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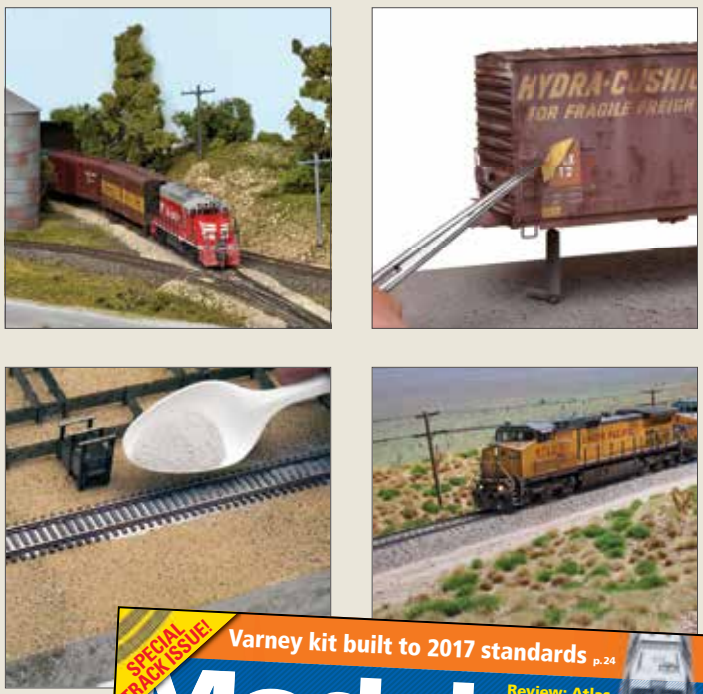

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GREAT Model Railroads 2018

Both depicting and making history

IT'S BEEN SAID MANY TIMES that model railroads are like time machines. But once in a while, something comes along that really brings that point home.

Unless you're modeling the present day like Eric Brooman (see *Great Model Railroads 2006*) or a completely fanciful freelanced railroad, your model railroad's purpose is to more or less faithfully depict the world as it was at some point in the past. I get that; my layout models 1906, after all. Each time I research my own line is a deep dive into history. It's an inextricable part of our hobby.

It's easy to get caught up in the hands-on aspect of our model railroads – finally pouring that creek, figuring out why that engine keeps derailing, building enough trees to cover that mountain. But sometimes, we come across something that reminds us of our roles as historians.

For instance, take Andrew Dodge's O scale Colorado Midland (see page 32), which is the epitome of the model railroad as historical depiction. Set in 1897, Andrew's layout realistically models the first standard gauge railroad to conquer the central Rockies. In his quest for historical authenticity, Andrew not only scratchbuilt his 11 brass locomotives from prototype plans, but also researched customer lists and shipping announcements published in newspapers of the day to make his operations as realistic as possible.

Another kind of historical research went into Mike Rabbitt's H&R Steel Co. layout (page 64). Mike didn't just read about steelmaking before building his HO scale model railroad; he spent years earning a degree in metallurgy engineering. A friend who's seen Mike's steel mill structures says they're so authentic that if it were possible to heat them up like the prototype, they'd actually produce steel.

What brought on this philosophical musing? Recently I was reviewing an O scale Pullman troop sleeper car for *Model Railroader*. Such a task always starts with seeking out builder's drawings and other prototype info to which to compare the model. And though I found more detailed drawings in the December 2001 MR, I was more intrigued by the article in our December 1943 issue. It took me back to a time when those troop sleepers were brand new and doing their vital duty of carrying soldiers to fight in a war whose end was still somewhere in the uncertain future. That article wasn't historical, it was historic.

There's a difference between those two words. Historical means pertaining to or depicting history; museums, books, and most of our layouts are historical. But it's rare for something to be both historical *and* historic – that is, intrinsically significant to future generations. In the pages of *Great Model Railroads 2018*, you'll find layouts that are both.

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By Don Weixl ▪ Photos by the author

PICTURE-PERFECT BRITISH COLUMBIA

This freelanced HO scale layout was designed with photography in mind

1 Locomotive no. 89 pulls a train of reefers out of the yard at Nitro Junction on Don Weixl's HO scale Nitro Pass & Okanagan layout. Don, a professional photographer, based the double-deck layout on a John Armstrong track plan.

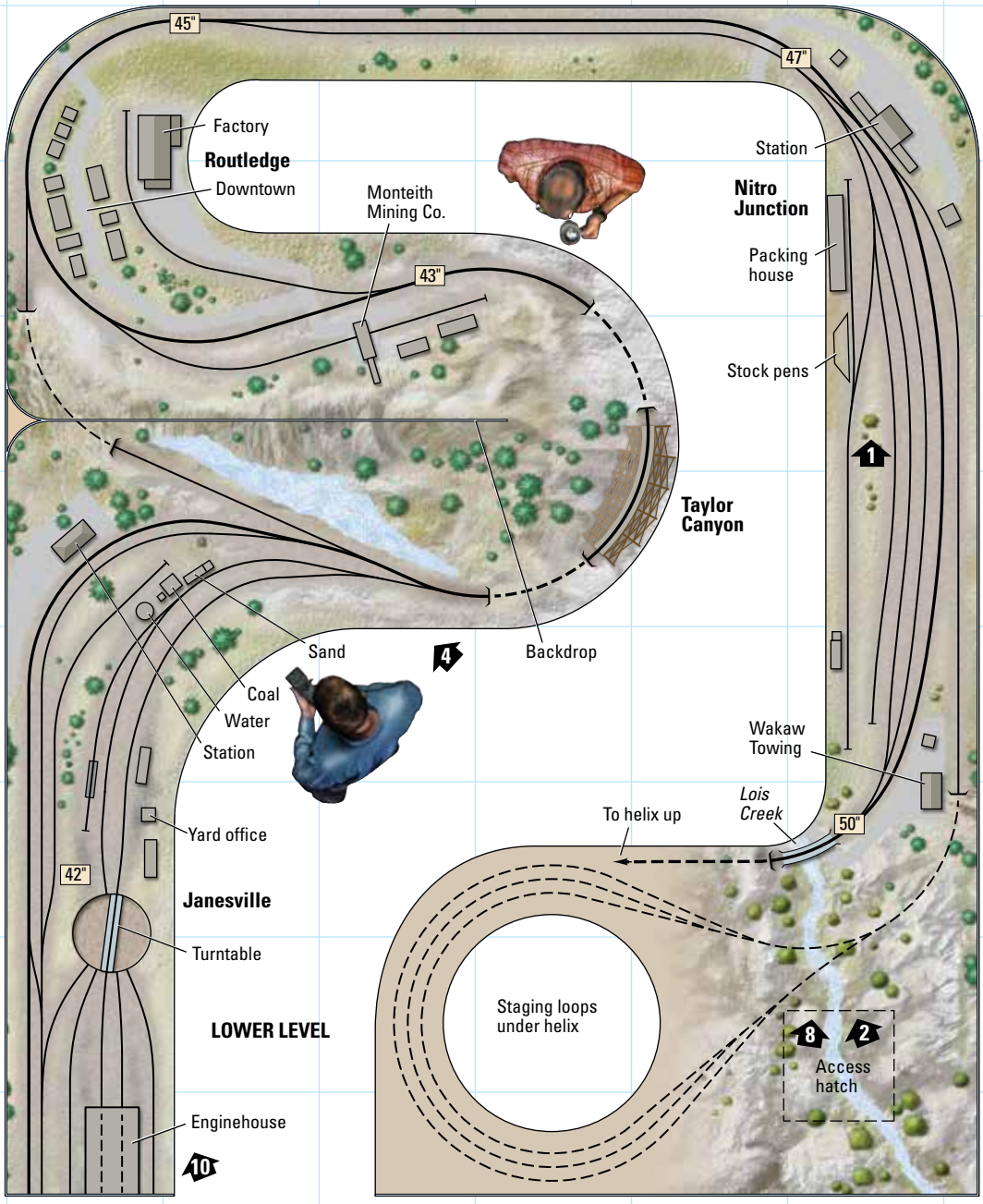
The Nitro Pass & Okanagan got its name (and its nickname, "The Explosive Route") from the dynamite needed to blast the right-of-way through an almost impenetrable mountain pass. The NP&O is a fictional railway located in southern British Columbia, Canada.

I started working on the HO scale model railroad in 1991. Back in the railroad's early days, when it was still called simply the Nitro Pass RR, I had custom decals printed. I lettered several cars with the reporting marks NP until I discovered that each railway must have unique reporting marks. Since NP was already taken by the Northern Pacific, the name evolved from the Nitro Pass into the current name.

My 12 x 15-foot double-deck model railroad is in the basement of our home, below the sunken living room, which leaves a ceiling height of only 6'-6". The track plan is based on a John Armstrong plan published in the February 1991 *Model Railroader*. The layout is 95 percent complete.

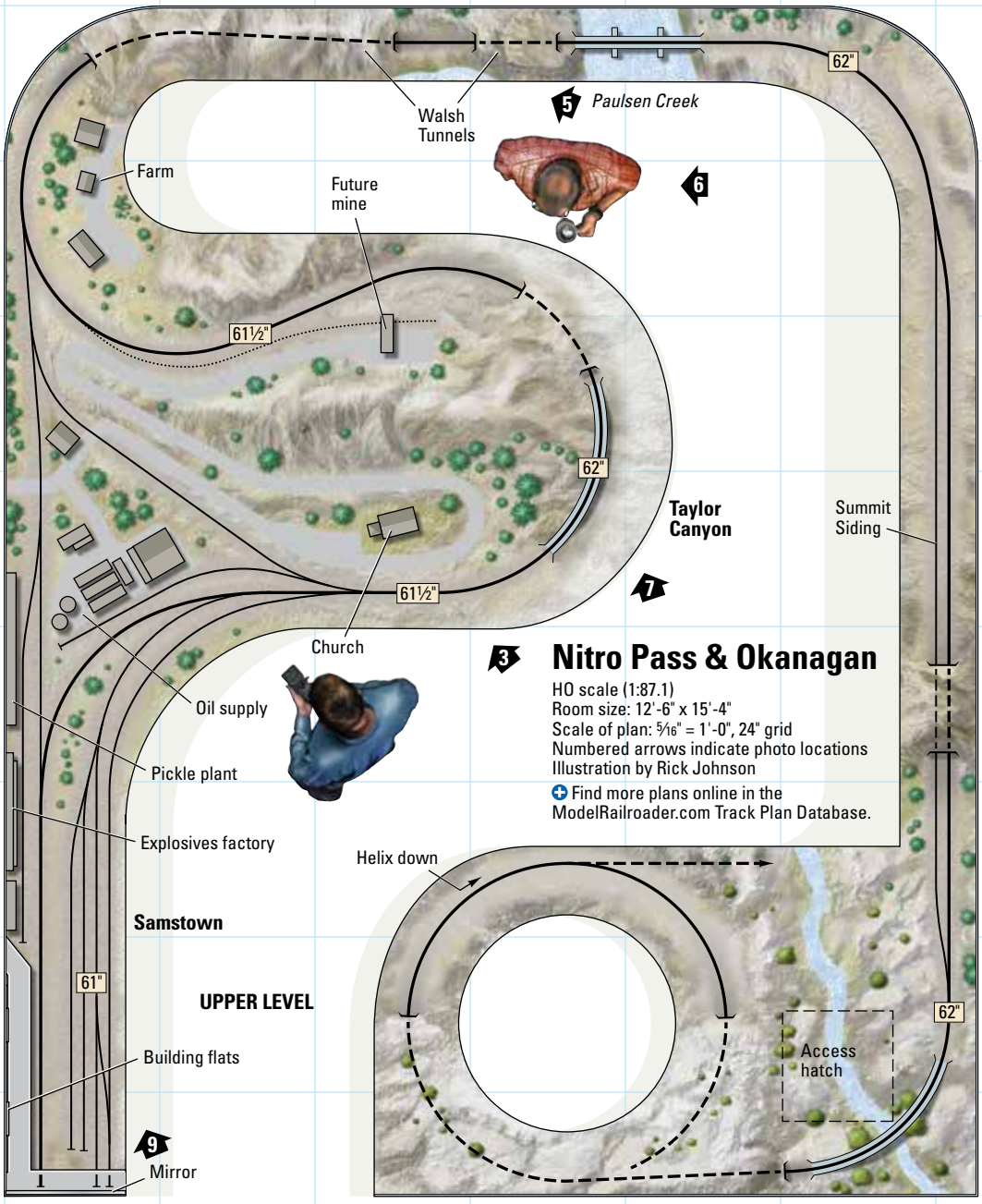
When I was 5 years old, I saw a model train at a Christmas display. I was fascinated by the sight of a train crossing a bridge and entering a tunnel. Ever since, mountain railroads, bridges, and tunnels have intrigued me. A year later, my father surprised me at Christmas with a 4 x 6-foot HO scale layout. Since then, I've been trying to figure out how to add more bridges and mountains to my layouts.

I built a series of successively larger model railroads until I was 16. The last layout I built as a teenager took up so much of my bedroom that I had to sleep under it. Fourteen years later, I met my future wife and discovered that she had an unfinished basement in her home. It was love at first sight, and I moved in quickly. Finally, I had a space big enough



THE LAYOUT AT A GLANCE

NAME: Nitro Pass & Okanagan
SCALE: HO (1:87.1)
SIZE: 12'-6" x 15'-4"
PROTOTYPE: Freelanced
LOCALE: southern British Columbia
PERIOD: 1955-1965
STYLE: double -deck walk-in
MAINLINE RUN: 120 feet
MINIMUM RADIUS: 24"
MINIMUM TURNOUT: no. 4
MAXIMUM GRADE: 2 percent
BENCHWORK: L-girder (lower level), open grid (upper)
HEIGHT: 42" to 62"
ROADBED: Cork on 5/8" plywood, Homasote in yards
TRACK: Micro Engineering code 55 and 70 (visible track), Atlas code 100 (staging)
SCENERY: plaster over cardboard webbing, natural rock and sand
BACKDROP: Photos or painted on tempered hardboard
CONTROL: Keller Engineering Onboard analog command control



to get back into the hobby in a serious way.

My favorite parts of model railroading are detailing, painting, and weathering rolling stock and structures, as well as detailing scenery. As a professional photographer, I'm constantly reminded that the camera doesn't lie. A photograph displays all the imperfections of a model scene in vivid, and sometimes brutal, detail.

CONCEPT AND DESIGN

My original plan was to create a fictional standard gauge railway with the look and feel of a narrow gauge road. One of my influences was the Kaslo & Slocan branch of the Canadian Pacific (CP) in southern British Columbia. The K&S was originally a narrow gauge railway built by the Great Northern. When CP took it over, it converted the track to standard gauge. Other prototypical influences are CP's Kettle Valley RR and the mining railroads in Northern Idaho.

In my fictional world, the NP&O is a short line partly owned by CP. My original scenario was to specifically model the summer of 1955 in southern British Columbia, with a railway serving the mining industry in the south and the fruit growing region of the Okanagan to the north. To that end, 95 percent of my equipment is vintage 1955 or older. Inevitably, I acquired a few pieces of newer equipment that I can only run prototypically if I switch to modeling 1965. Over time my adherence to modeling a strict time period has mellowed.

I wanted to have the maximum run between towns and industries, so due to

2 This view from the access hatch near the helix shows how Don blends scenery between decks. Straight ahead is Taylor Canyon, while at right is the town of Nitro Junction on the lower deck and Summit above.

my limited space, I used a two-deck design with a helix linking the two. This allowed for a much longer run than a single-deck plan.

I modified John Armstrong's track plan to fit my space and added a hidden storage yard under the helix for additional trains. At the time, I wasn't aware of the value of staging at both ends of the main line, a feature I now wish I'd incorporated into my plan.

I managed to keep the grades to 2 percent maximum and the curves to a minimum radius of 24". The small yard at Nitro Junction is on a 1 percent grade, which isn't ideal, but was necessary to keep the maximum grade to 2 percent. The ruling grade in the helix allows a single locomotive to pull a 10- to 12-car train. That works well, as my sidings are limited to trains of 12 car lengths.

To make my trains look more realistic when negotiating 24" curves, I only operate first-generation, four-axle diesel locomotives and a small 2-8-0 Consolidation steam locomotive. Likewise, my freight cars are all 40 feet or shorter. Cars longer than that don't look realistic on sharp curves, as the angle between the cars is magnified in photographs. My passenger cars are 60 feet long instead of the prototypical 80-foot cars.

BENCHWORK

The benchwork was built from 1 x 4 lumber with 2 x 2 legs. I used L-girder benchwork on the lower level and open-frame benchwork for more clearance on the upper deck. L-girder benchwork is roughly twice as thick as box girder benchwork when made from the same size wood.

I treated myself to new table and chop saws when I began building the Nitro Pass. These tools made making the benchwork quick and enjoyable.

The roadbed is ⅝" plywood cut cookie-cutter style with a jigsaw. I added cork roadbed to create a realistic

3 **Alco RS-1 no. 7, painted for the 25th anniversary of the NP&O, pulls a freight train past the church at Samstown. The Atlas locomotive has been detailed with grab irons, class lights, brake hoses, and a snowplow. Don made the sagebrush by grinding up an old seat cushion and dyeing the foam with fabric dye.**

5 **Canadian Pacific no. 8427, a Montreal Locomotive Works RS-3, runs through the Walsh tunnels. The concrete rock sheds were made by pouring Hydrocal plaster into wooden molds. The tunnels are based on the Canadian National's Skoonka Tunnels.**

Backdrops, photographed and painted

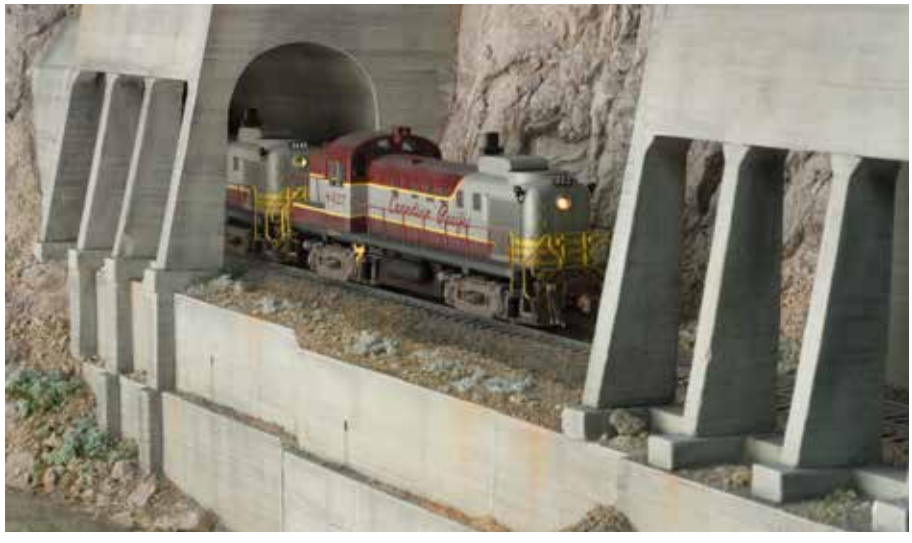
4 **Don's backdrops, visible here in a gap between three-dimensional mountains, are a combination of photographs and airbrushed sky.**

I CREATED MY BACKDROPS using my own photos and by painting them. The sky was painted using an airbrush, which allowed me to smoothly fade from light blue sky at the bottom to a darker blue at the top. I added clouds in some areas using an airbrush with homemade stencils.

My first photo backdrop was made before digital photography. It's a series of five 16 x 20-inch prints mounted on sheet styrene. Later photo backdrops were made seamlessly with photo editing software and a large-format printer.

Photo backdrops can be strikingly effective in achieving realism in model train photos. Unfortunately, however, a detailed photo backdrop can draw attention away from the modeled scene.

My goal is to have the modeled scenery be the same colors and tones as the backdrops so the transition between the two is hardly noticeable to the eye and the camera. I apply thin acrylic paint in my airbrush to weather my track and structures, often right on the layout. Using lots of reference photos when building and finishing scenery greatly helps this process. – *Don Weixl*



Balancing lighting color

6 **This photo shows portions of both decks of Don's layout. Notice how much more orange the lower deck looks compared to the upper deck.**

TWO-LEVEL LAYOUTS are great for adding mainline run length. However, lighting the lower level is tricky given the limited space to install and create even lighting. I used traditional tungsten-filament light bulbs under the upper deck to light the lower. The upper level is lit by 36" fluorescent tubes.

Having two different color temperatures of light makes for challenging photography. If you set the white balance for the fluorescent light, the tungsten lights will create an orange cast. If you set it for the tungsten lights, the fluorescents will make things look green.

The curious thing is that when viewing the layout in person, the human brain compensates for the color cast of the lighting. Only when viewing the scene in a photo, away from the its context, can the eye see the difference.
– Don Weixl

roadbed profile. Sheets of Homasote were used in the yard areas.

The design of the benchwork was critical to allow for viewing of both levels without difficulty. The upper level is narrower in most cases to avoid obstructing the view of the lower level. The spacing between decks is 15" between Samstown and Janesville, but it narrows to only 9" at the base of the helix by Nitro Junction. These distances are designed with my viewing angles in mind; I'm 5'-9". Taller or shorter operators will have a slightly different perspective. I keep a step stool handy to allow shorter operators a better view of the upper deck, if necessary.

TRACKWORK AND CONTROL

I used code 70 weathered Micro Engineering flextrack for all visible track. Code 55 was laid for some lightly used sidings. The hidden storage yard has Atlas code 100 flextrack.

About half of the 39 mostly Shinohara no. 6 turnouts are powered by a variety of switch machines picked up from swap meets, friends, and elsewhere. Spring action was added to the non-motorized turnouts by the addition of a RadioShack micro switch. I scratchbuilt two curved turnouts where standard turnouts wouldn't fit. All turnouts have powered frogs.

Using code 70 Micro Engineering flextrack was one of the best decisions I made. Its fine detail looks fantastic in photos, especially after being weathered with an airbrush.

I use a 1980s-vintage Keller Engineering "Onboard" command control system. Several model railroaders gave me their Onboard equipment when they upgraded to DCC. I have enough spare parts now to last years. The challenge of the Onboard system is that the decoders are large and give off heat. Decoder installation often requires major surgery to my locomotives.

7 **Nitro Pass & Okanagan RS-1 no. 9 creeps over the steel trestle at Taylor Canyon. The trestle was made using Micro Engineering parts. Homemade rubber molds were used to cast the rocks. The locomotive is an older Atlas model.**

SCENERY AND STRUCTURES

Realistic scenery with lots of fine detail is crucial for good model train photographs. I used Dave Frary's water-based scenery system described in his book *How to Build Realistic Model Railroad Scenery* (Kalmbach Books, 2005). Natural fine rock and sand were used. I painted the rock when I needed to match it to the existing mountains and backdrops. Bodies of water were made using Enviro-Tex casting resin. One of these years I'll muster the courage to attempt creating ripples on the water. To date, it's a very calm day on the Nitro Pass with very still water!

Some areas of southern British Columbia that I model are arid, almost desert-like. Sagebrush is common. I made my own ground foam to model the sagebrush by grinding up chunks of an old cushion and dyeing them to create the beautiful blue-green colors.

My structures are a mix of scratchbuilt and kit buildings. I'm slowly upgrading the buildings that could use more detail. Every building is weathered to blend in with the local environment.

The steel bridges on the NP&O are based on Micro Engineering kits. The scratchbuilt wooden Taylor Canyon trestle is based on a prototype in Myra Canyon on the abandoned Kettle Valley Ry. I cut the timbers from clear pine on my table saw. The timbers were dyed with thinned liquid shoe polish to get the creosote look. I cast the piers, footings, and abutments for all bridges using Hydrocal in wooden molds made from stripwood glued to plywood.


Micro Pass
9

8 **A Canadian Pacific passenger train pulled by an A-B set of FA-2 diesels leaves the yard at Nitro Junction. The FA-2s are Proto 2000 models with CP-specific winterization hatches added.**

9 **An Alco switcher idles nearby while a Canadian Pacific freight pulled by a pair of Montreal Locomotive Works RS-3s enters the yard at Samstown. Flats and photos add visual depth to this scene, which is only 18" deep.**

ENGINES AND ROLLING STOCK

I'm now past the acquisition phase ("Oh, sure," says my wife) and focused on getting my rolling stock and locomotives as detailed and as smooth running as possible. I have 12 powered locomotives plus a few unpowered diesels. This is about twice as many as I actually need. I'm slowly upgrading and modifying my Canadian Pacific locomotives to duplicate the unique prototypes.

My freight cars are mostly older, inexpensive ones that I enjoy upgrading and repainting. I have about 80 freight cars and eight passenger cars. All roll on metal wheels, which helps to keep the track clean. Clean track is critical for the Onboard system to function smoothly.

10 **Both NP&O and Canadian Pacific locomotives are serviced at Janesville Yard's two-stall enginehouse. The Russell snowplow is used to keep rugged Nitro Pass in southern British Columbia clear in winter.**

OPERATION

Over the years I've developed a plausible operating system. My track follows a point-to-point arrangement with return loops at each end to allow for continuous running. I usually use the return loops and run two or three trains at a time.

The hidden staging I added under the helix is halfway through the mainline run. A central storage yard isn't an effective way to introduce off-scene trains without having to backtrack at some point. The ideal situation would be to

have hidden staging tracks at each end. Currently, I operate prototypically by running point-to-point with each train terminating at the yard at either Samstown or Janesville.

HINDSIGHT AND FORESIGHT

The biggest drawback of two-level layouts is the limited workspace between levels. I have hit my head countless times against the upper level while working on the lower. As my near vision deteriorates with age, it becomes harder to work under the top level installing switch machines, adding wiring, and the like. Looking up eliminates the bifocal area of my glasses.

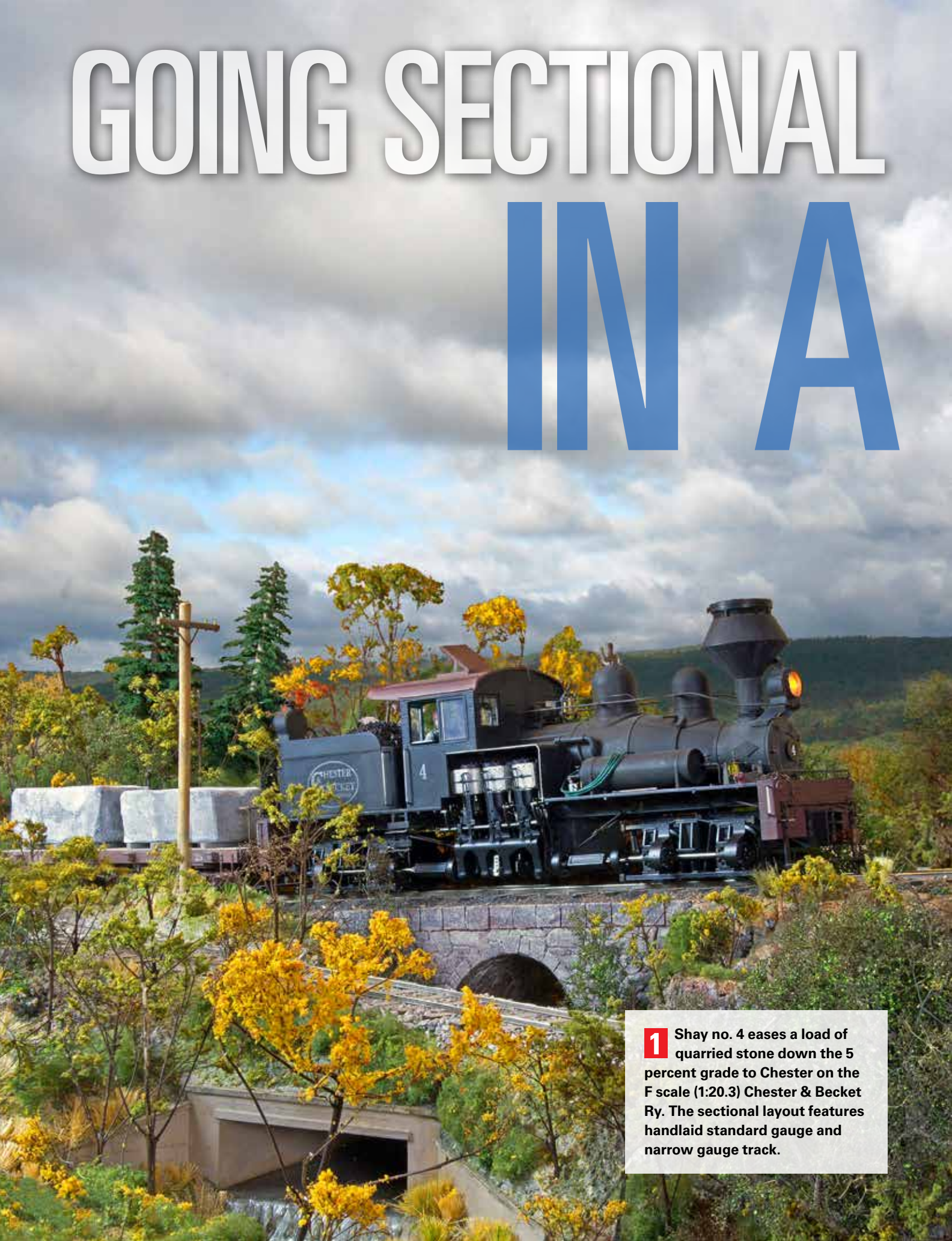
It's challenging to stick to a concept when you spread construction over 25 years. There are two decisions that I regret: I used photos of a big city for a backdrop behind the small yard at Janesville, when a smaller town would have been more realistic. I also built a rock shed based on Canadian National Ry.'s Skoonka Tunnels, though it's unlikely that a branch line would have had the resources to build such a structure.

For the future, I'm getting input from experienced operators to formulate more elaborate operating scenarios. I have one siding and a mine operation yet to build and more details and vegetation to add to the town of Rutledge. Fine-tuning my locomotives, rolling stock, and structures and photographing my layout will keep me busy for years to come. I'm excited to see my 25-year vision materialize as the various projects on the NP&O blend together. GMR

MEET DON WEIXL

DON WEIXL HAS BEEN a professional photographer for 35 years. Don lives with his wife, Jane, and daughter, Taylor, in Vernon, B.C. Other interests include skiing, camping, hiking, and auto racing. More photos are on Flickr: www.flickr.com/gp/donweixl/2fw31

GOING SECTIONAL IN A



1 Shay no. 4 eases a load of quarried stone down the 5 percent grade to Chester on the F scale (1:20.3) Chester & Becket Ry. The sectional layout features handlaid standard gauge and narrow gauge track.

The Chester & Becket Ry. models a rugged New England short line in large scale

By Steve Erickson ▪ Photos by Doug Scott and Mike Tylick

BIG WAY

STARTING IN SEPTEMBER 1994, *Model Railroader* ran a series of articles by Mike Tylick on the Pioneer Valley O scale railroad, a large portable shelf layout. That layout was a pioneer in more than just name; it was MR's first O scale project layout. In four months, Mike showed how to build a realistic, prototypical shelf layout. It opened the eyes of many to what could be done in a scale larger than HO.

A few years later, the first mass-produced On30 equipment came onto the market, and the leap from the concepts used by the Pioneer Valley to the current On30 boom isn't a large one.

For years after the articles were published, the layout was displayed at the Amherst Model Railway Society's annual train show in West Springfield, Mass., winning awards and delighting the public. The Pioneer Valley layout has since been retired.

