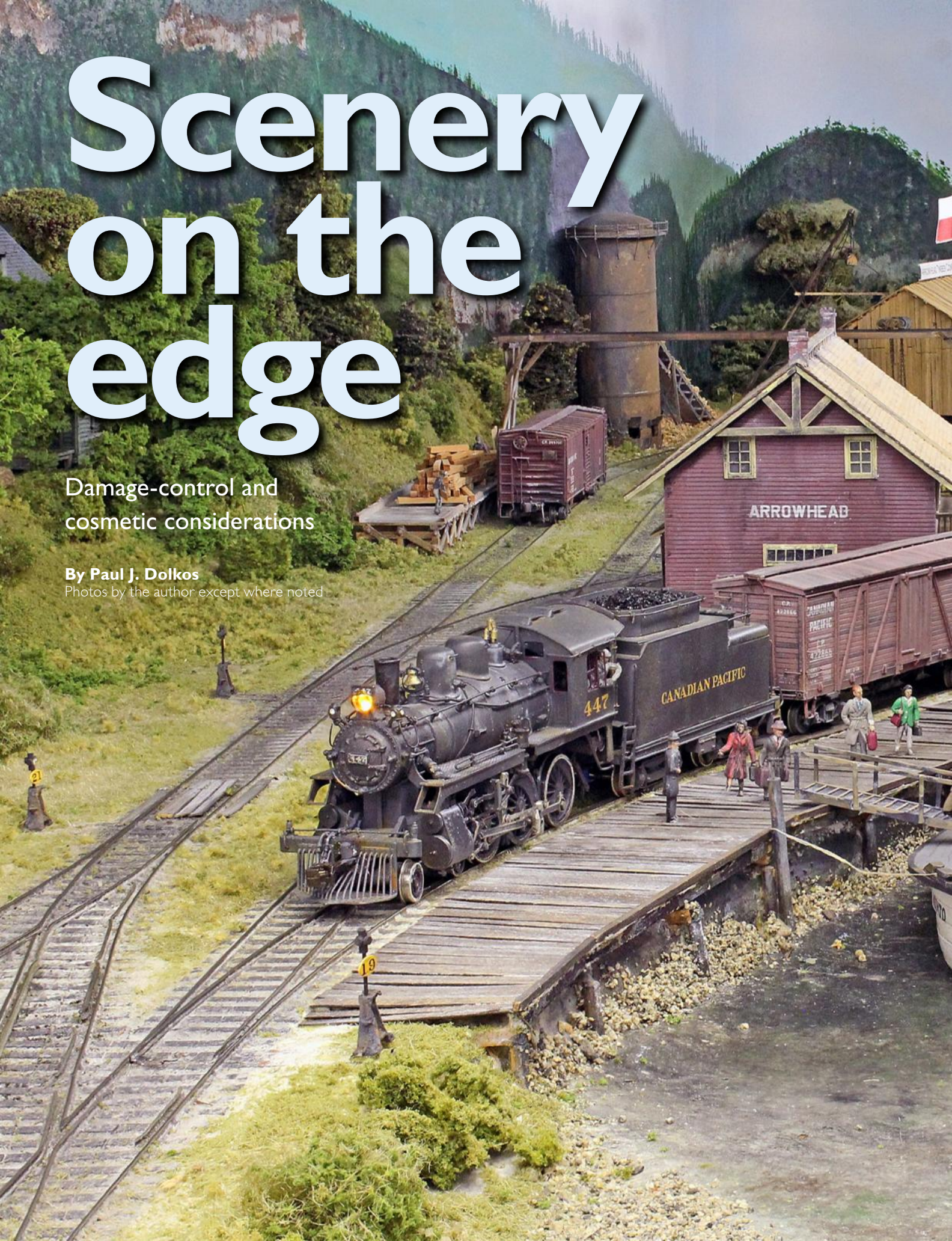
Tom Bailey's first scratchbuilt interurban came at about age 12: a model of LSE wood interurban 165 based on 1/8"-scale drawings in Model Railroader. He is an associate editor for the New York Central Modeler, an online magazine produced by the New York Central System Historical Society.

Scenery on the edge

Damage-control and cosmetic considerations

By Paul J. Dolkos

Photos by the author except where noted





Paul Dolkos discusses strategies to protect scenery along the edge of a model railroad layout. For example, Brian Pate protected his beautiful – and delicate – aisle-edge model of the Canadian lake sternwheeler *Minto* during operating sessions by moving it on a shelf. Brian Pate photo



The base of this Details West crossing signal drops into an 1 $\frac{1}{32}$ " Evergreen styrene tube section; if it's hit, it just tilts. The relay cabinet has pins that loosely plug into a base pad (made with styrene), so it can also easily be realigned.



The overhead hoist assembly on the car float transfer bridge has pins on the bottoms of the supports that drop into locating holes on the abutments. If the assembly is bumped, it can move without damage and easily be reset. The lone telephone pole is placed to provide some additional protection.

Some of the toughest layout real estate to scenic may be those narrow strips of space between the fascia and the track. Locating fragile details up front puts them at risk, and often the space is too tight for structures.

I try to limit my railroad's edge scenery to ground cover, bare dirt, ditches, and low-lying details such as ties. This stuff is relatively immune to damage from misdirected reach-ins by operators. Ideally, structures and other fragile construction can be concentrated on the far side of the tracks.

Scenery to the edge

But what about the scenery that reaches to the edge via roads, bridges, and trestlework, or upright items in the foreground like track signals, crossing gates, trees, and structures? Club layouts and others open for public viewing are often protected with transparent barriers, but this isn't usually acceptable for model railroads designed for operation.

Without such protective barricades, we need to think about what we can do to minimize damage. We need to add this consideration to the list of things to think about when we begin to sketch track plans.

I shy away from gluing down larger items close to the edge. My highway crossing signals plug into a styrene tube. If (when!) they're knocked over, they can simply be plugged back in.

My barge float-bridge hoist assembly has pins that drop into holes on the tops of concrete abutments. Being close to the layout edge, the assembly occasionally gets knocked out of alignment, but not broken. It can be quickly realigned. The pier that flanks the barge slip simply sits on the painted water surface. It may be knocked out of position, but not broken.

In other cases, I erect some sort of relatively indestructible barrier. Flanking a chain link fence that runs to the edge of the layout is a tie stack and a pole with a light. As I was building the fence, I told myself it was really vulnerable to an errant hand swipe. And, of course, before I could install any protective items, I knocked down the very section I was concerned about. With a tie pile and light pole installed, it hasn't suffered any damage since.

While effective, I'm not fond of the look of low Plexiglas or stronger Lexan shields screwed to the fascia to protect edge scenery or trains. I try to locate track and upright scenic items back from the layout edge to create a

Learning points

- Keep aisle-edge scenery simple and low, particularly where you and your operators will be reaching in.
- While planning, consider the exposure of aisle-edge items such as signals and bridges, and what buffer zones can be built in.
- Making particularly delicate foreground scenery items removable avoids damage during operating sessions.

buffer zone or allow for a low protective berm to be built. Including such protective elements must be part of the planning process.

But sometimes the roadbed section is so narrow there's no choice but to install a clear protective strip for peace of mind. A more professional looking installation would be to insert the plastic behind the fascia material instead of screwing it to the front. If one thinks about it early in the design process, it's not hard to do. On one of my early layouts, the fascia was a 1 x 4 board along the straight yard section. With a table saw, I cut a $\frac{1}{8}$ " slot into the board so I could drop in a clear shield.

Multideck concerns

On Brian Pate's HO and HOn3 railroad, the 64"-high upper deck is set back slightly so operators can't inadvertently brush against scenery or trains. Nevertheless, he's installed more clear shields on the top deck where tracks are close to the edge than on the lower deck, because operators normally reach in on a more horizontal plane. On the lower, 47"-high deck, reaching in is usually more of a downward motion. There's also better visibility, so it's easier to avoid upright items.

While taking these steps to protect your models, there's also a hospitality factor. As Brian put it, "My objective is always to avoid embarrassment for visitors. And nothing is more embarrassing than breaking something on the host's layout."

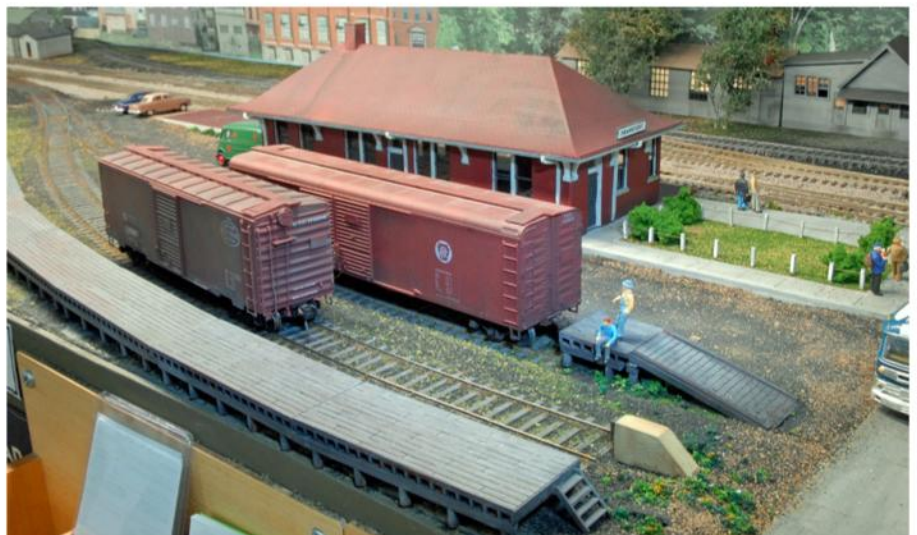
At one location, Brian has a large sternwheeler lake ferry sitting in the foreground. Railroad sidings are behind the boat and some town structures. Asked about concerns with operators reaching over the boat and structures to uncouple cars, he wryly observed that "The boat is always out of port during sessions." Translation: It resides on a shelf.



A tall tie stack and lamp post protect a chain link fence that runs to the layout edge on Paul's railroad. The fence posts and netting are Walthers. Silver thread on the top simulates barbed wire.



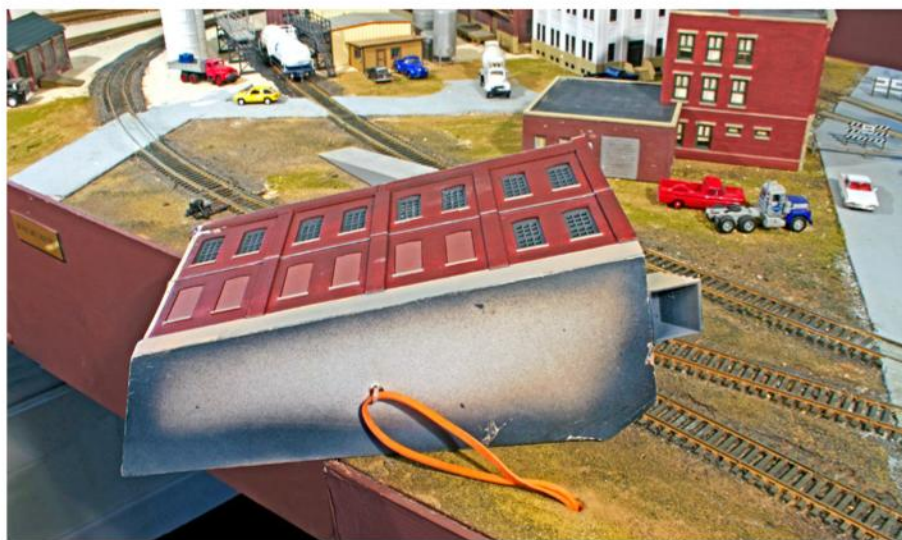
Brian Pate installed several clear $\frac{1}{8}$ " Plexiglas shields where track or vulnerable detail is close to the edge. Locating the shields behind the fascia board instead of screwing them to the front would provide a more finished look. Brian Pate photo



Model Railroad Planning editor Tony Koester didn't have room for the freight house at Frankfort, Ind., so he built only the loading platform. Plan B would have been to add the front wall of the freight house with open doors. Tony Koester photo



This pony-truss bridge is firmly supported on both sides of the track it crosses on Paul's layout. But it's not uncommon to see such model bridges cantilevered over the tracks without an aisle-side support pier.



Jim Senese has a narrow aisle where a building is frequently elbowed by his operators. To prevent it from hitting the floor, he installed a rubber band between its base and the benchwork.

Where scenery meets aisle

Let's consider the aesthetics of edge scenery elements. Is there enough space for an item? Are you trying too hard to squeeze it in? A common rationale is that we're suggesting structures continue into the aisle, that the world doesn't end at the fascia.

If there are only a couple inches of space, a truncated structure ends up being not much more than an outline of a building.

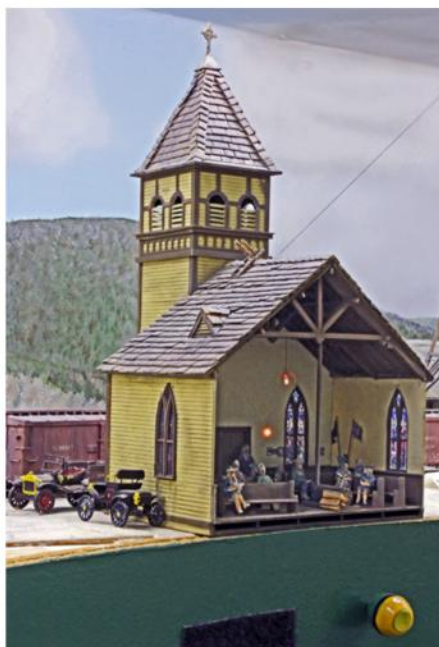
Although opinions on this vary widely, my thinking is such truncated buildings are distractions. They're impediments if operators have to reach

around them. The aisle side of a structure is typically painted black or the fascia color. This draws viewers' attention from the rest of the modeled scene. If you cover the profile shape with an appropriate wall material – brick, clapboard, metal – then at least it doesn't contrast with the other structures on the layout. I would certainly do this if the aisle-edge structure has any depth, not just because the prototype has been truncated.

Another approach is to open up a shallow aisle-edge structure and model the interior detail. The extra work helps justify the shallow depth and its location since it's a place on a layout where what's inside can be easily seen.

If you're thinking about an aisle-edge truncated industry structure with a siding in a narrow space, consider selecting an industry that doesn't require a structure along the track. Team tracks, coal trestles, and scrap yards are some examples. Or just install a loading dock along the edge, perhaps a nice concrete one without protrusions so a sleeve doesn't catch it.

A raised dock offers some protection for rolling stock spotted next to it. If the



Brian Pate's structures are in their prototype locations, hence this truncated model of the 1902 St. Paul's Anglican Church in Dawson City, Yukon, at the aisle edge. The detailed interior mitigated the model's shallow depth. But a visiting priest commented that the ladies should be wearing headscarves, not fancy hats, in the depicted 1940s era. Brian Pate photo

siding and structure are critical in a prototype-based scene, address this in the planning phase, although I appreciate that prototype alignments often don't fit well into our layout spaces.

Bridges ending in space

Bridges spanning the tracks are attractive scenic elements. But it makes me a bit queasy when there isn't enough room for a pier on the aisle side of the track and the last bridge span just hangs out in space. It's easy to envision someone walking by and catching the protruding span with his or her sweater or coat.

Some modelers say when the bridge end is exposed, it's nice to see the bridge's underlying beam detail. I'll trade a little beam visibility for a pier installed at the aisle edge. Some suggest installing a Plexiglas or Lexan plate at the bridge end for protection. Why not a bridge pier instead? A precaution I've taken with my aisle-edge bridge is not fastening it to the piers. If it's hit, it moves to one side, minimizing damage.

Bridges and their support structures often take more space than you'd expect. As early as you can, ideally during the planning phase, scale out the bridge and its parts to determine



A delicate mining siphon and trestlework model runs to the layout edge, but Brian has not shielded it because the location isn't where operators reach in. The upper deck height is 64" and recessed relative to the lower deck, so visitors aren't likely to brush against it. Canadian Pacific's Revelstoke, B.C., yard is below on 47"-high benchwork. Brian Pate photo

how much space is required at the edge. You very well may have to move the track back a bit to properly accommodate the end pier or the approach structure.

There be dragons here

The layout edge is a dangerous place. But like nature, we abhor vacuums and want to scenic right to the fascia, hoping the scenery survives. The fact is, particularly on railroads featuring operations, people are frequently reaching in, if not to

uncouple cars, then to adjust coupler centering, rerail something, or nudge a stalled engine.

And for appearance, I wouldn't try to squeeze in truncated structures where there's no breathing room. They'll look awkward.

So as you plan and the big picture evolves, don't forget to carefully consider the inches along the edge. **MRP**

Paul Dolkos is a frequent contributor to Model Railroad Planning.

Spaces between places

Planning scenery to give your
eyes a treat, then a rest

By Gerry Leone

Photos by the author unless noted



Gerry Leone is known for his highly detailed scenes and structures – the places – but he included open spaces between them to avoid overloading the viewer with detail.





The foreground scenery on the author's former HO railroad is transitioning from a busy, highly detailed town scene to more open spaces to the left.



Even a short breathing space between more intensely detailed scenes allows the scenes to stand out on their own merits.

When most of us sit down to enjoy a steak dinner, we take a few bites of the steak – the main focus of the meal – and then turn to the French fries or salad for a taste or two and maybe a sip of beverage. Then it's back to the steak, the meal's main course. You're giving your palate a breather. When you dig into that steak again, it tastes that much better.

The same principle is true when you're planning scenery for a model railroad: Give your visitors a savory eyeful to digest, then give them a side dish to cleanse their visual palate.

A metaphorical spotlight

Attention to details really helps to take a model railroad to that next level.

It's the little scenes and details that can make a model railroad memorable. But by giving a bit of a metaphoric spotlight to those scenes, and not to the spaces between them, the layout can actually seem larger than it is. Instead of the entire layout being one continuous cornucopia of highly detailed scenes, it pays to bracket them with less attention-getting areas.

Those areas are what I call spaces between places. They're the breathing room for your eyes. They're the fries between bites of steak. They're the things that make the main course that much tastier.

Why not just make it all savory by adding a jillion details everywhere? Sounds good on paper, and more than a few modelers do just that. But scattering hundreds of little crates and

boxes and people and dogs and stumps and ties here and there is a visual assault. Nothing is the focus, nothing the main course.

Pause – look – pause

A focal point is something for your eye to zoom in on, something to savor. It's a gas station model with used oil cans near the pump, a stain or two on the pavement, a stray cat hovering around the garbage cans in back, a guy filling up a hopelessly flat tire. It's the delivery guy talking the station attendant's ear off as the line of cars grows longer and longer.

But here's the key point: It should stand on its own merits, not be part of an endless chain of similarly detailed scenes. It's a spotlighted but tightly defined area that begs you to plant an unremarkable grove of trees next to it and to plop a vacant building across the street from it with elbowroom aplenty on either side.

Such spaces between places can be large – perhaps a field of crops bordered by utility poles that separate one town from the next. Sure, there's something in those spaces for our visitors to look at – a sea of corn, a wooded ridge – but nothing for their eyes to linger on.

Spotlighted scenes with breathing room between them can make a layout seem much larger than it is because it takes time for the viewers to linger there, analyze what's going on, internalize it, and react to it. It's something they savor for a moment or

The southbound *Alouette* is entering the Woodsriver depot "place" scene after passing under the highway bridge, beyond which is rural scenery "space" on Paul J. Dolkos's former Boston & Maine HO railroad. Paul J. Dolkos photo





On Dan Zugelter's Chesapeake & Ohio, a quiet Appalachian valley "space" between busy town and mine "places" is relieved only by an isolated tower ("cabin" in C&O parlance). Note how the lighted window adds attention-getting life to the scene without generating any of the clutter that extra details can create. Paul J. Dolkos photo

two before taking that breather between scenes and diving in again.

