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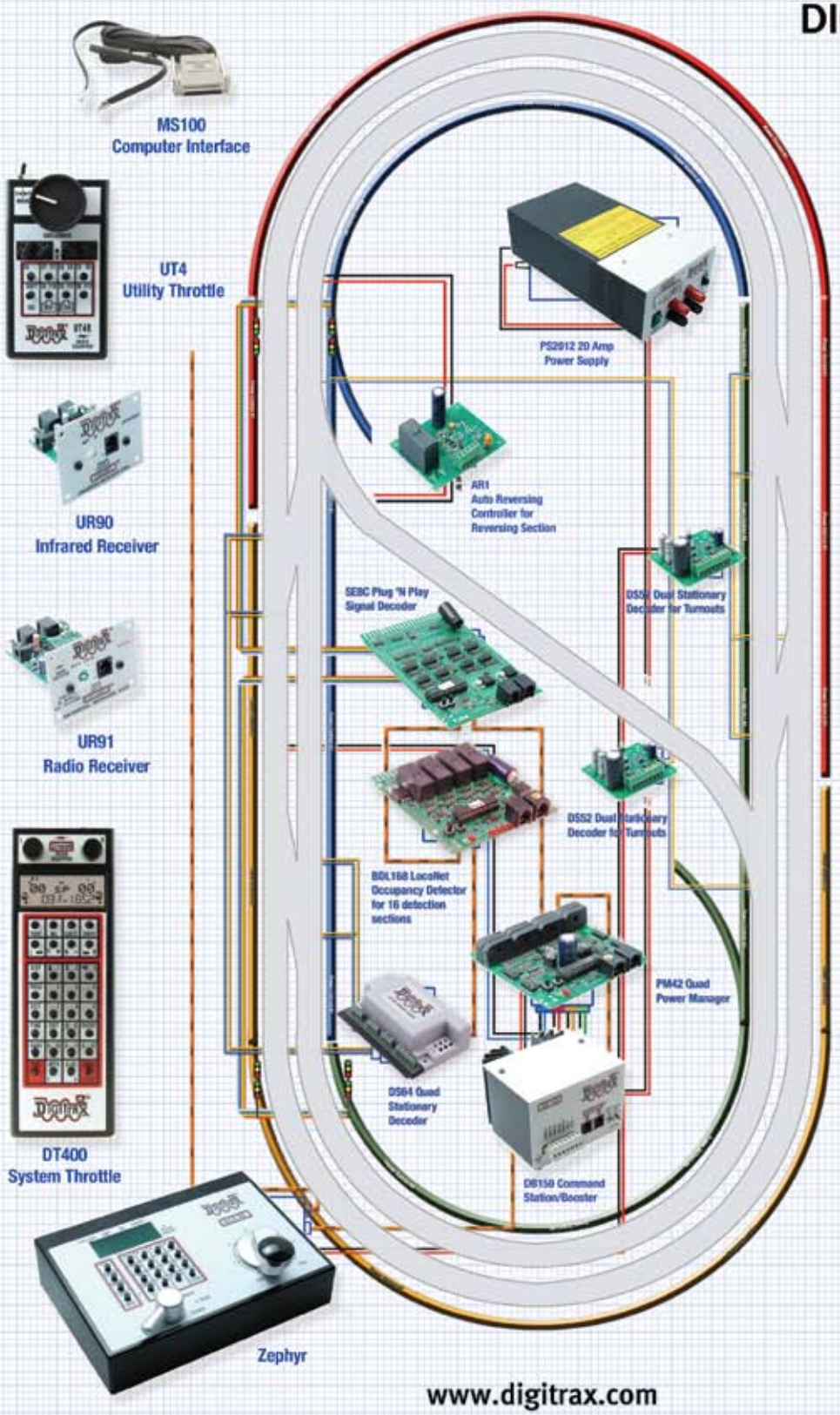