By 2005, Mike Tylick and Steve Morrill, the drivers behind the Pioneer Valley, had already decided they were ready for something new. Steve proposed that they create something bigger, but still sectional. Mike laid out a track plan using CadRail. The plan was revised in 2009, and construction got underway in earnest. The result is the Chester & Becket, an F scale portable layout that can be displayed at shows or in an average-sized basement. [F scale is the National Model Railroad Association's designation for 1:20.3-proportion trains on 45mm "large scale" track. – *Ed.*]

More than a decade later, the Chester & Becket is moving toward completion. The progress can be seen at the Amherst show each January. In 2015, three completed sections won a "Best in Show" award. A favorite of both adults and children, it has a presence that can't be duplicated in smaller scales. Every bit of detail can be seen and appreciated, even from a distance.

THE BIG IDEA

Large scale is most often used in outdoor garden railroads or small displays. Not the Chester & Becket. When all six sections are assembled, it fills three walls of an 18 x 24-foot room.

The layout depicts both actual (quarry) and fictional (logging) operations on a short line that ran through western Massachusetts from 1898 to 1931. The historians of the road claim that it was the first standard-gauge mountain railroad, using switchbacks to

2 Engine no. 4, a two-truck Shay, rolls by while no. 1, a Porter 0-4-0 switcher, works Chester Yard. The locomotives are Bachmann models that have been detailed and custom decorated.

3 **A yard worker chats with the engineer of Shay no. 4 at Chester Yard. Scenes like this are important on large-scale layouts, where details are more visible. The figures are from Woodland Scenics.**

surmount a steep grade from the quarry up to Chester. Fortunately, the loads went downhill.

Early on, the C&B was absorbed into the Boston & Albany system. The C&B's main job was to haul granite from the quarries in Becket to Chester, where the slabs were made into finished product. The railroad was just under 5½ miles long, and it was always standard gauge. (Our layout is narrow gauge, though.)

Chester Station stands today, having been saved in 1990 and moved across the track from its original location. Built in 1840 by the Western RR, the wooden station was never replaced by the more modern brick-and-stone B&A stations built toward the end of the 19th century.

Sections of the rail line have been replaced with a hiking trail that follows the right-of-way and gives access to the magnificent arch bridges of the railroad.

A TEAM APPROACH

As is the case with many great model railroads, a collaboration of talent made the C&B what it is. Mike's experience modeling in many scales, his artistic abilities (he's a retired art teacher and a graduate of the Rhode Island School of Design), and his knowledge of the hobby helped to create the "feel" of the railroad.

Steve, an employee of IBM, is an electrical engineer who designed the layout's electrical system and the method of interlocking the modules to hide the seams. He also built a large part of the quarry operation, drawing from knowledge gained as part of a family that worked in the granite industry.

John Sacerdote of the Amherst Society handlaid all the track. The ties are cut from fir on a band saw to enhance a prototype appearance. Since John was such an accomplished track layer, Steve and Mike decided to give him as many challenges as possible, resulting in a plan that's long on operation.

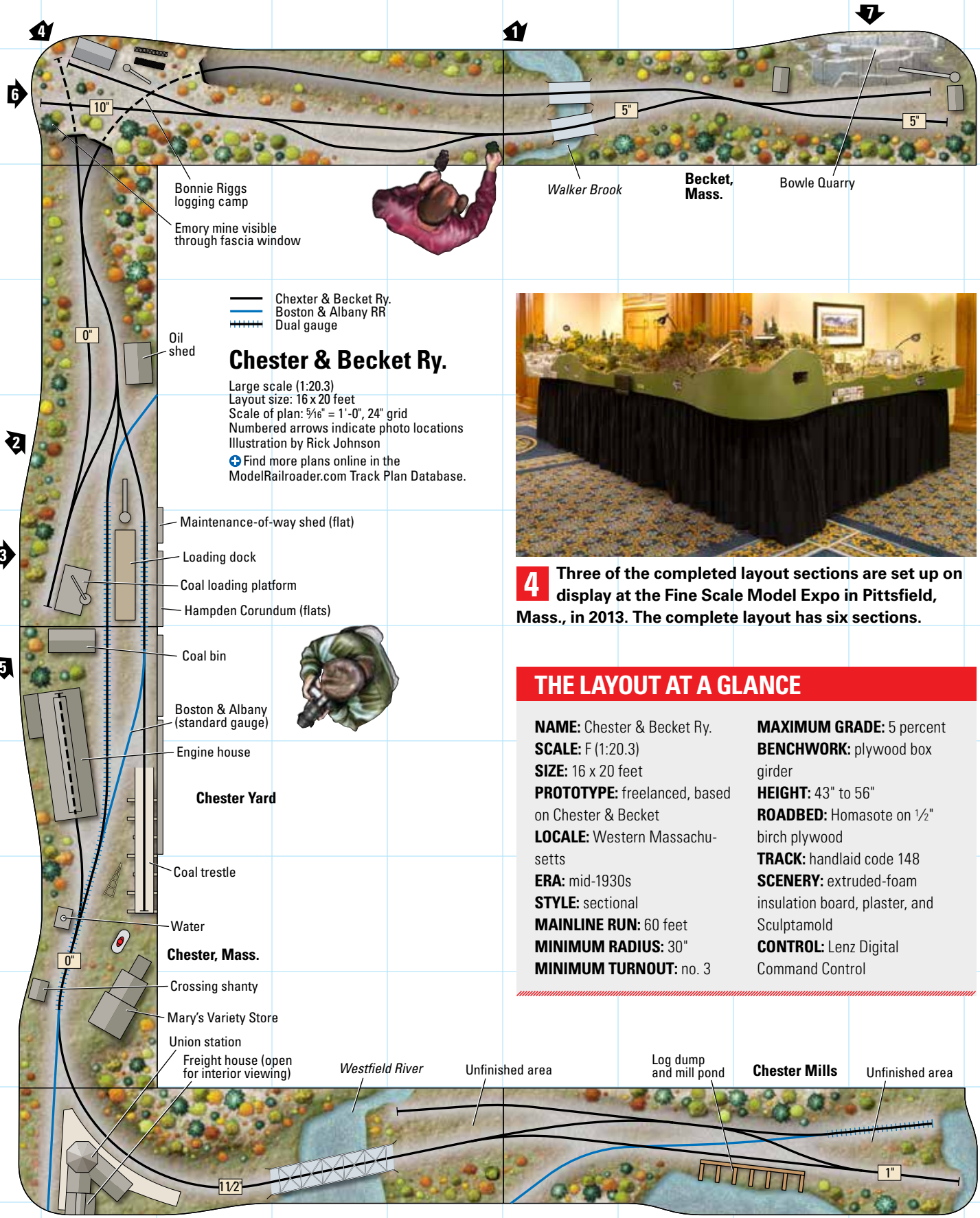
Leon Wasiak joined Mike to do considerable work on the scenery. Additional helpers who have contributed over the years include Bob Kerber, Doug Scott, Peter Higgins, Dave Kiley, Gregg Christopher, and myself.

SECTIONAL DESIGN

The layout sections – they're technically not modules, because they only fit together one way – are 2 x 8 feet. Using a lightweight design developed by Justin Maguire and Roland Marcotte, we cut most of the structural members from lauan and birch plywood. The framework is 2 x 2 poplar.

The leg arrangement is particularly clever, using swivel bolts so the legs swing up in place. Steve cut the stops from ABS plastic. The legs are slanted out about 15 degrees to create a trapezoid shape that doesn't require bracing.

Open-grid construction, uncommon for portable layouts, was used to permit



4 **Three of the completed layout sections are set up on display at the Fine Scale Model Expo in Pittsfield, Mass., in 2013. The complete layout has six sections.**

THE LAYOUT AT A GLANCE

NAME: Chester & Becket Ry.
SCALE: F (1:20.3)
SIZE: 16 x 20 feet
PROTOTYPE: freelanced, based on Chester & Becket
LOCALE: Western Massachusetts
ERA: mid-1930s
STYLE: sectional
MAINLINE RUN: 60 feet
MINIMUM RADIUS: 30"
MINIMUM TURNOUT: no. 3
MAXIMUM GRADE: 5 percent
BENCHWORK: plywood box girder
HEIGHT: 43" to 56"
ROADBED: Homasote on ½" birch plywood
TRACK: handlaid code 148
SCENERY: extruded-foam insulation board, plaster, and Sculptamold
CONTROL: Lenz Digital Command Control

5 Workers refuel Shay no. 4 at Chester Yard. The layout has no backdrop, so Hampden Corundum, the industry in the background, is a fascia flat.

the many changes in track grade and scenery elevation. The lowest track elevation is 43" from the floor, allowing easy viewing and operation. The logging portion is more than 10" higher, making for a prototypically correct 5 percent grade.

Thanks to their size, transporting the sections is a bit more complicated than with an N or HO scale modular railroad. These don't simply fit in the back of an SUV. The group rents a medium-sized truck to transport the six pieces, which are stored when not in use. Although two people can move each section, four make it an easier task.

SCENERY

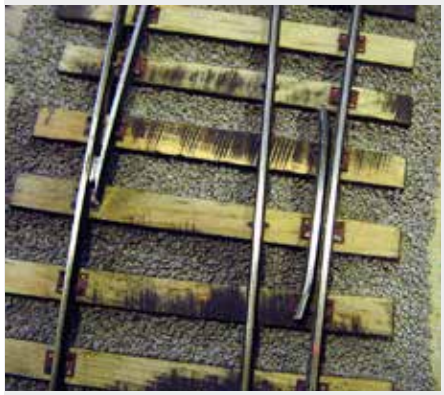
Leon was the main scenery specialist, with Steve focusing on the rough terrain and Mike helping with the finish work. The goal was to have a cluttered, somewhat forested look to the scenery, with plenty of rock showing. Woodland Scenics and Scenic Express materials (particularly pine trees) were used to especially good effect, as the size of the material is dramatically smaller in F scale. Some trees and other vegetation have been made from a variety of craft store items and real tree branches.

The goal, as Mike puts it, is "to ensure that no two scenes are exactly alike. Especially in F scale, you have to be

careful not to repeat a scenery technique. Variety adds interest to the layout."

Mike also noted that the trees on the layout top off at a scale 20 feet – fairly short for a real tree, but still tall on a large-scale model. It's a decision that was based on practical considerations. "If the trees were the scale height of real trees, they would dwarf even the F scale equipment and make the layout impossible to move," Mike said. "The reality is that the time period we are modeling, roughly

Handlaid track



Light rural railroads often used rough-sawn ties. The band saw marks on the Chester & Becket's ties help reinforce the layout's realism. John Sacerdote photo

Spiking the rail to every tie of handlaid track is a lot of work, but in large scale, the extra effort pays off in a more realistic appearance. John Sacerdote photo

WHY HANDLAID TRACK? The answer is, "Because it looks great." The best-looking track I've ever seen has been handlaid. Since you're placing ties by hand, there's no exact pattern to it, so it doesn't look too perfect. When you're modeling backwoods short lines, that's exactly the look you're going for.

I use code 148 rail, usually used for O scale track, but it's just right for light-duty rail on this Fn3 layout. The spikes are ½" long, which is long enough to make it through the ties and into the Homasote. Ties are cut from pine on my band saw. In F scale, you can easily see the saw kerf marks on these ties, even after lightly sanding them to make them even. This is probably how they would have looked back in the day. All the ties have to be stained. I used different colors for the standard gauge and narrow gauge track.

I work on 18" to 24" at a time. Consulting the track plan, I test-fit the ties and picture how the rail will look, especially in the areas of turnouts, crossovers, and dual-gauge track. Once it all fits, I can begin to set ties and ballast. I apply a generous amount of white glue, which gives me plenty of working time, then place the ties into the glue and immediately apply the ballast.

After spreading the ballast, I brush off the tops of the ties to make sure the ties are exactly where I need them to be. I sight down the tie line to make sure all flows nicely. When I'm satisfied, I let the glue dry at least 48 hours. I can't stress enough how important it is to wait until all ballast is completely dry before laying rail. The ballast will actually hold the ties in place.

After lightly sanding the ties, I start from the intersections of track and work my way out. I spike all outside track first – the stock rails on a turnout, for example – and build the frog last. When building a crossing, I build one part of the line through the diamond's location and then build the second line across the first. That will guarantee a smooth flow and look more prototypical.

It can take a week of spiking rail to complete a track-intensive section. This includes many details installed along the way, such as a tie plate on every tie of the standard gauge track. Also, I put a feeder wire on every piece of rail by grinding a slot in the bottom of the rail, inserting the feeder, soldering it smooth, and feeding it down through a hole drilled in the tie. This means you can't see any track wire. The location of the feeder must be exact.

I don't use jigs of any kind. I simply file each piece of rail (in switches and cross overs) to fit that exact area. I solder all frogs and then cut the flangeways with a short piece of hacksaw blade. When it's done, I end with some great-looking, easy-flowing track. – *John Sacerdote*

6 One of the most popular scenes on the layout is the Hampden Corundum emory mine, which is visible through a window in the fascia.

the 1920s and 1930s, was a period of relative deforestation in this part of New England. We're used to seeing trees, however, so accurately modeling a deforested landscape would look unnatural to most modern observers."

Leon carved most of the rocks from Sculptamold, although some rubber rocks from Cripplebush Valley Models were also used. We found that adding some extra material to the Sculptamold, like dirt or scale ballast, made the rocks set up faster and stronger.

Most of the terrain is extruded-foam insulation board with an overcoat of Sculptamold. Some initial work was done with plaster of paris, but the team found that it chipped too easily. Drywall compound proved to be more durable.

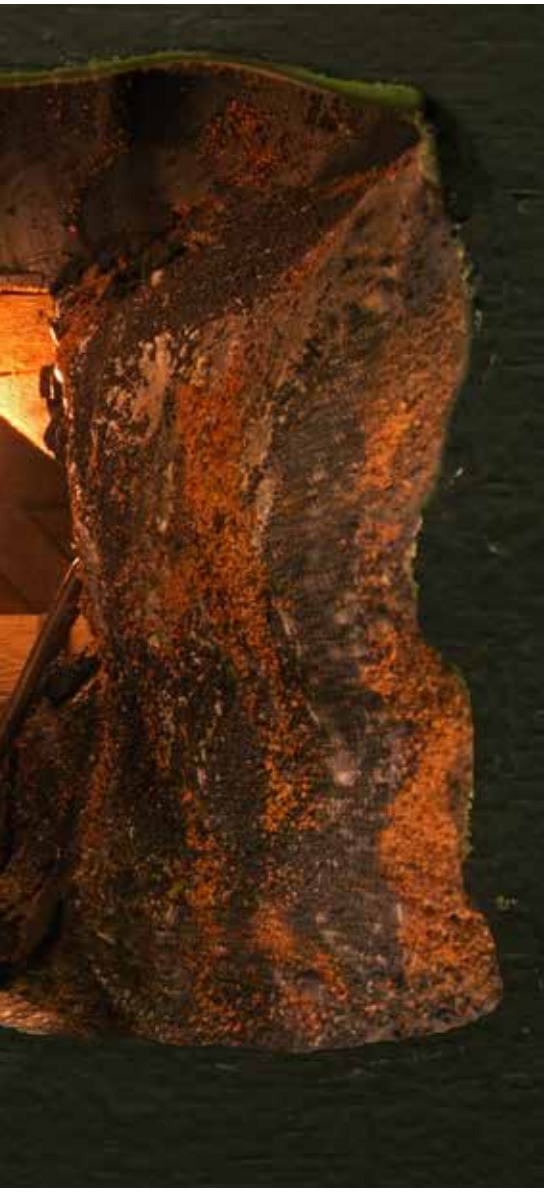
The granite blocks in the quarry are foam board painted with white ceiling paint, weathered with India ink and alcohol, then coated with stone dust. Developed by Steve, the technique closely mimics Chester "blue granite."

One of the crowd-pleasers built into the corner module is a window in the fascia showing a mine interior. The display is lighted and is a favorite of younger viewers. The mine is part of a hill that the railroad tunnels through to pass between two side sections and the front section, thus giving visual separation to the two parts of the layout.

TRACK AND WIRING

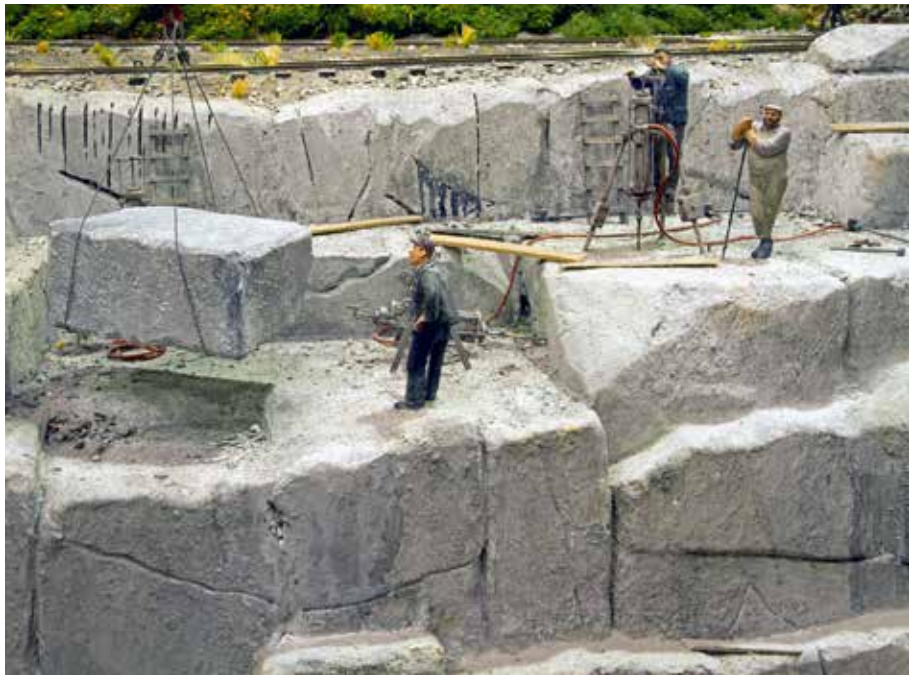
The main line was reimagined as narrow gauge rather than standard gauge to distinguish it from the B&A and add the operational interest of transloading interchange cargo. Part of the layout is dual-gauge, further complicating John's track-laying headaches as well as giving visitors some idea of the small size of these very large models.

The roadbed is cut from Homasote. To lay the track, John used code 148 rail, a commonly used O scale size. In F scale, this works out to about 40-pound rail. The result is a lightweight, low-profile track that looks realistic. Turnouts are operated by ground throws made by Llagas Creek Railways.



Trains on the railroad are operated using a Lenz Digital Command Control system. The track is powered through a bus of 12AWG stranded wire, with 20AWG feeders. Connections are crimp ring terminals with terminal strips.

The modules are electrically connected to each other with multi-pin connectors that are easy to plug and unplug when setting up or dismantling the layout. It's clear that having an electrical engineer like Steve on board makes the whole operation run seamlessly. As Steve said, "My goal was to create an electrical system that would work efficiently throughout the layout but be simple to connect when assembling modules. To do that required absolute precision in the electrical and track-laying areas."



7 Workers hoist a recently cut block of stone at the Bowle Quarry. The stone is extruded-foam insulation board, cut into blocks and painted.

DESIGNED TO IMPRESS

The locomotives are as impressive as the layout itself. Bachmann locomotives, already well detailed, have been further upgraded by the crew. There are two Porter 0-4-0s, a 38-ton Shay, and a Plymouth gas-mechanical switcher. The Porters have sound decoders, and Steve is adding sound to the Shay.

Rolling stock is by Bachmann and is limited to flatcars to move the granite and cars for the logging operation.

The two sections that show the quarry and the sawmill are particularly striking together, as the logging operation is up a steep grade from the main line, and the quarry dips well below the fascia, creating a strong sense of vertical space.

The entire layout was first displayed together at the 2014 Amherst Railway Society Railroad Hobby Show, returning to the location where the Pioneer Valley was seen by tens of thousands over the years. It was the first opportunity for the public to see what the entire layout will look like when completed. The layout won first place in the modular division (although the unfinished section also received a "least completed module" award – a one-time special consisting of a bag of lemons).

Bringing to life a sectional layout that has operational interest, runs smoothly, and accurately represents a specific prototypical place and time in large scale while still fitting into an average-sized basement is no small feat. GMR

Steve Erickson is a retired judge who models the New Haven's Old Colony lines in HO and N scales. In his spare time he builds F scale structures.

MEET THE BUILDERS

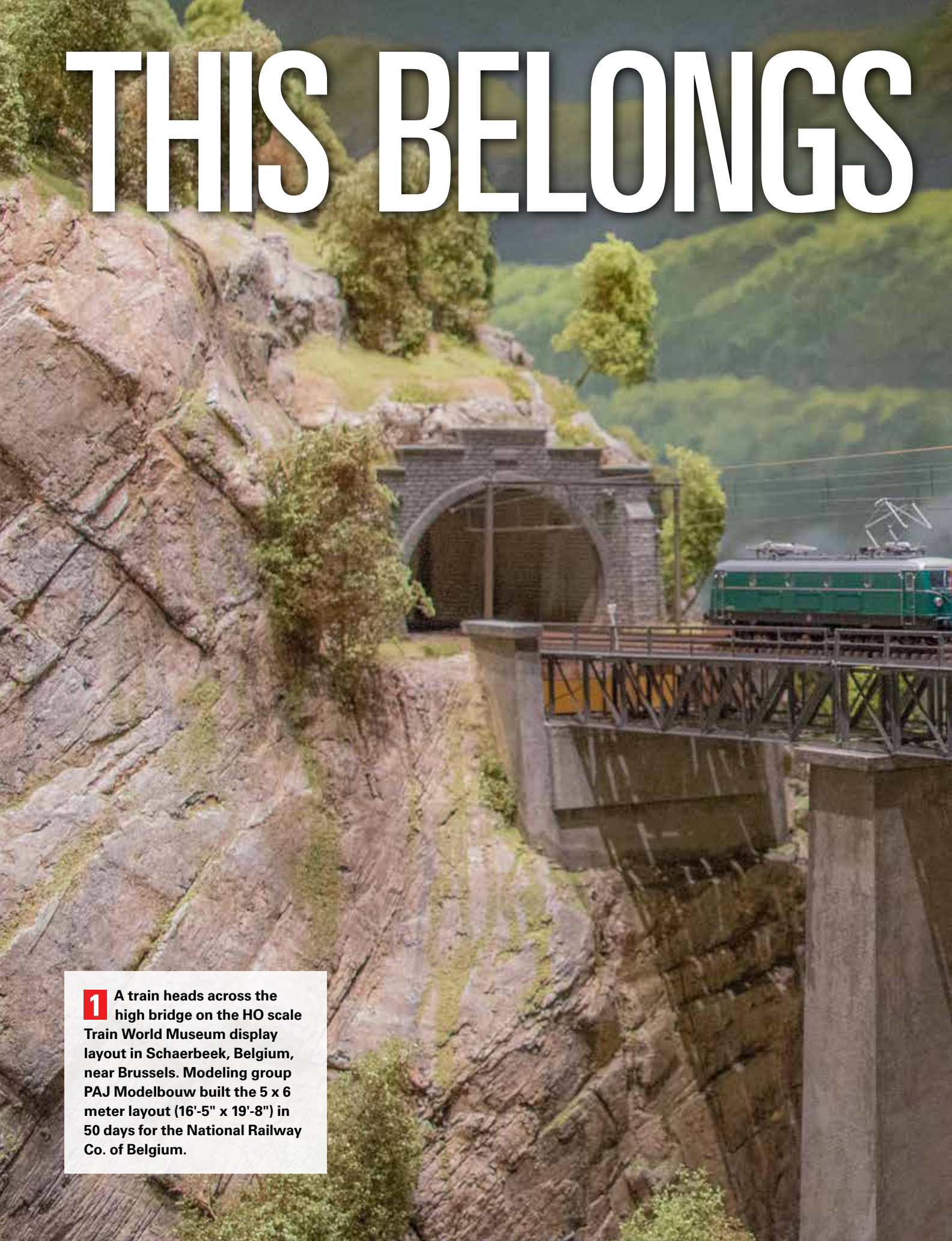
STEVE MORRILL, left, lives in Southbridge, Mass. In 1985 he met Mike Tylick, who got him into the hobby. He's modeled in N, HO, O, and Fn3 scales.

JOHN SACERDOTE, right, discovered model trains in a store's window display when he was 7. Today, he models in HO scale.

DOUG SCOTT, not pictured, is a photographer, railfan, and retired banker. He lives in Eastham, Mass., where he models in HO scale.

MICHAEL TYLICK, not pictured, has been a frequent contributor to *Model Railroader* and its special issues for years.

THIS BELONGS

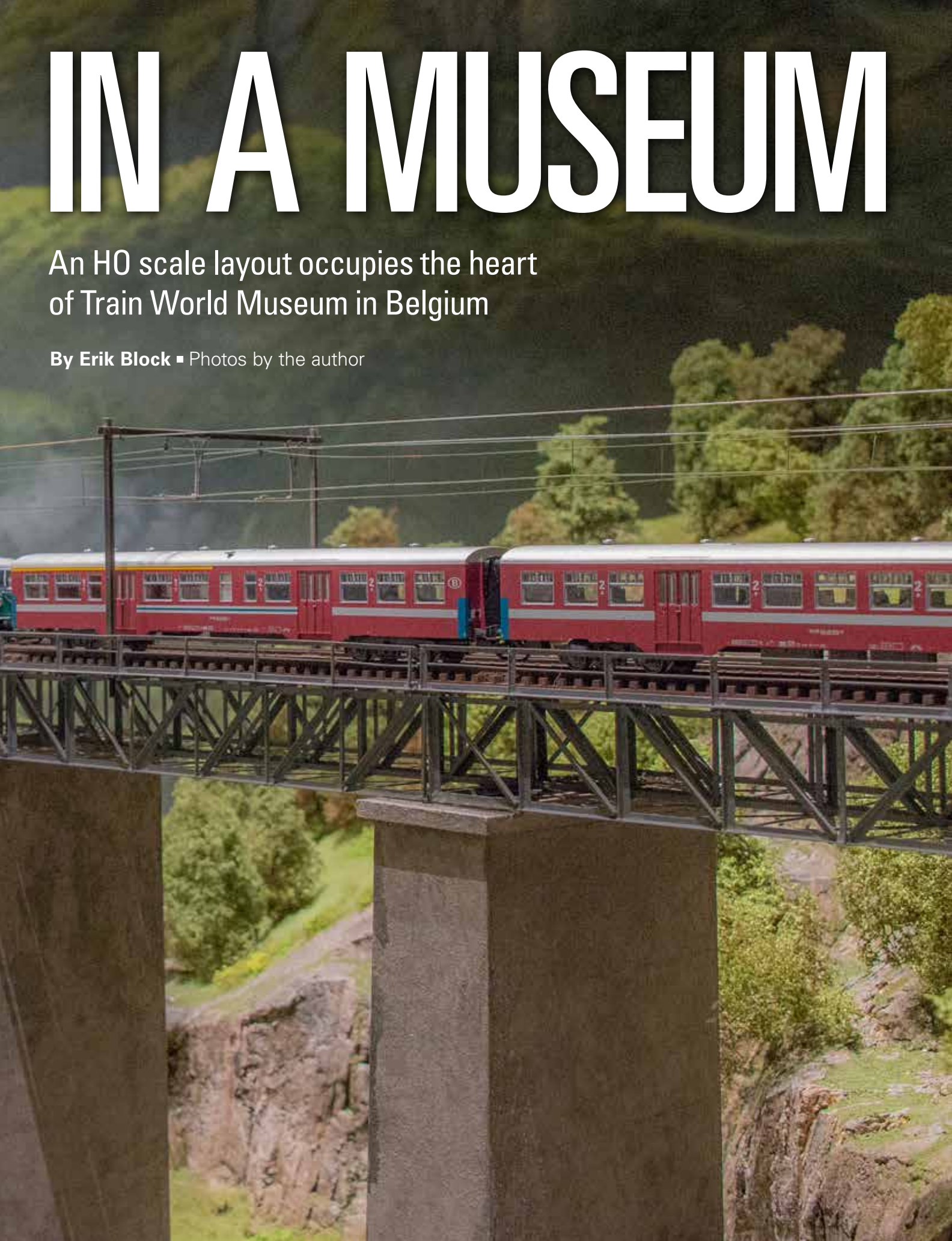


1 A train heads across the high bridge on the HO scale Train World Museum display layout in Schaerbeek, Belgium, near Brussels. Modeling group PAJ Modelbouw built the 5 x 6 meter layout (16'-5" x 19'-8") in 50 days for the National Railway Co. of Belgium.

IN A MUSEUM

An HO scale layout occupies the heart of Train World Museum in Belgium

By Erik Block ▪ Photos by the author



2 **A train pulls up to the station in the village on the lowest level of the layout. Buildings, platforms, and streets on the layout are lighted, and the room lights are synched to a day-to-night illumination cycle.**

3 **The layout is built in the attic of a historic track foreman's house preserved within the museum. Visitors view the layout from a cantilevered deck that extends into the attic.**

IN EARLY 2015, the National Railway Co. of Belgium approached our modeling group, PAJ Modelbouw (PAJ Modeling) with a proposal. The railroad (officially titled *Societe Nationale des Chemins de fer Belges/Nationale Maatschappij der Belgische Spoorwegen*, or SNCB/NMBS) was planning a new national railroad museum in Schaerbeek, near the Belgian capital of Brussels. In addition to many vintage locomotives, rail cars, and artifacts, a model railroad was proposed.

To design the model railroad, we worked with Belgian artist and cartoonist François Schuiten, who designed the rest of the museum.

The museum, which stands next to Schaerbeek Station, encompasses a real track foreman's house. The Train World Museum was built around the house, and the model railroad would be built in the house's attic. Visitors would view the model railroad from a bridge that enters through the roof, as if from a viewpoint on the surrounding mountains.

Train World Museum

HO scale (1:87.1)
Size: 3.8m x 6m (12'-6" x 19'-8")
Scale of plan: ⅜" = 1'-0", 24" grid
Numbered arrows indicate photo locations
Illustration by Rick Johnson and Roen Kelly

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

THE LAYOUT AT A GLANCE

NAME: Train World
SCALE: HO (1:87.1)
SIZE: 16'-5" x 19'-8"
PROTOTYPE: freelanced
LOCALE: Ardennes region of Belgium
ERA: 1980s
STYLE: museum display
MAINLINE RUN: 181 feet
MINIMUM RADIUS: 22¾"
MINIMUM TURNOUT: none
MAXIMUM GRADE: 2.2 percent
BENCHWORK: open grid
HEIGHT: 12" to 60"
ROADBED: cork
TRACK: Märklin K-Rail (visible track), Märklin C-Rail (hidden track)
SCENERY: plaster cloth over wire mesh covered with Sculptamold
BACKDROP: painted on drywall
CONTROL: direct-current cab control with motion detection

The museum wanted a dynamic model railroad that would fill almost the entire attic. The locale and atmosphere had to be Belgian, but the background painting was more freelanced. Downstairs, the track foreman's house would be renovated as it appeared in 1958, when the World Expo was in Brussels.

NOT A TYPICAL HOME LAYOUT

From the start, the project was different from all the other projects we did before. First, there was a deadline of six months, working on weekends only, so we had about 50 days in which to complete the layout.

The layout itself was also different. It had to be able to run six days a week, seven hours a day, without interruptions. The train controls had to be simple, reliable, and automatic. The museum also wanted day-to-night lighting.