A personal touch

That brings me to the next point. If the scenes on your layout look just like everyone else's, you've missed an opportunity to stand out in your viewers' minds. The trick is to do something everyone else has done – it's hard not to! – but do it differently and memorably, and maybe with a little

bit of emotion. Tell a story or make a joke or bring something to that scene that makes it unique. When visitors spot those out-of-the-ordinary scenes, they'll bring their own emotion to it: the delight of discovery. And your railroad just got larger again.

Here are a few examples:

A couple of guys working up on a roof don't have a supervisor breathing down their necks, so, hey, why not take a little break? You've just told a little



A perfect example of a highly detailed “place” with a story to tell on Paul Dolkos’s Baltimore-based HO railroad: The two delivery men discussing the ball game may work for competing breweries, but they both root for Baltimore’s sports teams. The Pappas package goods store acknowledges the ethnicity of the Greentown section of the city. Paul J. Dolkos photo

Learning points

- Detailed scenes are an asset, but can be lost in the crowd.
- The spaces between places let the viewer’s eyes rest between detailed areas.
- Spotlit places can tell a unique and perhaps humorous, hence memorable, story, thus helping to differentiate your railroad from others.
- Allowing for open spaces requires as much planning as highly detailed areas.

story, given visitors something to discover, and brought a little emotion to an otherwise mundane scene of guys working on a roof.

Many of us have plopped fire hydrants down on city block corners and called it a day. Maybe we’ve even added the requisite dog leaving a message on the hydrant. But what about turning it into a little story? What about tying up that dog to a nearby lamppost and having him stare

longingly at that hydrant, just inches out of his reach? What a neat little scene for someone to discover and react to – and remember.

Eliciting emotions can turn an average layout into one with soul. It’s a layout that gives something back to the viewer. It rewards him or her for looking closely. And your little plywood universe has a life of its own.

But unless those scenes are allowed to stand out without being stuck in a

crowd, the messages may be missed. Spaces between places are as important as the places themselves. **MRP**

Gerry Leone is a retired advertising creative director and currently serves as a contributing editor to Model Railroader Video Plus and as the National Model Railroad Association’s vice president for special projects. He and his wife, Renay, live in suburban Minneapolis and also enjoy travel, running, and photography.

Pop quiz on yards

An overview of yard design and operation

By Tony Koester//Photos by the author



Quiz time: Although there are seldom yes/no, left/right, black/white answers to how the full-size railroads did things, especially as conditions changed over the years, there are some basics of yard design and function that should prove helpful to modelers. Please give some thought to the questions posed below before reading the responses.

A yard is defined by yard limit boards, and special rules apply to the movement of engines and trains within yard limits.

I. What is a “yard” and how it is identified?

Although we think of yards as any place where more than one track allows cars to be sorted, for the purposes of this article we'll define a yard as one or more tracks that exist between yard limit signs. A small town where a lot of switching is done may be designated as a yard simply by

posting yard limit signs, which gives crews switching cars protection against all but first-class trains. Inside (between) yard limit signs, only first-class trains such as Nickel Plate Road No. 9 behind Alco PA-1 187 can operate at track speed expecting to find the main track clear of all obstructions.



Unlike the actual Nickel Plate Road yard at Frankfort, Ind., the author's HO edition has rock ballast on the main as a visual aid to modelers amid the sea of cinder-ballasted yard tracks.

2: In the photo above, which track is the main line?

This is sort of a trick question. Obviously, the main line is the one with the light-colored rock ballast, as shown in several photos in this article. The “trick” part is in the prototype yard on the Nickel Plate Road at Frankfort, Ind., the main was ballasted with cinders like any other yard track. So, why did I use limestone ballast on the main?

The reason lies in the answers to the third and fourth

questions. My crew members need to be able to identify the main line at a glance to comply with rules governing first-class train movements through the yard and to know which east- or westbound yard track they're working with. Using cinders to ballast the main would have made spotting it amid the dozen-plus yard tracks very difficult indeed. They don't do this stuff every day, after all.



The main track through a yard is just another track – until a first-class train is due. Its schedule must be respected until it has cleared the yard or is 12 hours past due.

3. What rules govern the operation of trains on the main track through the yard?

Second- or lower-class trains, extras, and yard engines may use the main line through a yard like any other yard track without dispatcher permission, special clearance, or protecting against other trains with one important exception: The main must be clear for the scheduled passage of first-class trains. Remember that a timetable schedule is in force for 12 hours, so a passenger train due at 12:30 p.m. retains its rights until 12:30 a.m. For other than first-class trains, yard movements must be made at restricted speed, which means the engine or train must be able to stop within half of the sight distance.



Yard tracks are numbered starting with the main line, so the red Swift reefer is on eastbound yard track 4, or E4. A corresponding E4 bill box holds the waybills for cars switched into this track.

4. We're looking northeast. Frankfort has an eastbound and a westbound yard separated by the main line (light ballast on the author's HO edition). Which track, by direction and number (E1, E2, W1, W2, etc.), is the red Swift reefer on?

Yard tracks are numbered by counting from the main. The red Swift reefer is four tracks to the right (south) of the main line in the eastbound yard, so it is on E4.

It's critical to realistic operation for every track to have a distinct name. This is how cars are spotted and switched into coherent blocks for movement to a given industry or interchange track, or in proper sequence on a yard track as a specific train is being built in "block order" – cars grouped by destinations. So like someone sorting mail at the post office by putting the letters for Main Street or a given ZIP Code into a specific pigeonhole, a yardmaster sorts cars into tracks temporarily designated for a specific use.

At Frankfort on my railroad, the eastbound yardmaster sorts cars into three categories: those headed northeast on the Toledo Division ("Toledos"); those headed east over the Sandusky Division ("Sanduskys"); and cars billed to destinations in Frankfort ("probers"). The Toledos are then further sorted into "shorts" (cars for the Second Subdivision local to deliver sorted numerically by station [milepost] number) and "throughs" (cars for the next division point at Delphos, Ohio, or beyond, which are blocked into through trains). Similarly, the Sandusky Division cars are sorted into shorts and throughs. The probers to local industries, interchanges, and railroad facilities such as the coal dock are distributed by yard or Commercial Engine crews.

E1 and E2 are typically kept open for arrivals. E3 through E8 are available at the yardmaster's discretion as the workday progresses for blocking Toledo and Sandusky division shorts and throughs, and for probers.

Similarly, the eight tracks in the westbound yards are used to classify cars for St. Louis, Peoria, or Frankfort (probers), and the shorts are further sorted into station order for locals to deliver.



It was unsafe, inefficient, and likely to cause damage to lading if a yard crew pulled all of the cars on a long yard track to classify them. So the lead needed to be only 15 or so cars long in the pre-radio era.

5. Assuming the longest track in the yard holds 40 cars, how long should the switching lead (drill track) be?

Not 40 cars, but the answer is somewhat dependent on era, as the advent of radios made it easier for engine and ground crews to keep in touch. A conversation with former NKP engineer Don Daily illustrated differences in the pre-radio era.

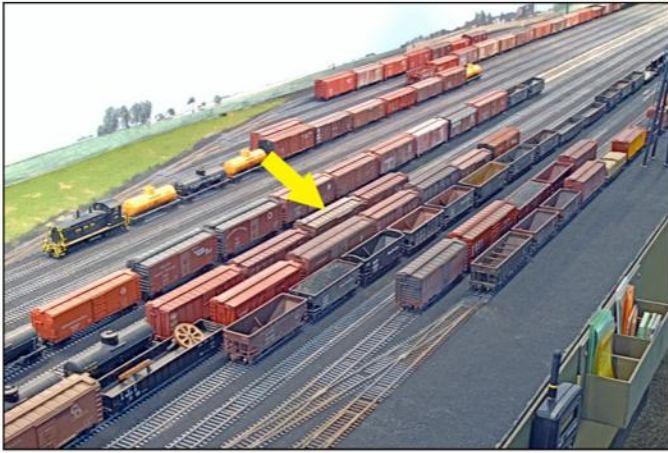
On prototype track plans, I couldn't find a yard lead as long as the longest yard track (a design parameter modelers are often advised to observe) at the east end of either the east- or westbound yard that didn't involve repeatedly crossing over the Monon and Pennsylvania RR diamonds. Don chuckled as he said that he preferred to switch cuts of only 10-15 cars at a time – "about as far as I could see due to the reverse curves through turnouts." He added he never even considered trying to switch a cut of cars that filled an entire yard track.



Ladders that spring away from the viewer make it difficult to see the lead cars on the back tracks.

6. What's 'wrong' with the design of this yard ladder?

Nothing, as it models the prototype. But from a modeling perspective, it's better to have the longest track farthest away so the first car on each track is "stepped back" from the lead car for easy identification. I do this by wasting several car lengths of track. However, by keeping up with waybills as cars are sorted, the yardmaster will always know the cars on every track.



Cars are moved according to routing instructions printed on their waybills. Waybills are sorted into bill boxes as cars are sorted into tracks, so there should not be a need to find a specific car buried somewhere in the yard.

7. How will the yardmaster determine the reporting marks, number, and destination of the car marked with the yellow arrow?

Yard tracks were typically not far apart, perhaps 13 feet or so. In HO, the typical track spacing is 2", about 14 scale feet. This has ramifications for professional and model railroaders alike. For the pros, walking yard tracks could be hazardous, although "yard checks" were certainly done. For modelers, seeing over the cars in the front tracks to find a car farther from the aisle is difficult.

We shouldn't even be trying to do that! A basic tenet of realistic operation is that every car has a waybill that tells everyone concerned where that car is routed. As an inbound train arrives, the conductor hands the packet of bills to the yardmaster. Presumably, the bills are in the same order as the cars in the train. If not, the yardmaster can quickly resort the bills and drop them into a bill box designated for that arrival track.

As the yardmaster breaks down the newly arrived train, he sorts bills as he sorts cars. If a bill notes that Southern Pacific boxcar 12345 is bound for Buffalo, the bill will specify the routing east of Frankfort: NKP-Sandusky Div.-Buffalo. He adds that car to the Sanduskys already standing on, say, track E4, and he drops the bill into bill box E4. That ends his concern with the routing and whereabouts of SP 12345.

If for some reason he wasn't working on Sandusky cars at that moment, he could designate a "for now" track. The cars on it might be what railroaders call a "dog's breakfast" for a variety of destinations. But he will never have to search for specific cars at a future time. Instead, he'll simply pull that track and retrieve the pre-sorted bills from that track's bill box, then use the information to sort the cars into blocks.

The point is, there's never a need to find a car in the middle of a distant track. Yes, cars are occasionally separated from their bills; railroaders call them "no bills." Sooner or later, they'll turn up. If the president of Ford Motor Co. calls to demand a hot carload of auto parts be located and delivered to his plant ASAP, each track will be pulled and cars checked as they roll by. A clerk wandering around in a busy yard looking for a lost car is dangerous, and standing on tippytoes to peer over the tops of cars in our model yards to find a lost sheep is a bit silly.



Road and yard crews normally leave and pick up their engines in the engine facility "on the [inspection] pit." Having road and yard crews pick up and leave engines on the pit adds considerably to the fun of operation.

8. Where would an outbound road crew find their engine? Where would an inbound crew leave their engine?

Steam-era engine terminals had inspection pits where the running gear of locomotives could be inspected and lubricated. Inbound road crews left their steeds on or near "the pit." The "outside" hostler serviced the locomotive with fuel, water, and traction sand. If it needed more, the "inside" hostler would move it into the roundhouse. After servicing, it would be spotted on a ready track near the pit. So the answer to both questions is "on the pit."

The hostler had no authority to couple an engine to an outbound train. Similarly, a road or yard crew on a model railroad should pick up their locomotives in the terminal. An exception might be a through train, including a passenger train, where power isn't changed. In the second-generation diesel era and beyond, some hot through trains only slowed down in the yard as a new crew swung aboard and the old crew hopped off.

The purpose of realistic operation, beyond its tremendous entertainment value, is to simulate the operations of full-size railroads. Since yards comprise much of the track mileage on many model railroads, it's good to understand the reasons behind their design and operation. **MRP**

Tony Koester is the editor of Model Railroad Planning and a contributing editor to Model Railroader.

Learning points

- Special rules apply to the movement of trains within yard limits.
- Each and every track on a railroad must have a specific name.
- Yard tracks are numbered by counting from the main line.
- The length of a yard lead need not equal the length of the longest yard track.
- Searching for individual cars in yards is both counterproductive and unrealistic.



CSX 230, a General Electric AC4400CW on an eastbound coal train, crosses the Harpers Ferry Bridge on Aug. 10, 2008. The bridge at left, used by CSX's Shenandoah Sub, was built in 1894 and was replaced as the mainline bridge in 1931. The scene is depicted nearly to scale on Byron Henderson's N scale CSX Cumberland Subdivision track plan.

A balancing act

Thoughtful selective compression yields a successful N scale track plan of today's CSX Cumberland Subdivision

By **Byron Henderson**//Prototype photos by Henry Freeman

The current-day CSX Cumberland Subdivision is an appealing modeling subject with its famous locales and railfan scenes. But even with a multi-deck approach in N scale in a large space, I knew that compromises would be necessary.

This former Baltimore & Ohio RR line is still quite busy today, with a variety of CSX freight traffic, Amtrak's *Capitol Limited*, and MARC's (Maryland Area Regional Commuter) Brunswick Line sharing the tracks. There are also many rail-served industries and interchanges with other railroads. My

track-plan client's primary interest was in modeling contemporary mainline traffic, but potential for en route switching was also to be incorporated.

Finding a footprint

The overall space seemed at first to be quite substantial for N scale, but a

political boundary at one side (violated only once!) and an area to be kept clear for current uses and possible future railroad expansion left us with one usable wall and a decent space in the center of the room. I nearly always try some sort of spiral into the space from a wall in similar situations. This is often the best use of the space overall, as was the case in this design. I also often try to capture unavoidable support columns within benchwork and was able to accomplish that here.

With a desire for subterranean staging and multiple decks, I expected we would need at least two or three turnback curves (or “blobs”). But one of the advantages of N scale is that even a fairly broad radius is relatively compact in a large space such as this. The client’s desire for contemporary railroading and cosmetically pleasing curves led us to choose a 21" mainline radius for visible track and 18½" minimum radius for hidden track, both with easements.

Trimming down the prototype

One of the first compromises I consider in any prototype-based layout design is scope – framing the locations to be modeled versus the entire candidate area. The nearly 100-mile-long subdivision would require excessive compression to fit into the room in its entirety, so some portion would be unceremoniously lopped off and represented by staging. But where to do the trimming?

At the east end, the solution was obvious: The iconic tunnel and bridges scene at Harpers Ferry, W.Va., was already the highest priority for my client, and the tunnel conveniently provided a way for trains to exit the visible layout on their way to staging. Equally important, this well-known scene at one end of the layout could serve to set the time and place in viewer’s minds. With that decision made, the next question became how far west the design should stretch and how compressed each of the various Layout Design Elements (LDEs: Visually and operationally recognizable models of actual locations) should be along the way.

Besides the double-track mainline crossing of the Cumberland Sub, the other railroad bridge across the Potomac is the CSX Shenandoah Sub. This was a lower priority, so it’s minimally represented with a nod to the large gravel pit found a few miles from Harpers Ferry. Although it would require some work, it might be possible to squeeze a return loop below one of



MARC 32, a westbound evening commuter train from Washington, D.C., crosses the Harpers Ferry Bridge on April 4, 2011. Four MARC trains and Amtrak’s *Capitol Limited* will pass by during the week between 5 and 7 p.m. The bridge’s hump is the result of projects to improve clearance by lowering the tunnel floor.

the helixes to allow trains to travel out and back.

“Modulating” fidelity

Rather than define the west end of the layout at the outset, my client and I decided to develop the track plan from Harpers Ferry and make a final decision on the other end “when we got there.” As I continued with the design, I began to make use of another layout design tool: modulating fidelity. By this I mean that I compressed and modified various LDEs to lesser or greater degrees depending on the client’s priority for that area, the available space, and the modeling realities of crossovers, industries, and supporting trackage.

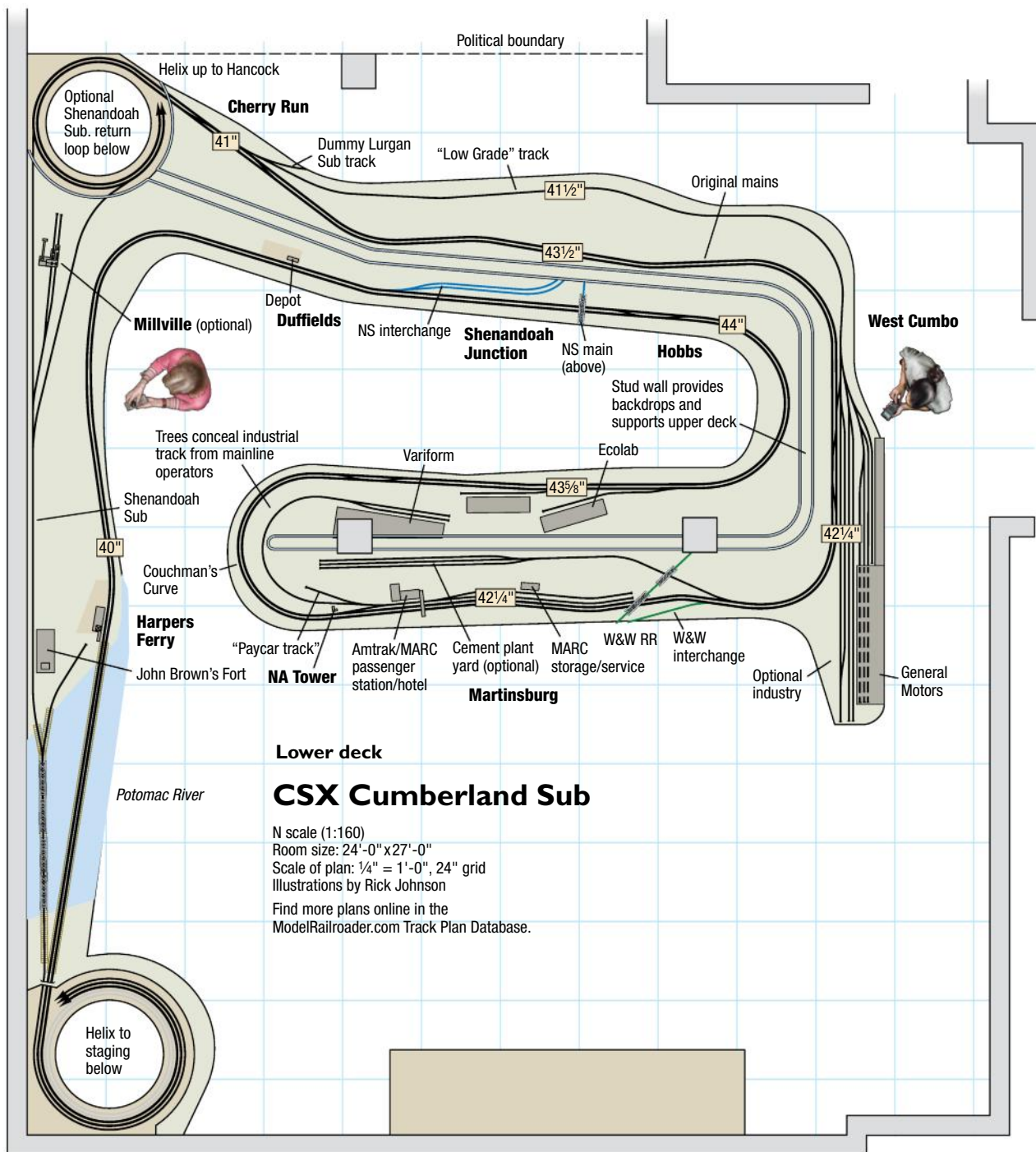
With this approach, there’s no consistent ratio of compression and/or modification everywhere; rather, it varies from scene to scene. The bridge scene at Harpers Ferry is nearly to scale, while other locales are more significantly compressed. In some

cases, I kept the form (appearance) of the LDE while reducing it in size. In other cases, significant modifications were made to fit a particular space or to ensure that the modified LDE would still function on the layout – even if that function was slightly different from that of the original location.