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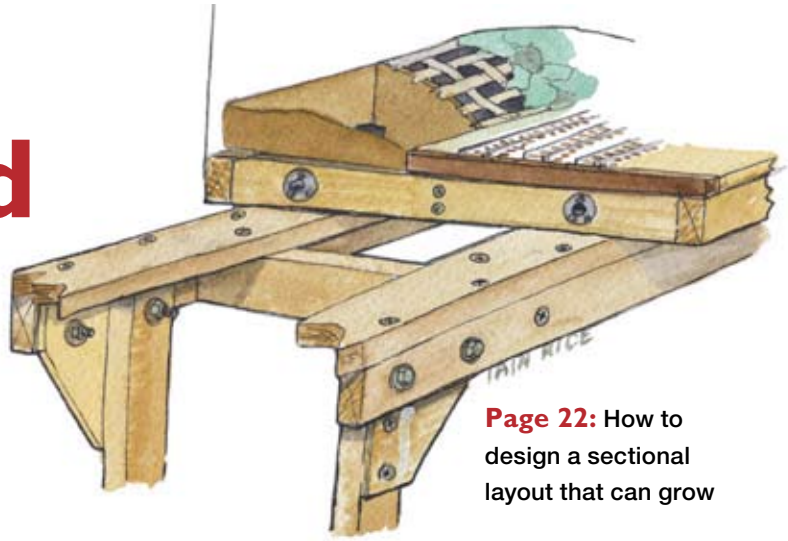

Page 22: How to design a sectional layout that can grow

Page 42: The Southern Pacific and more, prototypically

On the cover: Bernie Kempinski details the design choices behind his new N scale Tennessee Pass layout. Photo by Bernie Kempinski

Art and photos, clockwise from top: Iain Rice, Matt Kosic, Paul J. Dolkos (2), Bruce Chubb, and Rob Enrico

Page 50: Realistic rendering of a busy railroad town

Page 78: What to wish for in an ideal layout space.

Page 70: Realistic design supports realistic operations

Model Railroad Planning 2006

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//Editorial

Colorful memories in black and white

Rob Enrico's report on how and why he built his O scale edition of a branch of the almost omnipresent Pennsylvania RR (page 16) is a colorful tribute to an impressive railroad. Having been intrigued by a clinic Rob gave at a prototype modeler's meet last March near Pittsburgh,I asked him to prepare an article for this issue on the *raison d'être* for his railroad.

As we wrapped up production of the article, Rob sent along a handful of photos depicting scenes similar to those he'd captured on Ektachrome color slide film for the article. But these were black-and-white prints. It was too late to go back and redo the steam-era photos in monochrome, but I wanted to share one of those photographs with you here.

What intrigues me about this photo is how in some key ways it seems more realistic than color views of the same period. I can recall conversations with other modelers and railfans about when color was "invented." The implication was that, contemporary oil paintings not withstanding, the world itself was rendered in black and white until Kodachrome came along. Or at least it seems that way from photos in the many vintage books and magazine articles on steam-era railroading.

This irony hasn't been lost on other modelers. Gary Hoover did a fine job of honoring O. Winston Link's black-and-white night photography in the May 1998 *Model Railroader*, for example. And I heard about a modeler who is coloring his entire model railroad for the black-and-white look. Everything on the layout, foliage and all, is in shades of monochromatic gray.

Those who venture into the arcane world of black-and-white photography quickly learn that the rules of lighting and composition have changed. The photographer can't depend on sheer color to give the image form; a red caboose won't pop out against a lush green forest in black and white. Instead, the lighting and background have to be considered carefully. In the case at hand, Rob has used strong side lighting and dark shadows to pop the caboose out of a busy background.

What used to be the norm is now old-school, but new challenges galore await the model photographer who chooses to pursue layout photography, or even railroad modeling itself, with a monochromatic palette.

Feasibility studies

The very first question that MRP and MR readers ask me when we meet is how my new Nickel Plate Road model railroad is coming along. By the time this appears in print, it had better be coming along very nicely, I tell them, as the NKP is on one of the layout tours scheduled for the National Model Railroad Association's 2006 convention in Philadelphia, Pa. (July 2-8). Nothing like four busloads of eager conventioneers to focus your attention on your model railroad, I can assure you.