The space for the model railroad was approximately 16'-5" x 19'-8" (5 x 6 meters). Since it would be viewed from above, we could maximize the height of our mountains by building the base of the layout directly on the wooden attic floor. The layout's wiring would be laid beneath the scenery.

We kept the track plan simple, a double-track main line with no turnouts. One train would run in each direction. The trains would cross through the scene three times on three different levels, linked by helixes concealed in the hills. One of the helixes would be visible to visitors through a glass window.

4 **A freight train crosses the low bridge, headed toward the village. The group sculpted the rocks by hand from Sculptamold over a shell of plaster cloth on a wire mesh base.**

5 **Another freight train rolls onto the high bridge, which was inspired by the bridge at Moresnet, Belgium. The pillars were made from plywood, and the trusses are brass.**

NOW ON THE WEB

Train World's English-language site is at **www.trainworld.be/en.** You can also see a video of the layout at **www.ModelRailroader.com.**

6 **A window allows visitors to watch trains climb one of the three helixes that link the different levels of track.**

CONSTRUCTION

We weren't able to get into the museum until March 2015, with the opening planned for September. So we started in advance by building the helixes and the bridges in our workshop.

Three bridges are on the layout, one on each level of track. The largest is 9 feet long and 24" high. It was inspired by the Moresnet bridge in Belgium. The pillars are made from plywood and painted with latex house paint. The spans on top are brass.

Once we finished the bridges and the helixes, we installed them at the museum and started to build the rest of the track work. We used Märklin K-Rail (which conducts power through a row of stud contacts down the middle of the ties) on the visible track and C-Rail (sectional track with attached roadbed) on the hidden areas, including the helixes. The catenary is from Sommerfeldt.

Building the layout was a challenge. Since it would have to fill the entire room, we had to work while standing in the middle of the landscape. So we constructed the mountainous perimeter of the layout first and worked our way toward the lower central area and the village last. We left three access hatches to get back into the layout, if necessary.

THE LANDSCAPE

We roughed in the terrain with wire mesh supported by wooden struts. We covered the wire with plaster-impregnated gauze and sculpted the rocks and landscape with Sculptamold.

The backdrop was painted on the walls of the attic by artist Alexandre Obolensky, and we had to make the landscape blend in with it. So we sculpted the rocks with the background as a reference, rather than using reference photos. We've created many such rocky landscapes before, so even though we all have our own style, we know that what we build will match.

After sculpting the rocks, we added several light and then dark washes. When those washes were dry, we dry-brushed the rock with several colors to give it highlights.

The flocking was applied using a Noch Gras-Master static grass applicator. The trees are from AnitaDecor in Holland (www.anitadecor.nl; site is in Dutch). Normally we'd go into more detail with trees, bushes, and flowers, but because of the viewing distance, no one would see such detail.

The buildings, inspired by the houses of the Ardennes, the French part of Belgium, are laser-cut kits designed and made by dyniMO Modelbouw.

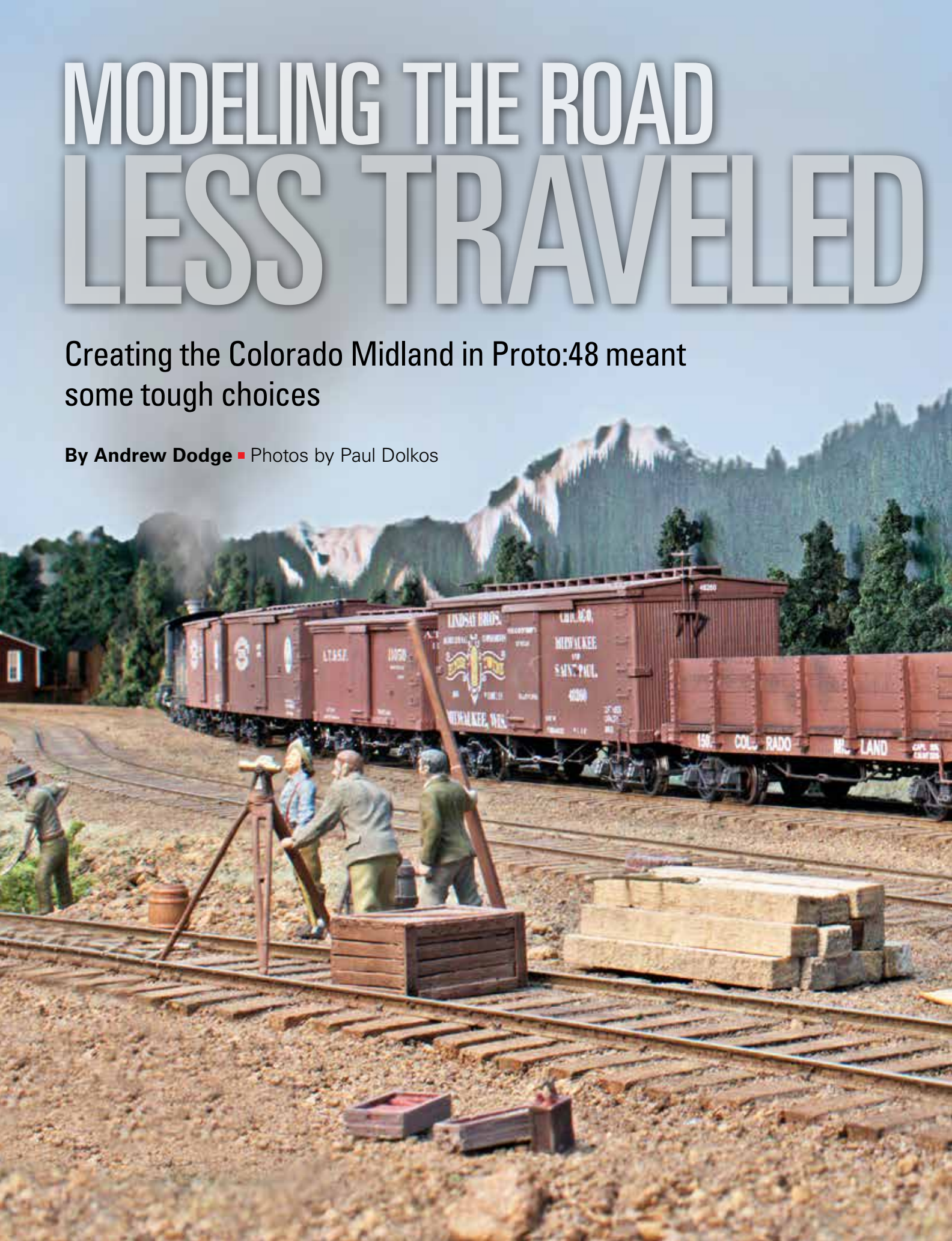
As a crowning detail, the track foreman's house that is home to the model railroad is also modeled on the layout. There's no tiny layout in the attic. GMR

Erik Block is a professional zookeeper who lives in Antwerp, Belgium. He's a member of Branchlines & Backwoods, a group of European hobbyists who model American prototypes. His article "Big train, small layout" appeared in Model Railroad Planning 2014.

MODELING THE ROAD LESS TRAVELED

Creating the Colorado Midland in Proto:48 meant some tough choices

By Andrew Dodge ▪ Photos by Paul Dolkos



1 At Ivanhoe, Colo., engineers prepare to reopen the old High Line over Hagerman Pass as a Colorado Midland train steams toward the Busk-Ivanhoe tunnel on Andrew Dodge's O scale Colorado Midland. Handlaid track, scratchbuilt structures, and scratchbuilt brass locomotives characterize the Proto:48 layout.

2 This view from the entrance to the layout shows the lift bridge connection point at front right, Basalt at right rear, and Sellar at left.

A ride on the train from Durango to Silverton, Colo., in 1953 was my introduction to narrow gauge steam railroading. I rode on a stack of 2 x 4s in the baggage car on the way up and returned in the cupola of the caboose. After many other trips to Colorado, including one to see the last pure revenue operations on the Rio Grande narrow gauge from Alamosa to Chama and back to Cumbres Pass, I was hooked on Rocky Mountain railroading.

In 1967 I started modeling the Denver & Rio Grande Western in HO and HOn3. However, the project lacked focus, quality, and any real sense of the prototype. Twenty years later, I changed to O scale.

I decided to truly integrate my love of model railroading with my long-held interest in late-19th-century American history by modeling the Denver, South Park & Pacific narrow gauge line. [Andrew's South Park layout was featured in *Great Model Railroads 2009. – Ed.*].

However, after dreaming about and modeling Colorado narrow gauge railroads for more than 50 years, I felt I'd done everything I could with them. It was time for a change.

Change isn't always easy, and one has to be prepared to meet new challenges. In 2009 I began to consider what I might like to model on what would probably be my last layout. I quickly chose the Colorado Midland in O scale. But it was obvious from the start that this project would present many obstacles: no imported brass locomotives, no prototypical structure kits, and a limited amount of suitable rolling stock. This wouldn't be easy, but it fulfilled my desire to do something outside the mainstream and take the road less traveled. To quote Robert Frost, "that has made all the difference."

CONCEPT AND THEME

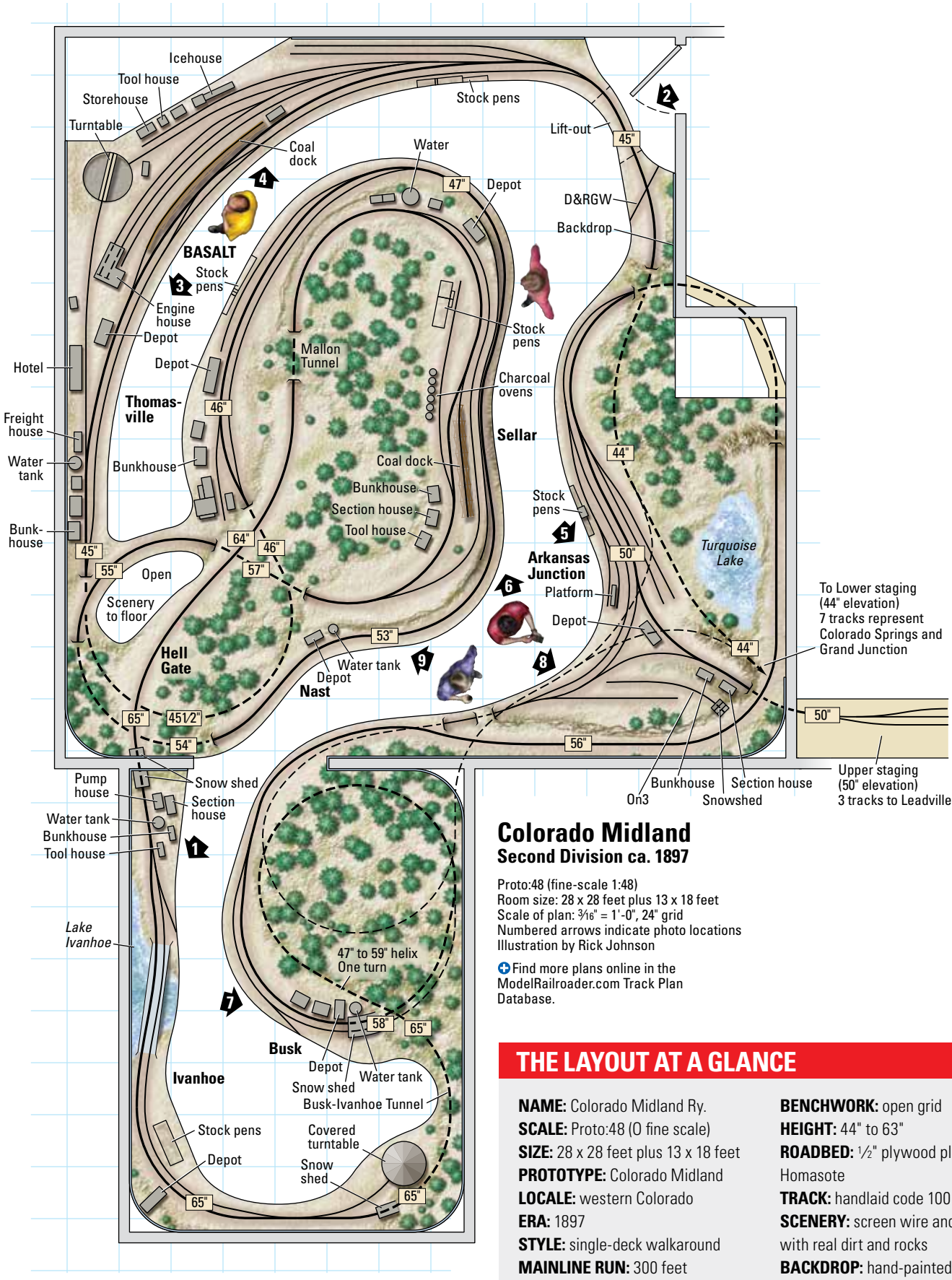
A coherent concept adds vision and purpose to the model railroad. I've always enjoyed the creative process of choosing the scope and theme of a project. One of the challenges was figuring out what time period would hold my interest the longest. I tend to get bored easily, which was something I wanted to avoid. I didn't want to start a layout only to lose interest. On the other hand, my theme couldn't be so esoteric that other modelers and visitors during open houses wouldn't get it. I wanted visitors to feel that I had succeeded in re-creating a vibrant part of late 19th-century American railroading.

The Colorado Midland was the first standard gauge railway through the central Rockies, which meant that the theme of my modeling project would focus on late 19th-century mountain railroading. The historical Colorado Midland operated between 1887 and 1918, running from Colorado Springs to Grand Junction, Colo.

Going west from the Springs, the Midland had to confront the 4 percent grade over Ute Pass. After reaching the pass at Divide, the Midland climbed several lesser grades until it reached the Continental Divide. Even though the chief engineer surveyed a route with ruling grades in the range of 3 percent, the Midland's daring ascent of Hagerman Pass achieved a legendary place in American railroading.

Stations, water tanks, and other railroad buildings would be the major focus of structures designed to support the theme of mountain railroading. By following the prototype, I could use my space to faithfully replicate several locations on the historic Midland.

Another asset I sought to take full advantage of was my space. I discovered



Colorado Midland

Second Division ca. 1897

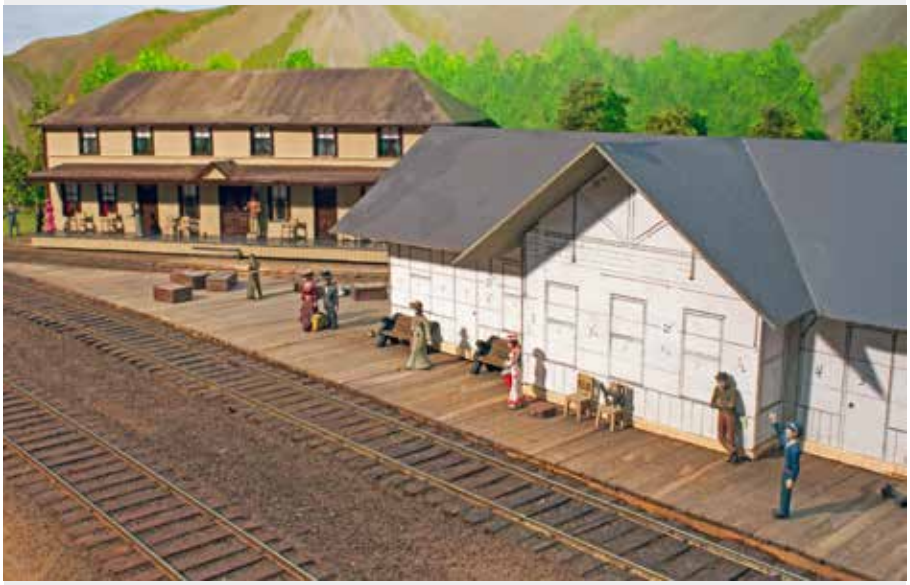
Proto:48 (fine-scale 1:48)
Room size: 28 x 28 feet plus 13 x 18 feet
Scale of plan: 3/16" = 1'-0", 24" grid
Numbered arrows indicate photo locations
Illustration by Rick Johnson

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

THE LAYOUT AT A GLANCE

NAME: Colorado Midland Ry.
SCALE: Proto:48 (O fine scale)
SIZE: 28 x 28 feet plus 13 x 18 feet
PROTOTYPE: Colorado Midland
LOCALE: western Colorado
ERA: 1897
STYLE: single-deck walkaround
MAINLINE RUN: 300 feet
MINIMUM RADIUS: 46"
MINIMUM TURNOUT: no. 6
BENCHWORK: open grid
HEIGHT: 44" to 63"
ROADBED: ½" plywood plus ½" Homasote
TRACK: handlaid code 100
SCENERY: screen wire and plaster with real dirt and rocks
BACKDROP: hand-painted watercolors on drywall
CONTROL: NCE DCC

Plexiglas structure cores



3 Rather than build structure mock-ups that would inevitably end up in the trash, Andrew designed and built Plexiglas structure cores that he would later sheath with wood siding to complete the buildings.

WHEN MODELING a prototype scene, I like to build full-scale structure mock-ups in Plexiglas. It took only a few weeks to draw and fabricate 30 or so of these stand-in buildings. Using them during the design phase revealed a few serious problems in the location of tracks and greatly improved the layout.

For example, when developing the plan for the yards at Basalt, Colo., I needed to place a single track between the station and the Harvey House Hotel. Though building footprints would provide some guidance, an accurate picture could only be provided by accurate scale models of the station, with its platforms and 5-foot roof overhang, and the hotel, with its porch.

In another instance, the model of the Basalt icehouse led me to deviate from the prototype. As the yard was designed, the icehouse tracks would be at the limit of my reach, between the structure and the wall. The height of the building would have prevented me from seeing or reaching the couplers.

Building with Plexiglas also shortened my total construction time. Rather than throwing mock-ups in the trash, I could use my Plexiglas structures as the cores of my final buildings. When it came time to build the structures, I simply covered the cores with clapboard or board-and-batten siding in a matter of weeks, not years. The roofs and chimneys on these structures are still to be added, but I will install them all at the same time in order to shorten work time. – *Andrew Dodge*

that the smaller of my two rooms provided a real sense of distance from other areas modeled. This feeling of isolation enhanced the feeling of remoteness of the stations at each end of the almost 2-mile-long Busk-Ivanhoe Tunnel.

DESIGN ISSUES

Designing a railroad is a balancing act between potentially conflicting concerns. For example, although I wanted realistic point-to-point operations, the "little boy" in me who loves to see trains run around the layout wanted continuous operations. Continuous running was also needed so I wouldn't have to turn the train around every 10 to 15 minutes during open houses.

To allow this option, I'd need to run a track across the layout's entrance. It would be problematic to open a lift bridge while operating the railroad. A duckunder that was high enough for those like myself who are getting less agile would make other parts of the mountainous layout too high. I even considered having visitors roll under the layout in a chair with casters. This didn't seem viable, so I opted for a lift bridge that could be ducked under in a pinch.

I achieved a 44" clearance under a bridge made of 1 x 12 pine with 1½" aluminum L-bracing screwed on top. This increased the bridge's rigidity without impacting the clearance underneath. This height let me keep the highest elevation on the railroad below 63".

Track radii and aisle width were other important components in the design. Well-known layout designer John

4 **The coal dock at Basalt was a busy and dirty place where Midland engines were refueled from the coal pockets or by hand. Andrew scratchbuilt steam locomotives like Schenectady-built no. 12 from prototype diagrams.**

Armstrong thought 24" aisles were sufficient, but those days have passed us by. I wanted at least 36" aisles so people could pass each other with ease, and I achieved this in all but one area.

The aisle width in turn affected the curve radius. I built my locomotives to prototype dimensions in order to retain the beauty of their original design. This meant that I wouldn't have the advantages of HO scale Midland 4-6-0s imported in the 1960s. Those models had front trucks that were 14 scale inches longer than the prototype so they could negotiate very sharp curves. Having scratchbuilt one O scale engine, I consulted the Colorado Midland design standards and National Model Railroad Association Recommended Practice RP-11 and settled on a 46" minimum radius.

Another design question centered on how long passing tracks should be. When the Midland started operations in the late 1880s, most trains had only one locomotive, but that soon changed. With the advent of double-heading, sidings were lengthened in order to accommodate more engines and cars. This happened again around the turn of the century, when dispatchers called for three locomotives per train. The Midland's Rule and Regulations book of 1898, one year after my time period, only mentions double-heading, which would limit a freight train to 11 or 12 cars plus two locomotives on 3 percent grades. Since most cars of the period measured 34 feet (8½" in O scale) and the Midland's engines were approximately 60 feet long (15" in O), my trains could pass on 12-foot sidings. While this was doable on my layout, portraying the railroad in 1900 would have required 18-foot sidings, which would have been impossible.

STANDARDS

Constructing a model of a railroad that not only looks prototypical but also runs well requires good standards. Since I was modeling a period before the introduction of articulated locomotives, I didn't have to worry about boiler overhang, but I still had to keep clearance in

5 Westbound passenger train no. 7, the *Ute Express*, has just arrived at Arkansas Junction. The locomotive will make up a train of coaches, sleepers, and baggage cars to go to Leadville, which is represented by staging.

mind. I settled on 5" minimum vertical clearance, which required 6" between railheads at divided grade crossings. This required some careful planning, as I'd settled on a 2 percent maximum grade. I chose this limit because the compression of distances can make grades seem steeper than they are. Also, if I employed the grades of the prototype, the highest elevation of my basement layout would fall somewhere above my living and dining room floors.

Standardizing grades also ensured quality of operations. On the Midland during my time period, one engine could only pull five to six cars up a 3 percent grade. The same principle applies in the modeling world. The steeper the grade, the more strain one places on motors and gearboxes. Also, even with my high-quality Swiss motors and NorthWest Short Line gearboxes, my locomotives still buck when I bring them down from the coal docks. Those grades are very steep, but with poorer quality drivetrains and lower gear ratios, the same thing would occur at lower grades.

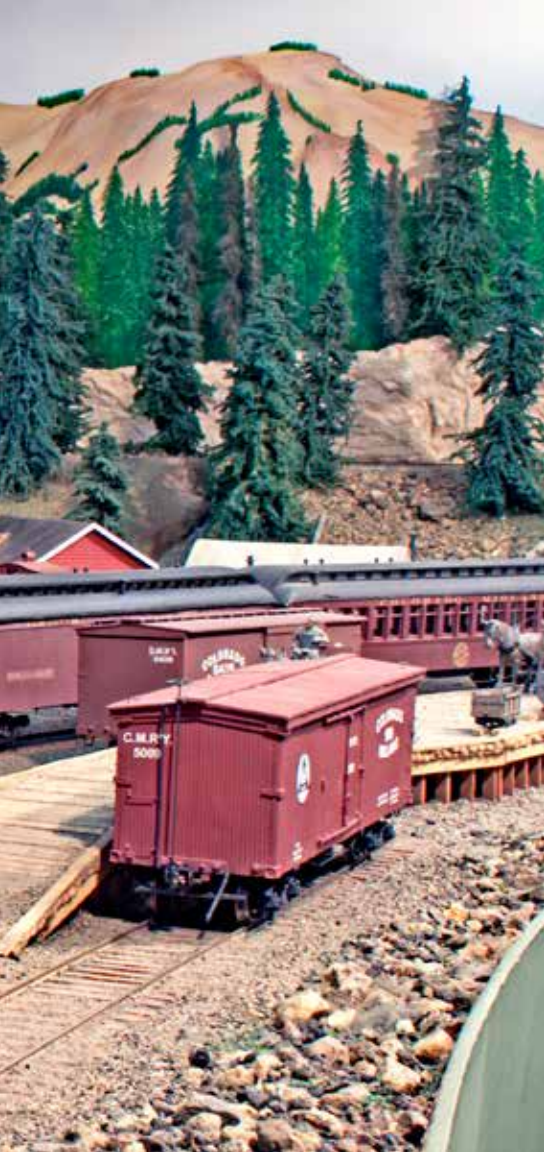
One of the benefits to handlaying track is the ability to build curved switches to exactly meet your needs. I'd used commercial turnouts in my HO days and had to lay out the track so as to allow for the transition from a curve to tangent track. All my switches are no. 6, which matched the radii of any curved entrance to the switch. Some turnouts are a standard length if the track is straight, but on curved track, the turnout might be as much as 2 feet long.

To ensure track standards, I made several tools. I found commercial track gauges weren't up to my requirements. The flat types are critical for switch work and well suited for checking gauge when a problem crops up, but when laying track, I use a track gauge I made by cutting slots in metal bar stock.

Another critical tool was a 46" curve template I made from heavy paper. This confirmed that all my curves maintained a constant radius. I found that without this tool, it was too easy to make curves too sharp or introduce kinks. Standards keep the wheels on the track.

SCRATCHBUILDING LOCOMOTIVES

I learned in my HO modeling days that it took three L-131 class 2-8-8-2 steam locomotives to move 50 cars eastbound over Tennessee Pass's 3 percent grade. If I wanted to capture the Midland's operations prototypically, I had to



keep the effect of grades in mind. Engines with one-fifth the power of an L-131 would call for much shorter trains and the use of helpers. Because the trains were so much shorter by 20th-century standards, the Midland locomotives hold center stage in the visual sense and in operating the layout.

I scratchbuilt all my locomotives from brass not only out of necessity, but also because I love the clean lines and style of the Midland's engines. These locomotives were intended to be a major feature on my Colorado Midland.

The Midland procured its early motive power from Schenectady Locomotive Works. Besides three 0-6-0 switchers, all the engines were dual-purpose 4-6-0 Ten-Wheelers and heavy 2-8-0 Consolidations. Ten Baldwin-built 4-6-0s finished the early orders, which were followed by increasingly larger classes of 2-8-0s.

Daylighting a tunnel

6 Though the track from Nast to Basalt was originally planned to tunnel under Sellar, Andrew decided to "daylight" the tunnel and landscape it as if it were a narrow second deck.

ACHIEVING 3-FOOT-WIDE AISLES was a major concern during the design process. The Sellar area was particularly troublesome, with the need to have a reachable yard and engine service facility and also run a track below to connect Nast and Basalt. I originally planned the track connecting those towns to go through a tunnel under Sellar. I didn't like that, not only because the tunnel didn't exist on the prototype, but also because I couldn't watch the train.

After I built the basic framework for the layout, a solution presented itself. All I had to do was daylight the tunnel. This required building a cantilevered structure to support Sellar, with a base of ¾" plywood supporting the 1" of roadbed and subroadbed. To finish the daylighted tunnel, I added a narrow strip of tempered hardboard fascia to the edge at Sellar, painted the underside of the plywood with light blue paint, and added scenery between the two levels to simulate canyon wall common in the area. – *Andrew Dodge*

7 The snow shed at Busk was the eastern entrance to the tunnel under the Continental Divide. An interlocking controlled entry to the tunnel.

8 The *Denver and Pueblo Fast Freight* has arrived at Arkansas Junction, where the engine will be changed for a First Division locomotive for the trip to Colorado Springs. Arkansas Junction is the *de facto* division point, so all locomotives are changed here as well as any cars to or from Leadville.

The chief engineer of the Midland contracted with Schenectady and Baldwin to design and produce engines to the railroad's standards. I applied these same standards to all 11 of my scratchbuilt locomotives. My layout's mountain grades required that I build almost all of my engines with 52"drivers; I built only one with 60" drivers. The small size of the locomotives enhanced the feeling of a slower era and the continual need to replenish the locomotive's coal and water supplies.

BUILDING IN STEPS

When I first contemplated removing my old railroad and building this one, a friend asked me how long it took to build the old layout and whether I though I'd have enough time left to build another. I answered that I felt if I proceeded in an efficient manner and managed my time, I could do it. But if I spent too much time watching TV, golfing, or engaging in other activities, I couldn't scratchbuild 11 brass locomotives, 30 to 40 structures, and 50-plus cars, in addition to the layout itself.

Time management could do a lot, but organizing each step in the project was of equal importance. When I was still working, I set aside specific times of the day for model railroad projects. Before leaving for work, I'd work on a machining project for 30 minutes that I'd set up the night before. Then in the evening, I'd have a block of time to myself for additional work.

Scratchbuilding 11 brass locomotives in 20 months didn't just happen. Doing things in assembly-line fashion reduced the learning curve needed to go from one type of project to another. I focused on fabricating parts and assembling the engines in groups of three so I wouldn't have to try to remember how I made a particular part or performed an operation on the milling machine. Doing these projects in sequential steps saved a lot of time.

OPERATIONS

Realistic operations have become a major feature of model railroading in recent years. Many different elements go into making successful operating sessions, including necessary design elements, personnel focused on doing

9 **Andrew reproduced one of his favorite photos of the prototype Colorado Midland with this shot of a train on the low trestle at Nast. The station was a flag stop for those fishing for trout in the Frying Pan River.**

assigned jobs, and good paperwork. I conducted the first operating session on my old South Park railroad in the late 1990s, but I lacked good historical information and official documents.

My Midland layout was designed for point-to-point operations from Colorado Springs to Grand Junction, Colo. With freight and Pullman car information, I was able to push the operational boundaries well beyond my modeled portion of the railroad and into the surrounding region. Customer lists and shipping announcements published in local newspapers of the day – uncovered through the research of folks such as Mel McFarland, who publishes the *Colorado Midland Quarterly* – add a real feeling of authenticity to the waybills.

Through my own efforts I found a copy of a waybill from 1890, a volume of the Midland's *Rules and Regulations* in the Mercantile Library in St. Louis, and an 1898 timetable from the Colorado Narrow Gauge Museum Library in Golden, Colo. Other paperwork included a clearance form from the back of the *Rules and Regulations* book, Forms 31 and 19 found online, station registration sheets also from the internet, and a copy of railroad telegraph code.