So we pressed on from Harpers Ferry. One of the key desires was to include some commuter stops for MARC trains. Returning to the Cumberland Sub proper, the first of these is at Duffields, where a small station and parking lot are located. The main lines are climbing here, as on the prototype, headed for Shenandoah Junction, where the Norfolk Southern crosses overhead and a pair of tracks allow for interchange.

This grade crests near the crossovers at Hobbs and begins descending as it passes a pair of rail-served industries. Next up is Couchman’s Curve around the end of the peninsula, leading us into Martinsburg, W.Va.





The compromises begin

Martinsburg is a famous railroad town with many interesting elements. But it was clear I would need to compress and modify this area more than I had some others. I was able to suggest the interesting S-curves through town as well as to find space for the historic combined passenger station and hotel. I could also include the walkway that spans the tracks here to reach the restored B&O roundhouse and shop buildings. (Unfortunately, these are imagined to be in the aisle and not modeled due to space constraints.)

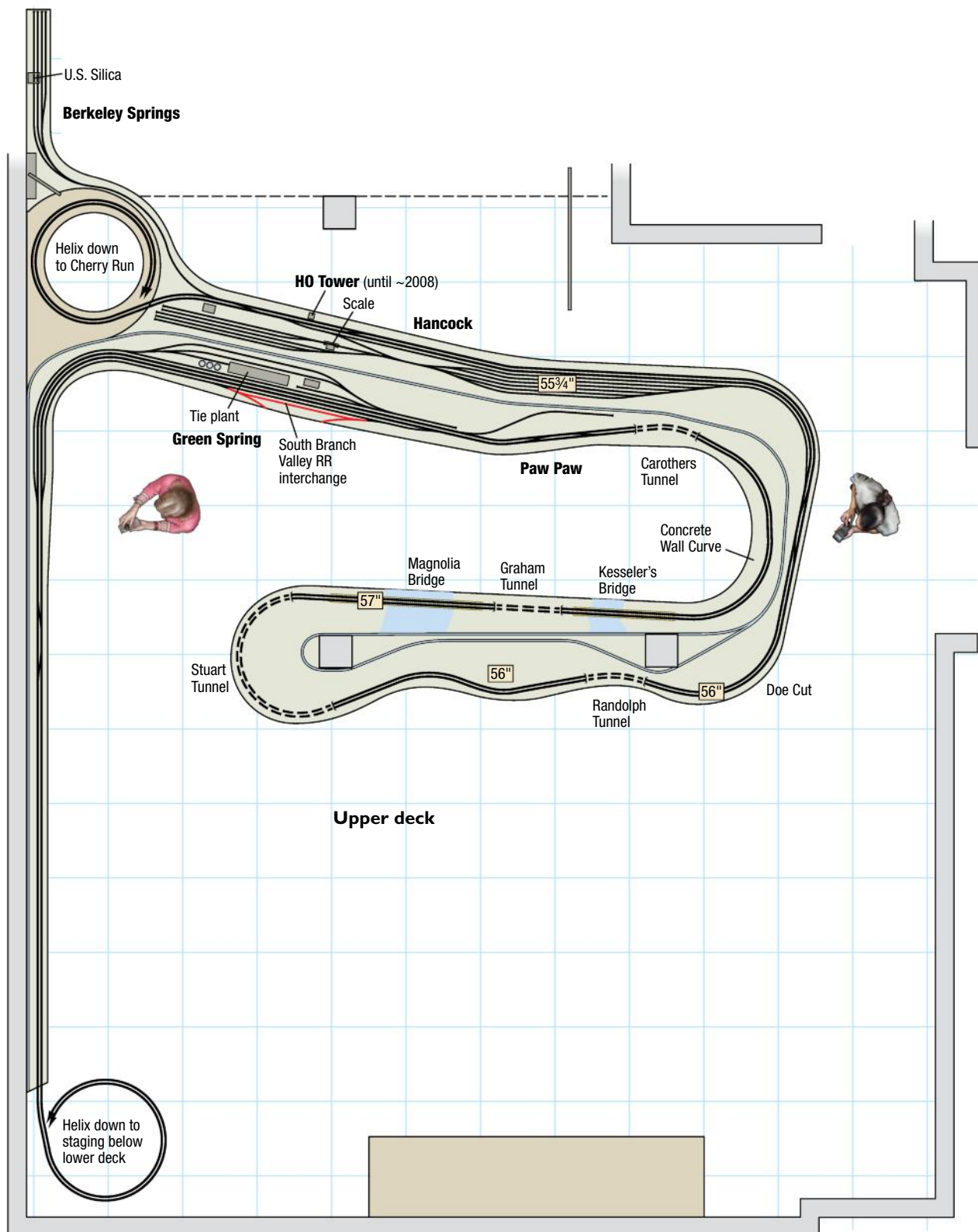
An even greater compromise came in the modeling of industrial tracks and interchanges. Two extensive industrial tracks depart from the main line east of Martinsburg, but we didn't really have space to do them justice. One departs from its prototype location at NA Tower, but here it curves sharply back eastward in an unprototypical fashion to serve Variform. A screen of trees somewhat hides this compromise from viewers.

The other industrial track receives an even greater modification, being moved west to depart near the far end of Martinsburg to serve an imagined

cement plant via an optional three-track yard. The crossing of the shortline Winchester & Western has also been reoriented relative to the CSX main line, but I was able to keep a short interchange track.

Small model of a big industry

Leaving Winchester, our next LDE is the West Cumbo area. In real life, this includes a large industry support yard and separate leads serving General Motors and Quad/Graphics plants. This has been significantly compressed to include the GM plant as a fascia-side model, with most of the structures



imagined to be in the aisle. The Quad/ Graphics plant was lost entirely.

West Cumbo is also the location where a less-steeply graded “Low Grade Line” departs the main lines for Cherry Run. (As an example of modifying for function, I also use this line as the switching lead for the GM plant, which isn’t prototypical.) Making the Low Line distinct in grade and appearance from the main lines was an

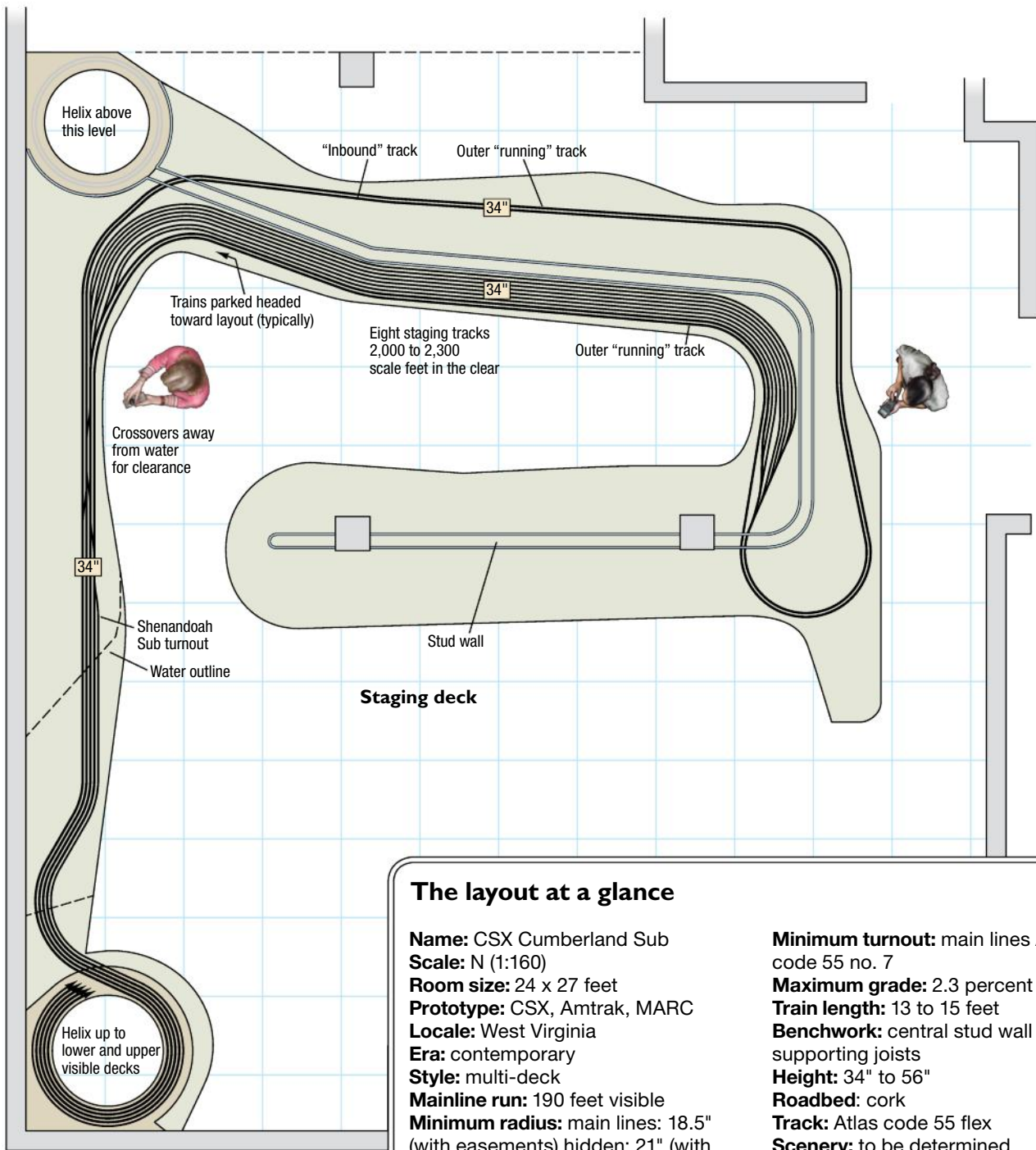
important priority for the client, so I used the remainder of the lower deck to create a short but steep up-and-down grade on the main versus the gradual descent of the Low Grade Line.

I tried to gain as much horizontal physical separation between the routes as possible, although the impinging support column does cramp the aisle a bit. At Cherry Run, a dummy track represents the Lurgan Sub, and the

rejoined main lines and Low Grade Line enter a double-tracked helix to climb to the upper deck.

Hancock – and looking beyond

My initial hope had been to find room for Hancock on the lower deck, but there was too much other “good stuff.” With the location of the yard now determined at the beginning of the upper deck, it was time to face the final



decision of how far west the modeled layout should continue. Personally, I'm a big fan of visible active classification yards, so I was originally hopeful that we could meet the client's wish-list objective of incorporating at least a compressed version of Cumberland Yard, which is just beyond the west end of the Cumberland Sub.

But a roughly to-scale conceptual sketch provided some bad news: The client's highly desired railfanning scenes around the Magnolia area were being compressed virtually beyond recognition to accommodate the upper-deck layout length needed for

even a modest visible active yard at the west end. Back to the drawing board – CAD program, that is.

So I turned again to modulating reality, this time in the other direction. By allowing Hancock Yard to grow a little larger relative to some of the more-compressed LDEs, it could be the "home base" for more operation, providing some of the functionality that would have been found in Cumberland Yard. While this doesn't match the prototype's operating pattern, it was acceptable to the client.

By happy coincidence, this also allowed me to replicate the form of the real-life track arrangement at Hancock with more fidelity, including the track scale that could provide operating interest for some loads. An optional addition that would have changed the form of Hancock Yard a bit more would be to rearrange the ladder to incorporate a yard lead.

Berkeley Springs breakthrough

The massive U.S. Silica plant near Berkeley Springs was an interesting

Learning points

- Modulating fidelity serves to zoom in on the most highly desired scenes and operations with more accuracy while compressing and/or modifying other locations more significantly to fit the space.
- When a large visible active classification yard can't be accommodated, a smaller industry support or branch junction yard may be conscripted to fill some additional operating roles.
- Modeling a well-known scene nearly to scale at one end of the layout can be a dramatic way to set the place and time in viewers' minds.
- "One-way" loop staging offers operating simplicity at the cost of some hidden running.

potential LDE for inclusion on the layout. Unfortunately, to keep the prototype relationship to Hancock Yard, it would need to branch from the aisle side and toward the political "no fly" zone.

But a bit of negotiating on the client's part secured rights to an additional narrow shelf along the wall for a much-reduced representation of the prototype facility. Still, it should provide some helpful operating traffic.

Pure railfan enjoyment

In some of the running length gained by jettisoning Cumberland Yard, I was able to stretch out the key tunnel and bridge scenes from Randolph Tunnel to Carothers Tunnel, including Magnolia Bridge and Kesselers Bridge. This effort wasn't without some additional compromise and modulation of reality, however. For example, the notable railfan scene at Concrete Wall Curve bends in the opposite direction from the prototype to fit the benchwork footprint and aisles defined by the lower deck.

Because the railroad room ceiling is somewhat low, the railhead height of the upper deck is slightly constrained. So the benchwork may dip down in order to recreate the desired railfan scenes at Magnolia Bridge and Kesselers Bridge. These scenes have been placed above low industrial buildings on the lower deck to allow more space below. It might be possible to incorporate some of the techniques Mark Dance used on his N scale layout (*Model Railroad Planning 2016*) in the Kettle River Bridge/Castlegar scene.



Westbound Q373 (Philadelphia to Cumberland) behind CSX 4826 exits the west portal of Stuart Tunnel on May 14, 2009. The tunnel, used to hide a tight curve on the plan, is named for F.L. Stuart, the B&O's chief engineer who supervised the 1914 construction of the Magnolia Cutoff.

One bit of trickery here is to change the form of Stuart Tunnel, which is arrow-straight in real life. On the layout, I curved the track inside the tunnel to orient the main lines for the linear major bridge scene. This also allowed me to use the tighter functional minimum radius out of sight in the tunnel to minimize the size and overhang of the upper-deck blob.

The last compromises

As we leave the railfan-inspired LDEs, the last couple of locations offer some operational interest with a bit of era compromise. The long spur at Paw Paw is long out of service but will be active on the model. The extensive railroad tie plant at Green Spring was just recently closed but will still be an active switching location on the layout.

A short interchange track with the South Branch Valley RR (a former B&O branch) provides an additional reason to run a local or two. The short line's wye connection here must be truncated at the edge of the benchwork, but at least suggests the real-life area.

Staging to create the traffic

Leaving Green Spring, trains traverse a nondescript narrow shelf above and behind Harpers Ferry before winding down the inner double-tracked helix to reach the staging below the lower visible deck. Staging is arranged to allow one-way traffic: Trains arriving from either deck may be routed to enter staging via the inbound track. This allows them to be pointed out and

ready to enter the layout on either deck. An additional track allows continuous-run options.

Note also that the turnout for the Shenandoah Subdivision (located within the Harpers Ferry Tunnel in real life) is located on the staging deck for better access. Shorter trains (such as the MARC commuters) may be doubled-up on the long staging tracks.

Where's the river?

While the prototype subdivision follows the Potomac River quite closely for much of its length, the track plan calls for actually modeling the river in only a few bridge locations. This minimizes benchwork depth vertically and horizontally, leaving more room for railroad elements. In most locations, heavy foliage between the track and the river would make the water less visible anyway, so this compromise was acceptable.

Capturing the flavor

The final design captures much of the flavor of the prototype in a manageable track plan. Making concessions in modeled scope and modulating reality made for a much better layout to please both railfan and operator. **MRP**

Byron Henderson is a custom model railroad designer (www.layoutvision.com) from San Jose, Calif. He is editor of the National Model Railroad Association Layout Design Special Interest Group's (www.ldsig.org) Layout Design Journal and a regular contributor to MRP.



This evocative painting by Pete Lerro, showing Pennsylvania RR A5 0-4-0 677 switching the Delaware Avenue Branch in Philadelphia, inspired Bill Neale's track plan. Large prints suitable for framing are available at www.lerroproductions.com.

A sectional URBAN SWITCHING DISTRICT

Three 2 x 6-foot sections make up this challenging HO scale railroad

By Bill Neale

The Delaware Avenue Switching District is intended as a portable, walkaround HO layout built from three 2 x 6-foot sections. The center section of the L-shaped layout will need a 1-foot extension on the corner to facilitate the curves.

I designed the layout to be displayed at various model railroad meets. The layout sections should fit on tables normally found at convention centers. My design uses both sides of each module, so aisle access should be planned accordingly. Crews must walk around the Monroe Yard/17th Street Yard end of the layout to follow their trains.

I envision a removable protective cover for each section so they can be stored on their sides for easy transport. The sections should be no more than 12" to 14" high, including the cover, so that all three could fit across the back of the SUV.

I also recommend using lightweight construction methods to keep weight to a minimum: ¼" plywood for the structural members as well as gluing and screwing small blocks to make the structure extremely rigid.

Many switching layouts are on one level and fairly simplistic. This layout is neither. Having multiple levels adds tremendous visual and operational interest. It also allows limited overlapping use of the same footprint.

This switching railroad is built on four levels with sloping connector lines running between them. There are also multiple situations where custom trackwork is required. While most of the track can be commercial products, other complex areas will require some handlaying skills. With its grades and custom trackwork, this layout design is for an experienced modeler. However, the ideas can be applied to some of the simplest of layouts.

Prototype inspiration

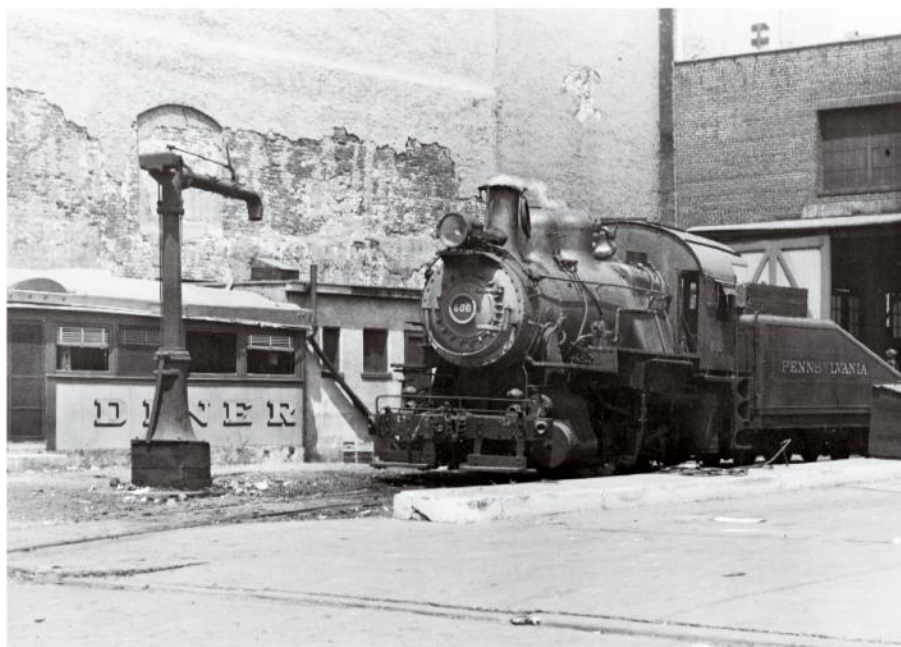
Those who are familiar with the Pennsylvania RR Delaware Avenue Branch in Philadelphia will realize that I used the prototype only for inspiration. I didn't follow the line with any great degree of prototype fidelity but instead attempted to gain the feel of urban railroading, while affording interesting operation in limited space.