There's no way that the railroad will have much scenery by then, nor will either of the two division-point classification yards and engine terminals be operational. But I do expect to be able to run Nickel Plate Road trains from one staging yard to the other in a well-lit setting. Perhaps the progress will be sufficient to allow me to prepare a status report for MR that doesn't look like a tour of a lumberyard.

Which brings me to lessons learned to date. One of the most important lessons is that a track plan, even a really good track plan done using some sort of CAD software, is usually nothing more than a feasibility study. You can print out full-size copies of the plan that show where each track center line will go to a tiny fraction of an inch, but that doesn't mean that the track should actually be glued down there. At best, the plan represents your current knowledge, and as the railroad moves from Great Idea to 3-D Reality, new bits and pieces of information will trickle in, and changes will be required. Or you may discover that what looked great in two-dimensional form doesn't really cut it when seen in three dimensions.

I'm happy to report that Frank Hodina's original track plan, which appeared in the September 2000 MR, has withstood the test of time. Several clever

Rob Enrico built his O scale railroad so he could re-create and photograph the glory days of the former Pennsylvania RR and its successors. In addition to composing the color photos for his report in this issue, Rob enjoys the challenges and hands-on darkroom work required for dramatic black-and-white images such as the one shown here. Rob Enrico photo

ideas that he worked into the plan seem just as worthwhile now that the railroad has taken physical form.

Yet there are countless revisions that have improved the plan. As I stood on the raised floor between the perimeter basement wall and the Charleston, Ill., yard roadbed, for example, I found that it would be difficult, if not impossible, for the yardmaster to reach the most distant tracks. And the roundhouse was in the way.

Part of the problem is that the yard is located 69½" above the basement floor; even with a raised platform, it's still quite high. Two subsequent design changes have narrowed the yard in two steps, and I'm keeping my options open. Only when the main line is glued down this winter will I believe I have a workable plan.

I also revised the lower (east-end) staging yard to move all the turnouts out to the edge of the benchwork along the aisle. Reaching under the mid-level benchwork to repair or remove a faulty turnout, an unlikely but possible event, could have been nightmarish.

Steve King offers another view on the idea of a layout plan being little more than a general goal in his Rear Platform commentary on page 99. There are decades of model railroading experience in Steve's few words. As the saying goes, you can learn those lessons now or you can learn them later.

Bonus: Introduction to Track Planning

This issue of *Model Railroad Planning* includes an extra 16 pages, thanks to a bonus booklet on drawing track plans prepared by MR executive editor and MRP editorial director Andy Sperandeo. It contains the type of information you need to prepare an accurate track plan, from making a scale drawing of your layout space to doodling a basic plan and then drawing it in detail.

We hope you find it of value. After reading it, if you still have questions, please let us know. We can then address them in future issues of MRP or later editions of this guide.

Attention MRP track plan users

If you've used a track plan published in MRP as the basis for your model railroad, even in modified form, we'd like to hear from you. And if a report on your layout design has already appeared in MRP, consider preparing an update so we can all learn both how well your initial planning worked out as well as – be frank now! – what concepts or details had to be reconsidered.

Keep us in the loop

I occasionally see copies of e-mail messages that MRP readers have sent directly to our authors praising their articles or asking questions about them. Sometimes these are of potential interest to other readers, so please send a copy to us at info@mrmag.com. You can also send comments directly to us at that address. Please put "MRP feedback" in the subject line, and be sure to include your town and state, province, or country name; we like to include them in letters printed in the Reader Forum section of MRP.

Thank you!