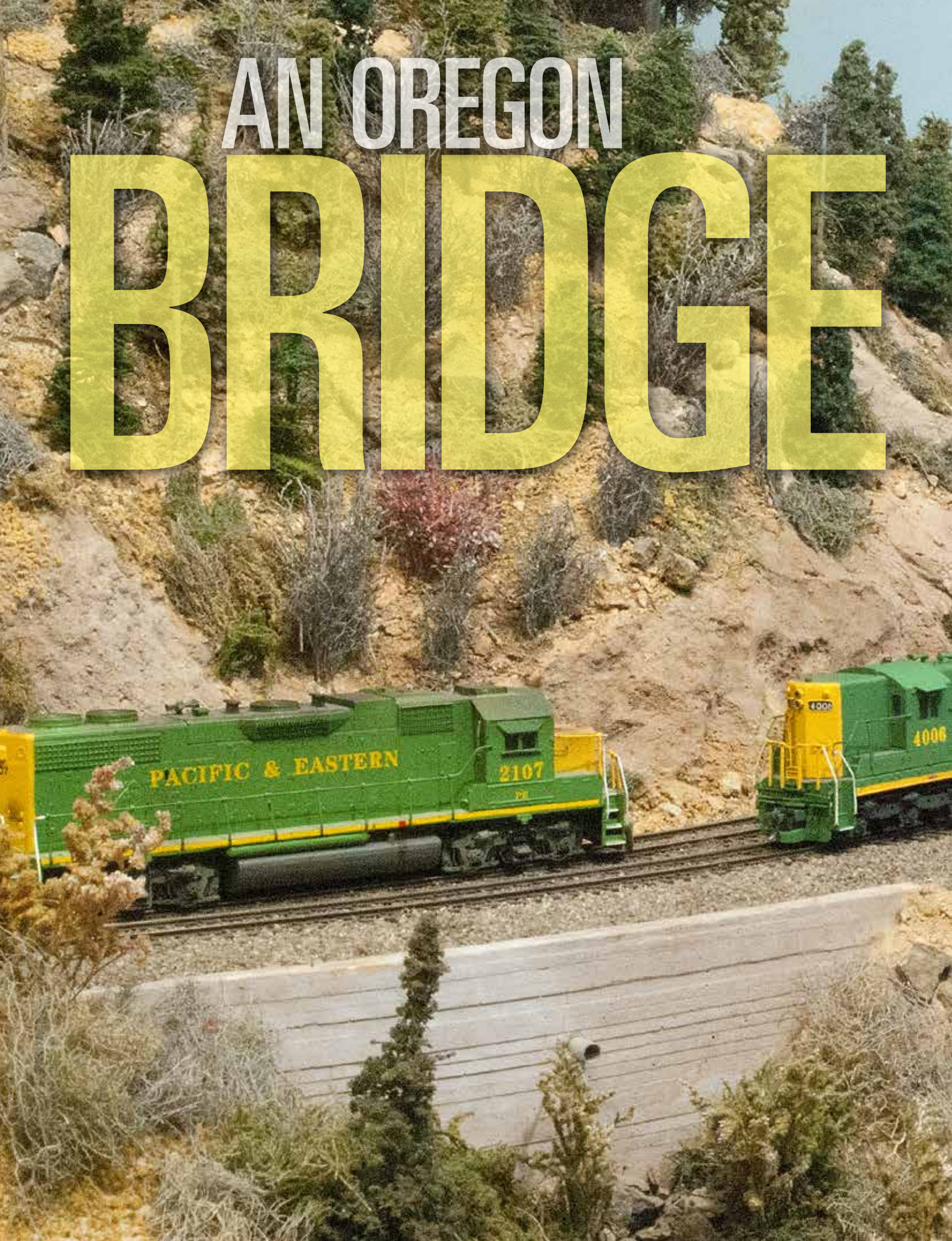
I started using telegraph communications on my previous layout, and it works very well on my Midland layout. It's historically authentic and slows the tempo of operations to match the pace of the late 19th-century time period. I wrote an article for the June 2001 MR describing how I developed the system.

I feel that using the proper type of communication systems and historically correct paperwork truly enhances the operation of my historically accurate model railroad. GMR

MEET ANDREW DODGE

ANDREW IS a retired educator who used to work for the U.S. Holocaust Museum in Washington, D.C., and for the U.S. House of Representatives. He lives in Olney, Md., and enjoys 1½"-scale live steam.

AN OREGON BRIDGE

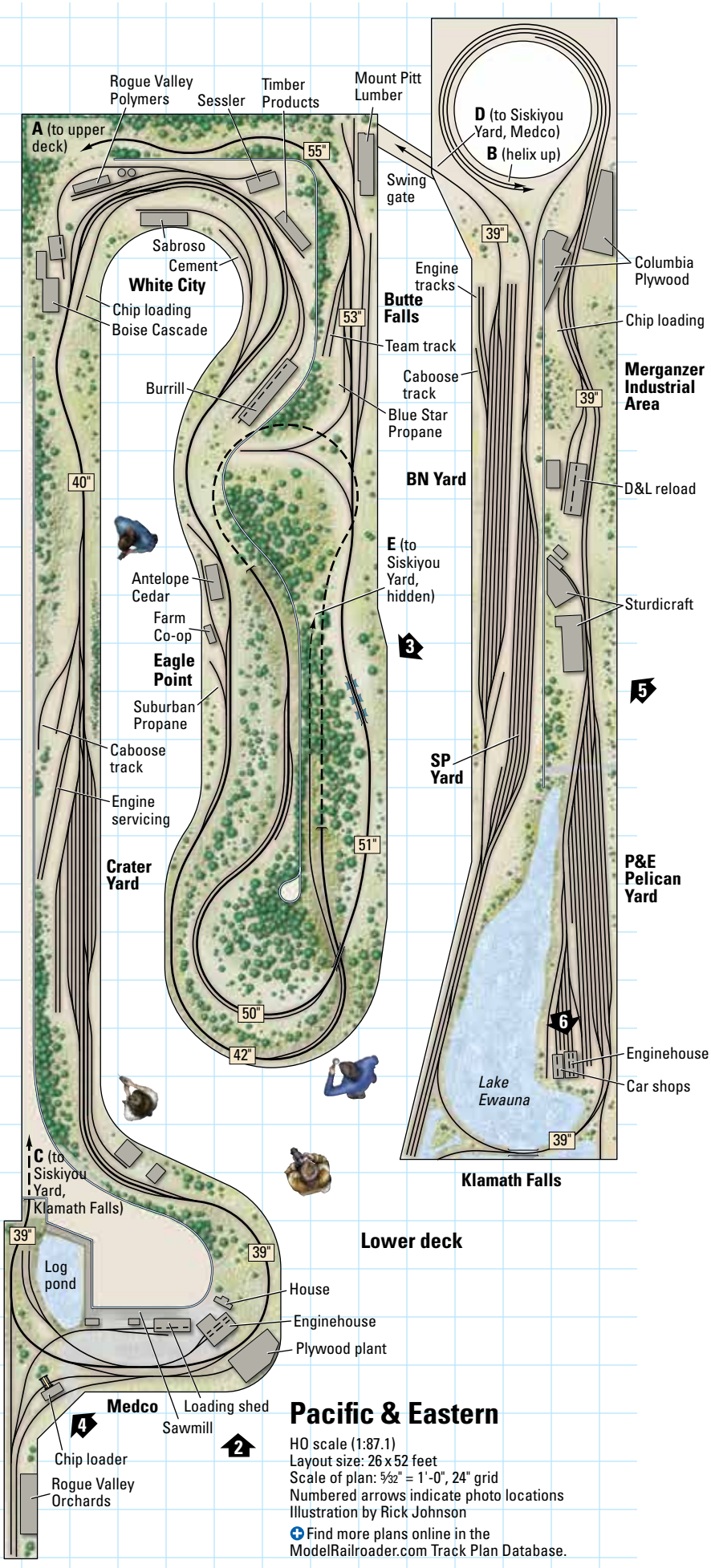


LINE

The Rogue Valley Model RR Club's HO scale layout models a "what if" scenario

By Bruce S. Kelly with Steven Otte
Photos by Jerry Hellinga unless noted

1 **The Butte Falls Turn rounds the curve at Palisades while the West Hauler holds the siding. The Rogue Valley Model RR Club's HO scale Pacific & Eastern layout loosely models a prototype in southern Oregon.**



Pacific & Eastern

HO scale (1:87.1)
Layout size: 26 x 52 feet
Scale of plan: 5/32" = 1'-0", 24" grid
Numbered arrows indicate photo locations
Illustration by Rick Johnson

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

The Pacific & Eastern RR is the Rogue Valley Model Railroad Club's HO scale layout in Medford (Ore.) Railroad Park. It's a "what if" bridge line connecting Medford to Klamath Falls, Ore., in 1989. The route follows the route of the lumbering railroad of the Medford Corp. (Medco), the Weyerhaeuser Timber Co.'s West Block Lines, the Great Northern Ry., and an imaginary segment linking the Weyerhaeuser and Medco tracks through the Cascade Mountains. The on-line industries are those that were in existence in 1989.

The Rogue Valley Model RR Club was formed in the mid-'70s with a modular layout that at one time comprised as many as 40 HO scale modules. In 1995, the club completed construction of its current 32 x 80-foot clubhouse. Phase 1 of replacing the modular layout with a permanent one began in 2003. In 2008, phase 2 was started to complete the current 26 x 52-foot, two-level layout, with hidden staging and storage yards.

Dave Spakousky, who with other members walked and studied the abandoned P&E right-of-way from Medford to Butte Falls and active tracks in

THE LAYOUT AT A GLANCE

NAME: Pacific & Eastern
SCALE: HO (1:87.1)
SIZE: 26 x 52 feet
PROTOTYPE: semi-freelanced
LOCALE: southern Oregon
ERA: 1989
STYLE: double-deck walk-in
MAINLINE RUN: 531 feet
MINIMUM RADIUS: 34"
MINIMUM TURNOUT: no. 6 (main), no. 4 (sidings)
MAXIMUM GRADE: 2.5 percent (main), 4 percent (logging branch)
BENCHWORK: engineered wood I-beams and 1 x 4 open-grid
HEIGHT: 39" to 62"
ROADBED: cork on plywood
TRACK: code 83 flextrack (main), code 70 (industrial sidings)
SCENERY: plaster shell over cardboard mesh or extruded-foam insulation board
BACKDROP: hand-painted

Klamath Falls, designed our Pacific & Eastern track plan.

ROAD TOUR

Let's follow the East Hauler job around the layout. Medford is the railroad's western terminus. The interchange there allows access to the Southern Pacific's Siskiyou Line. Proceeding north we pass Medco's huge lumber mill, the largest customer for the P&E. Then we cross over Bear Creek and Interstate 5, before entering Crater Yard, the P&E's western yard.

The Hauler follows the route north entering White City, a military training camp during World War II. White City in 1989 is home to trackside industries producing products such as plywood and chemicals.

The next town is Eagle Point, which has a feed mill for chicken feed, a cedar fencing and shingle manufacturer, and a propane distributor. Eagle Point has one of two remaining passenger stations on the line; passenger service on the P&E ended in 1953. The stations are now used for office space and equipment storage.

As the Hauler proceeds up into the Cascades, we pass a quarry at Derby that sits on one of three passing sidings on

2 This overall view of the Rogue Valley Model RR Club's layout shows Summit on the upper deck at left, the Medco mill complex below it, and Klamath Falls to the right.

3 West of Butte Falls, Ore., SD40-2s nos. 4204 and 4201 lead the West Hauler over McNeil Trestle. Though the prototypical P&E didn't last long into the diesel era, the club's fictionalized version shows a sense of history with a variety of related but distinct diesel paint schemes.

4 A tractor trailer fills up at the sawdust loader at the Medco complex while P&E and Southern Pacific trains rumble past. The lumber mill, the largest customer on the line, is modeled so faithfully that visitors to the layout recognize it on sight.

Corrugated cardboard structures

5 **Though it lacks details, this corrugated cardboard structure is a credible stand-in for the future warehouse.** Bruce Petty photo

IN THE REAL WORLD, lumber mills and their associated structures are sprawling complexes, so fitting models of them into our layouts can be a challenge. As construction progressed on the P&E's Merganser industrial area, club members used corrugated cardboard structures as placeholders.

Corrugated cardboard is more durable for large buildings than mat board. Structures made from it can be easily modified to better suit layout space without using expensive modeling materials. We painted our structures to give club members a chance to get used to what a finished structure would look like in its place. Once everyone had time to express their opinions about the structure's appearance and size, the finished structure could be built.
– Bruce Petty

the line. We next approach Canyon Junction, where we pass over a through-truss bridge and navigate a canyon to reach Butte Falls.

Crossing McNeil Creek is the largest bridge on the P&E, built using Great Northern bridge plans. Before entering Butte Falls, we pass the wye that was used to turn steam locomotives until 1962. Today the wye is still in use for storage and turning diesels.

Leaving Butte Falls, the Hauler now heads southeast. At Summit is the second passing siding, as well as an interchange with the Medco logging line.

Descending into Keno, we come to the third passing siding at Palisades before heading north to Merganser and the eastern terminus of the P&E. Pelican Yard in Klamath Falls is where the main P&E locomotive and car repair shops are located. Klamath Falls also has interchanges with both the SP and Burlington Northern.

CONSTRUCTION

The P&E is built on benchwork made from engineered wood I-beams donated by Boise Cascade. The benchwork went together quickly, being ready for roadbed in two months.

We used code 83 flextrack on the main line and its passing sidings. Industrial spurs and sidings are code 70. Turnouts in yards and spurs are manually controlled using Caboose Industries N scale ground throws. Mainline turnouts are lined by Tortoise by Circuitron switch motors controlled by Digital Command Control (DCC).

The system is controlled by Digitrax DCC, powered by a DCS200 base station and three DB200+ boosters. The layout is further divided into 11 power districts.

The layout has working Automatic Block Signals, which are controlled by a custom system using Java Model Railroad Interface (JMRI) software and components from Computer Model Railroad Interface pioneer Bruce Chubb and others.

Club member John Gerritsma painted the backdrops and walls. John had no previous backdrop painting experience before starting this project.

For scenery we used colored plaster over forms made either of extruded-foam insulation board or corrugated cardboard covered with plaster-dipped paper towels. We used a number of materials for ground cover, including

6 Pacific & Eastern no. 2105 is serviced in the enginehouse at Pelican Yard, Klamath Falls. The scratchbuilt structure is a selectively compressed version of the Great Northern's enginehouse at Klamath Falls, and its interior is based on prototype photos. Larry Tuttle photo

ground foam, locally collected dirt and stone, and local natural vegetation.

There are about 5,000 trees on the layout. Most of the conifer trees are made from skewers and furnace filters, mixed with commercially manufactured deciduous trees.

Photos of scenery and structures along the original right-of-way were used for reference to ensure that the layout is as faithful to the prototype as possible.

EQUIPMENT AND OPERATIONS

The freight cars on the layout represent prototypes listed in the 1989 *Official Railway Equipment Register* (R.E.R. Publishing Co.).

The motive power roster is made up of Electro-Motive Division locomotives, including SD9, GP9, GP38, GP38-2, SD35, SD38, and SD40-2 diesels.

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You can watch user videos of the Rogue Valley Model RR Club's HO scale layout on our website, **www.ModelRailroader.com**.

Medford Railroad Park

OPEN TO THE PUBLIC IN 1982, Medford Railroad Park was established to restore the Medford Corp. no. 4 Willamette steam locomotive. The park is a joint effort of five railroad-oriented volunteer organizations:

- Southern Oregon Railway Historical Society
- Southern Oregon Live Steamers
- Medford Garden Railroaders
- Rogue Valley Model Railroad Club
- Morse Telegraphers

Volunteers belonging to these organizations display and demonstrate full size trains, 7.5-inch gauge live steamers, a large-scale garden railway, an HO scale model railroad, and the use of railroad Morse code.

Admission is free. The park is open on the second and fourth Sundays of the month from April to October. The club's website is www.rvmrc.net.
– Bruce Kelly

7 **Medco switcher no. 9, an EMD SW1200, descends from Summit with a log train while logging operations go on in the background. Most of the conifers on the layout are made from skewers and furnace filter material; the deciduous trees are commercial products.**

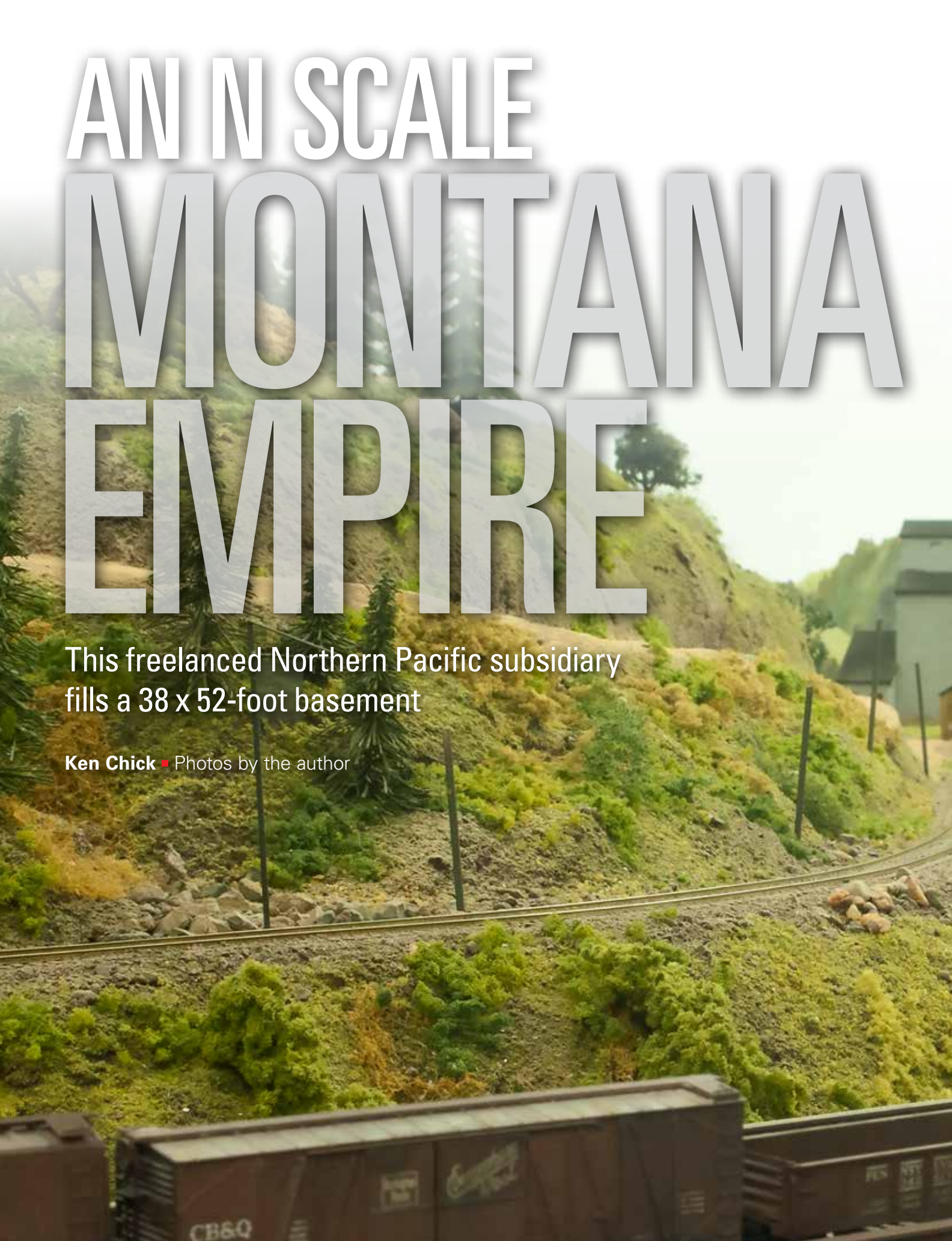
Traffic on the P&E consists of locals, transfers between yards, and overhead traffic. Operations are controlled by a dispatcher via radio-issued track warrants, with Automatic Block Signals to indicate track status ahead.

Formal operating sessions are conducted once a month. Depending on how many members are available for a session, crews may be one or two people. Typically a session involves 11 scheduled jobs (plus one or two more as traffic warrants), five bridge traffic jobs, and the dispatcher. The operating sessions take four to five hours.

Cars are routed using waybills with car cards. Cars are selected by a draw system covering an 8-month period, which varies the number and type of cars going to one location and ensuring cars are routed to different locations on the layout during the year. This keeps operating sessions fresh.

The club holds its operating sessions at 10 a.m. on the second Sunday of every month. Experienced and novice operators alike are welcome to join the crew. And even if you aren't an operator, but just want to watch the trains go around, feel free to stop by. GMR

AN N SCALE MONTANA EMPIRE



This freelanced Northern Pacific subsidiary fills a 38 x 52-foot basement

Ken Chick ▪ Photos by the author

IN 1887, JAMES DOUGLAS III decided to cash in on the frenzy of railroads making their way to the Pacific Ocean. He started his railway in Danforth, Mont., crossed the Hadley River and headed west, naming it the Danforth, Hadley & Northern RR. The line fell into receivership in 1903, where it languished until the Northern Pacific purchased it four years later. The NP pushed the DH&N west until it reached Garrison, Mont., and an interchange with the NP. It was merged into the Burlington Northern along with its parent in 1970.

About 1996, the DH&N found a new location for its corporate offices – the basement of my new home. My wife bought the upstairs and I got the 38 x 52-foot basement. It contained nothing but the furnace and water heater, offering a large, blank slate for the railroad. The DH&N, my third and final model railroad, is designed for operation, and although it isn't 100 percent finished, it's been operating and serving its customers well for several years.

PREPARATION

Construction started with the basement walls, which I sealed, studded, insulated, and drywalled. The floor was tiled and a drop ceiling was installed, with fluorescent lighting.

I had the water heater moved to allow room for the main yard and a 3-foot operator's aisle. I then walled off the furnace and water heater in a separate room that became the dispatcher's office.

The final preparation element was the "pizza oven door." This is a 30 x 60-inch hole cut into the top of the concrete wall in the shop, the bottom of which is level with the garage floor, to allow drywall, plywood, and lumber into the basement.

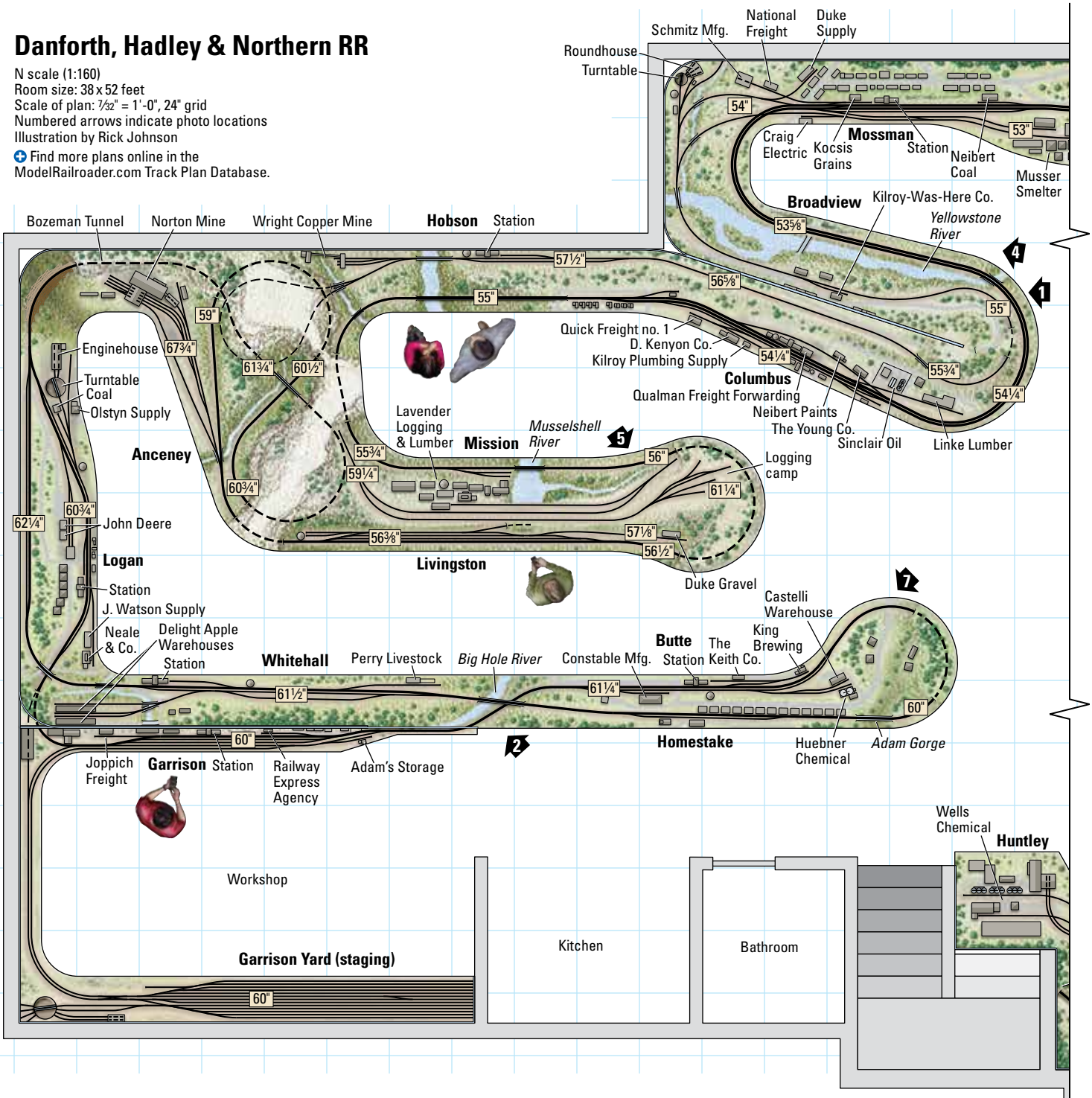
The basement has its own breaker box with eight circuits. Two are for the wall outlet power, two for the general basement lights, two for the railroad lights, one for the workshop, and one for a row of outlets that runs along the back of the benchwork. That last is the line for all of the railroad power, including its DCC system, a capacitor discharge unit, and low-voltage power for on-layout lighting. The railroad room lights and power are all connected to four wall switches at the bottom of the basement stairs.

1 An eastbound through freight crosses the Yellowstone River and meets a Northern Pacific empty hopper extra westbound on Ken Chick's N scale Danforth, Hadley & Northern RR. The layout depicts a fictional NP subsidiary in Montana.

Danforth, Hadley & Northern RR

N scale (1:160)
Room size: 38 x 52 feet
Scale of plan: 7/32" = 1'-0", 24" grid
Numbered arrows indicate photo locations
Illustration by Rick Johnson

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



SETTING STANDARDS

I started my design by setting basic standards, including a 24" minimum radius for the main line and an 18" minimum radius for the branches. I settled on a 1.5 percent maximum grade on the main and 2.25 percent on branches.

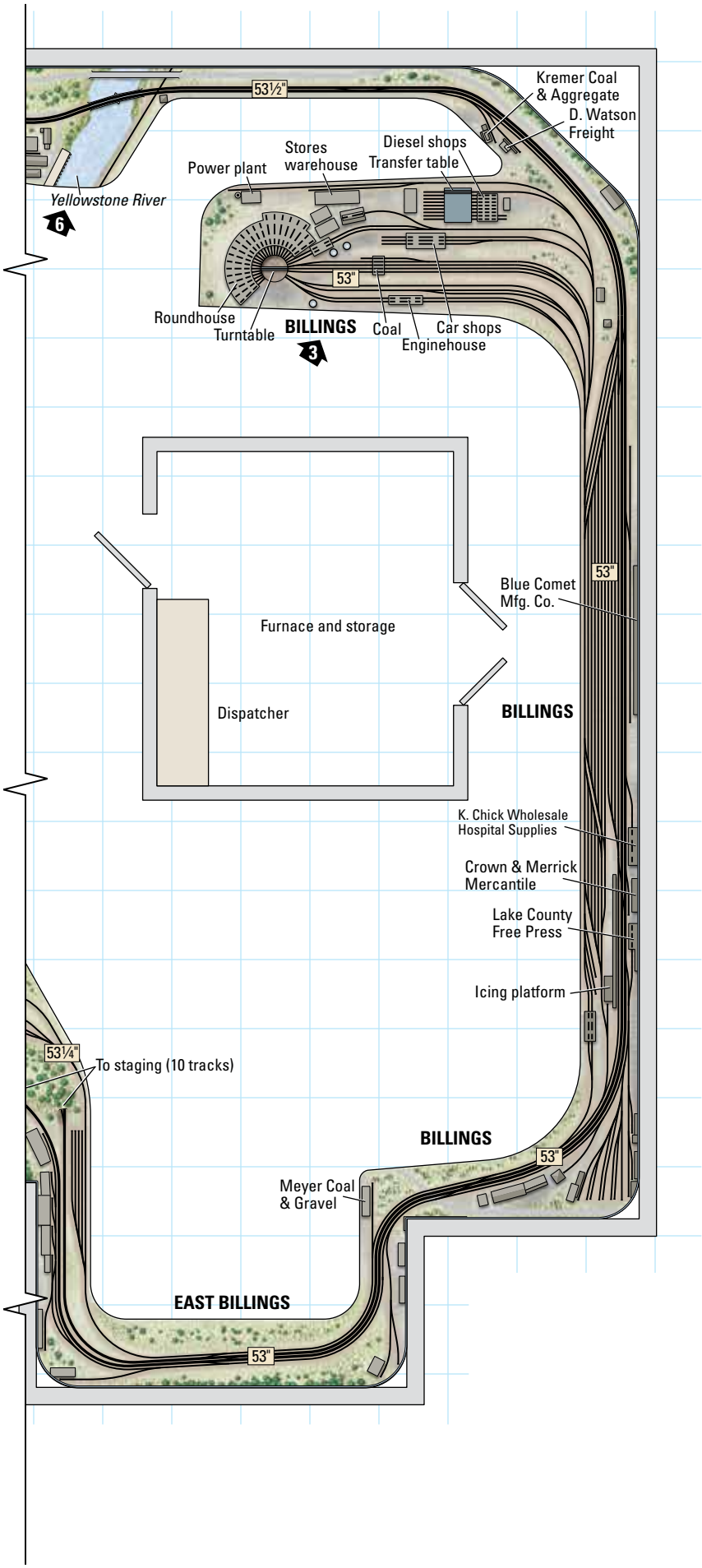
The DH&N was designed for operation, so it was important to have room for people to move around and work in a comfortable environment. Operators shouldn't be bumping into each other. I chose a minimum aisle width of 3 feet.

With these and some other design considerations in place, I started to sketch a basic shape that would allow for a long main line and six or more towns. N scale lets me put a lot of railroad into the available space with a large scenery-to-track ratio, and I wanted to take advantage of that. The DH&N was to be a Class 1 railroad with through traffic, local switching, long runs between towns, and a Rocky Mountain setting.

The 38 x 52-foot basement gave me the ability to build a railroad that would sustain operation for 10 to 20 people. Our Midnight Pocatello Yardmasters club has about 17 active members. It's a round-robin club, and most of the members have operating railroads. We've been meeting every Friday for about 30 years, and the DH&N was designed with their input and experience.

BUILDING THE ROAD

My previous railroads had been built with L-girder benchwork sections about 6 feet long, and I'd saved those sections.



THE LAYOUT AT A GLANCE

NAME: Danforth, Hadley & Northern RR
SCALE: N (1:160)
SIZE: 38 x 52 feet
PROTOTYPE: freelanced, based on Northern Pacific
LOCALE: Central Montana
ERA: 1954
STYLE: walkaround
MAINLINE RUN: 400 feet
MINIMUM RADIUS: 24" (main), 20" (branch)
MINIMUM TURNOUT: no. 5 (main), no. 4 (industrial spurs)
MAXIMUM GRADE: 1.5 percent (main), 2.25 percent (branch), 3 percent (logging)
BENCHWORK: L-girder, with plywood and spline subroadbed
HEIGHT: 52" to 62"
ROADBED: cork on ½" Homasote
TRACK: code 55 (main) and code 40 (logging line) flextrack, with hand-built turnouts and crossings
SCENERY: extruded-foam insulation board and Bragdon Enterprises Geodesic Scenery
BACKDROP: painted on walls and aluminum sheet
CONTROL: NCE DCC

Once the new basement was readied, the benchwork sections were set up based on my sketches of the proposed railroad. However, nothing seems to look or work the same way in real life as it does on paper, so they were moved around until I was happy. Lots of constructive criticism from the group helped, and once I was satisfied with the configuration, the sections were secured together.

The benchwork is still all L-girder, and it has served well through the years. The DH&N uses plywood subroadbed in towns and switching areas, and spline roadbed elsewhere. Both the spline roadbed and plywood are covered with Homasote. Siding and yard tracks were laid directly on the Homasote, but the main line and branch lines were laid on cork roadbed glued to the Homasote with contact cement.