The branch was owned by the city of Philadelphia, which granted trackage rights to three railroads, each of which operated portions of the line. The Reading Co., Baltimore & Ohio RR, and Pennsylvania RR all ran through



The Delaware Avenue Branch Line had a long history in Philadelphia and featured a wide variety of industries. This circa 1914 photo shows the rail-served T.B. Rice & Sons, Co., a firm that made wooden shipping boxes.

Photo courtesy of PhillyHistory.org, a project of the Philadelphia Department of Records



In August 1947, a trackside diner at Delaware Avenue and Stock Street provides a convenient lunch stop for the crew of Pennsylvania RR no. 606. The crew can also give the A5 switcher a drink from the water spout. This scene could inspire a fun modeling project on a Delaware Avenue Branch layout. Charles S. Freed photo

the city streets of Philadelphia on the Delaware Avenue Branch. Parts of the line ran through the streets under a rail viaduct, so that part of my plan has some justification.

Trackage rights now belong to Norfolk Southern and CSX, which take turns serving the line's few remaining customers.

For more information on this remarkable railroad, I recommend

getting a copy of *High Line* Volume 9-1, "The Delaware Avenue Branch" (autumn 1988 reprint), from the Philadelphia Chapter of the Pennsylvania Railroad Technical & Historical Society (www.philaprrths.com).

General design notes

Train lengths are planned to be six to eight cars, which is about 5 feet long with engine and caboose added.



On Saturday, June 28, 1947, Pennsylvania RR no. 677 stands ready in front of the water tank at a small yard located near Richmond and Cumberland streets on the Delaware Avenue Branch. The class A5 0-4-0 switcher was the most common power used along the Philadelphia waterfront during the late steam era. Leslie R. Ross photo

I envision this railroad as back in the days of steam engines, or in the early transition period when freight cars were 40- to 50-foot long. All the locomotives in use on this switching district would be small shifters. In steam days, 0-4-0 or 0-6-0 wheel arrangements would be in use, including the Pennsy's fat-boilered A5 class 0-4-0 switchers.

Alco S-4s, Electro-Motive Division SW1s, or General Electric 44-tonners would be good diesel candidates for a transition-era setting. The curves are 24" minimum radius, so the equipment should be kept on the small side to look right and operate reliably.

Let's walk through the design. The best place to start is the little staging area at the bottom of the long leg. There are four tracks walled off by a low backdrop (remember, the sections have a height limitation). The front three tracks should be used as the outbound tracks, where the superintendent does some fiddle yard work building outbound cuts of cars. The back track is for inbound trains and must be kept clear.

The double-track viaduct should be used with right-hand running, so, when standing inside the "L," inbound trains will be on the near track and outbound trains on the back track. The staging yard operator would quickly reuse those newly arrived inbound cars

on one of the trains he's building, or perhaps move them into off-layout storage. For a permanent layout, drawers could be added under the Madison Avenue staging yard to hold more cars and the Digital Command Control (DCC) system.

The design is made for two or three trains to be in operation at any one time. The tracks are arranged to allow them to function with minimal interference with each other, as seen in the double-track viaduct leaving staging. Trains can easily pass each other here. On the lower levels, the "subway" line is also double-tracked.

Double track might seem unusual on smaller switching layouts, but it plays an important role in this design. The full-size Delaware Avenue Branch was double-tracked through much of its length, arranged in a large loop around the industrial area of Philadelphia. So there is prototype justification for this design element.

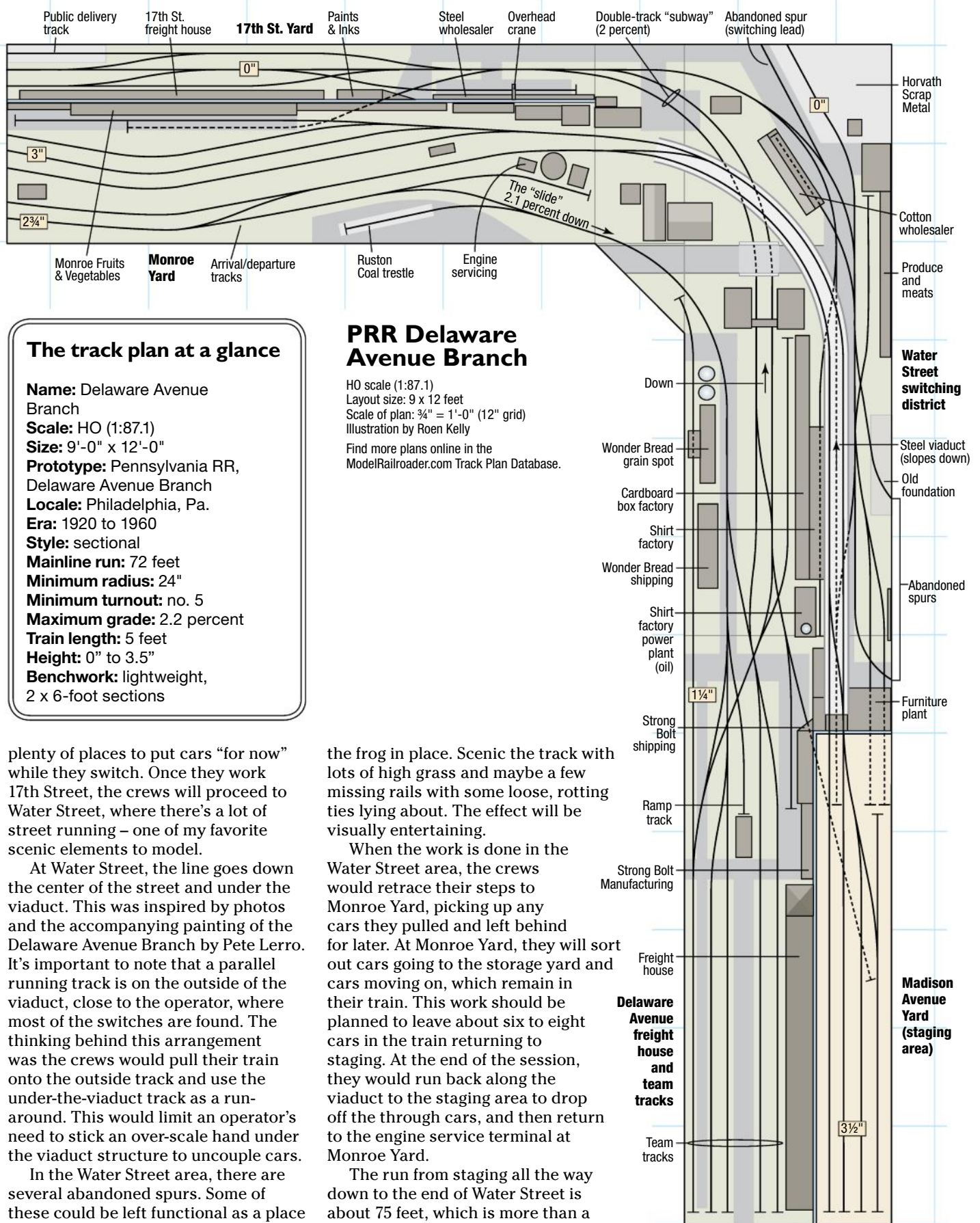
The double-track sections have two purposes. Obviously, this allows two trains to pass each other. The second use is that it allows two engines to switch side-by-side in the same area by providing two functional switching leads. For example, Monroe Classification Yard can be worked from one viaduct track while a second engine sorts cars and does a runaround in the arrival/departure tracks.

Layout operation

Monroe Yard is the hub of the operations. Crews pick up their engines here and drift back along the viaduct to the staging area to pick up their consists. Returning to Monroe Yard, they can sort out their train, pull any off-spots from the storage tracks, and organize their cars for work out on the line. With a second crew on the railroad at the same time, the first crew can make for Water Street directly while the second crew can start its work at Delaware Avenue. Each crew works toward the opposite end of the railroad.

Crews can either push the train down the "slide" or run the locomotive around the cars and pull the train down the 2.2 percent grade into the Delaware area. Here, crews work the Delaware Avenue freight house and team tracks. Several other near-by industries will need servicing as well. Once done in this area, the crews will run down the "subway" track to the 17th Street Yard area.

The 17th Street Yard area is very compact, but there are enough working tracks to keep this from being a switching "puzzle." In fact, I tried to avoid making any of these areas a puzzle. There are multiple runaround tracks, usually one in each area. There are also plenty of extra tracks and long leads, giving the switching crews



plenty of places to put cars "for now" while they switch. Once they work 17th Street, the crews will proceed to Water Street, where there's a lot of street running – one of my favorite scenic elements to model.

At Water Street, the line goes down the center of the street and under the viaduct. This was inspired by photos and the accompanying painting of the Delaware Avenue Branch by Pete Lerro. It's important to note that a parallel running track is on the outside of the viaduct, close to the operator, where most of the switches are found. The thinking behind this arrangement was the crews would pull their train onto the outside track and use the under-the-viaduct track as a run-around. This would limit an operator's need to stick an over-scale hand under the viaduct structure to uncouple cars.

In the Water Street area, there are several abandoned spurs. Some of these could be left functional as a place for the crews to sort cars. The abandoned spur down the street along the scrapyards fence would be one I would keep functional. On the other spurs, I would pull the points but leave

the frog in place. Scenic the track with lots of high grass and maybe a few missing rails with some loose, rotting ties lying about. The effect will be visually entertaining.

When the work is done in the Water Street area, the crews would retrace their steps to Monroe Yard, picking up any cars they pulled and left behind for later. At Monroe Yard, they will sort out cars going to the storage yard and cars moving on, which remain in their train. This work should be planned to leave about six to eight cars in the train returning to staging. At the end of the session, they would run back along the viaduct to the staging area to drop off the through cars, and then return to the engine service terminal at Monroe Yard.

The run from staging all the way down to the end of Water Street is about 75 feet, which is more than a scale mile. The crews must retrace this distance to return to staging, making the switch run 2 1/2 scale miles long. The long run provides the feeling that the switch crews are traveling a good

Show concessions

When operating at a show with guest operators, it's necessary to make some concessions. Handling waybills and knowing how to use them can be a challenge to rookie operators. Imagine sitting at the staging yard and giving a crew of people you haven't met before a stack of waybills, a throttle, and a set of train instructions. Then imagine telling them, straight-faced, that before they can turn a wheel they must read the employee timetable cover to cover. By the way, they also have a stack of bulletins to go through.

I recommend creating an automated system of sorts. I would set up an Excel spreadsheet with each industry having a "cell" for every place a car could be spotted. For example, the Strong Bolt Manufacturing Co. has an inbound materials track that will hold two cars at most. The outbound track can hold five to six cars. I would design the spreadsheet with two cells for the inbound track and maybe five cells for the outbound track. Wherever cars stand, I would have their reporting marks entered in the cell. We will call this sheet the "Inventory Tab" because it contains the inventory of all the cars and their locations at the start of a session.

On the same tab, adjacent to the location table, I would have a "Move Sheet" area. This move sheet would have setouts and pickups for each crew. It represents cars on the move. To put a car in a train, I would drag the car's reporting marks from its current location into one of the pickup or setout cells in the Move Sheet. Each train would have its own move sheet with about six to eight setouts and a roughly equal number of pickups. I might also have some movements from the Monroe Yard to the Delaware Avenue team tracks and back.

Behind the Inventory Tab, I would build a Switch List Tab. Cells on the switch list form would draw their data from the Inventory Tab, directly from the "move" cells. It's simple enough to reference another cell and ask Excel to repeat the same data in a second cell. Placing the reporting marks of a car into the "Move Section" of the spreadsheet on the Inventory Tab would trigger the exact same reporting marks to be entered into the Switch List on Tab 2.

The parts of the Switch List that don't change like timetable data or old-head tips can be entered ahead of time as permanent text on the switch list. Then specific cars the crew must handle get populated on the list by moving the reporting marks to various cells in the move section. Once done, the switch list is printed out and given to the crew on a clipboard. In fact, you could consider the document you hand these guest crews a combination switch list, train-order form, employee timetable, and "old-head tips."

To download an example of an Excel switch list, click on the link under Online Extras at www.ModelRailroader.com. – B.N.

distance to complete their work. In my experience, switching eight spots and a couple of off-spot cars can provide 1½ to 2 hours of entertainment. None of the actual switching is overly challenging. There's plenty of working track, which allows more flexibility in switching moves.

Alternative approaches

What I have suggested above is to have each train run the length of the railroad, with cars for every area. I like the long run as well as working only a few of the many spurs available. But there's another approach.

Any given crew might get cars for only a single area, and they would be limited to switching in that area. For example, Crew 1 gets cars for Delaware Avenue only and spends its whole shift in that one area of the railroad. Crew 2

gets cars for 17th Street and stays in that area once it travels there. Crew 3 might get Water Street cars, and so on. After completing their work, they can rotate areas for the next session.

Here's another variation: Maybe there's an early morning reefer block that goes out to every fruit distributor, team track, and meat wholesaler with cars that need to be expedited. In addition, you could run a couple transfer freights between staging and Monroe Yard just to stir up the roster of cars in the yard, and mix the cars around a bit. The yard transfer could also stop by 17th Street Yard to exchange cars.

Minimal rolling stock

One of the secrets to making this layout enjoyable is to keep the rolling stock at the minimum. Start with only

one or two cars in each spur, don't fill them to capacity, and leave an empty track or two in the yards.

For example, there are five tracks at the freight house and team track at Delaware Avenue. The closest track to the aisle should always be empty, allowing easy access between the slide and the subway track. The other tracks are close to 4 feet long and can hold eight cars each, or 32 cars total. I would spread no more than 10 cars across all these tracks. Most industries would get one or two cars at most.

The specific car types will depend greatly on which industries are modeled. The industries I've shown in the plan are just suggestions.

Urban scenery strategies

Scenery promotes prototypical operation. Left in its plywood state, the layout becomes a mechanical puzzle to be solved as quickly as possible. We want the crews to take their time and enjoy the scenic nuances. We want them to feel the joy of running a train through these convoluted and narrow clearance areas with the skill and pace of a real railroad crew.

Most of the buildings are limited to two to three stories high, given the SUV-transportation height constraints. We need to keep the structures about 12" high at most.

If the layout base is at least 2" thick, that leaves only 10" height for the tallest structures unless they're removable. There are a few retaining walls, mostly around the "subway" area. Most of the scenery will be basic ground cover, paved roads, or large brick structures. Most of the brick structures will be flats along the backdrop – thick flats in some cases. Many of these brick structures would have fading signs painted in black and white, with various billboards and water tanks on their roofs.

Where track runs along a structure just inside the wall, I recommend that the building be modeled with an offset first story. This is an inset of the loading dock area, exposing the freight cars sitting on the track with the pillars that support the upper floors framing the track. (The cotton wholesaler and shirt factory on the track plan would be examples of where this type of structure could be built.) That way, operators can see what they're switching. Several of the spurs penetrate structures and go under upper levels, such as at the Strong Bolt Manufacturing Co. In this case, the crew must pull the whole string of cars out of the building for sorting. That's



By the diesel era, General Electric 44-tonners worked the industries on the Delaware Avenue Branch. In this photo from the early 1960s, a brakeman adjusts a gondola's coupler for a push move. The engine crew will use the switcher's end sills to shove the gon along a tightly curving spur into the building. Ken Douglas photo

often what a train crew would do on the prototype.

Street running and track

There are several methods for modeling in-street track. The Walthers street system of brick-textured plastic sheets would work well in the Water Street area. There are tools sold at Shapeways (www.shapeways.com) to roll brickwork textures into plaster or other modeling mediums. Search for "SET brick row paving with borders" at the website. These tools create both flangeways and adjacent brickwork when rolled along the track while the street material is still pliable.

Another approach would be to use model girder rail, which is available from several traction-modeling suppliers, and pave the road with plaster poured around the rails. [One source for girder rail is The Proto:87 store at www.proto87.com – Ed.]

Peco code 75 or Micro Engineering code 70 turnouts could work on the viaduct. Both brands feature an over-center point-throwing spring that can be flipped by fingers. This would eliminate the need for an under-the-table mechanism on the viaduct.

Don't miss the opportunity to detail the track on the viaduct. Add the inside bridge safety rails. Add the walkways and railings to protect scale train crews. I would make this scene a showpiece.

As designed, many of the turnouts and crossings would need to be scratchbuilt. For those who enjoy that

part of modeling, this would be a fun layout to build. However, slight modifications would allow commercial track components to be used. Using a highly adaptable track system like Central Valley's would make it even easier to meet the design requirements for the turnouts. Central Valley has nos. 5, 6, 7, 8, and 9 turnout kits and curvable tie strips.

Code 70 diamonds are available in a wide variety of handy sizes. Using FastTracks (www.handlaidtrack.com) track-building jigs, an even wider variety of frog choices is available.

User-friendly paperwork

A waybill system would be a reasonable way to drive the operation. I would add dividers to the bill boxes so each crew has its own set of waybills to work with: Crew 1 pulls these two cars; Crew 2 pulls a different set. The owner/superintendent would walk around between sessions and advance the cards.

Each crew should get a set of instructions with employee timetable information and with some "old-head" tips to help them work. Taking this railroad to shows exposes it to operators with a wide range of skills and knowledge. To enable a novice switch crew to enjoy themselves and to keep verbal coaching to a minimum, I suggest that a number of hints and tips be included with the switching instructions. For more tips on operating a layout at a model train show, see "Show concessions," at left.

Learning points

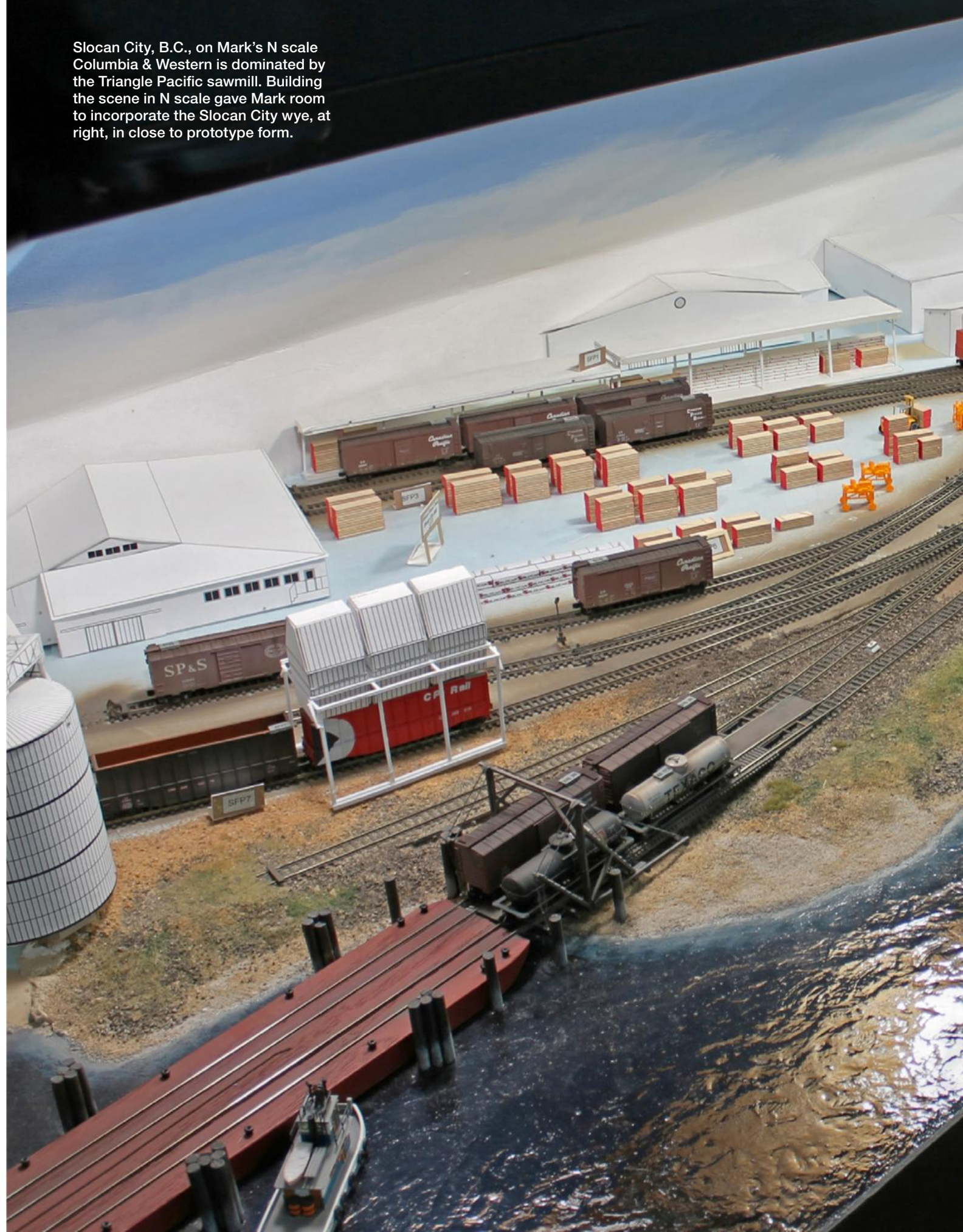
- One photograph or, as here, painting can inspire an entire model railroad.
- The small areas typically available to many model railroaders often means taking liberties with the prototypes that inspired their layouts.
- Small track plans and shorter rolling stock are a good match.
- A double-track design allows dual use of key trackage.
- "Scenery promotes prototypical operation. Left in its plywood state, the layout becomes a mechanical puzzle to be solved as quickly as possible."