Tony Koester, editor

Modeling Tennessee Pass

This N scale layout features a famous Colorado rail route

By Bernard Kempinski
Photos by the author

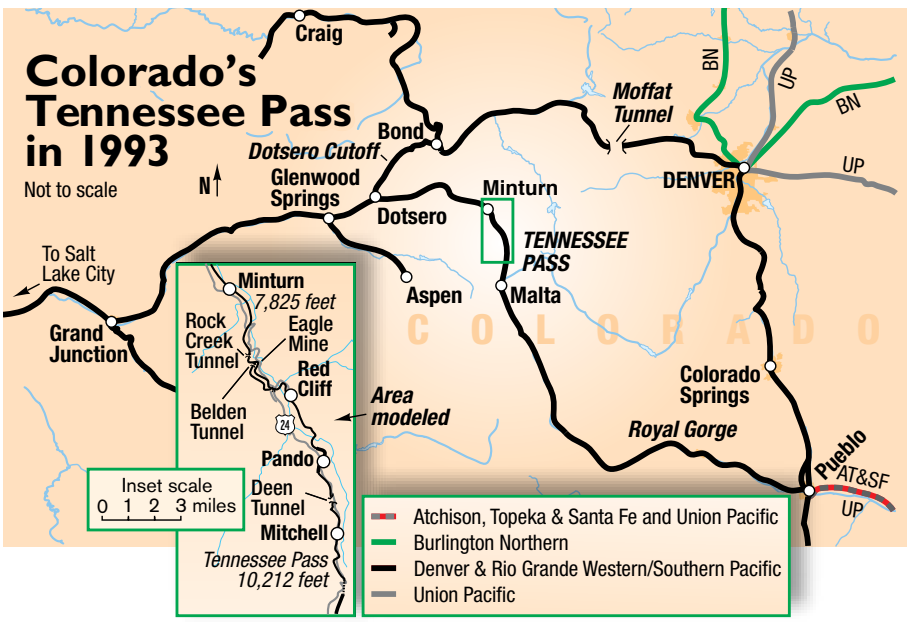
Many of us have made false starts when deciding what railroad to model or how to build a layout to support our operational goals. But on my road to modeling the post-1988-merger operations of the Denver & Rio Grande Western and Southern Pacific over Tennessee Pass in N scale, I made two false starts. I spent two years preparing the basement, painting sky backdrops, and building benchwork. During that time I developed two track plans, neither based on Tennessee Pass, but wound up scrapping both because I was dissatisfied with a particular aspect of the railroad.

My first layout depended on the reliability of a fleet of N scale brass steam locomotives. Even after rebuilding with Digital Command Control (DCC) and sound, the models didn't perform up to my expectations and the assumed demands of the new railroad. My second model railroad was a double-deck, double-track-mainline railroad to be operated under Centralized Traffic Control (CTC), but the project soon proved overwhelming given all of the other demands in my life.

While my road to modeling Tennessee Pass was a bit convoluted, I'm glad I made

1. Another view of the S curve at Mitchell, Colo., (also see cover photo) shows that Phase 1 of Bernie Kempinski's new N scale layout is progressing nicely. Here, Denver & Rio Grande Western SD50 no. 5517 is on the point of a loaded coal train.

2. A Southern Pacific B23-7 (Atlas) and an SD40T-2 tunnel motor (JnJ-Kato) lead a Soo Line SD60 (Atlas) around the same curves shown at an earlier stage on the cover. Bernie made the foreground weeds using Silflor grass mats.



those false starts. Since making the decision to model the D&RGW and SP, I feel re-energized about the new layout and its prospects. Even though I live more than 1,500 miles away from the area I'm modeling, I can still enjoy the busy mainline action of Tennessee Pass by walking down to my basement.