I sketched a basic track plan, but I've never been very good at drawing plans that transform well to the working surface. Instead, I laid out track to approximate the drawing, than moved it around

2 **A freight train crosses the Big Hole River near Homestake. Under the through truss bridge is the main line out of Garrison.**

3 **The railroad's main engine terminal at Billings serves both diesel and steam locomotives. The car shop is at the rear and the diesel house is to the right.**

until I was comfortable with it. I let things sit while I pondered the layout and how the operation would work. Only then was the cork roadbed put in place and the track spiked down.

A great advantage of spline roadbed is that it will naturally form easements. The 1 x 4 risers were all clamped in place against the joists, which allowed me to easily adjust them. I placed a single spline atop the risers and curved it into the desired shape. I placed nails in the top of the risers to hold the spline. Once I was satisfied with the curves and grade, the placement of the risers and the angles of the spline atop each riser were marked. The risers were cut to length, and grooves were cut into the top of the risers for the splines to set into.

Under the single track, I used three splines each spaced about ½" apart, and under double track I used four splines spaced about ¾" apart. I glued spacer blocks between the splines every so often to maintain the proper spacing and provide strength. The risers' grooves were cut a little wider than the spline, and when everything was in place, I filled the extra space with hot glue.

About the time I was starting this railroad, Rail Craft (later purchased by Micro Engineering) came out with code 55 flextrack and turnout kits. I found the shape of the rail and the tie size and spacing to be much closer to the prototype than the Peco track I'd been using and immediately placed an order for 150 turnout kits (rails, points, and a frog, but

Aluminum backdrops and valances

4 **Ken coved the corners in his layout room with thin, flexible aluminum sheet. The seamless corners extend the visual size of his layout.**

TO GIVE THE LAYOUT a feeling of expansiveness, I coved all the inside corners in the room with 19 gauge sheet aluminum, used for roof flashing. I curved and glued the sheet in place with contact cement. Where the edges met the drywall, I covered the seam with drywall compound.

The Broadview and Columbus peninsula has a central view block extending to the ceiling. It, too, is made with sheet aluminum on light wood framing. A couple of club members helped me paint the mountain scenes on the backdrop. For the urban areas from Billings to Huntley, I used printed scenes from ScenicKing. I removed the printed sky and glued the city scenes to the wall with 3M Super 77 spray adhesive.

I made a lighting valance using the same aluminum sheet. This material is thin, lightweight, paints well, and is flexible. It's available in 50- to 100-foot rolls, 3 or 4 feet wide, at big-box home improvement stores. – *Ken Chick*

no ties) and 100 packages of flextrack. I figured they would never get any cheaper, and there's always the uncertainty of supply in this hobby.

I went through my initial supply of 150 turnouts years ago, and now I'm building them using Fast Tracks jigs. I've built a few curved turnouts and crossings on paper templates. There are only two store-bought turnouts on the layout, and I find them less reliable than my own.

N scale motive power is sensitive in terms of getting power from the rail. To minimize problems and keep all locomotives running smoothly, all my turnout frogs and crossings are solid rail, and all turnouts have solid (non-hinged) point rails. Power to the frogs is supplied through extra electrical contacts on the switch machines.

All my turnouts are powered by twin-coil switch machines. These are powered by a capacitor discharge unit activated by momentary single-pole double-throw (SPDT) switches. I like using a capacitor discharge system because it won't burn out a switch machine by continuously feeding power to it. If the momentary SPDT switch sticks in the "on" position, the capacitor simply won't recharge. This still causes problems, as it prevents any other switch from being lined. So I've divided the capacitor discharge bus line into blocks that can be turned off to facilitate finding a stuck switch.

LAYOUT POWER

The DH&N is controlled by NCE Digital Command Control (DCC), which was coming into its own 20 years ago. It made operation a pleasure. No longer did we have to turn selector switches to connect the throttle to the section of track our train was on. And, of course, DCC requires a lot less wiring.

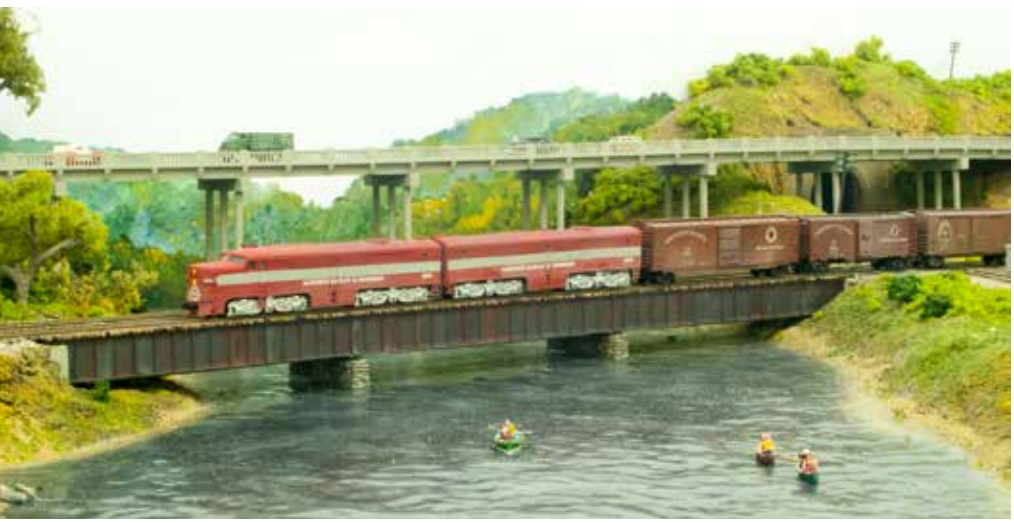
I started with System One because I'd met Don Wangrow and was impressed with his design and commitment. Also, System One, NCE, and Ramtraxx all worked together and used the same designs. At the time, these were the only systems offering four-digit engine numbering, a programmable fast clock display in the controller, and duplex communication. Unfortunately, System One ended when Don died, then Ramtraxx went out of business. After a few years I upgraded to a new NCE command station, but all of my System One booster units and my System One, Ramtraxx, and NCE controllers still work seamlessly.

Model railroads can require a lot of maintenance to keep them operating properly. On a railroad the size of the DH&N, this could be a big problem, so it was important to build the railroad well and not take shortcuts. All of my electrical connections are soldered; I don't trust the "suitcase" connectors. All rail

Oatmeal scenery

5 The DH&N's only Shay ferries a string of log cars back up to the Lavender Logging Camp. Most of the terrain on the layout is covered in "oatmeal," a paste of vermiculite, papier-mache, water, glue, and paint.

"OATMEAL" SCENERY is a 50-50 mixture of vermiculite (a granular insulation material) and Celluclay (a brand of instant papier-mache) with white glue, water, and acrylic paint. It's mixed into a thick paste. Scenic oatmeal can be troweled over your terrain forms. Because it's thick, it will hold whatever shape you give it, and remains workable for several days. Simply apply other scenery materials over it, such as real dirt, ground foam, and foliage. After it's set, you can still easily poke holes for trees, poles, and fences. – *Ken Chick*



6 During a motive power shortage, a Danforth, Hadley & Northern PA and PB set is pressed into service pulling a fast freight. Meanwhile, below, boaters enjoy a day on the Yellowstone River.

joiners are soldered, and there are lots of feeder wires. Expansion and contraction are minimized by controlling the humidity in the basement with two humidifiers in winter and two dehumidifiers in summer. In 20 years, I haven't had a problem with the track kinking from benchwork expansion or contraction.

The DH&N and the NP own a lot of engines. Since I knew there would be a lot of sound-equipped locomotives drawing power on the layout even when idle, and some of my older engines still have their original, not very efficient motors, I opted to bulletproof my power supply. There are three dual 5A boosters, each connected to two power districts, which are further subdivided by circuit breakers from Tony's Train Exchange.

To supply power to the boosters, I built a separate power source. It consists of an old computer cabinet holding three heavy duty 18V, 10A transformers. The system is fused on both the input and output. There are also two small transformers that provide 18V, 1A power to the command station and 12V to two cooling fans. The front of the cabinet has lighted switches for each of the transformers, and a main power switch as well. I can turn individual sections or the whole system on and off and still keep the capacitor discharge and lighting supplies working.

SCENERY

I modeled the terrain on the DH&N in two ways. Some of the areas are extruded-foam insulation boards stacked and glued together, then carved with serrated knives, Surform tools, and an Avalon Hot Wire foam cutter. Most of the topsoil is "oatmeal" (see "Oatmeal Scenery" at left) applied over the foam and topped with sifted real dirt. I sprayed the dirt with diluted white glue or matte medium, then sprinkled on Woodland Scenics materials.

The second terrain technique I used was Bragdon Enterprises' Geodesic Scenery materials. The Big Belt Mountains started with a bunch of cardboard strips hot glued into a large hollow mountain shape. I wanted to be able to access the track that ran through the mountain. Because of Murphy's Law, anything that can go wrong with trains will go wrong in a tunnel, no matter how careful you are with your trackwork. So I made all my hidden track accessible. The ceiling-height mountains are also removable to allow access to a water shut-off valve behind the ceiling tiles.

Once the basic mountain shape was formed, I covered it with sheets of plain paper. It stayed that way for well over a year, during which I reshaped it several times. Eventually it looked right, and I began to apply the base of the Geodesic Scenery. Once that was done, I left it like that for a while and again made small changes. Finally, I made the rock castings and applied them. There were a number of areas where I simply needed

7 **A set of EMD F3s has just pulled through Butte and is on its way east. Building in N scale gives Ken the space to model wide-open landscapes.**

earth, so here I applied the oatmeal over the Geodesic Scenery and sifted real dirt and Woodland Scenics materials on it.

Trees continue to multiply on the DH&N. There are already 1,000 trees on the railroad, and several hundred more will be planted there soon. Many are now awaiting completion under the railroad and in the shop. All the ready-made ones are enhanced by spraying with hair spray and then flocking with a blend of Woodland Scenics fine turf materials.

Many modelers don't ballast the switch rod area of their turnouts for fear of gluing it to the roadbed. I feel this yields an unrealistic look, so I ballast the entire turnout. I spread the ballast evenly just as I do for the track itself; however, before I apply the diluted glue, I put a little lightweight oil on the ballast on both sides of the switch rod to keep the turnout from binding. As a result, I've never had a problem with a seized switch rod.

Since I had to place all the turnout ties for the original kit turnouts and for the Fast Tracks ones, I spaced the ties closer together under the frogs, just as the real railroads do to handle the higher stresses there. It's not something that most visitors would ever notice, but I know they're correct.

OPERATIONS

Operating sessions normally include 17 trains. The DH&N runs on a fast clock usually set at 8:1. There are four fast clocks built into the fascia around the railroad, and the NCE controllers have fast clocks as part of the displays.

A dispatcher controls permission to move for all the trains except the two *North Coast Limited* passenger trains, No. 25 westbound and No. 26 eastbound, both of which run on a timetable. All other trains are run as extras.

Communication with the dispatcher is via small handheld radios. In addition to the 17 trains normally run, a number of special trains are sometimes added.

Train length runs from just a few cars to as many as 30. The dispatcher is informed of the number of cars in the train at the start of the run and after any switching has been done. His panel shows the capacity of each of the sidings, which helps him plan passing moves.

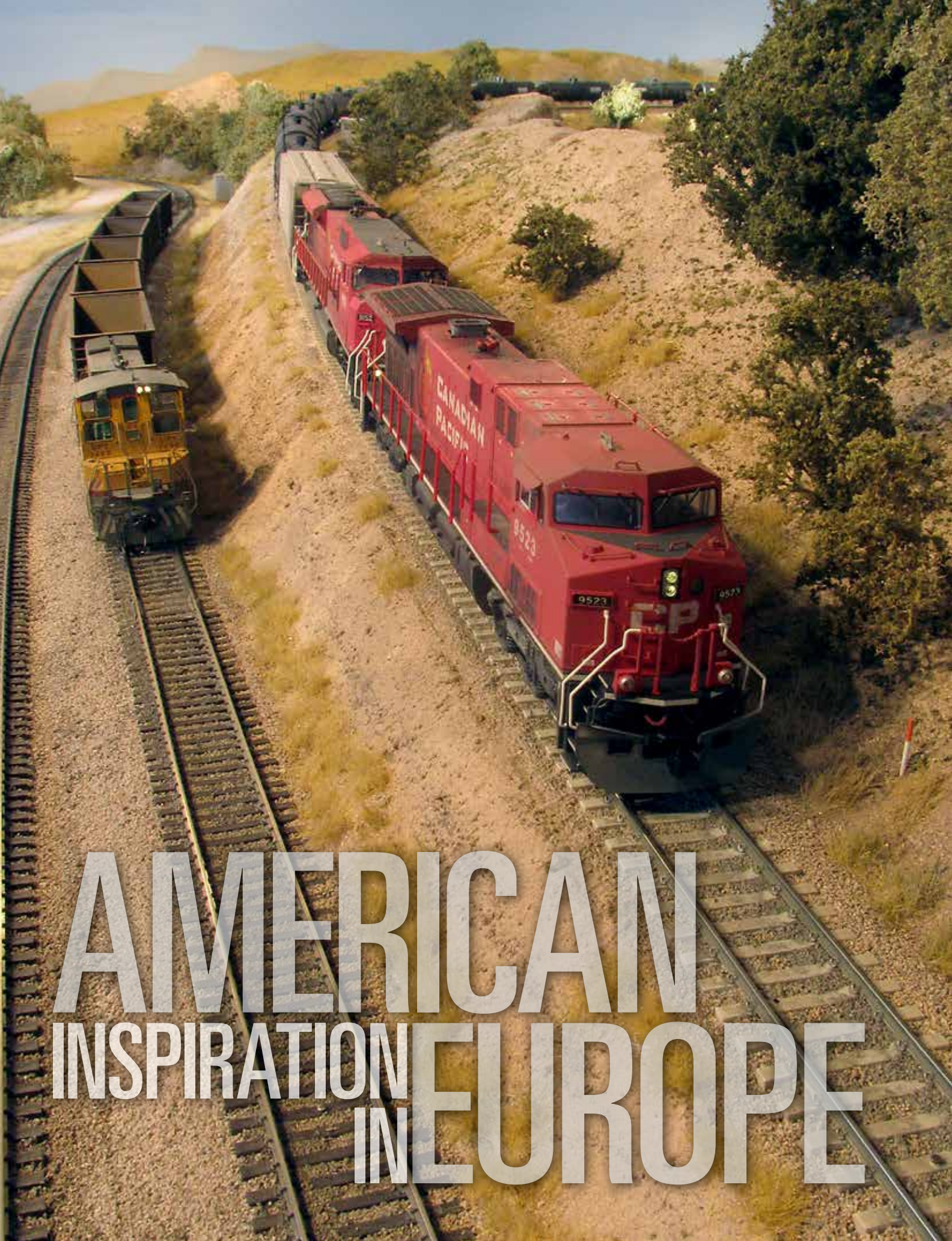
THE FUTURE

The future for the DH&N is bright. We're finding new industries to serve, revenues are increasing, and we're profitable. We soon expect to see new trees, grass, weeds, and debris on the logging hill. The population is growing in all the towns and cities.

I would be remiss if I didn't acknowledge the help over the years of many fine modelers who have contributed ideas, sound advice, manpower, encouragement, and friendship. Some have passed on, but thankfully, many are still helping. Special thanks are due to Larry Wright, Ron King, Bill Neale, Scott Kremer, Joe Kocsis, Mark Olstyn, and Dewey Norton. GMR

MEET KEN CHICK

KEN CHICK LIVES IN Northville, Mich., where he's a founding member of the Gandy Dancer Model RR Club and a longtime member of the Midnight Pocatello Yardmasters club. He and his wife, Beverlee, have three grown sons and two granddaughters. His other interests include reading, deep-sea fishing, and visiting the beach.



AMERICAN INSPIRATION IN EUROPE

Ethanol is the lifeblood of this modern-day Midwestern layout built in Sweden

By Rolf Malmborg ▪ Photos by the author

Though I live in Sweden, my interest in North American railroading was established many years ago when I found a copy of *Model Railroader* in my local library. So when I finally got enough space to build my own layout in 1993, there was no question that I would model an American railroad. My favorite railroad was the Denver & Rio Grande Western, so that's what I built. Even though the Rio Grande was being merged out of existence in the time period I modeled, I expressed my love for the railroad by putting some patched-out D&RGW diesels to work on local freights.

Though I liked my previous layout very much [see the February 2015 issue of *Model Railroader – Ed.*], it suffered from one unforeseen problem: its stub-ended staging caused no end of trouble. I finally decided that the only way to solve this issue was a new layout [see "Making staging accessible" on page 62]. But what should I do next?

LOOKING FOR INSPIRATION

I wanted the new railroad to have a purpose, so I looked to prototype practice. I enjoy railfanning the United States in western locations like Sherman Hill, Crawford Hill, and Soldier Summit, and wanted to bring some of that enjoyment to my new layout. So what kind of trains do I see on my railfan journeys? Unit trains! Coal trains, oil trains, double stacks, and grain and ethanol trains. That's it! Grain and ethanol trains start and end at the same place, the ethanol plant. This could be an interesting industry to model. Walthers had just released a whole series of structures for the industry, based on a plant in Minnesota, just outside Granite Falls.

1 A Canadian Pacific ethanol train heads downgrade toward Granite Falls while a switcher shifts empty coal hoppers below. Rolf Malmborg is Swedish, but was inspired to model American railroads by *Model Railroader* magazine.

2 This view taken from an access hatch shows most of Rolf's layout, with the ethanol plant to the left and rural Montana to the right.

I bought Jeff Wilson's book *The Model Railroader's Guide to Industries Along the Tracks 3* (Kalmbach Books, 2008). One of the chapters, which illustrated how an ethanol plant works, convinced me that it would be a suitable subject for my size of layout.

Like most things on model railroads, this industry had to be compressed. So I chose to model only the structures that would be next to the track. I made some drawings to see what I could squeeze in. Finally I selected the storage shed, silos, elevators, ethanol tanks, and unloading racks, plus a Pikestuff office building.

Then I drew two tracks, long enough to hold at least 20 cars apiece, one for incoming grain and one for outgoing ethanol. But before I could get going, I had to dismantle my old layout.

OUT WITH THE OLD

Destroying a model railroad that you put so much work into can be heartbreaking. Though you tell yourself "The next one will be even better," it still hurts to see all that work go into the trash.

I managed to salvage most of the track and turnouts, buildings, and trees from my old layout. But except for three rock castings, the mountains had to go. Since I was going to set my ethanol plant in Minnesota, like the prototype for Walthers' model, I had to learn about a completely new landscape, far from my favorite Rocky Mountain area.

My first thought was that I would need a lot of trees. But I couldn't let go of my love for the mountains, so I decided to route the main line from Granite Falls, Minn., through North Dakota to the mountains of Montana.

Slowly I started to get a picture in my head of how I wanted the new layout to look. I built a mock-up from my drawings to visualize the plan.

I started with the staging yard and worked my way up to the station area. I added long passing tracks, more than

3 **The Granite Falls Ethanol Plant is the visual and operational heart of the layout. Rolf kitbashed it from Walthers and Pikestuff structure kits.**

4 **Unit trains like the coal, ethanol, and grain drags seen here are the reason for Rolf's railroad. For operational reliability, Rolf linked the cars in the coal train with dummy couplers.**

THE LAYOUT AT A GLANCE

NAME: Granite Falls Ethanol RR
SCALE: HO (1:87.1)
SIZE: 13 x 24 feet
PROTOTYPE: BNSF Ry., Union Pacific, Southern Pacific, and Canadian Pacific
LOCALE: Minnesota, North Dakota, and Montana
ERA: 2013
STYLE: walk-in
MAINLINE RUN: 180 feet
MINIMUM RADIUS: 22"
MINIMUM TURNOUT: no. 8 (main), no. 6 (staging and industry sidings)
MAXIMUM GRADE: 2.5 percent
BENCHWORK: L-girder with plywood tabletop
HEIGHT: 54" to 59"
ROADBED: cork on foam camper tape
TRACK: code 83 flextrack
SCENERY: papier-mache over extruded-foam insulation board
BACKDROP: hand-painted tempered hardboard
CONTROL: direct-current block control

30 cars long. The maximum grade is about 2.5 percent, so the engines have to work hard to bring up a loaded coal train. Three locomotives do the job.

BUILDING THE NEW

I built the new layout on the old benchwork, though I had to make some changes to gain more mainline space.

To make the trains less noisy, I glue my cork roadbed to a base of foam camper tape [double-sided foam tape used to seal a pick-up truck topper to the bed – *Ed.*] on top of a double layer of plywood. I've soldered all track joints and dropped electrical feeders every 6 feet or so for reliability.

All curves are superelevated. I accomplished this by gluing a wire under the outside rail before attaching the track to the cork roadbed.

The layout is powered the old-fashioned way, with direct-current block control. (I have two dual-mode, decoder-equipped locomotives with sound, but after a while I can't stand the noise.) The layout uses an MRC Tech4 220, which is powerful enough to run three or four engines and light up the buildings. Using the momentum button makes train operation more realistic.

Passing tracks and industrial spurs are on separate electrical blocks, as are the staging tracks. Power is managed by control panels on the fascia.

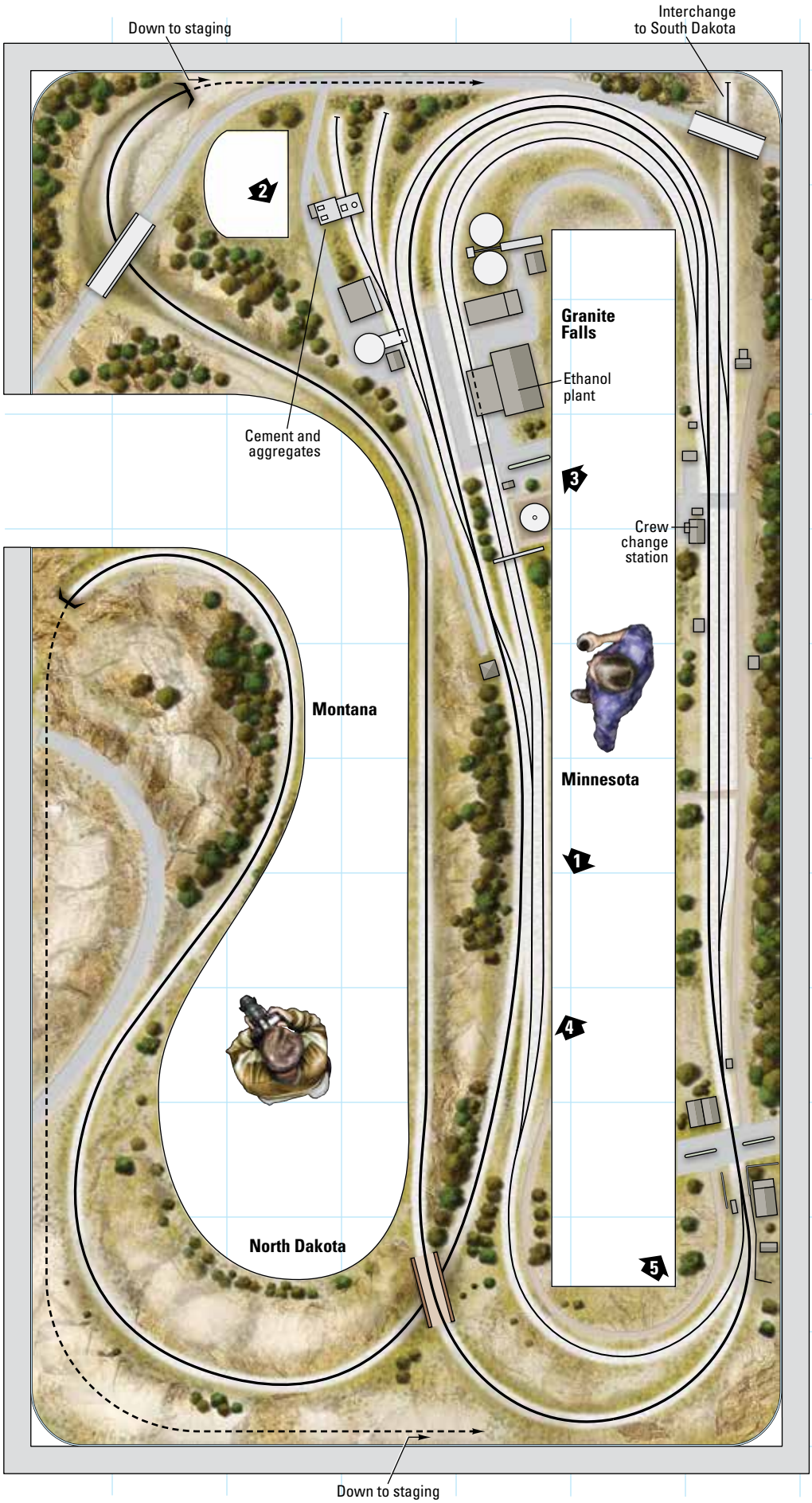
Above the terrain, there are lighted street lamps, illuminated houses, and a railroad crossing with flashing lights.

CARS AND LOCOMOTIVES

Most of my locomotives are from Kato and Atlas. I've updated some of my locomotives by patching their reporting marks to reflect a new owner using Microscale decals.

My rolling stock roster is packed with Athearn and Atlas models. I'm so happy that most cars today are ready-to-run. They're a bit more expensive, but worth every cent.

All of my locomotives and rolling stock are weathered, using an airbrush, powdered chalk, and sometimes a fine paintbrush. I learned these techniques from MR contributing editor Pelle

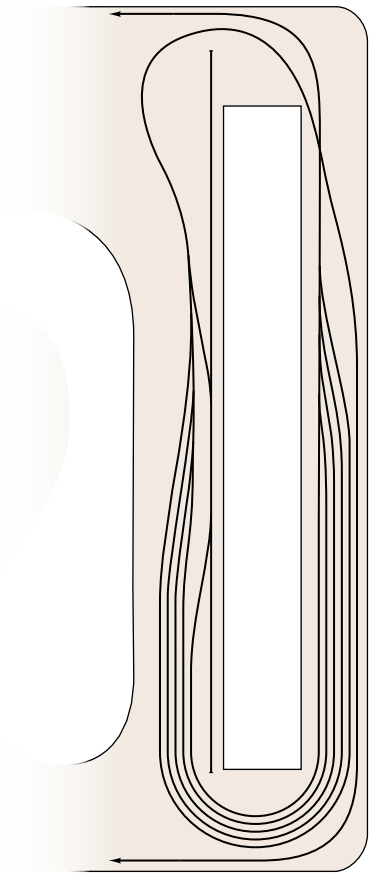


Granite Falls Ethanol RR

HO scale ((1:87.1)
Room size: 13 x 24 feet
Scale of plan: ⅜" = 1'-0", 24" grid
Numbered arrows indicate photo locations
Illustration by Roen Kelly

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

Staging level



Making staging accessible

THE MAIN REASON for rebuilding my layout was the staging problem. My old layout had stub-ended staging, which required me to either back trains in, or cut off the motive power and run around the consist via an escape track. Therefore, the staging area was one of the first parts of the new layout I built.

I solved the problem of stub-ended staging by making my new staging level a big bulb of five tracks, each long enough to hold 30-car trains. Now trains can come and go without the difficulty of coupling and uncoupling on hidden track.

The double-ended staging yard under the main deck is one of the first parts of the layout Rolf designed and built.

All my turnouts are operated by Caboose Industries ground throws, including those in staging. Reaching into the narrow space above staged trains to line turnouts could be tricky. So I used steel wire to extend the actuating arms of the ground throws so I could place the throws on the edge of the benchwork. Now, all my turnouts can be operated easily.

I also installed light-emitting diode fixtures to light up the staging yard. I bought LED lamps that can be daisy-chained together and glued them to the walls surrounding the staging level. – *Rolf Malmborg*

Søeborg's book *Done in a Day* (Kalmbach Books, 2009). Pelle has long been a source of new ideas and inspiration. Maybe one day I'll call him to arrange a visit to see his work in person. He lives in Denmark, a few hours' drive from me.

Graffiti is also a part of today's railroading, so graffiti decals are a must.

Though I had a lot of equipment from my previous layout, due to my change of region and the ethanol plant, I had to invest quite a bit of money on covered hoppers and ethanol tank cars. I thought it was appropriate to add some Canadian Pacific and Canadian National locomotives. I also have an inspection car to make a loop around the layout every now and then.

I usually run seven or eight different trains on the layout. I've got one double-stack container train and a unit coal train, one ethanol train, one grain train, two mixed freights, and two work trains.

In order to avoid unwanted uncoupling on the coal train, I link the cars with dummy couplers. That makes them a bit tricky to get apart, but they don't uncouple when I don't want them to.

SCENERY AND STRUCTURES

The terrain is made of extruded-foam insulation board covered with papier-mache. The mountains are the same. For ground cover, I use real dirt.

I make my own special mix of papier-mache. The base is wet newspaper that's been shredded almost into a pulp. I mix this with a little Portland cement and white glue. I don't have a specific recipe; I always have to test to get the right proportions. If it doesn't stick to the area, I add some diluted white glue to make the surface more tacky.

I plant the tall grass by hand. I start by wetting the area with isopropyl alcohol, then placing small dots of white glue on the surface. I then pinch a small amount of static grass between my fingertips and plant it in the glue. After letting the glue dry for 24 hours, I vacuum up any excess. It's a time-consuming project, but the result is quite good.

I scratchbuilt most of the trees. The trunks are made out of sagebrush, to which I add small branches from Scenic Express SuperTrees. I then glue on Woodland Scenics green foliage and Noch leaves. I don't know how many trees I have, but I'd guess more than 100.

The structures are mainly from Walthers kits, except for a few Pikestuff and Rix products. The relay boxes and radio antenna are from BLMA (now part of Atlas Model Railroad Co.). I wire the Walthers utility poles with Berkshire Junction EZ Line. The road bridges are from Pikestuff. Everything on the layout is at least lightly weathered.

OPERATION

Though I was fond of my previous layout, this is the first time I've built a model railroad with a purpose. Granite Falls exists in the real world, but it doesn't look the same as my version.

The ethanol plant is a centerpiece that needs to be served by rail. Across the tracks from the ethanol plant, I have a small cement and gravel industry. There's also a terminal where locomotives change crews across the aisle from the plant, adding operating interest.

My layout doesn't model a particular prototype; I run trains from any railroad seen in the area I model. Canadian

5 **Though he models the modern day, Rolf is a fan of the Denver & Rio Grande Western, which is represented on the layout with a couple of ex-D&RGW diesels patched out for new owner Union Pacific.**

Pacific runs ethanol trains, and the grain train is Union Pacific. A double-stack container train behind BNSF Ry. power makes a crew change at the small station along the passing track. A mixed UP freight and a loaded coal train also make their way through the town.

One of the passing tracks leads off the edge of the layout to an unmodeled connection south to Sioux Falls, S.D. I stage a local freight on that track coming in from Sioux Falls. It's usually powered by older units like GP35s and GP40s.

Two work trains make daily trips to different locations in the area. All in all, it's a quite simple operation routine, but it keeps me busy.

BEING A MODEL RAILROADER

I have no problem telling people my hobby is model railroading. But sometimes, I meet people who look at me with skeptical eyes and wonder why I still play with trains. Usually, these people change their attitude once I explain what I do.

Then comes question number two: "How much does it cost?" Sorry, but I've lost track of the money I've spent on my layout, because I've been into this hobby for more than 20 years.

Very often it's men who ask the money question. Women, in contrast, are more fascinated by the artistry. They look at the details, the landscape, and the scenery. I feel very much like an artist when I work on my layout. I can spend hours decorating one little creek, because that's what it takes sometimes, and I enjoy it.