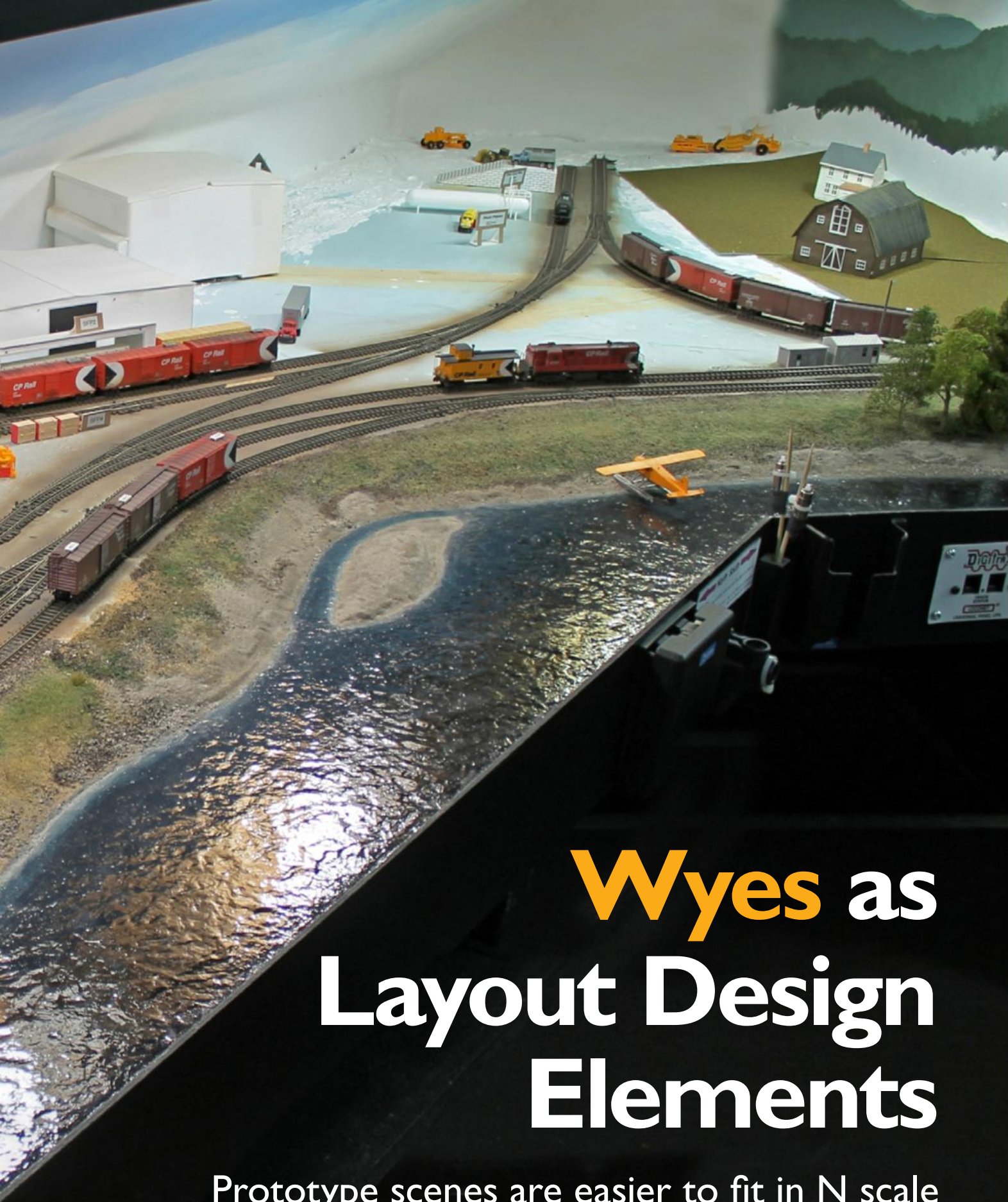
A portable option

A portable railroad like the Delaware Avenue Branch provides a chance to model something different than a permanent basement-size layout. For example, someone who models the Santa Fe through the western desert may enjoy the chance to model trackwork in the streets wandering between dirty brick buildings. It could be an entertaining change of pace. **MRP**

Bill Neale lives in Farmington Hills, Mich. He worked in the automotive industry for four decades, mainly in IT. Bill's primary modeling focus is the pre-war Pennsylvania RR.

Slocan City, B.C., on Mark's N scale Columbia & Western is dominated by the Triangle Pacific sawmill. Building the scene in N scale gave Mark room to incorporate the Slocan City wye, at right, in close to prototype form.





Wyes as Layout Design Elements

Prototype scenes are easier to fit in N scale

By Mark Dance//Model photos by the author



The tug *Iris G* waits as a Canadian Pacific Geep loads its train onto the rail barge at Slocan City for the trip to Rosebery. Mark's model railroad uses several rail barges to interchange cars between cities. Doug Wingfield photo

This article has a dual purpose: to illustrate the utility of modeling wyes, especially those scaled down from prototype scenes as

Layout Design Elements (LDEs); and to call your attention to a major attribute of N scale – its reduced reach-in distance. The compression of certain prototypical functions into a practical area is something you can often achieve with N scale that may be impractical in larger scales.

That said, I believe examining ways to find room for what can be space-consuming prototype elements such as wyes can be informative without regard to scale. [Also see “Ten ways to wye” by Dan Bourque in MRP 2013 and “Combine a wye with a room divider” by Keith Jordan in MRP 2009. – Ed.]

Why use wyes?

Prototype railways use wyes for several reasons. At junctions, wyes

enable trains to easily leave subdivisions without stopping or changing direction. They're also useful to turn locomotives and other single-ended equipment without the expense of a turntable or the space required for a balloon track.

Canadian Pacific's now-abandoned Boundary Subdivision through southeastern British Columbia was a mountainous line that saw up to 30 feet of snow each year. I'm trying to re-create the action on this subdivision circa 1970 in a 320-square-foot garage. Given its snowy, mountainous setting, multiple pusher grades, and branching subdivisions, it was no wonder that wyes were everywhere on the Boundary Sub. Anywhere subdivisions met, pusher locomotives began their runs, snowplows were used, or locomotives were serviced, there was a wye.

My goal was to replicate the prototype's 1970 operations as closely as I could while leaving open the possibility of backdating operations to

the steam era. I therefore challenged myself to incorporate all those wyes as LDEs (scenically and operationally recognizable models of actual locations) on my N scale Columbia & Western. In the end, the C&W incorporates nine wyes in its visible track alone (see MRP 2012).

Let's take a look at five of the C&W's nine visible wyes, their function on the prototype and model, the challenges they presented, and the compromises that were accepted.

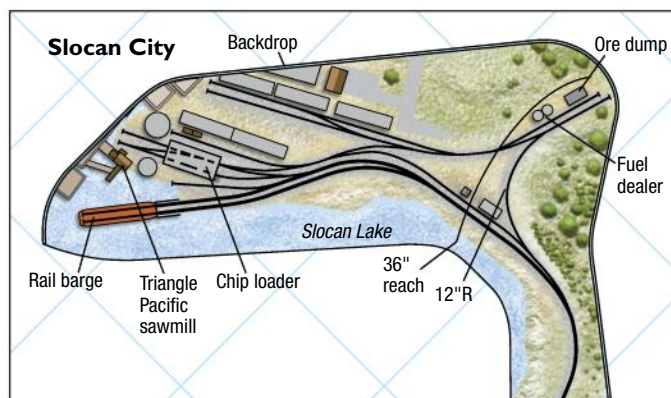
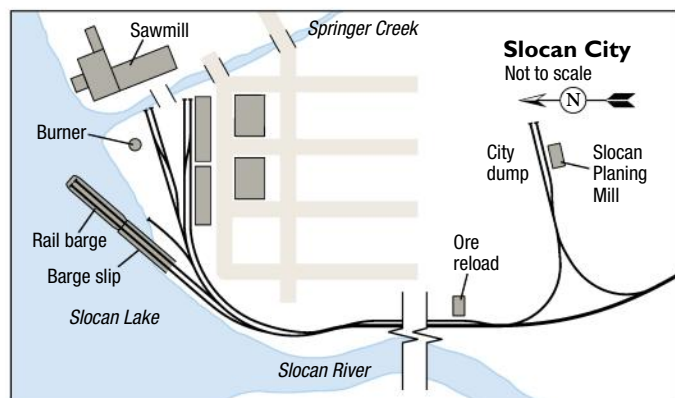
Slocan City, B.C.

The Slocan City LDE includes the lakeside barge slip where entire trains, including the locomotive and caboose, were loaded onto barges for the voyage to the isolated Kaslo Subdivision. The large Triangle Pacific lumber mill dominates the action here, shipping and receiving 12 to 18 cars a session, with a couple of smaller spotting locations also present off the wye tail track. Operators have successfully switched the mill in a variety of ways, and the southern leg of the wye is often used to set out loaded cars for pickup on the way freight's return journey after venturing out and back by barge on the Kaslo Sub.

I retained the functionality of the prototype track plan, although it required condensing the prototype's industrial spur/passing siding/wye configuration by overlapping tracks. The passing siding and industrial runaround track for the mill were combined, and the wye branched off from the runaround rather than farther down the main line. The tail track does double duty by acting as a switching lead for the lumber-loading spurs.

Tucking the wye track deep into an alcove and curving Slocan City around the operator in a U shape allowed the wye to be tilted on an angle to the benchwork, thereby moderating the curvature required of the wye legs.

As on the prototype, only four-axle road switchers ply the Slocan and





The other end of the Slocan Lake barge service is Rosebery, center of operations for the Kaslo Sub. The barge slip is at front left while the lower yard, engine servicing track, and wye tail track fill the balance of the front scene. At rear is the upper yard and train-order office. Fairbanks-Morse H-Liner no. 8727 will pull the cars onto the main line.

Kaslo subs. In N scale, these can easily negotiate the 12" radius of the southern leg of the wye. The benchwork here is only 42" above the floor, so the 36" reach to the end of the tail track is not a concern.

Rosebery, B.C.

The Rosebery LDE is the northern terminus of the Slocan Lake barge service. Whereas Slocan City was principally a mill town, Rosebery was a railway town and train-order station. From here, the CPR supported operations on its Kaslo Sub, branching south and east to the mining town of Sandon and the barge operations at Kaslo on Kootenay Lake, and north over Summit Lake Pass to the pole and shingle operations at Nakusp on the banks of Upper Arrow Lake.

The wye at Rosebery was used to turn steam locomotives and, in my era, small four-axle Fairbanks-Morse power. The track design at Rosebery curves around the operator even more

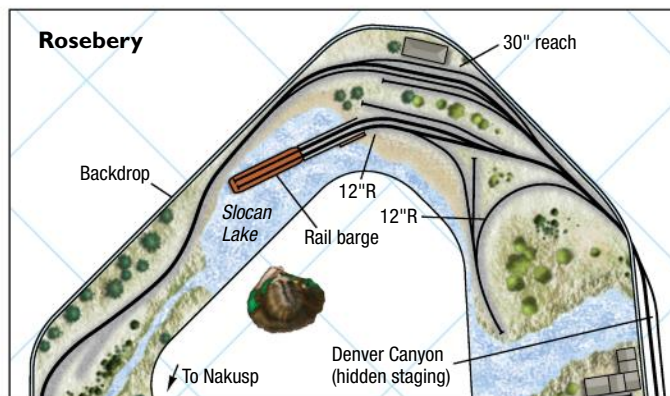
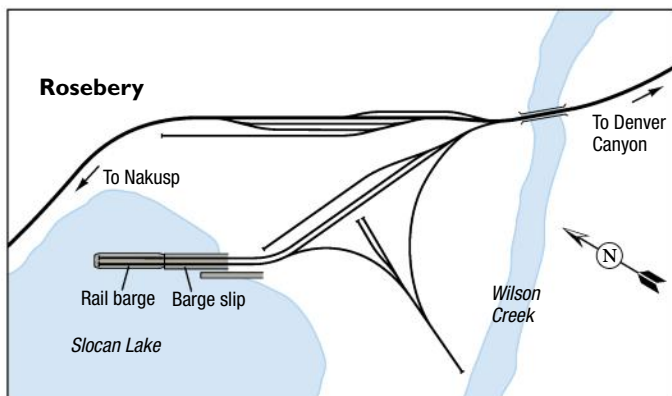
dramatically than at Slocan City, but the 56" benchwork height reduces the visual effect of this curvature. Operators are surrounded by a curving yard configuration, which reduces the required radius of the wye. The tightest leg is 12" curvature, but easements reduce the visual and operational impact.

Unlike Slocan City, the Rosebery wye is at the front of the layout, so tail track access is straightforward. However, the mainline leg of the wye south to Denver Canyon pierces the backdrop 32" from the fascia. (Access to the Denver Canyon end of the wye is from the other side of the backdrop.) Although this reach-in distance is shorter than that to the tail track at Slocan City, the increased height of the benchwork makes this the limit of what is reachable by an operator. In fact, the Rosebery roadbed was built to be removable so track could be laid and switch machines mounted, wired, and tested before the section was installed.

Castlegar, B.C.

Castlegar is the junction of the Boundary Sub (east-west) and Rossland Sub (north-south). It's also an interchange yard between the subs and features an iconic station nestled inside the wye junction. For much of the prototype's life, mainline trains traveled on both routes of the wye as they moved cars to and from the smelter and fertilizer plant on the Rossland Sub east to the CPR main line or west to the coast. Broad radii were required on the model to support heavy six-axle locomotives and long trains that included 65-foot covered hoppers of fertilizer.

As the wye branches in three directions, its location in the room was pivotal to the overall layout design, as some engineers will have to cross one or more of the main lines to follow their trains. The location of Castlegar and Nelson yards would constrain the design of the rest of the layout, so this was no small decision.





I chose to favor the heavily traveled Boundary Sub and ensure that no benchwork interfered with Boundary engineers following their trains. The lesser-traveled Rossland Sub, with its route through Castlegar Yard, was located against a wall on the other side of the benchwork from the main aisle.

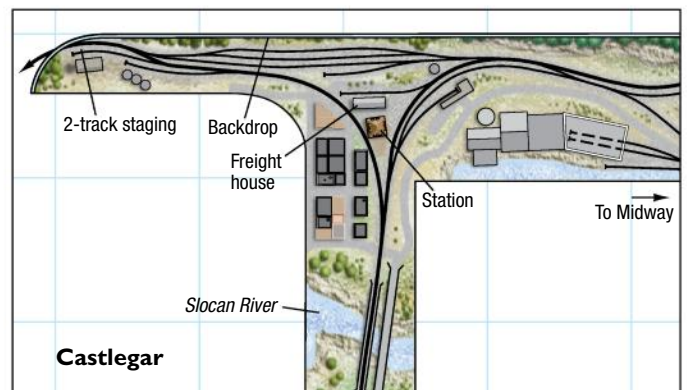
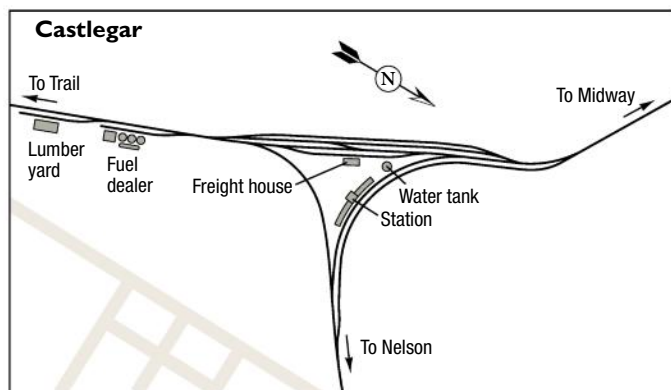
The balance of the Rossland Sub was simply represented by two visible staging tracks a short distance from the end of Castlegar Yard. This relatively close, visible staging allows Rossland Sub engineers to watch their trains as they leave staging and pass through the junction. They don't need to duck under any benchwork, as uncoupling points for setting off cars can be reached from the main aisle.

For local switching on the Rossland Sub side of Castlegar, and for entry into the layout room, there's a swing gate across the Boundary Sub main line that can be opened from either side. There's also a 54" nod-under below the upper benchwork. Both of these entries were described in the MRP 2012 article on the C&W. There's also a second, subordinate control panel for control of the switches in the south Castlegar area, which allows the engineer of the local to line the switches from either side of the junction.

Farron, B.C.

During the steam era, Farron was a busy place. The Canadian Pacific's southern route crossed the top of the Monashee Mountain at Farron Summit. Owing to the relatively light traffic over the southern main line, CPR located the pusher station at the summit rather than at the foot of the grades. This allowed the pusher crews and equipment to run down to meet the trains on whichever side they were needed. The railroad also stationed wedge plows here during the long winters to help battle massive snowfalls. Some way of turning the equipment was a necessity. A narrow gully east of Farron siding provided room for the wye tail track.

Castlegar is a junction town where the Kootenay River merges with the Columbia, just north of the smelter town of Trail, B.C. For the past 50 years, it has also been home to a massive kraft pulp plant and sawmill. Peter Cox collection



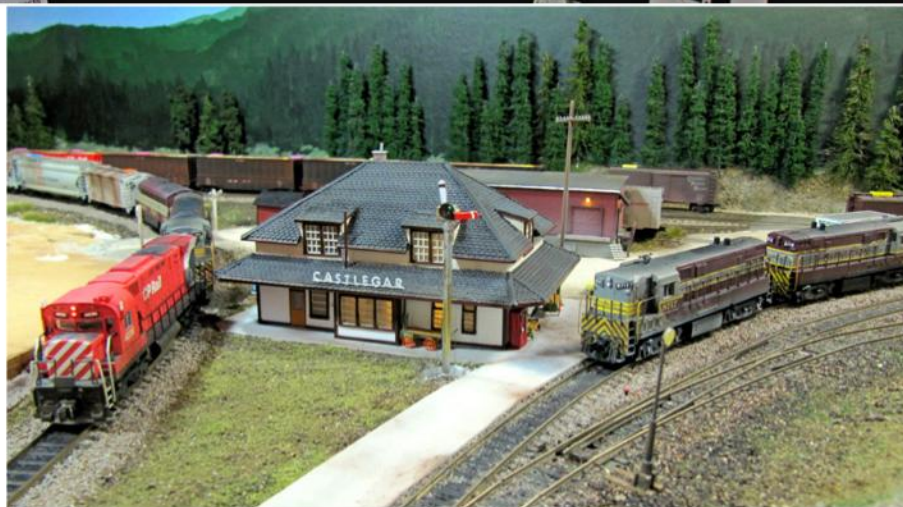


My C&W as designed was envisioned to operate in a dieselized 1970 when pushers were no longer used on the prototype. However, I wanted to retain the possibility of backdating operations to the steam era, so a wye was a necessity. As it turned out, in a quest to put more traffic over the model, I have reinstated both ore traffic and through freight over the summit. A diesel pusher set is now an integral part of our operations, and its home is the wye at Farron.

I preserved the functionality of the prototype track arrangement (on the next page) by including the backdated tracks necessary to support this pusher station. By flipping the wye to the other side of the main, it was possible to push the tail track into a corner. I also overlapped the wye with the passing siding to save space.

To make the tail track long enough to permit turning two locomotives, a plow, and a caboose, the track punches through the backdrop. I partially hid the resulting opening in the winter scene by painting the wall white and squeezing the tail track between snow-covered scenery and trees.

The 64" track height at Farron makes reaching back into the corner impossible from the front. But there are no active track elements past the tail track switch to maintain, and I can



Castlegar Junction, with its iconic depot, is shown on the lower deck. A long train from the Rossland Sub's visible staging snakes around the eastern leg of the wye to enter the Boundary Sub. The Kraft switcher waits by the station.

clean the full length of the tail track with a piece of hardwood molding. Should track repair be necessary at some point, I can open the garage door and go over the top of the backdrop – well, in theory, anyway!

Similar to Rosebery and other areas of the C&W, the Farron roadbed was made removable for construction and testing prior to permanent installation.

Cascade, B.C.

The town of Cascade was at the western foot of Farron Hill and thus

served as a turning point for the Farron-based helpers that assisted eastbound trains to the summit. The western climb crossed many treacherous slide paths and was notorious for receiving up to 30 feet of snow per year dumped by wet air hitting this ridge of the Monashee Mountains. Hence, Cascade was also a turning location for plows and flangers.

In the 1970s, all that existed at Cascade was the turning wye, but as it was the westernmost visible end of the C&W, I chose to backdate the LDE to



On the C&W, Farron Summit is once again the center of pusher operations. The wye tail track had to be long enough to allow a plow train of two locomotives, plow, flanger, and caboose to turn, which required piercing the backdrop. The hole is masked with snowbanks, trees, and structures.



Snow: For a third of the year, this is what Farron meant to the railroaders of the Boundary Sub. Add to this the pusher operations that were stationed at Farron Summit and you have a combination begging to be modeled.

John Leeming photo

include the passing siding, house track, and ore reload that once existed there.

The prototype's functionality was shoehorned into a small space. Only 6 square feet remained after reserving space for both a full-size replica of the fifth crossing of the Kettle River and an adequate aisle for operators.

Getting the prototype functionality to fit again required flipping the wye across the main line and moving it westward so its location overlapped with the main line and siding. But I still needed to find room for a passing track capable of accommodating a 25-car train equipped with four locomotives. To this end, half of the Cascade passing track is stacked on the top of a helix and behind the backdrop. The full length of the Cascade main and passing tracks, as well as the western

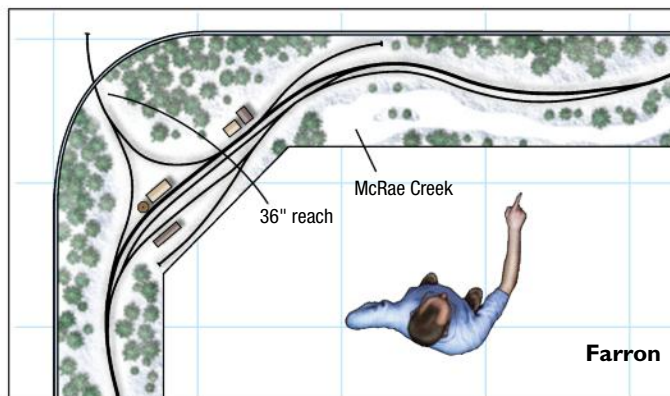
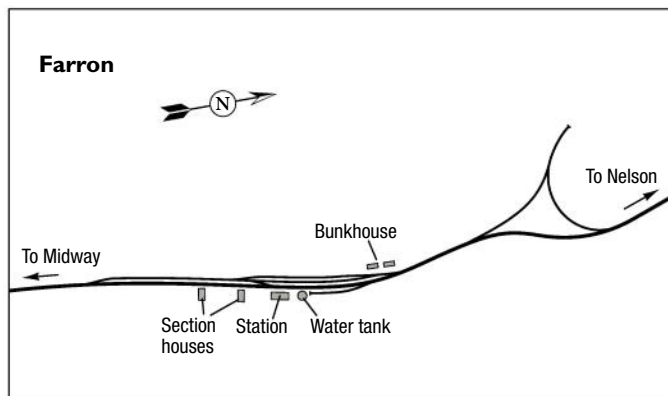
staging yard that starts right after the Cascade siding ends, is visible to the operators in ceiling-mounted mirrors. A mid-siding crossover is also helpful for runaround moves to serve the east-end industries.

Tops of helixes are great places for tail tracks. The minimum radius on the wye legs is 12", but the most visible leg has a radius of 14" with easements. To reduce visual interference of the cliff-side scene at Shields on the deck below, the tail track sneaks behind a curved backdrop but is visible in the ceiling mirrors over Cascade. I thought that labeling all the tracks using "backwards" written text that reads normally in the mirrors would help the operators, but it has occasionally led to confusion when an operator watches trains running in what appears to be the "wrong" direction in front of "correctly" written text.

In effect, the space-consuming helix west of Cascade performs multiple duties: extending the Cascade siding; providing space for the western staging; and, to cap it all off, providing real estate for the Cascade tail track. This helix is wrapped by two turns of the main line between Castlegar and Shields and accommodates a four-track east-end staging yard and a junction wye to Nelson.

The lesson: If you're going to take up a massive amount of layout space with a helix, it's a good idea to put that space to as many uses as possible.

After a year of operations and being dissatisfied with Cascade as the termination of the long run from Nelson, I expanded the track by moving the ore reload to its own spur. I also relocated a potato warehouse spur and an active interchange with the Burlington Northern's Republic Branch from the Carson spur branch, which on the prototype was a few miles west of Cascade. The house track then became a convenient place for through freights in each direction to spot and lift cars bound to and from the BN.





Cascade is a busy place for an area of only 6 square feet. Extending the passing siding and wye tail track over the helix gained valuable distance. And moving an interchange and industrial tracks a few miles east added operating interest.

Cascade has become a busy place in our operating sessions. Pushers assist two trains per day out of Cascade, and I've recently added a Cascade Turn out from Nelson and (hopefully) back the same day. My crew and I also operate the layout as though a through connection still exists to the West Coast across the abandoned Kettle Valley Subdivision, permitting operators to run through trains that drop blocks at Cascade in both directions.

I'm still not happy with Cascade. One of my big regrets is not having enough space to include even a small representation of the sawmills and yard tracks at Grand Forks or, even better, the division point at Midway farther to the west where the real Boundary Sub terminated. This would

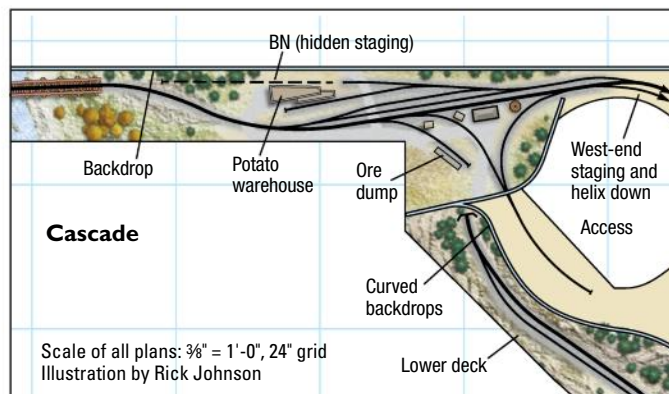
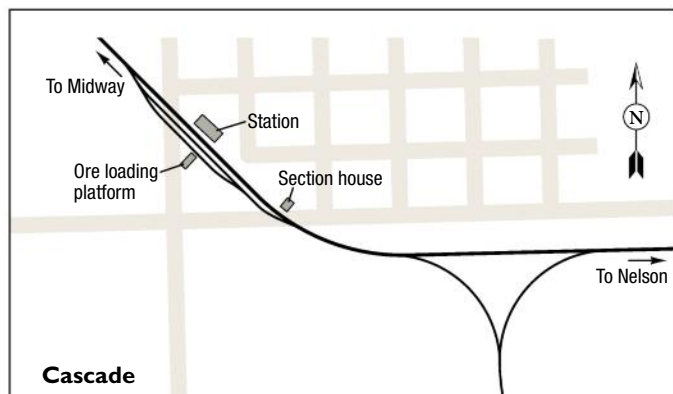
have provided not only more switching but also a much more logical termination or origination point for westbound and eastbound freights.

I agree with editor Tony Koester's advice that it's more realistic to have all road crews originate and terminate their runs in visible locations, ideally at division points, and not in hidden staging. If I had another 6 to 8 feet in the layout room, this is the first place I would use it. **MRP**

Mark Dance lives in Vancouver, B.C., with his wife, Christiane, and their two children. His N scale Columbia & Western has appeared numerous times in Model Railroader and its special issues, most recently in Great Model Railroads 2016.

Learning points

- As always, look to the prototype for inspiration and information.
- Wyes can add considerable operating interest.
- N scale's compact footprint reduces comparative reach-in distances and opens up opportunities for locating wyes.
- The higher the benchwork, the more difficult reaching in becomes.
- Consider making the roadbed for hard-to-reach areas removable, at least initially, so that construction, track laying, testing, and ballasting can be done in a convenient place.
- If the "play value" of your prototype's operations comes up short, change it by referring to the first point above.





1. Bruce Williams' South of Pico Boulevard HO scale layout sits in a small area atop the stairwell that provides access to the main HO Southern Pacific layout. The 4'-0" x 13'-6" Los Angeles scene features an impressive industrial district.

Finding room for switching

Found space above a stairway to the layout room was a perfect spot for the South of Pico Boulevard model railroad

By **Bruce Williams**//Photos by the author



2. The view looking west across the switching module shows the main layout in the background. Only the unobtrusive fascia visible behind the orange reefer gives away the aisle location.

Welcome to Los Angeles, 1952. Just a few blocks east of Central Avenue, the birthplace of the L.A. jazz scene and the setting for Raymond Chandler's *Farewell My Lovely*, lies the vast, gritty commercial and industrial heart of the glamorous Southland.

This is the story of how the layout I call South of Pico Boulevard came into being.

But first, a brief description of my "main" HO railroad is in order. It's an around-the-walls panorama of the American Southwest featuring the Southern Pacific. There are no windows or doors in my upper-level train room, only skylights. The room is accessed from below by a folding stairway on the long axis of the 16 x 32-foot space.

One day when the SP-themed layout was about 85 percent complete, it dawned on me that the space above the stairwell was the ideal place to create something the main railroad lacked: an area for intensive switching operations.

Filling the void

Fellow modeler Jeff Welter and I surveyed the situation, then mocked up a few buildings and tracks on a temporary piece of plywood above the stairwell to check out sightlines. We soon had a provisional track plan worked out.

The next step was to design and put in place cabinetry to support the new layout. Chipper Thompson and I fabricated, painted, and installed the



3. Trolley-pole-equipped (to trip signals on the Pacific Electric) Baldwin VO1000 no. 1377 takes a breather as a Santa Fe switcher tends to its switching chores.

storage shelving and benchwork. Everything went together nicely.

The track plan evolved to include street running and two staging tracks as well as runarounds and a number of industries. The idea was for one lead track to represent Southern Pacific, the other Santa Fe. Where would these lines come together? How about the mythical *film noir* world of La La Land in the transition era of steam-to-diesel-era railroading?

Building the railroad

With the help of Jeff and Chipper, as well as Bob Dolci and Bob Tolbert, we got to work. The track base is a simple sheet of Homasote board supported by a grid of $\frac{3}{4}$ " cabinet-grade plywood

Learning points

- Take a second look around the room or the entire house for a usable place to build a layout or portion thereof.
- A separate, "disconnected" switching layout can complement a mainline railroad, even with a completely different theme and/or era.
- Today's commercial track components, especially in code 83, make building a layout much easier than even a decade ago.
- Curved turnouts can solve some track alignment concerns.



4. The overview of the entire switching layout shows how the stairwell walls support leads for the Santa Fe (at right) and Southern Pacific.



5. Southern Pacific no. 1377, with a tank car in tow, is passing the steam locomotive dead line at Luria Brothers scrapyards. The dead oil burners are brass models that will never see action on Bruce's railroad.

strips turned on edge. The track is all Walther's code 83 because we love those beautiful curved turnouts and none of us has the patience for handlaying.

A Lenz DCC system powers the layout. Separate bus wires feed Tortoise by Circuitron switch machines and miniature light-emitting diode (LED) lighting in buildings and exterior lamps – a must for night operations in a slightly sinister netherworld.

"Scrapbooking," a process art directors and set designers use in Hollywood, played an important

part in finding the look we were after for this project. The directors and designers collect iconic photo images of buildings, graphics, landscapes, flora, even open spaces to guide the selection of locations, set dressing, and construction for motion pictures (which I did for a living).

Structures are mostly from kits assembled by Jeff, Chipper, and myself. We selected them for their resemblance to the L.A. prototypes found in my scrapbook. And we're not above a few inside jokes such as Acme Hard-

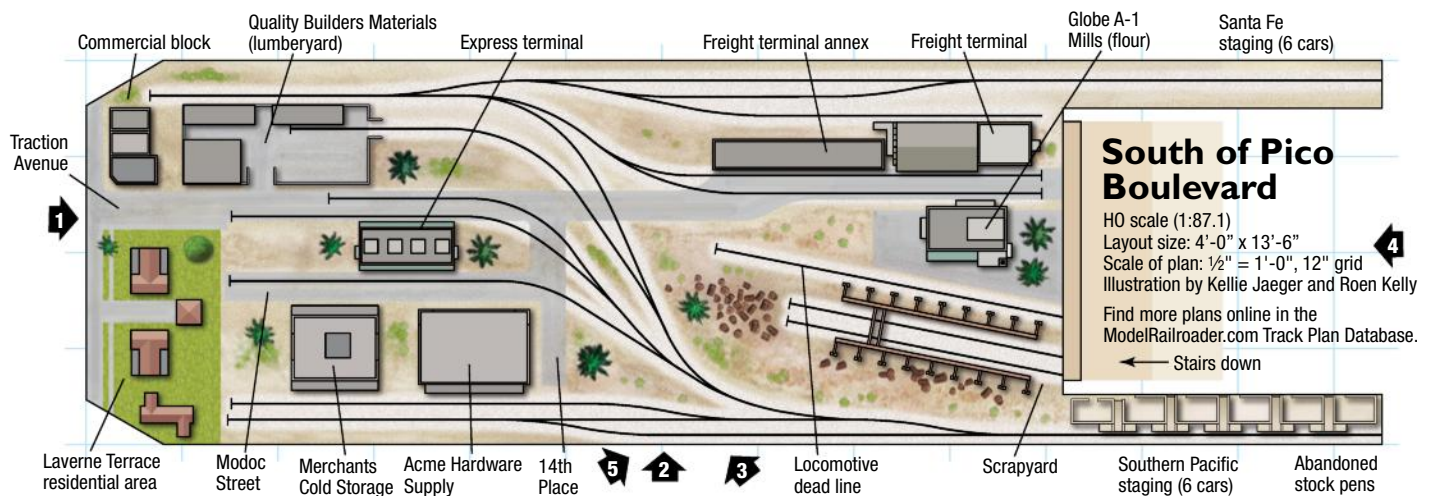
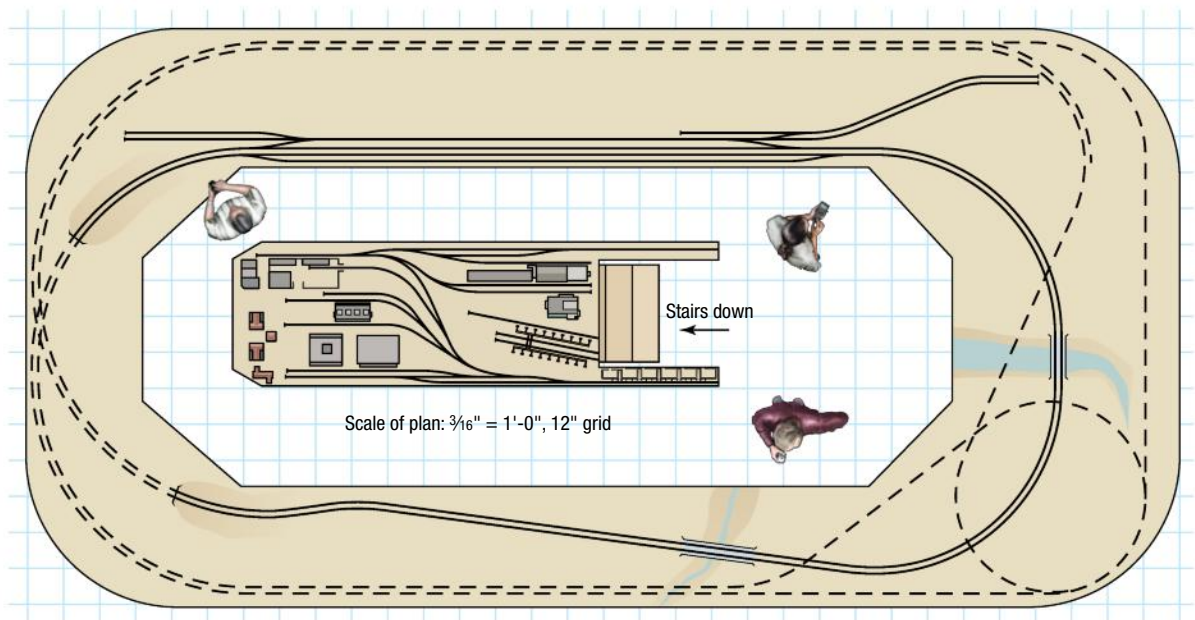
ware – remember Wile E. Coyote's penchant for Acme-brand products?

There's no backdrop as such. Part of the plan all along was that the surrounding layout itself would effectively function as the backdrop. As long as an operator's head hasn't popped up somewhere between the switcher and the around-the-room layout, the "city" section of the main layout serves as a beautiful 3-D animated backdrop.

The three unconnected, diagonal tracks serving the dead-locomotive line and scrapyards are a diorama of sorts, a kind of homage to the steam era.

The layout at a glance

Name: South of Pico Boulevard
Scale: HO (1:87.1)
Size: 4'-0" x 13'-6"
Prototype: ATSF and SP
Locale: Los Angeles, Calif.
Era: steam-to-diesel transition era
Style: single deck
Mainline run: not applicable
Minimum radius: 16"
Minimum turnout: no. 5
Maximum grade: none
Train length: not applicable
Benchwork: 3/4" cabinet-grade plywood grid 16" on center
Height: 60"
Roadbed: Homasote
Track: code 83
Scenery: groundcover mix of lightweight spackle, concrete bonding adhesive, fine sand, pigment
Backdrop: none
Control: Lenz DCC



Operation

With the help of Bob Tolbert, I'm developing software to generate switch lists. Two locomotives – a Bowser Baldwin VO1000 and a Bachmann Alco S-2 – and about 16 cars seem to be optimum for operations. For the sake of variety, cars can be interchanged (by hand) with those on the main SP layout, since the two layouts don't connect.