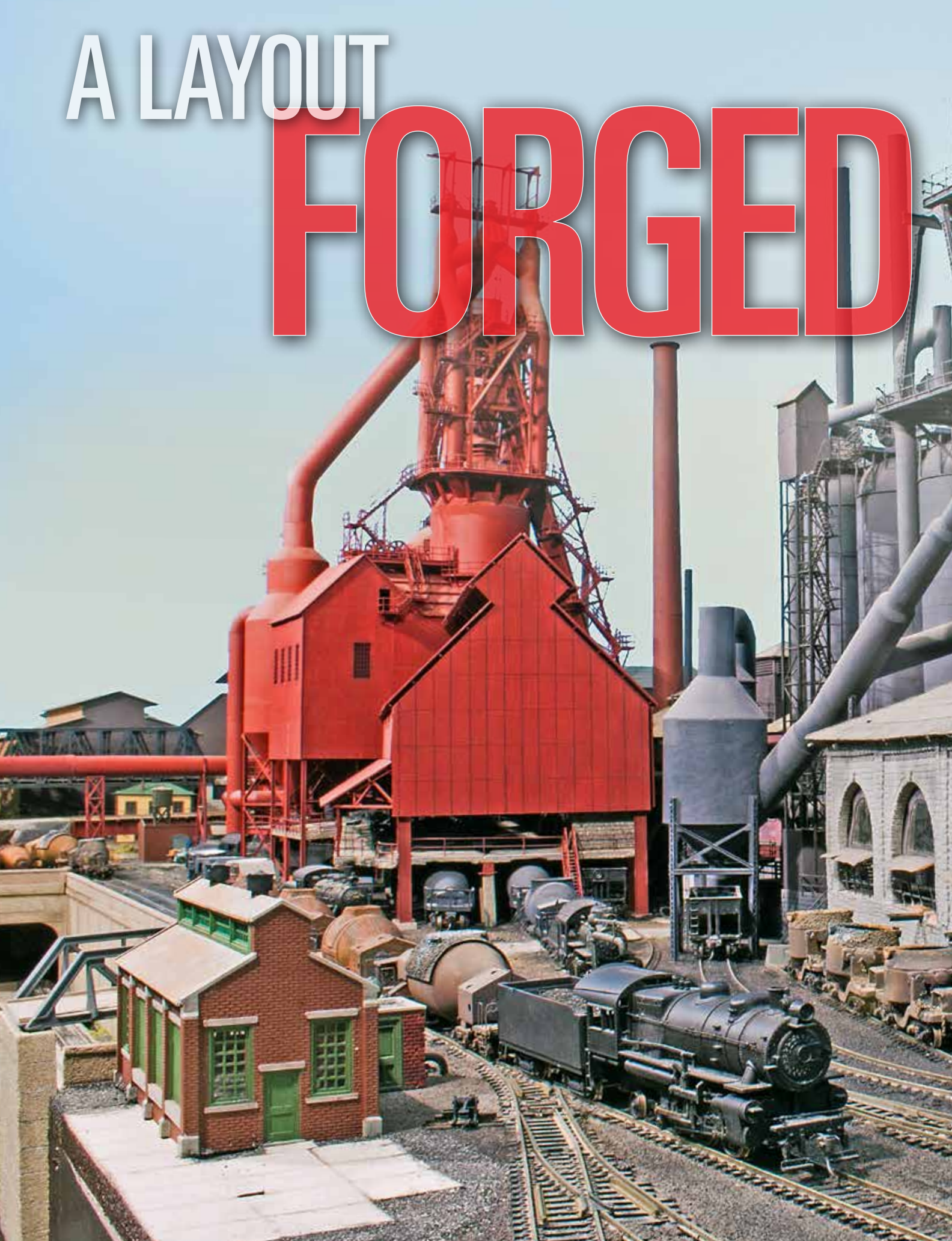
Who would look at a painting and wonder how much the artist paid for the paint? The time spent on building and planning a layout really gives me peace of mind. And the most fun part of the hobby is to create a completely new, fictional world in miniature, exactly the way I want it.

I guess that's why I'll keep building new layouts for as long as I have the strength to do so. GMR

MEET ROLF MALMBORG

ROLF MALMBORG (seen here preparing to dismantle his previous layout with a chainsaw) lives in Sweden with his wife, Christel, who supports him in his hobby. They have a son, Fredrik, who plays music with Rolf. In addition to model railroading and railfanning, Rolf enjoys videotaping and editing movies of his travels.

A LAYOUT FORGED

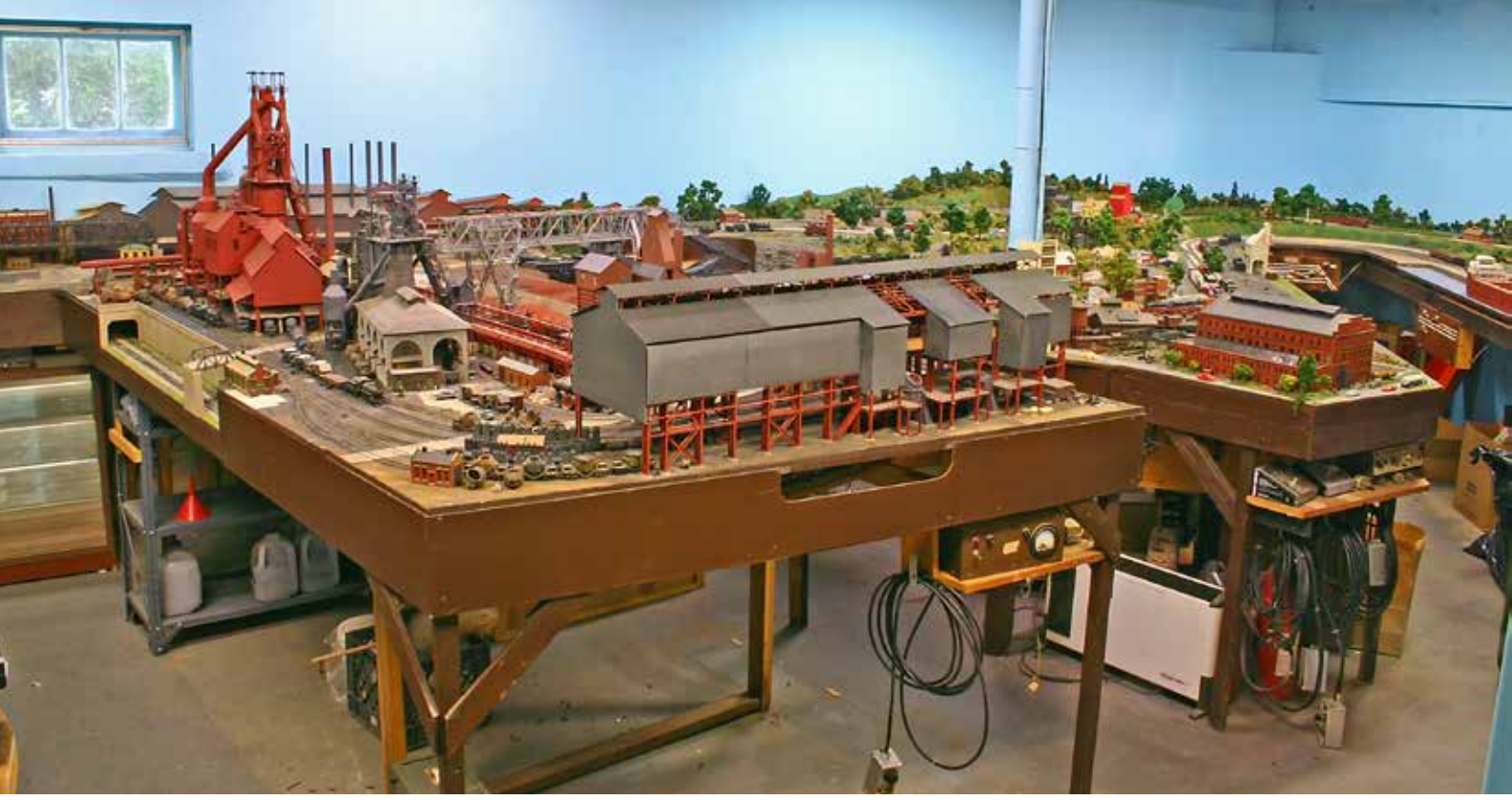


IN FIRE

A lifetime of study and research led to a steel-themed layout of unrivaled accuracy

By Paul J. Dolkos
Photos by the author

1 **The blast furnace area models a number of structures built over a span of decades, providing a visual history of the steel industry. The gray structure in the foreground is a modernized 1880s-vintage furnace. The red furnace in the back is based on a 1943 design.**



2 **This overall view shows most of Mike's HO scale layout, with the steel mill complex front and center.**

THE INSPIRATION FOR Mike Rabbitt's HO scale H&R Steel Co. layout came to him in a flash – literally.

As a youth in Sandusky, Ohio, Mike entertained himself riding his bicycle through the industrial landscape, observing the workings of the many factories and railroads in the city. One day he was outside a steel mill that he could look inside to see workers loading an electric arc furnace that converted scrap metal into steel. A sudden flash of light and blast of hot air almost knocked him over as the melting process began.

The sight – as well as a wave of searing heat – took his breath away. It was a moment that kicked off a lifelong study of iron and steel, and ultimately the construction of several model railroads focusing on the steel industry.

Mike built his first model, a blast furnace from the 1950s, based on a drawing in the *Encyclopedia Britannica*. He also began amassing an extensive library of books, photos, and drawings about making iron and steel. Later he earned a metallurgy engineering degree at Case Institute of Technology in Cleveland. The city exposed him to more heavy industry, much of it tied to steelmaking.

From his college major and intense interest in the steel business, one might assume Mike would seek employment in the industry. But he also had an interest in theater, specifically in stage sets and lighting. He earned a master's degree in theater arts. Over the years, both these academic tracks influenced the design and construction of five model railroads featuring steel mills.

Mike started building the layout seen here 25 years ago. Half of it is devoted to the steel industry; the other half represents neighboring urban and rural areas typical of the Midwest in the steam-to-diesel transition era. The layout includes items such as beehive coke ovens and a primitive stone iron furnace, providing some historical industry footnotes.

The steel mill complex represents an integrated mill, one that receives the raw materials to make iron and produces steel sheet, bar, and rod stock, plus end-user products like rail and pipe. Many of the structures were originally built for earlier layouts.

THE STEELMAKING PROCESS

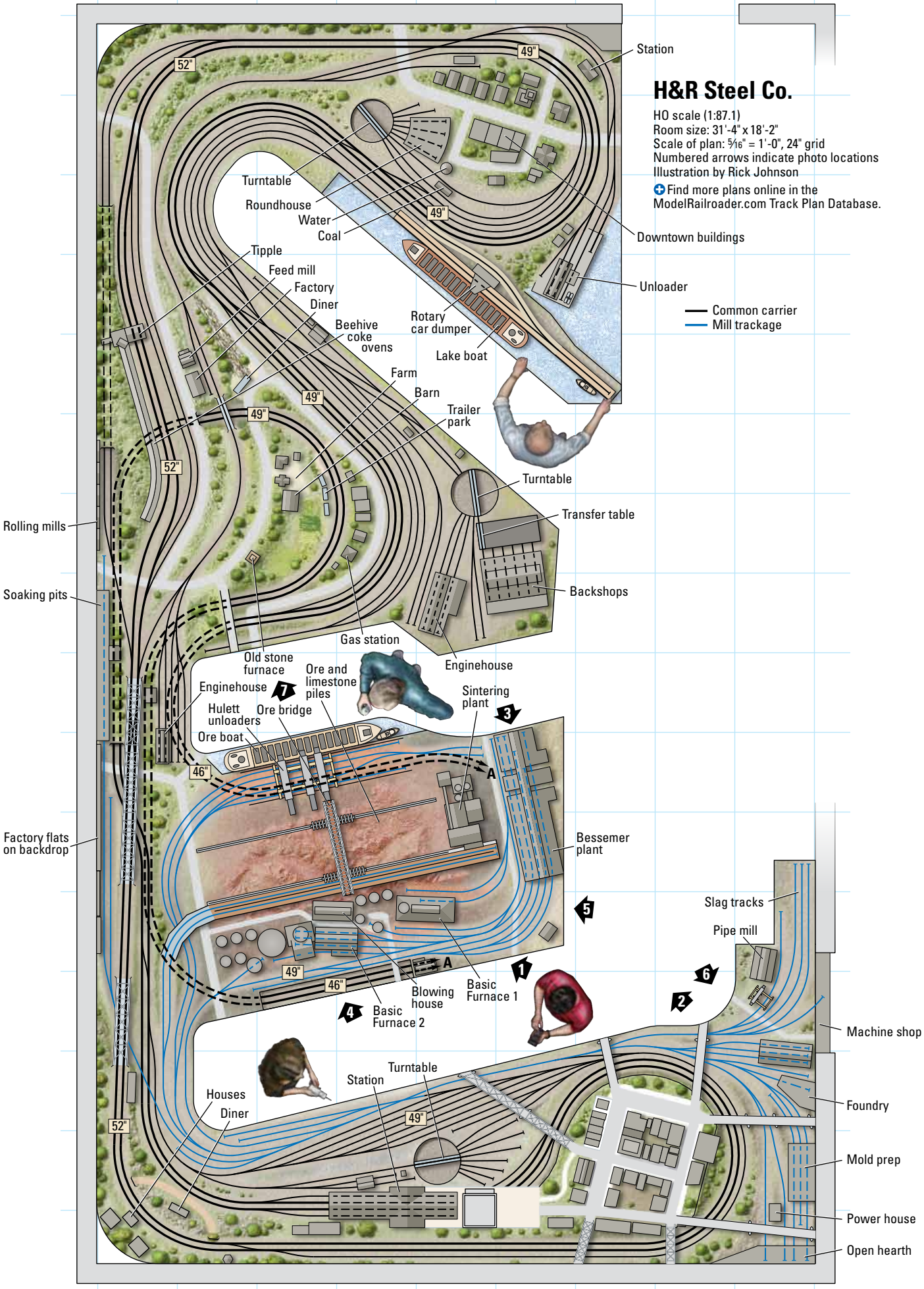
One can follow the process of steelmaking on Mike's railroad. It begins with ore, coke, and limestone arriving by rail or lake vessel. There's a large storage area for the incoming raw material.

THE LAYOUT AT A GLANCE

NAME: H&R Steel Co.
SCALE: HO (1:87.1)
SIZE: 18 x 33 feet
THEME: integrated steel mill
LOCALE: Midwest United States
ERA: steam-to-diesel transition era
STYLE: walk-in
MAINLINE RUN: 135 feet
MINIMUM RADIUS: 30" (main), 12" (mill)
MINIMUM TURNOUT: no. 3 (in mill)
MAXIMUM GRADE: 1.5 percent
BENCHWORK: open grid
HEIGHT: 46"
ROADBED: Homasote
TRACK: code 100 (flextrack and handlaid)
SCENERY: plaster shell
BACKDROP: painted wallboard
CONTROL: direct-current block control

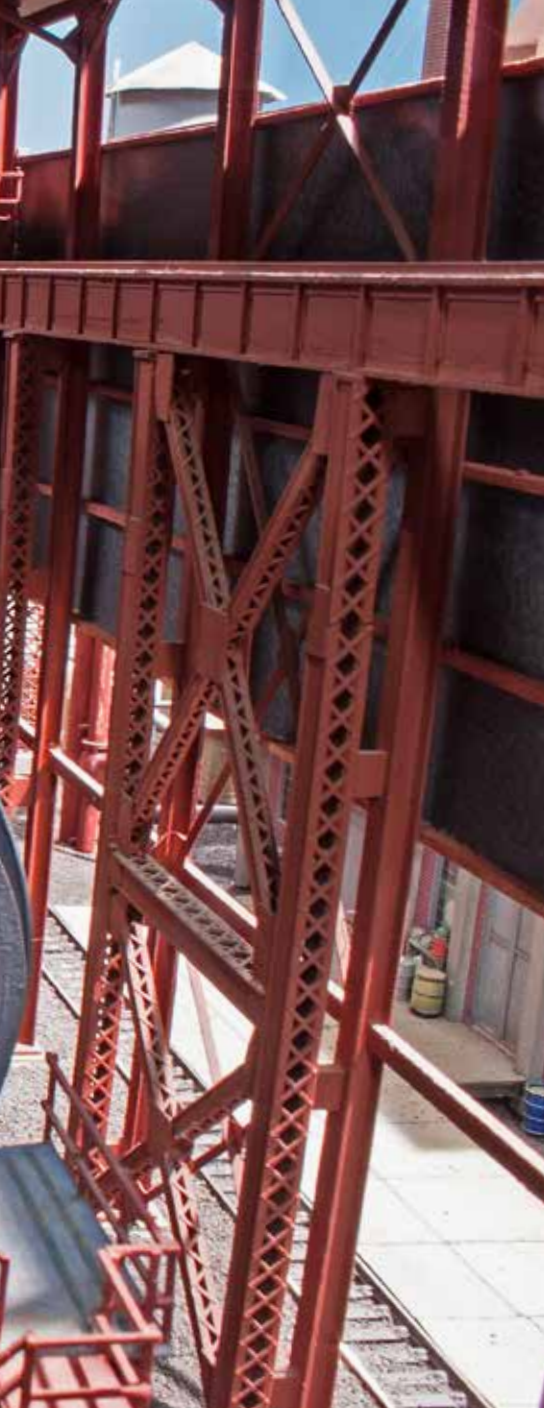
Mike has installed two Hulett unloaders along the lake pier to offload the material arriving by ore boat. Variations of such storage yards are found in both lakefront and inland mills. Coal can also be shipped by rail from free-standing coke plants, as it is on Mike's layout.

Two blast furnaces line the other side of the storage area. The raw materials destined for the furnaces are pulled from


H&R Steel Co.
HO scale (1:87.1)
Room size: 31'-4" x 18'-2"
Scale of plan: 5/16" = 1'-0", 24" grid
Numbered arrows indicate photo locations
Illustration by Rick Johnson
Find more plans online in the ModelRailroader.com Track Plan Database.
Common carrier
Mill trackage
Station
Downtown buildings
Unloader
Turntable
Roundhouse
Water
Coal
Tipple
Feed mill
Factory
Diner
Beehive coke ovens
Rotary car dumper
Lake boat
Farm
Barn
Trailer park
Turntable
Transfer table
Backshops
Enginehouse
Gas station
Old stone furnace
Ore and limestone piles
Enginehouse
Hulett unloaders
Ore bridge
Ore boat
Sintering plant
Rolling mills
Soaking pits
Factory flats on backdrop
Bessemer plant
Slag tracks
Pipe mill
Machine shop
Foundry
Mold prep
Power house
Open hearth
Blowing house
Basic Furnace 1
Basic Furnace 2
Houses
Diner
Station
Turntable
52"
49"
46"
A
1
2
3
4
5
6
7

3 Thanks to a lifetime of study and research, the interior of the Bessemer convertor building on Mike Rabbitt's HO scale model railroad looks like the real thing. The steel industry is the focus of Mike's layout, which is set in the steam-to-diesel transition era.

4 Hot metal bottle cars are used to move molten pig iron from blast furnaces to the Bessemer converter or open hearth furnaces. Mike models the gritty, solidified iron splatter by sprinkling sand or ballast onto glue, then painting it.



the storage piles by an overhead clamshell crane straddling the storage area. It dumps the material into hopper cars, one of them motorized. They move back and forth behind the blast furnaces on a trestle called the high line, delivering the materials to stockpiles at the base of the furnaces. The basic mix of raw materials is loaded through the top of the furnaces by skip cars.

After the mixture is heated and becomes molten, the resulting pig iron is poured into hot-metal cars and waste products into slag cars. In Mike's mill, the iron is transported either to the Bessemer convertor or the open-hearth building. In the Bessemer, air is blown through the molten iron to burn out the carbon, silicon, and manganese impurities, turning it into steel. The open-hearth building provides another process for converting pig iron into steel.

After the conversion, the molten steel is poured into ingot molds for transport to processing facilities, where they will be made into end products. Not all of the blast furnace output is converted into steel; some is kept as pig iron to produce cast iron products.

Hauling hot metal

5 The steel industry relies on a number of different specialized cars to move iron, steel, slag, and other materials around the mill at different stages of the steelmaking process.

THE STEELMAKING BUSINESS requires moving molten material from a blast furnace to another location for further processing. Usually the transfer happens within a facility, but in some cases the destination can be miles away. This is possible because the metal can remain molten in the specialized cars for up to 24 hours. Nevertheless, the moves are done on a priority basis.

The hot metal cars that carry the first-stage molten pig iron from a blast furnace to another facility for further processing are quite distinctive. One such car, a lower capacity, older design with a tulip-shaped basin, is called a Kling car for the design's inventor.

Later, higher capacity bottle cars, also referred to as torpedo or submarine cars because of their elongated shape, were placed into service. The opening into which the molten metal is poured is relatively small to help retain heat. Similar models were produced by Walthers.

Waste material produced in the blast furnace is called slag. It forms on top of the molten mass and is drained off into slag cars. The slag car container is a round-bottomed pot shape, fully open on top to facilitate dumping onto a slag pile. The dumping is a spectacular sight, especially at night, with glowing molten metal running down the sides of the pile. Slag can later be recycled and used in concrete and fertilizer. Walthers has produced these cars, too.

Another type of rolling stock unique to the steel industry is the short flatcar for carrying ingot molds. The molds vary in size to create steel blocks that are easier to handle in the end product production. Specialized cars like these are essential for accurately modeling the steel industry. – *Paul Dolkos*

6 **A hopper train on the main line skirts the H&R Steel Co.'s open hearth, mold prep, and foundry facilities, while a plant switcher awaits its next assignment.**

The iron and steel industry depends on rail transport, both for deliveries of raw materials and outbound shipments of products. And within large mills, there are frequent transfers of materials by rail between processing facilities.

To better handle these requirements, the companies own and operate railroad companies for plant switching plus some transfer runs (such as the Philadelphia, Bethlehem & New England and Union RR) and line haul (Bessemer & Lake Erie and Duluth, Missabe & Iron Range).

Owning their own railroads not only provides the steel companies operational control, but since the roads are common carriers, the steel company also gets a say in railroad tariffs and reciprocal rate agreements.

Mike hasn't named his Class 1 railroad connection, but there are several staging tracks on the railroad from which trains originate to deliver ore and coke to the mill. There are also a handful of other rail-served customers around the layout to be switched. But most of the activity takes place within the mill itself. The priority rail activity in the plant is transferring molten metal between processing facilities. It's critical that hot metal cars be in place for the molten iron pour at the specified time.

Once the pour is made, the cars are normally moved promptly to the next processing stage, even though the metal can remain molten in the cars for up to 24 hours. At the same time, other crews work the congested tracks that wind between the plant buildings. These crews clear for the hot metal moves.

MODELING THE INDUSTRY

Steel mill structures, especially the blast furnaces and raw material handling systems, aren't just simple boxes with windows and doors. Having a set of

Steel Mill Modelers SIG

TODAY THERE'S MORE AND MORE emphasis on building credible prototype-based model railroads rather than generic representations. Doing so depends on having good information. Thanks to the internet and Special Interest Groups (SIGs), a modeler can find information on virtually any area of interest. But this wasn't always the case.

Decades ago, when Mike was building his first blast furnace model, he relied on library books for his research. Then one day fellow Ohioan Dean Freytag heard of Mike's efforts, called him, and asked to visit. They met and were pleased that they shared the same interests. Later, they met others interested in modeling the steel industry. Through the years Dean and Mike built extensive libraries of industry data.

Some years ago, facilitated by the National Model Railroad Association and the internet, like-minded model railroaders began associating in SIGs. Many steel industry modelers joined the Railroad Industries Modeling SIG. As other like-minded modelers joined the group, they realized there was a benefit to forming their own group to focus exclusively on the steel industry. The group has fostered many relationships, enabling modelers to exchange information and provide sales channels for low-volume steel industry modeling items.

The group meets annually, often in a steel mill town, to hold clinics, display models, and when possible tour steel industry facilities. The group's website is at www.smmsig.org. – *Paul Dolkos*

good photos doesn't necessarily provide a modeler with a clear understanding of how the all parts fit together. Mike, falling back on his engineering and theater design schooling and referring to the documentation in his library, drew large, detailed plans of the complex structures before beginning construction.

Mike built his structures using styrene, wood shapes and strips, metal, and paper. Sometimes he comes across unconventional materials, such as shelf lining paper, with the right texture to represent metal siding. He's partial to stripwood because it's more resistant to bending than plastic, especially in large structures. He builds following prototype practices, including all the bracing and tie rods, to ensure long-term stability. Some of the structures on the layout are 40 years old.

Mike's structures and related mill models are accurate, detailed, well built, and impressive. Many are full-scale, uncompressed models. This is where he has lavished his efforts. A friend says, "If you could heat up [Mike's] furnaces, they would be able to produce iron and steel."

With the exception of the specialty mill equipment like the hot metal cars, Mike's locomotives and rolling stock aren't detailed or weathered. For Mike, who sees his layout like a theatrical set, the trains, for now, are a lower priority.

NEW PLANS

Mike and his wife recently moved to a new home. The railroad presented here has been dismantled and a new version is under construction in a room of similar size. While the track plan will be different, the marvelous complex mill structures will be reinstalled to create new vistas of the steel industry. GMR

Paul Dolkos is a frequent contributor to Model Railroader *magazine and its special issues.*

7 In a rural portion of the layout, an early stone furnace, a remnant of early iron-smelting history, still stands in a farmer's pasture.

MEET MIKE RABBITT

MIKE RABBITT LIVES with his wife, Patricia Ann Buard, in King of Prussia, Pa., near Philadelphia. Mike is retired after several decades of theater stage set design work and teaching.

PENN

1 Pennsylvania RR 4-8-2 Mountain no. 6716 runs past a coal mine with loaded hoppers while an 0-6-0 switcher works the tipple. The scene is part of Chris Broughton's modular N scale Pennsy layout.

I GOT STARTED IN N SCALE WHILE IN college in 1988. I'd modeled in HO since I was 12, but I loved the fact that I could fit much more modeling in less space in N. I also liked the way the scenery could more easily dwarf the trains like it does its real-life counterpart. Since then I've built several small layouts.

In 2008, my friend Joe Rateau and I began reading about Free-moN, a free-form N scale modular standard that featured a single-track main line. Since we thought this promoted scenery and prototypical operation more than the Ntrak standard, with its rigid shape and three-track main line, we began building a trio of modules.

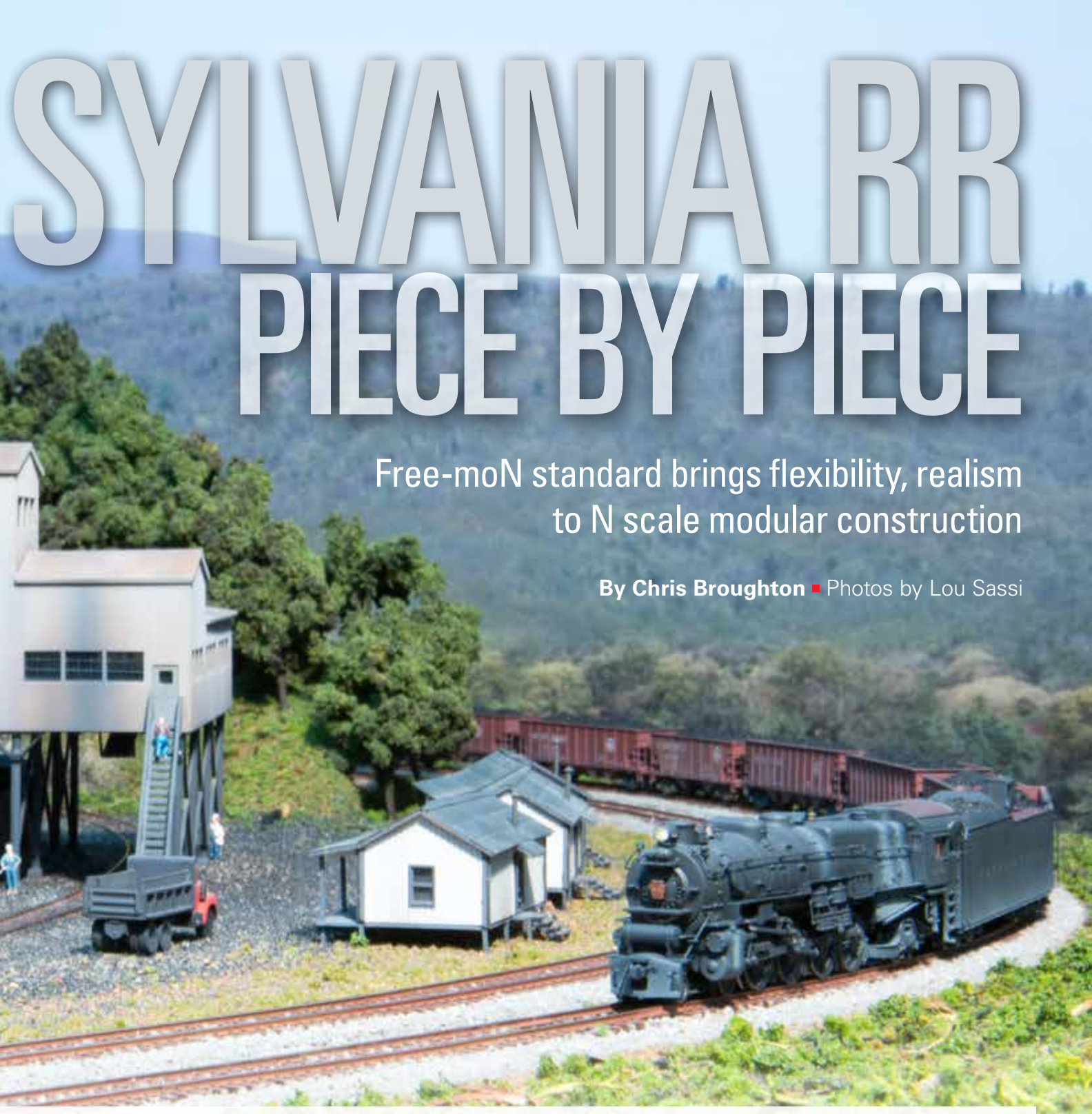
I like the concept of a modular layout and the fact that if I have to move, the layout can come with me, unlike some permanent layouts. Given that this is the third home for that first group of modules, going modular has served me well.

We hoped to connect with other Free-moN modelers around Louisville, Ky., but as it turns out, we were the only modelers doing so in the area. However, these three modules became the basis of a modular home layout that would continue to grow over the next eight years.