In our lonely corner of the world here in New Mexico, getting two enthusiasts to show up for an operating session is a blessing. It should take two or three of us about an hour and a half to two hours to do all of the switching operations designated on the switch lists.

If we have guest operators, we'll probably have the main SP layout in operation. We may also automate the SP layout so it can serve as a back-



These photos show the track plan being transferred to the Homasote roadbed and the basic framework that supports the roadbed.

ground when the switching operations are our main focus.

Thinking above the stairs

There's nothing like a new project to stimulate interest in the hobby. So it was with the South of Pico Boulevard switching layout. It nicely complements, rather than detracts from, the main layout. And it utilizes space that most

of us would typically overlook in our quest to build a model railroad. **MRP**

Bruce Williams and his wife, Edle – “a valuable member of the layout-building team” – live in Taos, N.M. Bruce taught fine arts and then became a set designer in Hollywood. He is now a designer and woodworker specializing in Spanish Colonial furnishings.

Hiding Tunnels where none belong

The need to hide track from view calls for creative disguises for portals

By Andrew Dodge//Photos by the author

One of the most vexing problems model railroaders face is the need to use some sort of tunnel to hide the movement of our trains from one point to another. In the design of prototypical layouts and even for some prototype-based freelanced layouts, it's often unavoidable to include a tunnel where none existed.

While every layout will have its own set of problems, the need to have a train disappear on a mountain-themed layout is one that can present challenges. Railroads in urban or agricultural settings can use a variety of view blocks, like warehouses or grain elevators, between the viewer and the tracks to obscure the point where trains move on or off the layout or emerge in another scene.

The ever-handly tunnel is indeed common on many mountain railroads, but prototype tunnels often don't meet modelers' specific needs. For example, there were no tunnels on the portion of the Denver, South Park & Pacific RR southwest of Denver to Breckenridge, Colo., which I had modeled in On3. On my new O fine-scale layout representing the Colorado Midland between Leadville and Basalt, Colo., there were only two.

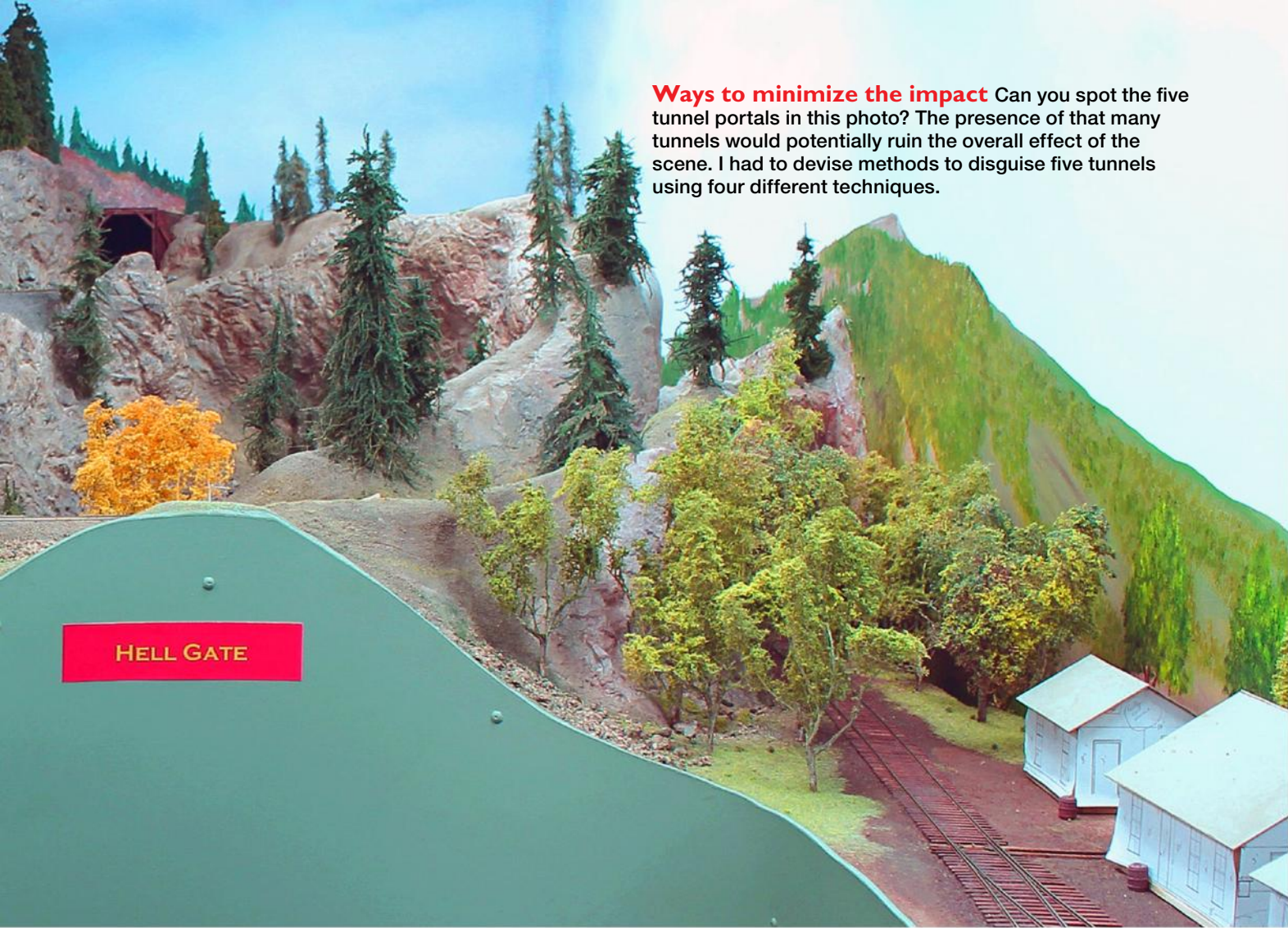
In both cases, because of space issues, I had to use tunnels where they didn't belong. The narrow gauge layout presented easier solutions because the tracks left the finished areas and went into staging parallel to the aisles. (See *Model Railroad Planning 1997* and *Great Model Railroads 2009*.) The Midland, with its longer sidings that consume more space and the changes in

Learning points

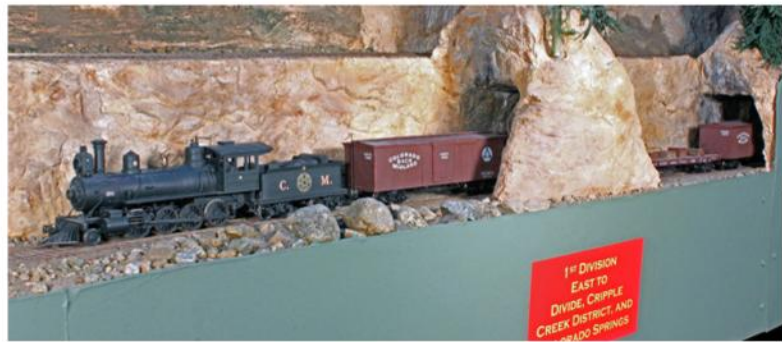
- Tunnels are needed on model railroads more often than they're prototypically justified.
- Disguising the portals of unwanted tunnels is challenging even on a mountain railroad.
- More than one solution is needed.
- Curtains may solve the problem of light coming out of portals.

elevations, necessitated using tunnels in more conspicuous locations. (See MRP 2013, pages 72-77, and MRP 2015, pages 40-45.) The omnipresent but not always desired tunnel openings on my new layout required the use of several different techniques to mitigate their visual impact.

Ways to minimize the impact Can you spot the five tunnel portals in this photo? The presence of that many tunnels would potentially ruin the overall effect of the scene. I had to devise methods to disguise five tunnels using four different techniques.



Daylighted tunnel. Perhaps the easiest solution for disguising the portals of an unwanted tunnel is to “day-light” the tunnel, removing the material above to turn it into a cut. On the lower deck, an eastbound mixed is running toward the turnback curve on its way to the upper deck. The original plan called for this to be in a tunnel, but I wanted more of the run to be in the open.



From layout to staging. To make the move between the modeled Arkansas Junction area and staging at Colorado Springs less noticeable, Andrew compressed the distance and employed the tunnels several miles away to ease the transition. Short tunnels through the shoulder of a cliff were common on the Midland. Andrew used one here to reduce the impact of the tunnel into staging.

Dealing with tunnel portals

How to deal with tunnels is best considered during the design phase of layout construction. Every modeler has to employ his or her ingenuity in solving frequently encountered challenges in creative ways. There's never a perfect answer.

I hope my solutions to the problems I encountered on my Colorado Midland layout will provide you with some ideas and insights. Modelers should add tunnels to the list of issues to consider when deciding which areas of a railroad are to be modeled and how to best display our work. However, the

creativity we all bring to the table should enable us to find ways to solve the vexing questions posed by almost inevitable, and hopefully invisible, tunnels. **MRP**

Andrew Dodge models in Proto:48 and is a frequent contributor to MRP.



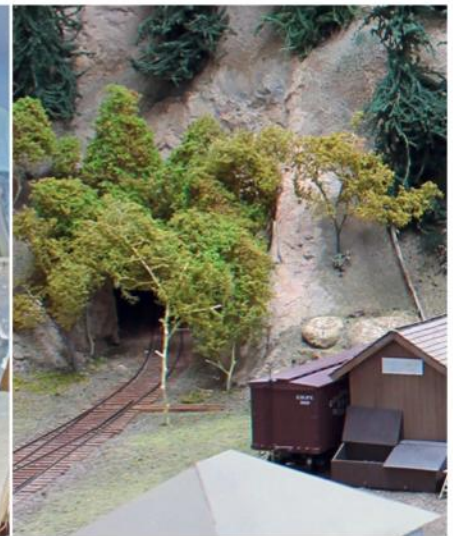
Solving the “in your face” problem. The upper turnback curve at Nast was next to the aisle and too visible. Because of an upper-deck track, Andrew couldn’t “daylight” the scene. Taking advantage of the scene’s height, he planned the top of the fascia to be just below head level. This created a prototypical appearance of the



track going into a cut. Even though the prototype doesn’t go through a cut at this location, the forest creates that impression. With the fascia in place, trees become the stars of the scene. Aspens are prolific here and provide concealment for the tunnel. They also help to keep viewers from looking into the tunnel and seeing the benchwork.



Thomasville tunnel. The turnback curve between Basalt and Thomasville required tunnel entrances at both locations. Basalt worked a little better than Thomasville because the track alignment didn’t allow a direct view of the opening. But Thomasville can be viewed from multiple positions, so hiding the opening was more difficult.



Completing the scenery and rockwork back into the tunnel helped reduce the impact of the opening. Using lighter colors on the rocks near the opening and progressing to darker colors helps disguise the problem. As at Nast, it was important to eliminate any light or ability to view down the track into the tunnel. Again, trees and vegetation helped.



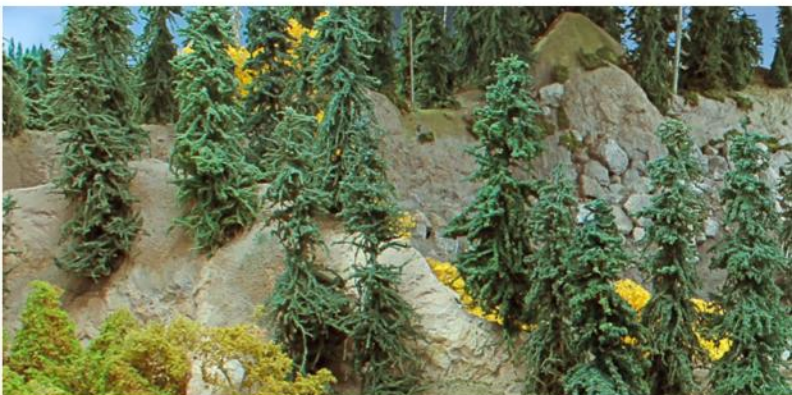
Upper Nast loop tunnel. Tunnel portals at several locations were required for the turnback curve between Nast and Sellar. Because this section of track curves away from the viewer, daylighting this tunnel was the best option. Cliffs



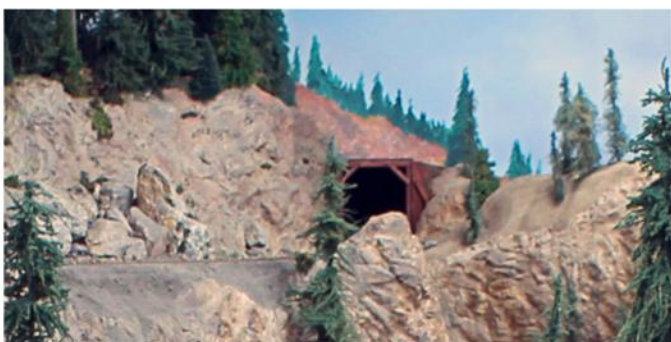
are common to mountain railroading, and in this case, they would serve two purposes: to reduce the view of the hidden turnback curve, and to maintain the visual effectiveness of the modeled area at Hell Gate. The plasterwork had to continue far enough around the inside curve to be out of view, and the painted backdrop on the outer side had to go all the way to the corner and partly around the bend to give the appearance of looking off into the distance.



Sellar Tunnel. After emerging from the daylighted tunnel on the turnback curve at Nast, another was required, because the track had to pass under the upper-deck track at Hell Gate. Fortunately, this section of track is at a right



angle to the end of the aisle. Obstructing the view with the ridge being constructed in the left center of the photograph was easy. With the addition of the ever-present aspens and pines in this area, the tunnel became almost invisible.



Hell Gate snowshed "tunnel." The last of the four methods used was the easiest. Where the track goes through a wall and into another room was a perfect place for a false snowshed. Andrew used the same method on my old South Park layout at this point and near Arkansas Junction on the new one. The shed becomes a focal point. This particular part of the shed on the Hell Gate side of the transition to Ivanhoe, which is the top of the line's profile, is only an inch deep. However, since this tunnel is at eye level and provides a direct view into the next room, he needed a way to foil the visitor who might remark, "Oh, I can see right through the hole."



Leaving Basalt. The Colorado Midland's yard at Basalt is a major point of interest, but created another "tunnel" issue. Fortunately, the prototype provided a solution: The eastbound main entered a narrow canyon lined with lots of cottonwoods and other trees. Obscuring the opening with lots of trees was easy. Moreover, the track is close to the wall, which precludes being able to see easily into the tunnel.



A visual barrier inside tunnels. An excellent and easy way to block the view into a layout tunnel is through the use of a curtain. I've used curtains for years on my South Park layout and on almost all my tunnels on the Midland. Curtain material should be dark and have enough body to fall back into place after the train passes. The curtain is most effective when several layers are used and even better if there's a small space between the layers of material. The weight of O scale equipment makes it unlikely the material could cause a derailment. I used pool-cover material for my curtains. It's a woven plastic material that won't snag like cloth and is heavy enough to hang down when the train isn't passing through. The curtain must be mounted high enough so nothing on the top of the cars or locomotives will snag on it, and long enough to fall just short of the top of the rails. With the curtain in place, almost no light or benchwork can be seen as this locomotive emerges from the tunnel. As soon as the last car of the consist passes, the curtain material falls back into place.





1. Neal Schorr's three-rail O scale layout features a unique approach to depicting time. The modeled period shifts from the steam era (PRR) to the 1960s (Penn Central) to modern times (Conrail and Norfolk Southern) as it progresses from east to west. Changes include number of tracks and ballast edges. Penn Central photo by Steven Schorr

Modeling 8 DECADES at once

The Middle Division from the
Pennsylvania RR to Conrail in
three-rail O scale

By **Neal A. Schorr**//Photos by the author



Work on my O scale three-rail Pennsylvania RR Middle Division began 20 years ago. It's been 10 years since my layout was presented in *Model Railroad Planning 2007*. Given that I now have a decade of experience with the model railroad, I thought I'd share a progress report.

Many of the decisions that went into designing my railroad were based on experiences with my old HO layout, which portrayed the never-completed South Pennsylvania RR. The first decision was whether to build a new South Penn or a different railroad. I opted for the latter, choosing a railroad that traversed the same general vicinity and became one of the greatest railroads in history.

I chose the Pennsylvania RR's Middle Division, which ran between Harrisburg and Altoona, Pa. Work on

the prototype began in 1846, with the line to Pittsburgh finished in 1854 upon the completion of Horseshoe Curve.

The PRR ceased to exist in 1968 when it merged with the New York Central to create the Penn Central. The PC lasted only until 1976, with the formation of Conrail. Finally, Conrail was broken up in 2000, with a portion becoming Norfolk Southern and the rest going to CSX. The Middle Division became an important part of NS.

The task I faced was to accurately reproduce a model of one of America's best-known railroads that looked and felt like its prototype. Two decades later, I'm happy to report that visitors comment on how much the layout looks like the real thing.

Modeling a wide span of time

My interests are from the 1930s through the demise of Conrail. I approached this seemingly

Learning points

- Changing scales and themes can make achieving specific goals possible.
- Being able to design a home for the new railroad can make modeling a major prototype railroad in a larger scale practical.
- Planning the scenery and backdrop as the track plan took shape is a key to avoiding future problems.
- Seemingly small details such as line pole locations are best accommodated in the early planning stages.
- Changing decades as the layout progresses east to west is a unique but effective way to accommodate a wide range of interests.

impossible task by building the railroad so it could represent that entire span of time: Starting at the eastern end of the line, each town represents a successive decade.