SYLVANIA RR PIECE BY PIECE

Free-moN standard brings flexibility, realism to N scale modular construction

By Chris Broughton ■ Photos by Lou Sassi

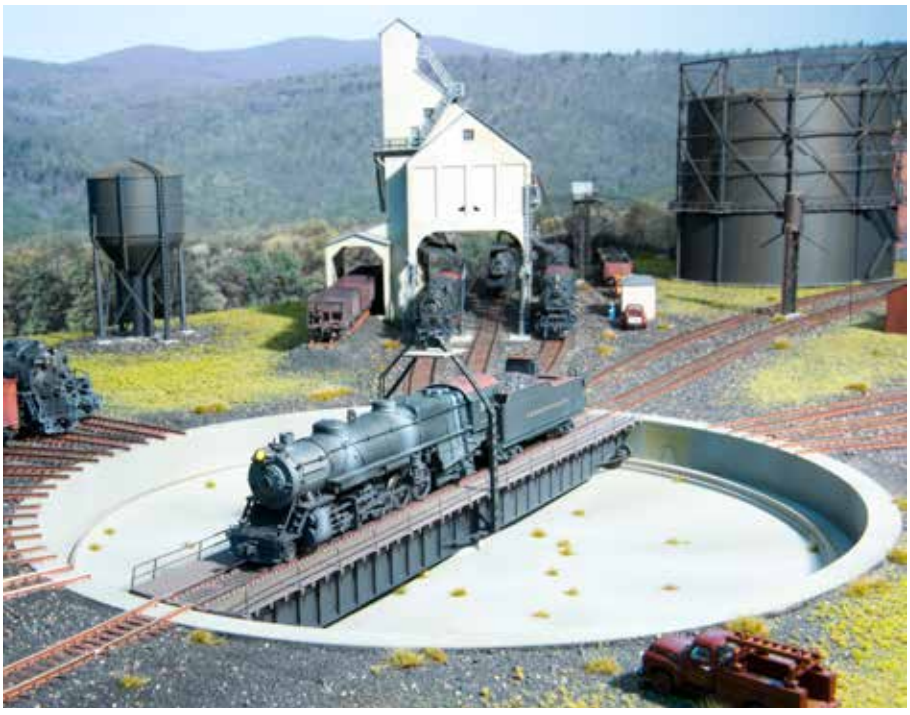


The layout's early configurations were point-to-point, with a stub-ended yard at each end. We added the first reverse loop in 2011, and later joined the two end yard modules into a double-ended yard. After moving into my current home, we added the second reverse loop, and over the years, several more modules. As the layout grew, the trains started to get longer, as well.

DESIGN AND CONSTRUCTION

Free-moN specifies a single-track main centered on the module ends (it can deviate from center elsewhere on the module), 50" in height from floor to railhead. The standard also specifies Atlas code 55 track and turnouts, Digital Command Control (DCC), Digitrax LocoNet, accessory buses, module construction and materials, and more.

Joe, a master carpenter, designed and constructed the modules. Thanks to his engineering and construction methods, the modules are exceptionally lightweight and sturdy. One of the most notable and functional contributions is the swing gate. This was added in lieu of a duckunder, and it's worked smoothly and flawlessly for a few years now. It's a knee and back saver, too!



2 **Pennsylvania RR no. 8812 rides the turntable as it's prepared for its day's work. Chris rebuilt the class N2sa 2-10-2 from a Con-Cor model. The turntable and engine terminal structures are Walthers structures.**

THE LAYOUT AT A GLANCE

NAME: Pennsylvania RR
SCALE: N (1:160)
SIZE: 18 x 27 feet
PROTOTYPE: Pennsylvania RR
LOCALE: Eastern U.S.
ERA: 1954
STYLE: modular walk-in
MAINLINE RUN: 85 feet
MINIMUM RADIUS: 20"
MINIMUM TURNOUT: no. 7 (yards and industries), no. 10 (crossovers)
MAXIMUM GRADE: none
BENCHWORK: Free-moN modules
HEIGHT: 50"
ROADBED: cork
TRACK: Atlas code 55 flextrack
SCENERY: extruded-foam insulation board covered with plaster cloth
BACKDROP: TracksideScenery.com photo backdrops mounted on .060" styrene
CONTROL: Digitrax Digital Command Control

3 **This overall view of the layout shows the huge Tandy Grains elevator in the foreground, with the main yard and engine terminal on the peninsula immediately behind.**

Some modules, such as the yard, have lauan plywood tops, while others in more scenic areas have 2" extruded-foam insulation board as the base. The track is glued in place on cork roadbed.

The layout evolved as a series of "building blocks" one module at a time, drawing inspiration from the various industries my model railroading friends and I wanted to model. The two yard modules (two of the first group of three) were built at the same time and designed to function either as two separate stub-end yards or one double-ended yard.

SCENERY AND THEME

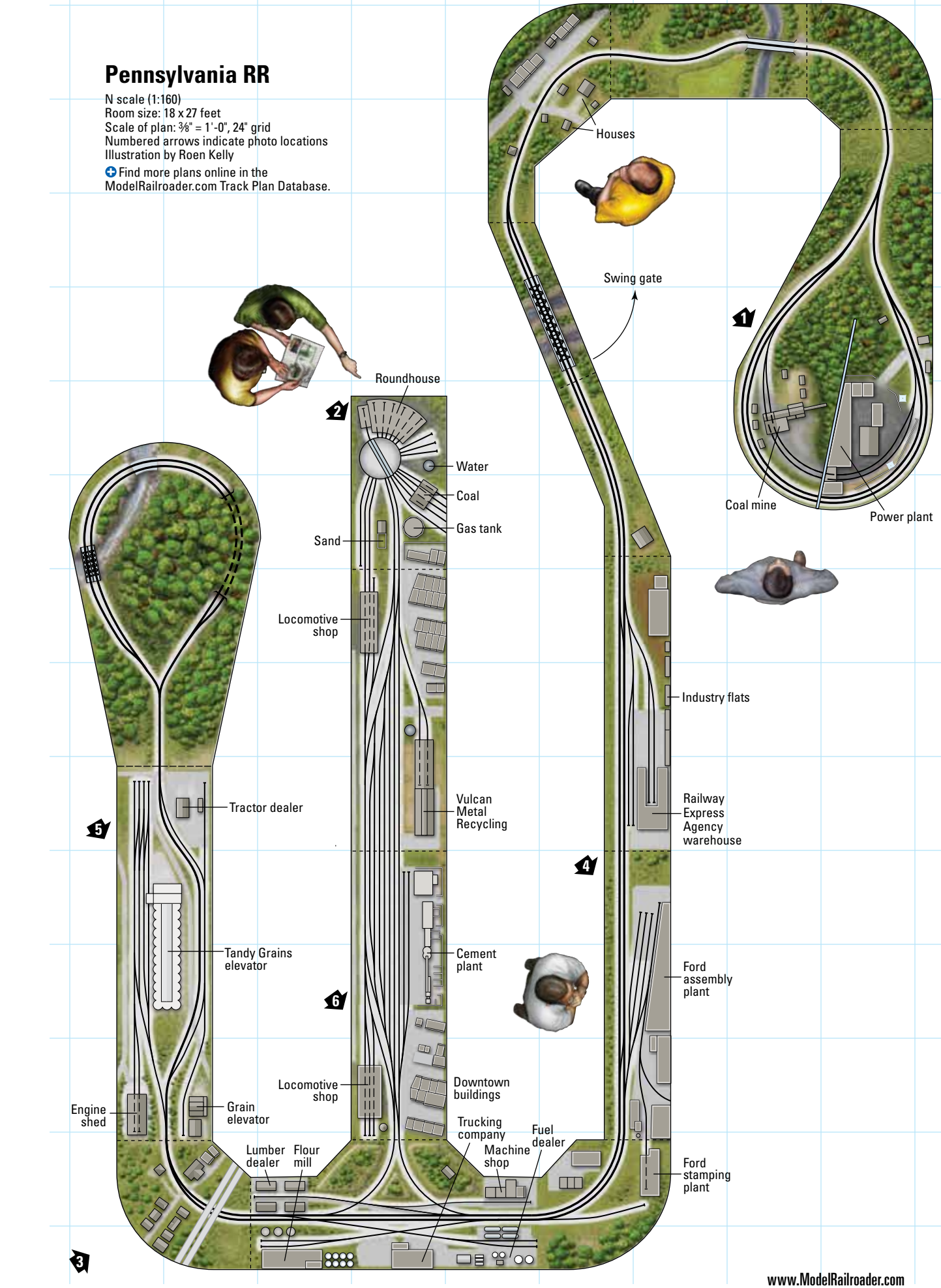
I'm often drawn to unique prototypes, regardless of road or era, and enjoy modeling them. So, I did my best to model structures that would be appropriate for either the steam-to-diesel transition era or the modern era.

I started out running modern traffic, such as stack trains and enclosed auto racks. Even so, I found myself often drawn to transition-era Pennsylvania RR equipment. I've always been enamored with the unique equipment of the Pennsy, such as diesels with train-phone antennas and steam locomotives with Belpaire fireboxes.

Pennsylvania RR

N scale (1:160)
Room size: 18 x 27 feet
Scale of plan: ⅜" = 1'-0", 24" grid
Numbered arrows indicate photo locations
Illustration by Roen Kelly

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



Improving inexpensive trees

BECAUSE THE MODEL RAILROAD needed so many trees, I came up with a method to improve inexpensive, mass-produced trees I buy from online vendors. The trees have wire armatures, a variety of sizes and shapes, and a nice overall appearance. The colors, however, leave much to be desired. After trying several techniques, I found one that I like both in terms of ease and result.

As they come from the vendor, these inexpensive trees have a good shape, but garish colors. Chris paints them and applies ground foam for a more realistic look.

The trees usually arrive rather flattened from their trip overseas, so the first step is to bend the wire branches back into shape. Once that's done, I spray the trunk and foliage thoroughly with brown spray paint, making sure the original color is completely covered. Spray outdoors where there's plenty of ventilation, and wear nitrile gloves to protect your hands.

While the paint is still wet, I hold the tree over a plastic tub to catch the excess and sprinkle on Woodland Scenics Green Blend ground foam from the shaker bottle. I apply the ground foam mainly on the top and sides of the tree, but not underneath. This helps create shadows and give the tree more depth. Vary the amount of ground foam applied from tree to tree to create variations in color – less green means more brown shows through.

Shake off the excess, and put the tree in a cardboard box to dry. Move on to the next one. It's that easy. I find I can do about 60 trees or so in an hour's time. – *Chris Broughton*

4 Chris felt he had to include the Ford plant on his layout, as the prototype is in his area. Chris' friend Jon Vincent scratchbuilt the large structure.

My good friend Jon Vincent (another PRR fan) and I tossed around the idea of temporarily backdating the layout and running our Pennsy equipment for a while. Given that our Thursday night crew usually brought transition-era equipment to operate, it made sense, so we did it. That "temporary" change was made about four years ago, and it's still 1954 on our Pennsylvania RR.

The scenery is generically Eastern United States, including parts of Appalachia. Landforms are made using traditional layered foam insulation board techniques. Rock forms are Hydrocal castings made in a mix of commercial and homemade molds, glued to the terrain, and painted.

Roads are cut from styrene, painted, and glued in place. I add some fine ballast along the shoulders of the road and use an extra-fine-tip paint pen to stripe the pavement.

Most of the ground cover consists of layers of fine-sifted real dirt over a painted base, with fine and coarse ground foam applied over that. I've started using a static grass applicator and static grass in a few areas, and really love the effect. When time allows, I'll apply static grass to more of the layout.

The backdrops are commercially made by www.TracksideScenery.com. These are the best commercial backdrops I've found, and the proprietor is great to work with. I have them professionally mounted on .060" styrene before placing them behind the layout.

WIRING

The wiring specs are largely dictated by Free-moN standards. Each module has a 12AWG wire bus for DCC track power; an accessory bus (also 12AWG) for switch motors, lighting, and animation; and a Digitrax LocoNet bus for connecting DCC components. The DCC and accessory buses are connected between modules with Power Pole connectors, and the LocoNet bus connects with 6-wire RJ45 cables. Feeder wires from the bus to the track are 20-22AWG.

After a few operating sessions, it became apparent that the layout needed to be separated into electrical districts so a short circuit wouldn't take down the entire layout. To that end, I added an additional bus to carry DCC power in

lieu of the original Free-moN track bus. This new bus powers a DCC Specialties PSX circuit breaker on each module and nothing else. The circuit breaker provides the power to the original Free-moN track bus, which is no longer connected to adjacent modules. Track joints between modules are also insulated. This allows the effect of a short to be limited to the module on which it occurs. Conveniently, this configuration is still backward-compatible with modules using the original Free-moN bus.

The two yard modules underwent a major upgrade in terms of turnout control over the last year or so. With 19 turnouts on each end of the yard, the multitude of manual turnout controls were confusing and frustrating, especially when someone new joined our Thursday night crew.

So I upgraded the yard ladder with Tortoise by Circuitron slow-motion switch motors operated by stationary decoders programmed to accept push-button input from the control panel. [See "Custom control panels" on the next page. *–Ed.*] An operator can simply press the button corresponding to the desired track, and the ladder will align itself.

Crossovers likewise got Tortoises controlled together by a single control-panel toggle switch. I've also added dwarf signals in the yard to provide on-layout indicators of turnout alignment in addition to the light-emitting diode (LED) indicators on the control panel.

The signals are numbered to correspond with the numbered tracks on the control panel to help operators identify the individual tracks. While this was a major undertaking, it has reduced the number of manual turnouts at each end of the yard from 19 to five and greatly simplified operating the yard.

5 **A Baldwin center-cab diesel brings a transfer for the Tandy Grains elevator on a sunny day. Since Chris models the steam-to-diesel transition era, grain is carried in boxcars rather than covered hoppers.**

INDUSTRIES

The massive Tandy Grains elevator was scratchbuilt by Chris Tandy. This was one of the first three modules, built back in 2008. Since then, I've modified the crossover tracks in the grain elevator yard and modified the scenery.

The larger of the two reverse loops lent itself to a coal mine-power plant combination designed for loads-in, empties-out operations. The coal mine is built from a Walthers kit, and the company houses are Blair Line. The scene is loosely based on photos in books on coal mining in Appalachia. This is my favorite part of the layout.

On the other half of the reverse loop, opposite the coal mine, is Pennsylvania Power & Light. Jon kitbashed the main structure from a pair of Heljan brewery kits. I added the roof, painted the architectural details, and built the smaller structures in the scene.

The Ford Kentucky Truck Plant was a must-model facility, since the actual plant is just a few miles from my home. We see lots of auto rack traffic from the plant on CSX's Louisville-Cincinnati line, which runs directly behind our house. These great structures were also scratchbuilt by Jon. He built several other structures on the layout, including:

• JV Materials – The plans were found in the May 1998 *Model Railroader*. I gave

Custom control panels

I'M OFTEN ASKED about the panels I use for turnout controls, circuit-breaker indicators, and the like. It's really simple. I design the panels using free photo-editing software, such as GIMP or MS Paint, to look just the way I want them. I include text labels as well as circles to be drilled out for light-emitting diodes, toggle switches, and mounting holes. For a turnout control panel, I also include a simplified track diagram, as seen at right.

Chris has his control and indicator panels like these made at a trophy shop. They lend a professional appearance to his layout.

Once everything is laid out, I print it at full size. Then, it's just a matter of taking the printout to a trophy shop and having the panel cut. They will cut the design into a two-tone plastic plate and even drill or punch the holes. The result is a clean, professional-looking panel that adds a nice touch to any fascia. – *Chris Broughton*

him the plans and a bunch of styrene, and he gave me this facility. I got the better end of that deal!

• Vulcan Metals – This was kitbashed from two Walthers Vulcan Metals kits. I turned it into a metal recycling plant.

• Locomotive shops – Jon kitbashed these from Walthers kits, and I added the interiors.

I built most of the downtown storefront buildings on the two yard modules. They were made from DPM, Walthers Cornerstone, and Downtown Deco kits, and many were kitbashed to fit the space.

One structure that might look out of place for 1954 is "Fast Layne." It's a memorial to a late high school friend whose passion was restoring 1960s Chevy muscle cars. Replicas of our high-school cars are parked alongside it, and the rest of the lot and garage are filled with some of his favorite cars.

There are other artistic nods to friends and family scattered all over the layout, such as signs with inside jokes, the Doctor Who TARDIS, businesses named for friends and family, and even a sign for my dog, Otis. There are nuggets of memories hidden everywhere.

LOCOMOTIVES & ROLLING STOCK

I've always loved Pennsy's unique and distinctive steam locomotives, and I enjoy the challenges presented in modeling them. My steam roster includes a pair of heavily reworked brass GHB class L1s 2-8-2s, a Key Imports I1s 2-10-0, and a Bachmann K4s 4-6-2, among others.

Two of my favorite PRR steam models are the class N2sa 2-10-2 that I built from a Con-Cor 2-10-2, and a heavily kitbashed class G5s 4-6-0, a "Franken-loco" made of parts from four different locomotive models.

The diesel roster consists of several first-generation locomotives, including Erie-Builts, Alco PAs and RS-1s, Electro-Motive Division E8s, Baldwin RF-16 "sharks" and a center-cab RT-624, and Fairbanks-Morse Train Masters.

The Baldwin RT-624 is unique in that it was built using a 3D-printed shell, fuel tank, and truck sideframes on an Atlas C-628 mechanism. I'm also fond of the Alco RS-1s with their distinctive train-phone antennas.

Detailing, painting, and weathering locomotives is one of my favorite aspects of the hobby. I make sure my locomotives are detailed and weathered before being put into service on the layout. With rare exception, all receive wire grab irons, uncoupling levers, m.u. hoses, antennas, fans, and fan grills, where appropriate. I use an airbrush to weather both steam and diesel locomotives, and apply Testor's Dullcote to protect the finish.

With so many new, highly detailed freight cars being continually introduced to the market, my rolling stock roster is often in a state of flux, with older, less-detailed cars being swapped out for newer, more detailed versions, especially when they are PRR-specific models. The last few years have been good for PRR modelers, with the availability of H21a

MEET CHRIS BROUGHTON

CHRIS BROUGHTON LIVES in Louisville, Ky., with his wife, Carol, who he says is very supportive of his hobby. They have four children. Chris is a database developer for a distiller in Louisville. His other hobbies include physical fitness, hiking, and World War II history.

6 **Several diesels idle in the yard, awaiting their assignments. Chris custom-built the Baldwin center-cab RT-624 on the far right using a 3-D printed shell and detail parts on an Atlas mechanism.**

and GLa open hoppers from Bowser, H31 covered hoppers from Fox Valley Models, H32 covered hoppers from Broadway Limited, G26 mill gondolas from Eastern Seaboard Models and G31 gondolas from BLMA (now Atlas Model Railroad Co.), as well as X29 boxcars from Red Caboose.

I've further extended my PRR roster with the addition of a few X32 and X31a boxcars from Fine N Scale (www.finenscale.com). Home road cars account for between a third and a half of the cars on the layout, with the remainder mostly from roads that interchanged with the Pennsy.

I still have a few older Micro-Trains cars on the layout, most of which have been lowered by modifying the chassis, using BLMA trucks, or some combination of the two in order to get them to a prototypical ride height.

All cars have been equipped with body-mounted Magne-Matic couplers and Fox Valley Models metal wheels. These two upgrades have improved tracking and reduced derailments, especially during backup moves.

I use a combination of techniques to weather freight cars. The easiest for me is the airbrush. I can quickly apply a dusting of grime and dust to make the car look not-so-new and more believable on the layout. Over the last year or so, I've begun using a combination of chalks and acrylics on a few cars with some success. While this process is more time-consuming, the results are worth it. I'm able to simulate faded paint, rust streaks, and grime accumulations in the various joints and crevices of the car.

TRAIN NIGHT

For the last six years, I've hosted Train Night every other week, during which a group of friends and I run trains on the layout. While it's not a prototypical operating session with switch lists, train orders, and dispatchers, we have a lot of fun simply railfanning our trains and enjoying the camaraderie of friends.

We have a close-knit model railroad community here in Louisville, and some years-long friendships have grown from it. Our Thursday night crew is a great example of it. Building and sharing the layout has been one of the greatest joys I've experienced and is by far the best part of having a large model railroad.

While I didn't set out to build a basement-size layout, taking a modular approach allowed the layout to grow and evolve over time to eventually fill the space I had available. I think this approach also allowed me to focus more intently on one section of the layout at a time and achieve a greater level of finish and detail than if I tried to build an entire layout at once. I do wish I had an area for staging, but I'm considering an expansion into my workshop to add a shelf of staging tracks.

While building and running model trains over a large, scenic layout is a lot of fun, being able to share that experience with good friends is even better. It's this intangible facet of the hobby that to me is the most rewarding. GMR

1 The low summer sun illuminates the smoke and steam surrounding engine no. 1 in the Ripton, Vt., enginehouse. Dave McLeod's On30 Otter Creek & Ripton packs a lot of steam-era action into a relatively small space.

GREEN MOUNTAIN NARROW GAUGE

This freelanced O scale layout captures the New England of a century past

By Dave McLeod ■ Photos by the author

Few states can rival Vermont for down-home, rustic charm. A Currier & Ives countryside of Victorian villages nestled in the folds of verdant mountains, it's the perfect setting for a narrow gauge railroad.

Vermont's hills and valleys were laced together by a web of short lines, a few of them narrow gauge. In their tradition I created the fictional Otter Creek & Ripton. Built in a 12 x 15-foot spare room, my On30 layout combines point-to-point operation with a cutoff for continuous running. There's a fair amount of track, with a mainline run of about 61 feet, but only one stretch of main line is visible at a time.

My greatest pleasure comes from model building and trying to attain a strong visual appearance. Operations may be secondary to this goal, but I still wanted the layout to have some interesting switching opportunities. Running a way freight on the OC&R can take up a surprising amount of time and presents some definite challenges.

A mix of facing- and trailing-point sidings provides operational challenges and keeps operators quite busy. There's a maximum train length of eight cars, as grades are tough, so that's about all the little engines can handle. Grades are up to 4.5 percent on the main and 6 percent on the Vermont Talc & Timber branch line, which is served by geared steam.

The Ripton wye passes through the wall into an adjacent laundry room, and the openings are hidden by trees and a covered bridge. Locomotives can also be turned at Rochester, Vt., on an "Armstrong" turntable.

BRINGING HISTORY TO LIFE

In the 1890s, the good citizens of Rochester, Vt., and Ripton, Vt., caught railroad fever. In the rugged hills between the towns were tempting stands of old-growth forest and deposits of talc begging to be brought to market.

Construction went quickly, and the 29 miles to Ripton were finished when funds ran dry in 1898. That was as far as the line ever went, but there was a decent amount of traffic, and industries sprouted along the tracks. The little engines struggled up the demanding grades with ever-increasing loads.

By 1912, the OC&R was established and comfortably profitable. The rest of its history is yet to be written, as this is the era I model.

The benchwork is typical L-girder construction, topped with ½" plywood and Homasote. The minimum curve radius is 24". To maintain visual interest,

2 Rochester is a busy place, as 2-8-0 Consolidation no. 9 pulls out with the passenger run while no. 2 switches the yard. The Consolidation is a Broadway Limited Imports model with a new tender, and the 2-6-0 Mogul is a Bachmann model.

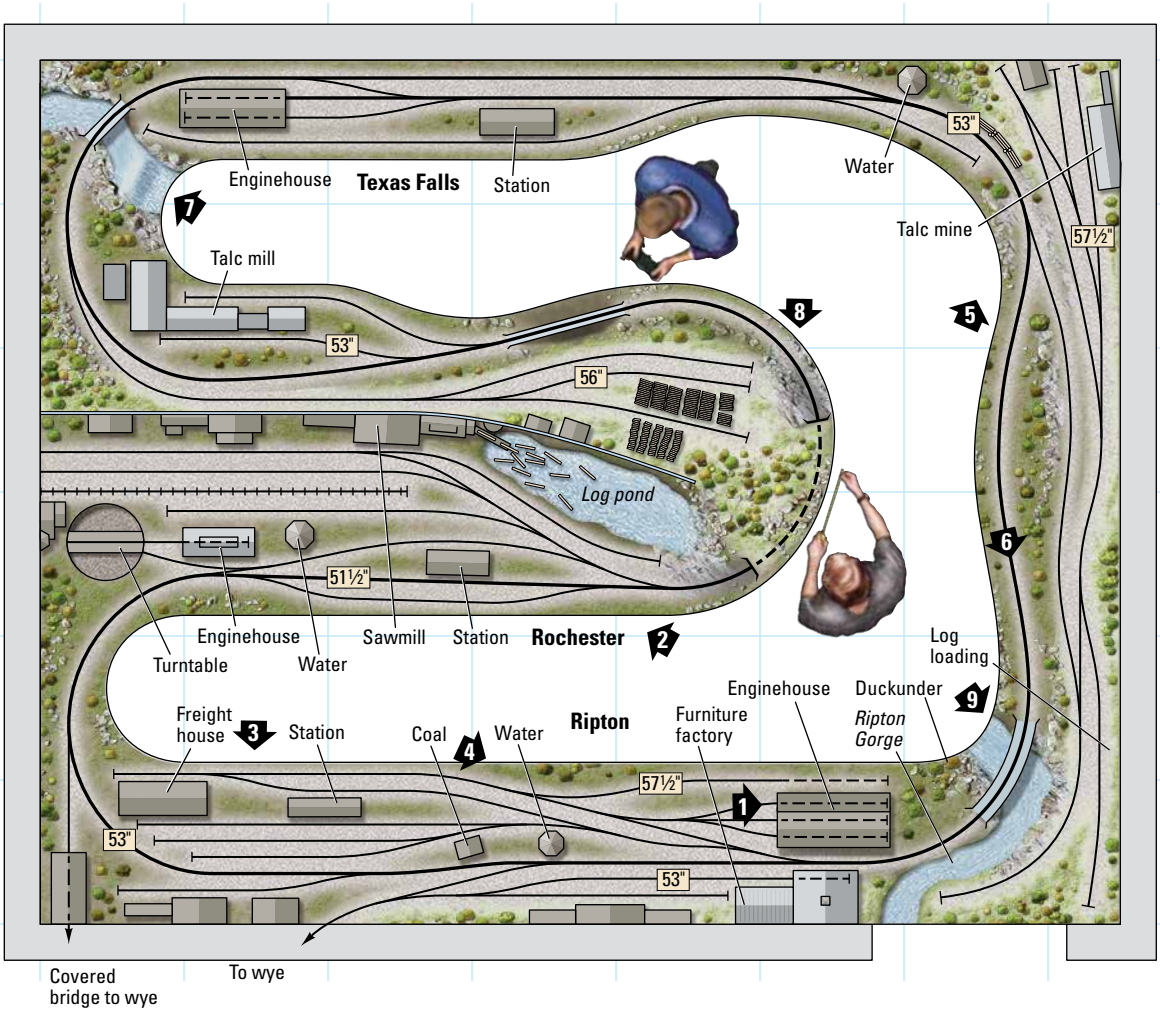
3 Team tracks, like the one in Ripton, were aptly named in the days of the horse and wagon, and were the lifeline of the community. The newfangled horseless carriage is a hint of hard times to come for the OC&R.

I tried to avoid lots of straight, parallel tracks in the towns and added subtle variations in track levels. I used Micro Engineering flextrack with Peco turnouts, and the ties don't exactly match. But with any dirt-ballasted railroad, track tends to sink, so the discrepancy isn't too visible.

One concession to my limited space was somewhat narrow aisles, but since I tend to operate solo, it doesn't present much of a problem. Viewing the trains from near track level helps accentuate the sense of realism, so I built Ripton and Rochester at 51", and the talc mine is at 58".

As with any long-term project, delayed gratification had its rewards. I amused myself building some models and prepping the room, but didn't lay much track at all during almost a year of planning. That said, as benchwork progressed, some areas were rough-finished with track and basic scenery before I moved on to the next section. This kept boredom from setting in while still allowing limited operation.

Needless to say, once everything was up and running, a number of inadequacies in my track plan inevitably became apparent. This led to some sections of the layout getting ripped out. Although this was painful, the long-term rewards have been greater.



Otter Creek & Ripton

On30 scale (1:48, 30" gauge)
Layout size: 12 x 15 feet
Scale of plan: ⅜" = 1'-0", 24" grid
Numbered arrows indicate photo locations
Illustration by Rick Johnson

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

THE LAYOUT AT A GLANCE

NAME: Otter Creek & Ripton
SCALE: On30 (1:48, 30" gauge)
SIZE: 12 x 15 feet
THEME: freelanced New England narrow gauge short line
LOCALE: central Vermont
ERA: 1912
STYLE: around-the-walls with peninsula
MAINLINE RUN: 61 feet
MINIMUM RADIUS: 24" (main), 18" (branch)
MINIMUM TURNOUT: Peco medium radius
MAXIMUM GRADE: 4.5 percent (main), 6 percent (branch)
BENCHWORK: L-girder
HEIGHT: 51" to 58"
ROADBED: ½" plywood and Homasote
TRACK: Micro Engineering code 100 flextrack with Peco turnouts
SCENERY: hardshell over cardboard strips
BACKDROP: hand-painted on tempered hardboard
CONTROL: NCE DCC with wireless throttles

SETTING THE SCENE

If a model railroad evokes the feeling of the prototype, it's a success. Adhering faithfully to a cohesive theme of time, place, and company mission is important. Studying pictures from my modeling era led to a greater understanding of period locomotives, rolling stock, style of dress, and architecture.

Buildings are key in establishing a railroad's unifying theme; every area of the country has a distinctive style. Small-town Vermont was, and still is, highly distinctive. Most structures were of wood construction, and charming Victorian style was prevalent.

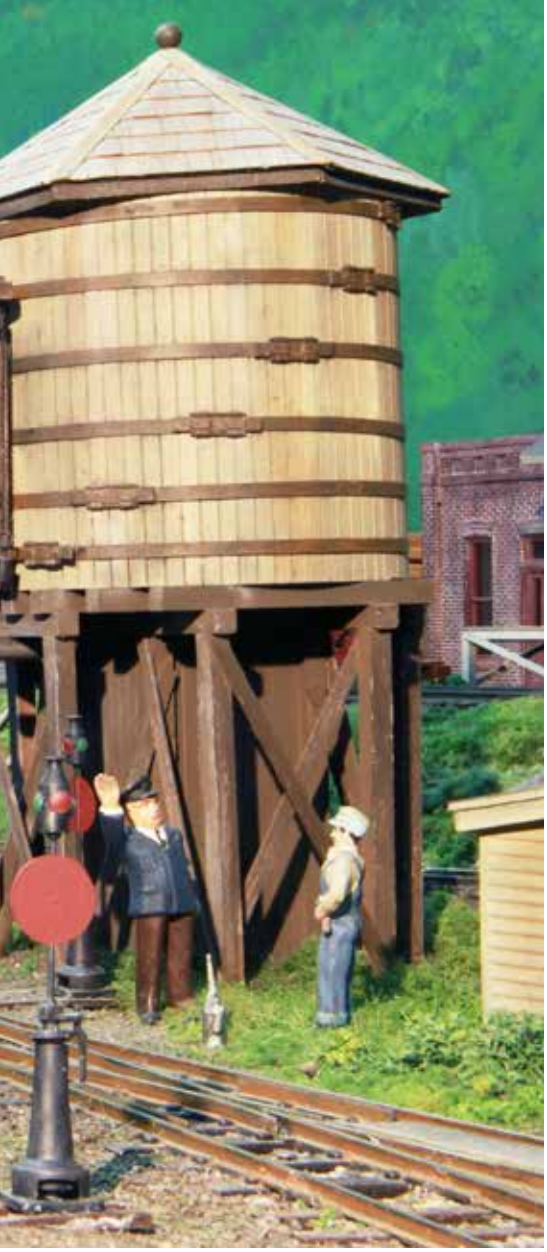
To pique interest and give a sense of place, I've included some industries characteristic of the area, such as the talc mine and mill. Vermont is one of the United States' biggest sources of talc.

There are other industries typical of the area, such as a sawmill with sound effects and woodworking businesses like a chair factory and a coffin manufacturer. Logs and pulpwood are loaded on line, and there are team tracks at Texas Falls and Ripton.