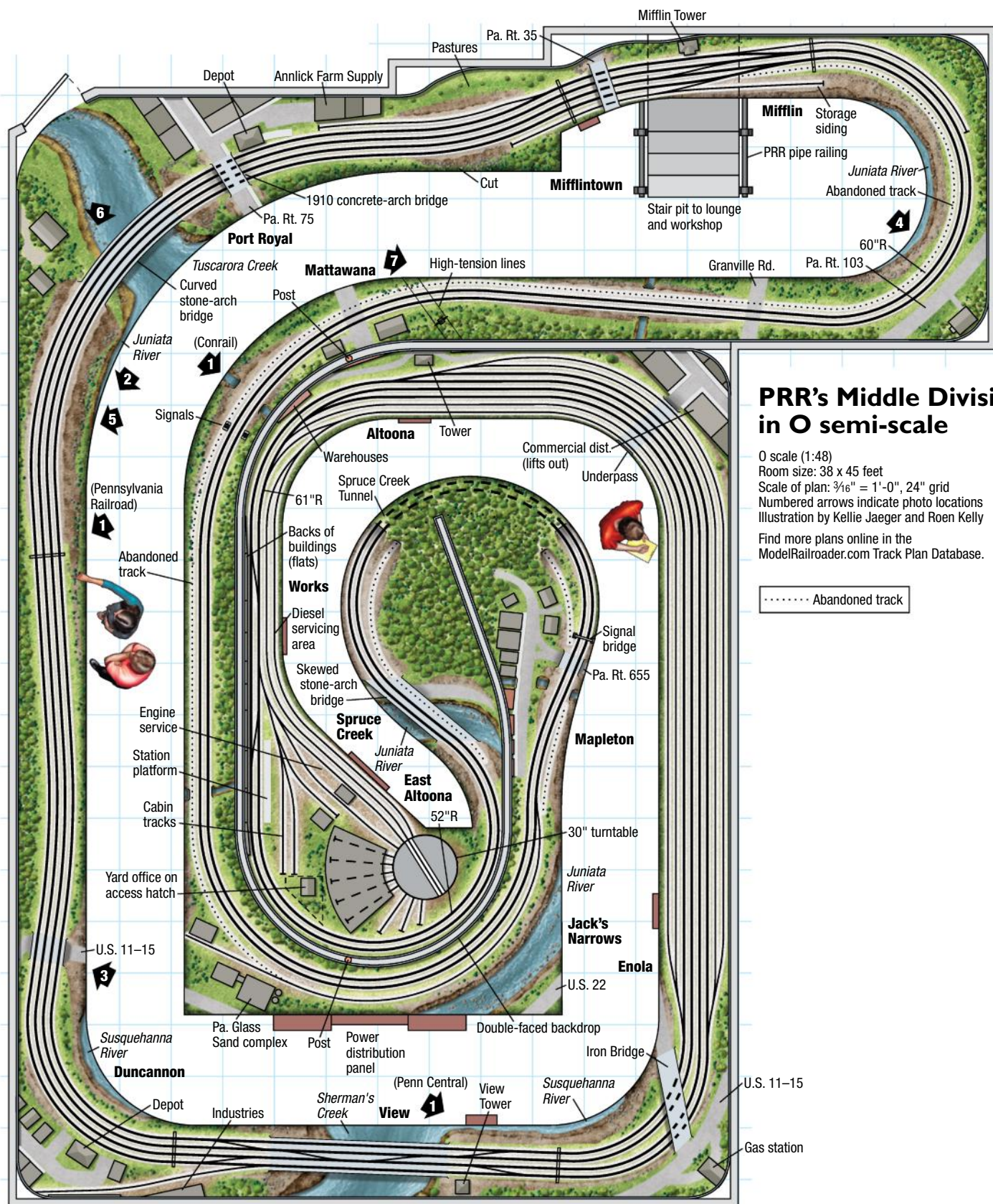
Enola, the easternmost town, represents the 1930s. The next town, Duncannon, the 1940s, and so on. The westernmost town, Mapleton, is modeled at the close of both the 20th century and the end of Conrail. As a nod to my son, Steven, who is enamored of contemporary Norfolk Southern power, a short stretch of railroad between the western portal of Spruce Creek Tunnel and Altoona now represents the modern Norfolk Southern.

Layout design

With the prototype chosen, the next step was to choose a scale and design the layout. I switched to O scale, utilizing three-rail track to avoid electrical complexity in the wiring and controls. The goal wasn't to have a "hi-rail" layout. Rather, I wanted a scale railroad that happened to use 3-rail track.

As noted in MRP 2007, I designed and built my home, which allowed construction of a basement specifically suited to a model railroad. Having purchased the land in 1990 but not starting construction until 1996, I had several years to design the house as well as the layout. I included obvious features such as extra electrical outlets, a higher-than-standard ceiling, and support posts located where they could be hidden within the backdrop.

The best decision was to build an around-the-wall layout with a single



PRR's Middle Division in O semi-scale

O scale (1:48)
 Room size: 38 x 45 feet
 Scale of plan: $\frac{3}{16}$ " = 1'-0", 24" grid
 Numbered arrows indicate photo locations
 Illustration by Kellie Jaeger and Roen Kelly
 Find more plans online in the
 ModelRailroader.com Track Plan Database.

..... Abandoned track

central peninsula, which turns out to be the most efficient way to use floor space. I had enough space to hook the peninsula into a J shape.

I avoided a duckunder by creating a "stair pit" – a short corridor about 6 feet in length, depressed 32" below the

basement floor, and accessed by steps at either end.

The around-the-wall design also affected my choice of lighting. The old layout had recessed lighting fixtures over the layout. Trains and scenery near the front of the layout shelf tended to be

lit from the top or even backlit, placing the front of the trains in shadow. On the new layout, I placed the lighting fixtures over the aisle. This also makes it much easier to change the bulbs.

I avoided looping the main line two or even three times around the room

The layout at a glance

Name: Middle Division

Scale: O (1:48)

Size: 38 x 45 feet

Prototypes: Pennsylvania RR,
Penn Central, Conrail, and
Norfolk Southern

Locale: central Pennsylvania

Era: varies by location

Style: single deck

Mainline run: 260 feet

Minimum radius: 60" main,
52" elsewhere

Minimum turnout: no. 7½ main,
no. 5 sidings

Maximum grade: none

Train length: 28 feet

Benchwork: open grid

Height: 54"

Roadbed: ½" Homasote on
¾" plywood

Track: Atlas code 215 three-rail
flextrack

Scenery: extruded-foam insulation
board and hardshell

Backdrop: painted drywall
and hardboard

Control: Lionel TrainMaster
Command Control

to double or triple its length. The result would have been parallel main tracks running within 50 scale feet or so of each other, with long stretches of railroad sitting atop endless retaining walls, unrealistically steep slopes, or sheer cliffs.

Setting priorities

There are three general focal points of model railroading: scenery and structures, trains, and operation. Scenery and reproduction of the railroad's physical plant were clearly my priorities. As such, my overall goal was scenic complexity combined with operational simplicity, and my track plan reflects that.

Four tracks compose the main line in the areas representing the railroad through the 1960s, while anything after that time frame has two tracks on a three-track right-of-way. Track centers were kept as tight as possible (as close as 3¾"), and most of the curves have a 60" radius. A few had to be reduced to 54" to allow the peninsula to double back on itself, but I was also able to include a few of exceptional radii. The largest curve has a radius of 156".

I included three interlocking plants to switch trains between tracks. They represent the prototypical interlockings of View, Mifflin, and Works.



2. Tangent track was in short supply on the Middle Division as it meandered along the banks of the Juniata River. Most of Neal's railroad consists of alternating curves connected by short tangents. Note the sharp ballast edge and cinder shoulder in this scene modeling the 1950s.



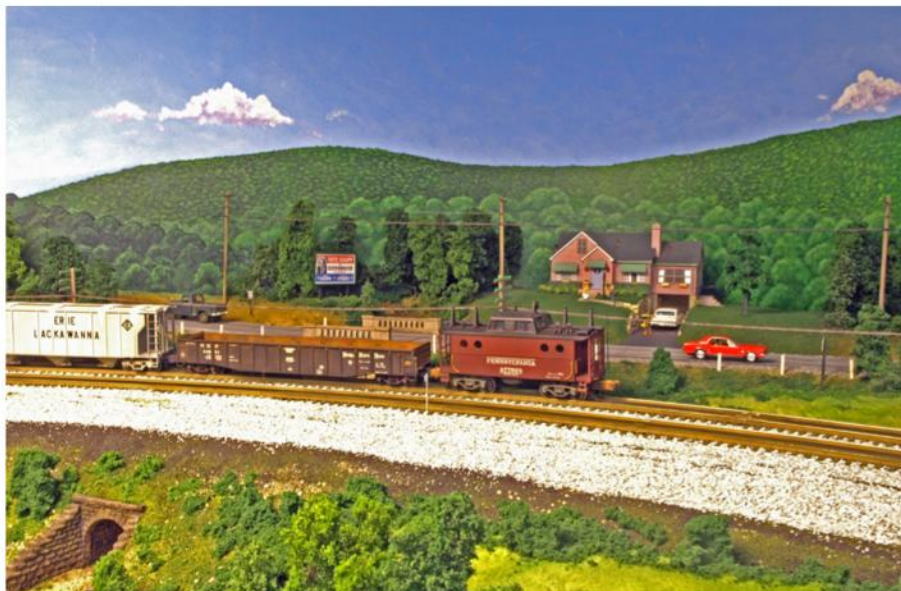
3. Elevating the subroadbed made it easy to model structures such as this highway underpass. Careful planning of the scenery ensured that risers were not in the way. Here U.S. Routes 11 and 15 duck under the main line at Duncannon, Pa.

Between these interlockings are long stretches of uninterrupted track.

To maximize mainline length, I only have one yard. It's actually a double-ended staging yard and not used for classification. One end represents Enola, the other Altoona. The double-ended staging yard is highly advantageous, as empty and loaded coal trains are always headed in the correct direction.

Construction

When I started work on the layout, the first order of business was to build and paint the backdrop. I'd painted Appalachian backdrops on my earlier layouts. Truth be told, this is my favorite part of the hobby. While it can be a slow and arduous task (I painted the backdrop over a three-year period), it's incredibly relaxing – and mistakes are easy to correct!



4. West of Mifflin Interlocking, the railroad drops down to two tracks on a three-track right-of-way. The space previously occupied by the torn out tracks is now used for a service road. Originally four tracks, the railroad was reconstructed with centerlines increased from 13 to 16 feet, and vegetation began to encroach in this scene re-creating the 1960s.



5. Most landforms are laminated pieces of 2"-thick extruded-foam insulation board from 2 to 5 feet in length. Here, one section has been removed to show the 8" high risers lifting the roadbed off the benchwork. The fill cross-section has a prototypical 3:2 slope.

It's also important to put the same care used to plan the layout into the backdrop. I carefully planned the scenery as the layout design was progressing, accurately identifying the location of structures and scenery. I was thus able to paint the backdrop such that it would closely match the 3-D scenery. The careful planning paid off, as scenes painted more than 10 years ago closely matched recently constructed scenery.

The benchwork consists of 2 x 4s rather than the usual 1 x 4s. Most

visitors assume that this is because the layout is O scale, but a 2 x 4 costs a little more than half of what a 1 x 4 costs.

I raised the roadbed 8" above the top of the benchwork joists. This allowed me to construct fills anywhere on the layout, as well as provide for drainage and highway underpasses.

Virtually all railroads had line poles paralleling the tracks until the 1980s, yet this feature frequently gets overlooked. It's tough to squeeze them in once the scenery is done; it really needs to be designed along with the

track plan. I was therefore careful to design the scenery such that a pole line could follow the tracks.

The two-decade mark

So how have things worked out after 20 years? The current layout is highly faithful to the prototype, and it's incredibly rewarding to have visitors immediately recognize scenes.

The portrayal of multiple time periods has also been extremely satisfying. While this is probably not a good option for the hardcore operator, it's ideal for someone such as myself who enjoys railfanning, studying the history of the railroad, and modeling different periods.

No matter how many times I've thought about it, and no matter how many other layouts I visit, I always come to the same conclusion: There's simply no more efficient way to design a layout than an around-the-wall plan with a central peninsula. I'm also very pleased with the decision to loop the main line around the layout just one time. Visitors often comment, "It looks like the trains are really going somewhere."

When preparing this article, I was asked to mark up the old track plan with any changes made since the 2007 article. The fact that no changes were necessary speaks volumes about the value of careful layout planning.

Too often layouts are built on a flat piece of plywood with just few areas depressed below track level for valleys or rivers. In reality, much of a railroad is built on fill. With my elevated roadbed, I was able to build long stretches on fills, reflective of the prototype. This also allowed me to model drainage provisions – ditches, stone culverts, and gullies – features often omitted on model railroads. The numerous fills also make it easy to model highway underpasses.

The pole line, combined with the cuts and fills on the layout, adds a great deal of scenic impact. One can easily see the rise and fall of the pole line as it runs along the tracks. Unrealistic gaps due to interfering structures were eliminated by planning the pole line along with the scenery. Line poles with up to six cross arms convey the image of a heavy-duty main line. Reserving space near bridges for H-poles (line poles with two uprights to accommodate long wire spans) along with their guy wires adds an additional touch of realism.

Looking back, and ahead

To enhance the utility of the staging yard, I built train storage racks – large plywood boxes on casters placed under



6. Line poles can't be set in a waterway, so the span between the poles adjacent to the river has to be extra long. To accommodate the extra weight of the communication lines, H-poles with two uprights and a double set of cross arms are used. These were kitbashed out of stock line poles from Weaver Models.

the staging yard. Depending on car size, each one can hold up to 60 cars. I simply roll these out from under the layout to quickly change rolling stock and diesel engines. They also provide a finished look under the layout.

Around the time I started painting the backdrop, a trend emerged in model railroading: painting the backdrop with a much lower horizon line. Having seen and studied the approach, I would probably drop the horizon on my backdrops a few inches. For a viewer standing in the aisle, the current height is perfect. But for eye-level photography, they're a bit higher than ideal.

I underestimated the number of room light fixtures, but this has been corrected to a large extent with more fluorescent fixtures. However, at the expense of a bit of glare, I would still go with my decision to place the lights over the aisles rather than the layout.



7. This photo taken looking down the aisle just east of Mattawana gives a good idea of how the layout was constructed. While most of the shelf is 30" deep, some is as narrow as 21". Also evident is one of the long, low fills made possible by raising the entire roadbed 8" above the benchwork.

One last question: Did I make the layout too large? While we all dream of having limitless space for our railroad empire, I'm not sure if I will achieve my goal of having the scenery completed. Fortunately, Steven has become an avid model railroader. With his help, the rate of progress on the layout has increased measurably.

So while Steven's serendipitous interest in model railroading couldn't be accounted for in the planning

process, at the 20-year mark and counting, it's clear that careful planning has indeed paid off. **MRP**

Neal Schorr is a retired family physician in Pittsburgh and has been active in model railroading for 45 years. He also enjoys gardening, biking, photography, and – with daughter, Caroline – tropical fish. Son Steven is now an active participant in all aspects of the hobby.

Reader forum

Maumee in the mailbox

With the arrival of today's mail, the wait for my favorite magazine was over. *Model Railroad Planning 2016* looks to be another home run.

I only had a short amount of time before running off to work to page through it, but every article featured something that will make me want to give it a thorough reading. I did take time to read Bill Darnaby's article on a new branch line; anything about his Maumee Route never disappoints. I liked how he fit a wye into the space. It's also interesting to see an author's initial ideas for his layout and how they evolve over time.

Chris Ellis, Akron, Ohio

I couldn't figure out how the new branch line on Bill Darnaby's layout connects with the main line. It wasn't clear to me on the track plan.

Bernard Kempinski, Alexandria, Va.

[The photo at right of the Miami Junction area shows where the branch leaves the main and enters the helix. A few turns later and the train is on the new lower deck. – Ed.]

I picked up the 2016 edition of MRP today at the local newsstand. Great job, as usual – a good mix of articles. I liked the focus on staging as well as seeing Dominic Bourgeois's elevated right-of-way article and Randy Laframboise's Rutland layout. Every time I see Mike Danneman's layout, I think about how much N scale I can fit into my basement to model more of the Rutland. The Maumee is always a favorite to see articles about. I also liked Mark Dance's article.

My only peeves: Removing the glued-in subscription cards damages the binding. And there have been many



The Maumee Route's Miami Branch leaves the main line just west of Miami Junction, Ohio, through the hole in the backdrop visible at left. Bill Darnaby photo

articles with prototype railroads, but few have links to the historical societies or groups that have lots of prototype information to help.

Phil Blanchard, Morrisburg, Ont.

[It's our practice to list contact information for railroad historical groups. Our apologies if we missed a few. – Ed.]

Grading on the curve

Van Fehr's excellent article in MRP 2016 on vertical curves provided some important guidelines for design of model railroad grades. I'd like to add one additional consideration based on a number of years working in the railroad industry. Current prototype practice is to avoid combining both vertical and horizontal curves at the same location, especially on horizontal

easements. The in-train forces on combined vertical and horizontal curves can cause derailments.

Almost certainly this is true for model railroads as well as the prototype. On many model railroads, however, it can be very difficult to completely avoid combining vertical and horizontal curves due to space limitations. Where there is no choice on a model railroad, I would like to suggest some additional guidelines for designing vertical curves:

1. Avoid in all cases putting a turnout on or near a vertical curve.
2. Combining horizontal and vertical curves at the crest of a grade will likely cause more problems than combining them in a sag, particularly for cars and diesels with three or more axles or for steam engines. If there is a choice, combine the two curves in a sag.

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3. When you must combine vertical and horizontal curves, going beyond Van's minimum recommendation for the length of horizontal curves and using the broadest possible horizontal radius will minimize issues. In this case, increase the vertical curve length to 1½- to 2 times the minimum tangent length. This is an estimate, and if you aren't sure if it will work, build a test section of track.

4. In general, it's most important to avoid combining vertical and horizontal curves if you plan on running long or heavy trains using multiple diesel units or large steam engines, as this will create the greatest in-train forces. Small trains with four-axle power or small steam engines will have lower in-train forces and reduce the risk of derailment on a combined vertical and horizontal curve.

Paul Clegg, Calgary, Alta.

[Paul's points are spot-on and well taken. During construction, modelers unable to avoid using a lateral-vertical curve combination should make sure the laterally curved subroadbed remains laterally flat, and the vertical curve along it is properly formed. – Van Fehr]

I especially enjoyed the more theoretical articles in MRP 2016, but then I worked at Bell Labs. Mark Dance's bridge article is reminiscent of what I went through modeling my big steel Duluth, Missabe & Iron Range RR bridge. And Van Fehr's vertical curve article is essential reading.

Bob Hanmer, Glenview, Ill.

Kudos to Tom Klimoski

We are accustomed to seeing the "luminaries" of our hobby and their great modeling presented in various venues on a regular basis. So it was refreshing to see a relatively unknown railroad such as Tom Klimoski's outstanding Georgia Northeastern featured in MRP 2016. This is not meant as a negative comment – where would any of us be without the inspiration and expertise of the giants of the hobby? – but rather as a positive reinforcement of the fact that our favorite pastime is securing a good future and is in capable hands.

Jim Talbott, Canton, Mich.

After reading about Tom Klimoski's GNRR re-creation in MRP 2016, I went in search of the prototype and some of its traffic, namely marble. After an "aerial flyover," I got a better sense of operations of the main customers in this space, Polycor and Imerys, but was

left with a question: Is large cut-marble block a commodity still shipped by rail? If not, when about did that business dry up or switch to truck?

I ask because on the small section of the Frisco (St. Louis-San Francisco Ry.) I'm researching and modeling, there was a customer (<http://kcspur.blogspot.com/2013/05/carthage-marble.html>) that would have received such product by rail. My modeled era is mid-1970s to early '80s.

Rich Steenwyk, Milwaukee, Wis.

[My understanding from the crews who work on the GNRR is shipments of marble slabs today are very sporadic, considerably fewer than years ago, but they do still ship by rail. There are several YouTube videos from a few years ago of the GNRR with gons loaded with marble slabs headed south. In an old promotional video, Georgia Marble states much of the marble used in

buildings and monuments in Washington, D.C., came from the Marble Hill quarry. There's not much demand these days for large marble slabs. Most of the marble shipped out now is chips in open-top hoppers. – Tom Klimoski]

Good timing

The new MRP was a welcome surprise. With any annual, the tough part is making it fresh. MRP 2016 doesn't disappoint. It's a refreshing and really useful collection of the creativity and wisdom of others, and niche topics that fit nicely in what I'm building now.

The timing is great: I'm in a new house and now challenged to work on a series of modules instead of a grand basement pike. This means new design approaches and the opportunity to focus on photographable scenes.


Thanks. I know I'll be back to each article time after time.

Alan Craig, Palm Springs, Calif.

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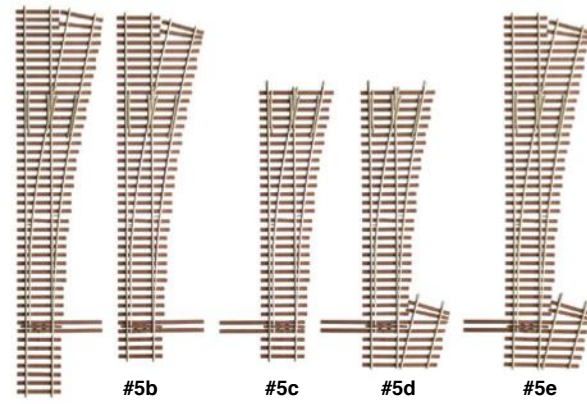



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