All structures are scratchbuilt using commercial doors and window castings. The larger buildings have multiple rooflines and additions for more visual interest. O scale structures gobble up a lot of room, and selective compression is especially important. There are a number of flats with a depth of about 1" and several half-buildings. To provide variety, many are set at angles to the track or backdrop.

4 The heart of the freelanced line is Ripton, site of the railroad's main shops and head offices. Mogul no. 2 will need servicing here after battling the stiff grades over the spine of the Green Mountains.

5 The Vermont Talc & Timber Co.'s Heisler switches the talc mine on the branch line while OC&R no. 9 trundles toward Ripton Gorge with the passenger train. Vermont is one of the United States' biggest talc sources, and this industry helps establish the layout's sense of place.



People also set the scene and must reflect the era. Men almost always sported hats, and clothing colors were rather subdued. Ties, brass buttons, and watch chains were common accents. Women wore long pleated white or dark dresses with high necks and large, elaborate hats. I think that people frozen in dynamic action poses look unrealistic, so most of my figures are in static poses, often as pairs in conversation. But a few are walking, and a man splitting wood wipes his brow as he takes a breather, his axe stuck in the chopping block.

KEEPING IT NATURAL

As for the natural elements, I've tried to always keep in mind that nature is random and varied, with a wide variety of colors, textures and shapes. Modeling this is more labor intensive, but it keeps the eye much more engaged.

Trees are mostly individually made from twigs hot-glued together to make armatures. I strip sprigs of amber blossom and caspia of blossoms to make fine, bare branches. Other armatures are covered with poly fiber and ground foam. For variety, some trunks are painted white to represent birch trees.

I build evergreens with the Jack Work technique [Jack wrote a number of how-to articles for MR in the 1960s and '70s. –*Ed.*] of individual caspia branches inserted in balsa trunks, then covered in foam or static grass. Sagebrush makes

Improve your model photography

6 Forney no. 1 smokes it up as it hauls a mixed train over the high bridge at Ripton Gorge. Dave uses his experience in railfanning to inform his model railroad photography.

I DO A FAIR AMOUNT of railfanning, and this has strongly influenced my vision of how to photograph model trains. Just as the models mimic the real thing, so should model photography. Here are a few of the guidelines I try to follow.

- Use linear elements like track, a cut of cars, or the side of a building to draw the viewer's eye to the main point of interest.
- Rule of thirds. Place important elements in your composition, like the front of a locomotive, a prominent tree, or the edge of a structure, one-third of the way from the edges of the frame.
- Wide angle lenses provide great depth of field and can often be placed very close to the subject. However, watch for excessive distortion.
- Shoot from low angles. This looks more natural and makes the model look bigger. Avoid the high viewpoint "helicopter shot."
- Place the camera in the scene.
- Be aware of everything in the frame. It's really easy to miss a bit of fascia, a light, or a dark area that ruins the illusion.
- Use a tripod to allow use a of low ISO rating, slow exposure, and small aperture without causing camera shake.
- Use spotlights on stands to create shadows and highlights. Make details pop by positioning lights away from the camera position. Flat light is boring.
- A white card can reflect ambient light into poorly lit spots, like the running gear of a locomotive, without casting shadows at odd angles.
- Image-stacking software like Helicon Focus can give infinite depth of field by layering multiple exposures together. – *Dave McLeod*

Plastic wrap waterfalls

7 **Dave creates realistic waterfalls by enhancing plastic cling wrap with clear gloss medium and aquarium filter material foam.**

I'VE DEVISED A METHOD for making waterfalls that's quite realistic. I start by constructing the riverbed and rockwork at the top and bottom of the falls.

I then affix tightly stretched plastic food wrap to the top and bottom of the waterfall with a small bead of clear caulk. If your brand of wrap comes off the roll with a rippled texture, the ripples must be oriented vertically.

I attach the top first and let it dry completely. Next, I roll the bottom around a heavy bar to stretch the wrap and fix the wrap to the bottom of the falls. When that caulk is dry, I remove the bar and trim off the excess wrap.

The wrap is then coated in a clear, flexible gloss medium. I use a product called Triple Thick by DecoArt.

I can then pour conventional resin water material at the top and bottom of the falls. I coax it into position to make it cover the top of the wrap without pouring down the surface. Any odd spots can be blended with more gloss medium. I then use aquarium filter material to represent foaming water and dry brush for more subtle highlights. – *Dave McLeod*

8 **The grade is steep through the tunnel at Breadloaf Mountain, so crews working upgrade have to hold their breath in the smoky bore.**

great, funky dead trees. The forest floor is strewn with fallen and decaying logs.

For ground cover, I keep to the dictum of variety, variety, variety. Static grass, ground foam, lichen, a wide variety of weed bits, bare earth, trash, and rocks keep things interesting.

Most of my rocks were made from Hydrocal cast in homemade molds and painted with water-based paints in multiple washes.

Water lends a sense of life, so the layout has two waterfalls with sound effects. I use hills to ease the transition between scenery and fascia, which is painted green to match the ground cover.

The backdrops are painted on tempered hardboard, and a mix of greens create variety. I stipple the trees to give them visual texture – lighter green on the tops and dark green to represent shadows between the leaves. As the mountains recede into the distance, I lighten them and add more blue to the mix for the impression of distance. Folds in the hills are represented with gradual darker tones. All the corners are coved.

ROLLING ON

Except for a Broadway Limited Imports 2-8-0 Consolidation, all my engines are from Bachmann. Most are really gutsy performers that haul surprising loads upgrade. Only one has escaped customization and detailing.

The Bachmann 2-6-0 really launched On30, and the OC&R has two. Mogul no. 2 sports a wagontop boiler from an ancient On3 model, and no. 5 was stripped down and detailed. Forney no. 1 was a 2-4-4 that got chopped in half and turned into an 0-4-4. The BLI Consolidation was given a replacement tender that makes it look more appropriate for a short line.

All engines have basic cab details added. I have a thing for fluted domes and capped stacks, and this lends a family resemblance to the roster. Weathering is applied sparingly, as this was the era of spic-and-span power, when no self-respecting hogger would let his baby be seen in anything but immaculate condition. All locomotives have Digital Command Control decoders with sound and are run by NCE radio throttles.

Most of the freight cars are standard issue Bachmann models, but all have been lowered for a more prototypical

9 The afternoon freight heads into the setting sun over the trestle at Ripton Gorge. The water is Enviro-Tex two-part resin and the rocks are cast from homemade masters.

look. The flatcars have received board-on-board decks, and Blue Mountain pulpwood racks have been added to some. There's a fleet of shorty 22-foot outside-braced boxcars and pulpwood racks that I cast in resin from my own scratchbuilt masters.

As with many period New England short lines, the Otter Creek & Ripton carries its customers and express in board-and-batten-sided coaches from Laconia Car Co. Car sides and ends were cast using a master made from an On3 kit that was shortened to fit the roof and underframe of Bachmann coaches.

The Vermont Talc & Timber Co. uses a Shay, a Climax, and a Heisler. The Shays have had issues with their gears and are troublesome runners. However, the others have behaved pretty well and are capable of pulling a decent load.

The VT&T has a motley collection of four-wheel dump cars, Gilpin-style metal hoppers, and wood gondolas. Apparently, they shopped around for odds and ends in the used narrow gauge market and got some deals – typical Yankee frugality.

DOWN THE ROAD

The histories of most narrow gauge lines follow a familiar pattern: overly ambitious dreams, construction, a more or less prosperous life, decline, and then the denouement, as a wrecking train rips up the last rail.

My Otter Creek & Ripton follows the script, but with a different, happier outcome. Yes, the railroad described in this article has been taken out of service and dismantled, but only to be reincarnated. The purchase of a new house with an almost 1,000-square-foot basement has made the dreams of expansion a reality. Construction crews are already laying steel, and soon, little trains will again be steaming through picturesque New England scenery. GMR

MEET DAVE MCLEOD

DAVE'S EARLY LOVE FOR TRAINS led him to work for Canadian National and Canadian Pacific, but now he and his wife, Diana, import jewelry and artwork for their retail business in Burlington, Vt. They spend four months a year overseas for business and adventure, having visited all continents except Antarctica. During these trips Dave has chased the last working steam engines in India, China, Indonesia, and Myanmar. He also enjoys photography, travel, scuba diving, playing music, and jewelry design.

SERVING THE GREAT MIDWEST

1 The *California Zephyr* speeds through Barber, a small town nestled under the bluffs. Pete Walton's HO scale Great Midwestern RR models the upper Midwest during the steam-to-diesel transition era.

This sprawling basement empire is the result of a long modeling journey

By Dave Rickaby ▪ Photos by the author

Model railroads can be time machines. They allow us not only to take a peek into the past, but also to virtually live there. Our layout rooms are places where our memories are played out every time we walk in.

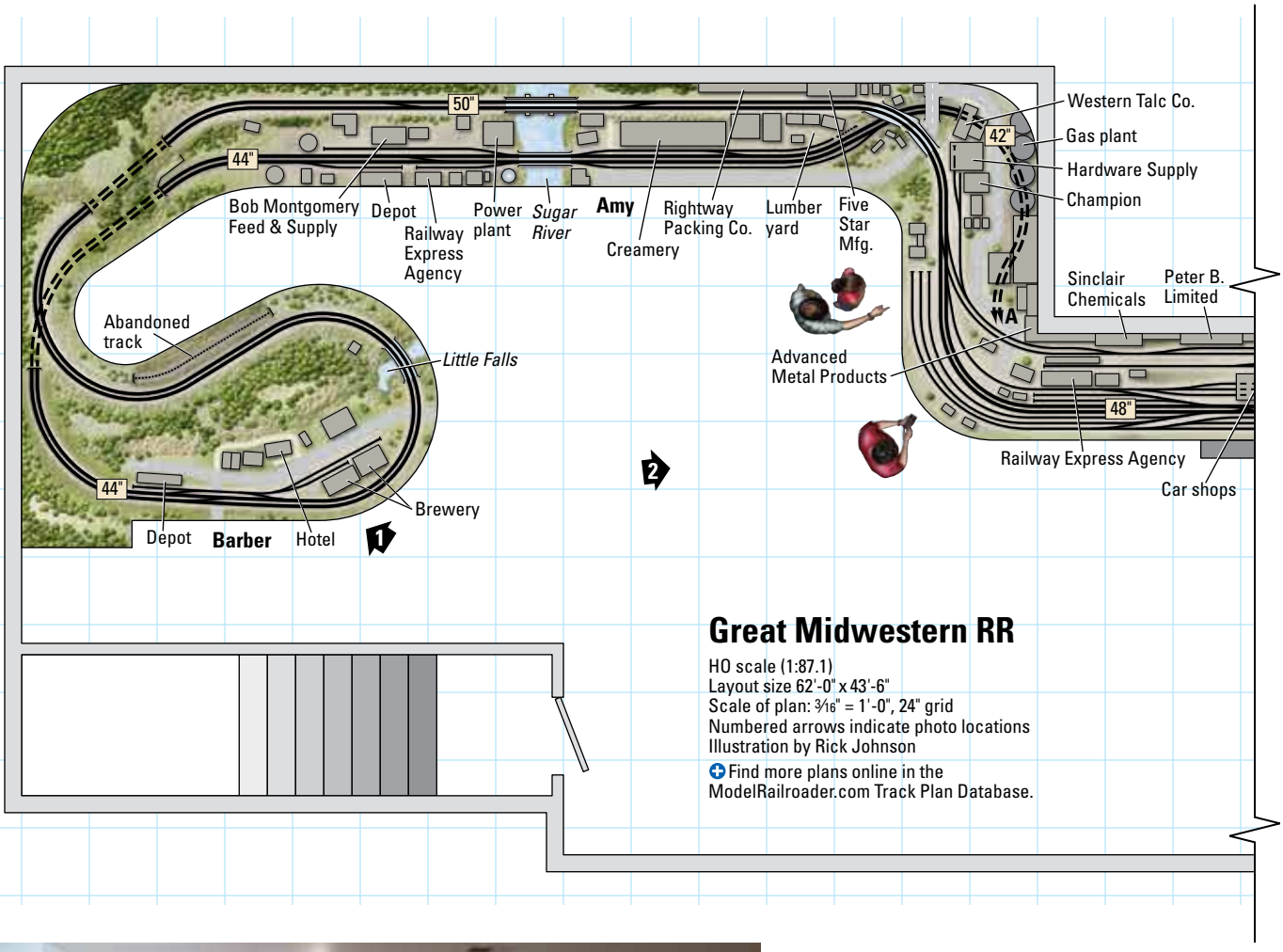
For Pete Walton, stepping into his Great Midwestern RR carries him back

to his days as a young man in the 1950s, when traveling by train was a way of life. Pete grew up in Rockford, Ill., and his parents did business in Chicago. They would travel by rail, riding the Illinois Central's *Land O' Corn* or the *Hawkeye*.

This was Pete's first introduction to railroading. There were more railroads back then, all resplendent in their own colorful paint schemes. They all left an indelible impression on young Pete, who decades later would take inspiration from these memories and transform them into his miniature world.

PETE'S JOURNEY

Pete got into the hobby in 1948, when he and his brother received an O gauge Lionel train set. However, they decided they liked HO scale better, so Pete got a Varney HO scale Electro-Motive Division F3 diesel the next Christmas. During the late 1940s and into the 1950s, Pete and a friend built several layouts in his grandmother's basement. But when Pete moved, he found his new house didn't have enough room for a layout.



2 **Pete's Great Midwestern snakes along the walls of a 36 x 63-foot basement. In the foreground, Pete works Walton Yard; along the back wall is Porto.**

Although he never completely lost interest, it wasn't until 1976 that he caught the spark again. His neighbor invited Pete over to look at some HO scale equipment and track he had received for Christmas, and that was all it took.

Pete went home and started to build a tabletop layout in his basement, but found that 4 x 8 feet wasn't enough. He expanded the model railroad several times before he had to tear it down for another move, to Madison, Wis.

He moved everything he could salvage into his new garage, where it sat until 1994. That's when he decided to try to get his layout ready for tours during the National Model Railroad Association's 1997 national convention, which was to be held in Madison.

He found that his job interfered with his modeling time, but a co-worker introduced him to a local fellow modeler, Hank Brown. Hank and his friends pitched in to help Pete achieve his goal.

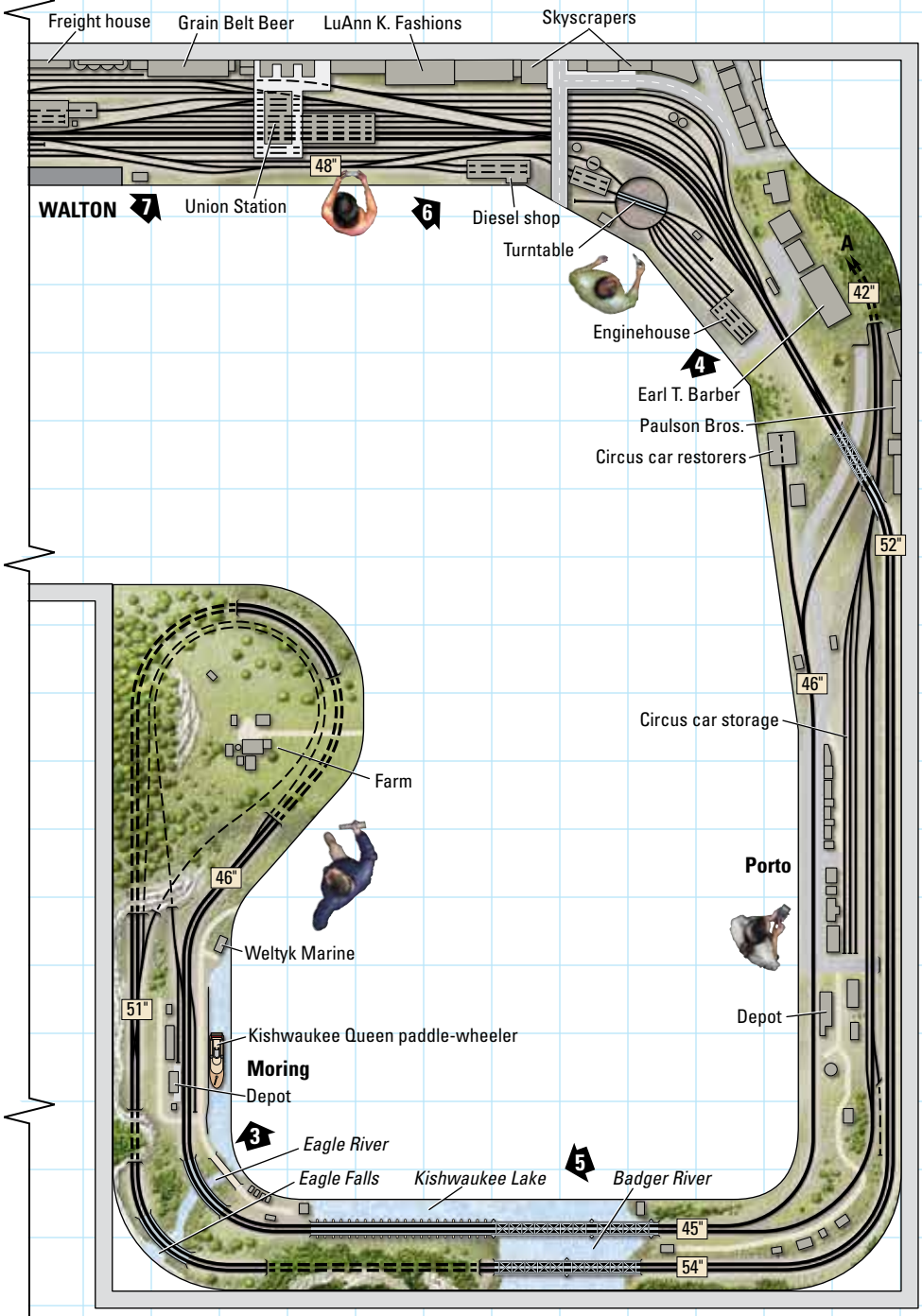
But before the convention, Pete was transferred again, to Minnesota.

This setback might have been the last straw for Pete if not for Hank. Hank suggested he and his friend, Dave Dettman, design a new layout for Pete, build it in sections in Madison, and transport it to his new home. Pete agreed, and it only took two weekends to install the new layout and get it up and running.

TODAY'S LAYOUT

Pete retired in 2001 and moved one final time, to a retirement community in Huntley, Ill. Pete feels that when you retire, your window of opportunity to build your dream layout starts closing, so he sought out Hank once more. By this time, Hank and Dave had both quit their jobs to go into business as full-time model railroad designers and builders.

Hank, Dave, and Pete developed the plan for his new dream model railroad, one that looked like it went somewhere instead of just going around in circles. Two things Pete wanted to avoid were losing sight of the trains in tunnels and hidden trackage, and going through towns more than once.



THE LAYOUT AT A GLANCE

NAME: Great Midwestern RR
SCALE: HO (1:87.1)
SIZE: 36'-6" x 63'-0"
PROTOTYPE: freelance
LOCALE: generic Midwest, based on northwest Illinois
ERA: 1950s
STYLE: around the walls
MAINLINE RUN: 600 feet
MINIMUM RADIUS: 27" (yard), 31" (main)
MINIMUM TURNOUT: no. 4 (yard), no. 8 (main)
MAXIMUM GRADE: 2 percent
BENCHWORK: open grid
HEIGHT: 42" to 55"
ROADBED: cork
TRACK: Atlas code 100
SCENERY: various methods
BACKDROP: painted sky plus city scene photographs
CONTROL: Digitrax Super Chief DCC with wireless throttles

The era is set in the 1950s steam-to-diesel transition period, as established by the presence of big-name passenger trains and era-specific vehicles. Pete has always modeled the 1950s because that's when he and his friend, Gary Crosby, would hang around the rail yards and ask for cab rides.

While some modelers may hone their era down to a specific year, month, and date, Pete models the entire decade. Pete likes the look of big cities, and especially admires the work that noted modeler George Sellios accomplished on his HO scale Franklin & South Manchester RR.

Pete's friend Walt Herrick came up with the concept for the Great Midwestern RR. Pete didn't start out to model any particular part of the country, but rather modeled what looked good to him. He runs locomotives and equipment from numerous railroads on his layout, including the Chicago & North Western; Milwaukee Road; Chicago, Burlington & Quincy; Illinois Central; Gulf, Mobile & Ohio; Norfolk & Western; and Chesapeake & Ohio.

CONSTRUCTION AND WIRING

Construction of the layout began in 2002. Pete supplied the lumber, and in

Originally Pete wanted to design the layout with a single-track main line, but Hank talked him into two mains side by side. It looks like a double-track main, but it's really a folded dogbone. Trains run through the towns in one direction on one main line, and on their return trip, they use the other. They originally planned the layout with a gantlet track at one end, where tracks overlap each other. Pete later replaced the gantlet with two stacked reversing loops to ease traffic.

3 **The *City of New Orleans* pulls into the station at Moring. The paddlewheeler *Kishwaukee Queen* was built by Pete's friend, Rich Porto.**

4 **Illinois Central 4-8-2 no. 2981 is turned at Walton. Pete doesn't model a particular railroad; trains from many lines run on Great Midwestern rails.**

one week, they had knocked out all the benchwork, laid the track, and installed the wiring.

The track is Atlas code 100 flextrack. Pete had a lot of it left over from his previous layouts, but he needed a lot more for this one. At the time, code 100 was still popular and the least expensive choice. He weathered the track, which helps to disguise the look of the higher rail. Pete painted his track dark brown with a combination of airbrushing, spray-painting, and brush painting.

All of the easily reached turnouts are lined by Caboose Industries ground throws. In harder to reach areas, he uses Digital Command Control-decoder-equipped Hankscraft switch motors,

controlled either with push buttons or from his wireless DCC throttles.

The layout was constructed in modular form on open grids of 1 x 4 lumber. The legs are attached to 1 x 4s on the wall by diagonal gussets. The subroadbed is ¾" plywood topped with Homasote and cork.

Originally the layout was wired for direct current, with 32 block controls. The trains were powered by two power packs and the blocks were controlled from panels Hank Brown built.

Later, Hank saw a Digitrax promotion offered by a local hobby shop. It was too good to pass up, so Pete made the jump to DCC. They installed the Super Chief system and wireless throttles. They kept the block wiring so Hank could install signaling on the layout. Unfortunately, Hank passed away before that dream was realized.

The layout room is illuminated with 32 incandescent can lights and directional track lighting.

SCENERY

The non-urban areas on Pete's layout resemble the Palisades, an area along the Mississippi River in northwest Illinois with high bluffs and rock outcroppings. Pete started the scenery at the Barber end of the layout and reached the Moring end with the completion of the large farm on top of the bluff 13 years later. That farm is modeled after the one where his wife, Luann, grew up.

Pete learned different scenery techniques over the years, and the scenery evolved as he worked from one end toward the other. He used several different techniques to create his landforms. At first, he used the Bragdon Enterprises Geodesic Scenery, which uses a two-part epoxy and bubble wrap. He draped large sheets of the overlay over cardboard forms and wadded-up newspaper. The sheets have an approximately 15-minute working time, and once they harden, can stand by themselves without support.

The mountains behind the trestle and bridge scene at Lake Kishwaukee were made from a web of cardboard strips covered by red rosin paper, a technique he learned from an article by modeler Howard Zane. The landforms under the large farm scene were made from Woodland Scenics Shaper Sheets, bendable soft metal sheets that can hold their shapes without much support. To complete other areas, Pete carved extruded-foam insulation board.

The terrain in most areas is topped with a coat of *Model Railroader* contributing editor Lou Sassi's "ground goop," which Pete really likes. [Lou last described how to make and use ground goop in the March 2015 MR. –*Ed.*]

Pete made his rockwork using Hydrocal or Bragdon Enterprises resin poured into rubber molds from Bragdon or Woodland Scenics. To color his rocks, he used several different earth-tone stains and chalks. Although he found that Hydrocal absorbed these quite well, Pete had difficulty getting them to stick to the resin. So he painted them with an oil-based primer by Kilz, after which the stains and chalks adhered perfectly.

The ground cover and bushes are primarily from Woodland Scenics. Though he originally used the "puffball" technique (clumps of poly fiber covered with ground foam) for his tree canopies, he now uses Woodland Scenics Foliage

Modeling water

5 A Chicago & North Western *400* speeds along a wooden pile trestle on Kishwaukee Lake, one of Pete's largest water features. Great Falls is visible in the background.

PETE HAS BUILT some large bodies of water on the layout, including Kishwaukee Lake and the Badger and Sugar Rivers. To start creating these scenes, Pete painted the lake and river bottoms flat black. He then mixed shades of blue and green oil-based paints directly into Unreal Details' Magic Water, a two-part resin, before pouring it into place.

As a topcoat he added Mod Podge gloss medium and Liquitex Super Gel, which let him sculpt waves. On some of the waves, he drybrushed white.

Modeling water scenes also gave Pete the opportunity to build long wooden trestles and bridges. When he added a paddle wheeler, he had to extend the width of the river at Moring out an extra foot.

Pete also likes waterfalls, so there are three of them on his layout. The waterfall on the Sugar River was made with clear silicone caulk. The one at Great Falls had to fall a great distance and have a white, frothy look to it, especially at the bottom. Pete used white silicone caulk to model this. – *Dave Rickaby*

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Author Dave Rickaby shot video of Pete's layout. Find it under Online Extras on our website, **www.ModelRailroader.com**.

Using Foliage Clusters

WOODLAND SCENICS' Foliage Clusters have been of great value in creating the massive tree canopies found on the Great Midwestern RR. I helped Pete build the tree canopies that cover the mountains on his layout. Here are some techniques we came up with for the material.

Pete created sections of forest canopy by gluing Woodland Scenics Foliage Clusters to red rosin paper, then glued them to the layout later.

Foliage Clusters can be used to create forested mountain canopies the same way as poly fiber "puff-ball" trees. But because the foliage clusters are based on a natural product, their shapes have more variety.

We used a mix of about 60 percent green foliage, 20 percent dark green, and 20 percent light green. We glued it to the dark-green painted mountain base with a hot glue gun.

To create the feeling of distance on a large mountain, we used larger pieces of foliage closer to the base of the mountain, and smaller and smaller bits as we worked our way up. This forces perspective.

We also worked on 1-square-foot sections of canopy at my kitchen table and glued them to Pete's terrain later with the hot glue gun. I used red or brown rosin paper as a base for these sections. Additional Foliage Clusters were used to fill in any gaps between sections.

Someday, we plan to overlay the large "puff ball mountain" on the older section of Pete's layout with Foliage Clusters. – *Walt Herrick*

6 The urban area of downtown Walton was inspired by the intensely detailed cityscapes on noted model railroader George Sellios' HO scale Franklin & South Manchester layout.

Clusters. [See "Using Foliage Clusters" above. –*Ed.*] The more detailed foreground trees are Scenic Express SuperTrees. The conifers are from Timberline and Scenic Express.

Pete used ⅛" tempered hardboard to cove the corners of his layout room and painted his backdrop directly on the wall. He painted clouds using a combination of sponge painting and stencils sprayed with spray paint. He then brush-painted the cloud linings for additional depth. He also added photo backdrops from SceniKing and Realistic Backdrops. He layered the city photos to create a more three-dimensional look.

STRUCTURES

Pete loves building structures straight out of the box, and the layout features buildings by Walthers, Custom Model Railroads, FOS Scale Models, and Blair Line. He's also built several structures out of Design Preservation Models (now part of Woodland) or City Classics modular pieces, and kitbashed others.

For larger structures Pete used several kits to make flats combining both the front and backs. Needing a large union station for Walton, he combined a CMR kit with the train shed from Walthers' Milwaukee Road Station. Faced with an orphan structure, he used the Walthers station as Walton's city hall.

As a member of the Kishwaukee Valley & Eakin Creek Model Railroad Club, he met expert ship modeler Rich Porto. Pete asked him to try modeling a railroad structure, and Rich found he liked it. Pete would find kits he wanted to include on the layout and ask Rich to build them. Once, Pete even ordered some kits to be shipped to Rich's house.

Rich has now built more than 50 craftsman kit structures for Pete's layout, including the paddle-wheeler *Kishwaukee Queen*. Were it not for Rich, the layout would never have gotten to the point that it has.

ROLLING STOCK AND OPERATION

Pete's rolling stock all have metal wheels and are weighted to National Model Railroad Association recommendations. He weathers his cars, locomotives, and structures with PanPastels and chalks. His passenger cars come from Rivarossi, Walthers, and Rapido, while his freight cars are mostly Athearn, Accurail, and Model Die Casting (now part of Athearn). He still has some pieces from the 1950s, including Varney cars.

Pete has a large and diverse roster of motive power, both steam and diesel, from Athearn, Proto 2000 (now Walthers Proto), and Broadway Limited Imports. All locomotives are equipped with DCC sound decoders.

Although Pete hasn't started serious operations, his layout is designed for it. The railroad hosts many passenger trains and includes several service buildings

7 It's rush hour, as evidenced by the many passenger trains loading and unloading at Walton's Union Station. Pete kitbashed the signature structure by combining a CMR station kit with Walthers' train shed.

and shops to support these operations. Numerous industries, not only in the metropolis of Walton but in the outlying cities as well, create a lot of freight hauling opportunities.

Pete envisions conducting operating sessions in the future, but first he wants to finish upgrading his trees and fix some electrical bugs so the layout will run as good as it looks.

CLOSING THOUGHTS

Pete is a founding member of his model railroad club, which has four layouts, one each in HO, N, O, and a garden railroad outside the building. The club's annual holiday exhibit has become such a popular attraction it brings people from nearby states.

The hobby has been very rewarding for Pete, especially since he retired. He believes the hobby is all about sharing information, developing camaraderie with fellow modelers, and establishing lifetime friendships. Pete would like to thank his good friends Hank Brown, Rich Porto, and Walt Herrick for helping to make his dream layout possible.

Some would say that it's not always about the destination, but rather the journey. For Pete, this is a road well traveled. His journey has covered more than 60 years of model railroading and is still going strong. GMR

Dave Rickaby is a regular contributor to Model Railroader *magazine and its special issues.*

MEET PETE WALTON

PETE WALTON WAS BORN and raised in Rockford, Ill. He graduated from Northern Illinois University. He retired in 2002 after 33 years with American Family Insurance. He and his wife, Luann, have two daughters and one son. Pete loves to golf and is active in the community government of his retirement village.

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From disaster to inspiration

By Steven Otte ■ Photo by the author

Cows wander out through a damaged fence on Steven Otte's HO scale Cincinnati, Lebanon & Northern, justifying two rogue cows stuck in a pond elsewhere on the layout.

NECESSITY, AS THEY SAY, is the mother of invention. And sometimes, you come up with an interesting scene for your model railroad because you have to.

A small-scale disaster struck my HO scale Cincinnati, Lebanon & Northern home layout when a pipe in the bathroom above sprang a leak. The water dripped onto the layout, soaking a scene of a small cow pasture with a pond.

I removed the sodden landscaping and fencing, and salvaged the cows. The pond itself, though, was undamaged. I decided to move the pasture scene to a different location, but two thirsty cows were embedded firmly in the resin water. How could I justify two rogue bovines just hanging out trackside?

Inspired by the disaster that spurred the move in the first place, I circled the new pasture with a fence damaged by a fallen tree. I then installed a string of cows strolling out through the gap. The two stuck in the pond simply became more wanderers. What could have been an uninspired rural vista became a whimsical scene, giving visitors something fun to look at between towns. GMR

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