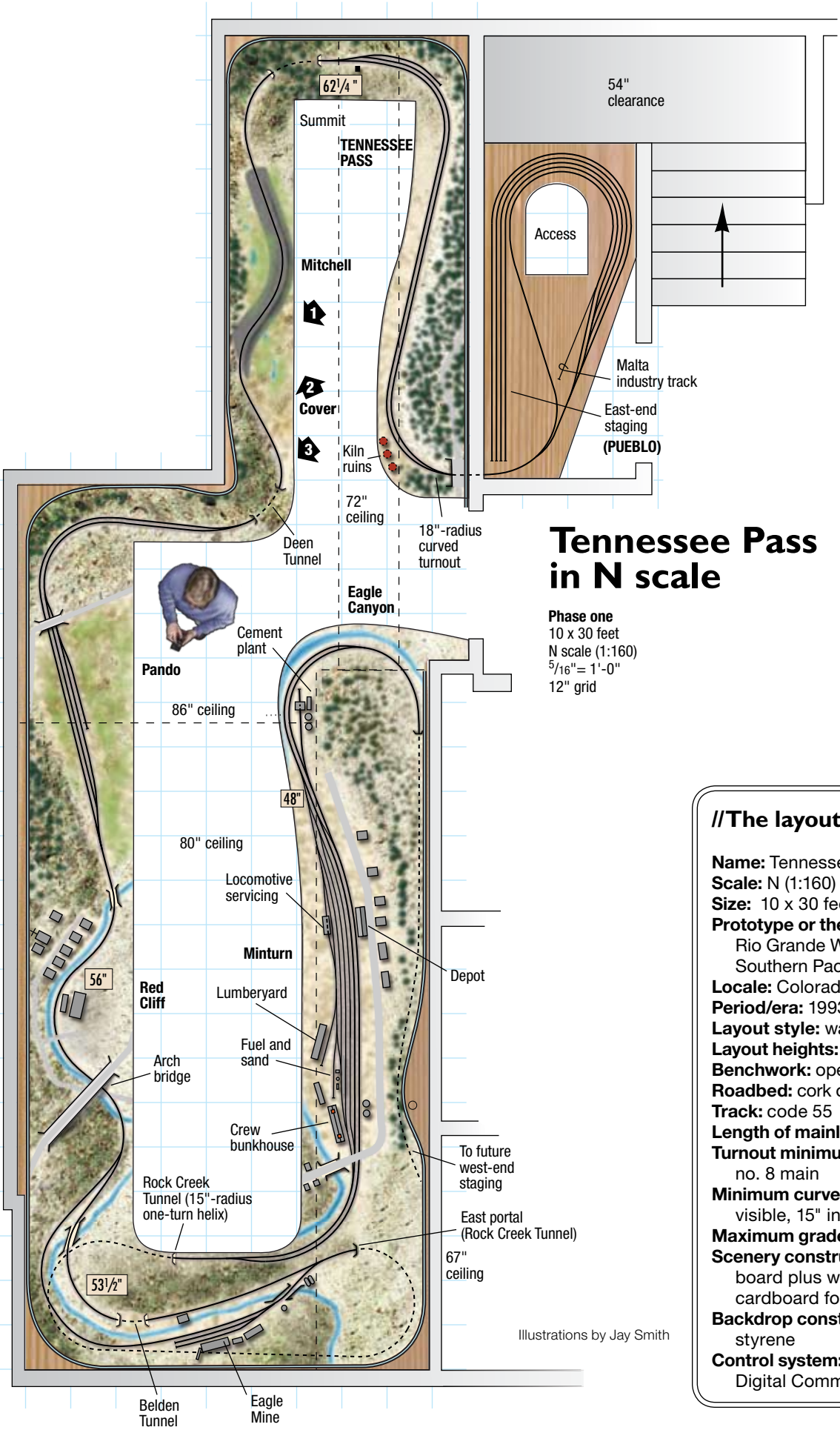
The road to success

The physical parameters of my basement proved challenging. The low ceiling, the result of a sunken living room, was made worse by various air-conditioning ducts and waste pipes. This effectively ruled out a mushroom design where the floor is raised to match a climbing main line. The room's long, narrow shape made a design with a central peninsula impractical. There were also two closets and a mirrored wall to contend with.

On the plus side, the basement was fully finished – a pleasant place to spend a lot of time. I felt a bit guilty about tearing out what my wife called perfectly good closets, but they had to go. I enlarged another closet under the stairs as compensation. After completing these carpentry tasks, I had a roughly 10 x 30-foot area for the layout, plus staging opportunities in adjacent rooms. It was, as several experienced HO modeling friends commented, "an N scale space."

My primary consideration was that the layout accommodate two- or three-hour operating sessions, which is about all my friends and I can handle after a long day of work. I prefer to operate on Friday evenings, as my weekends tend to fill up with other activities. A layout that could support a "cast of thousands" for an entire weekend day wasn't what I had in mind.

I also wanted my new railroad to complement the other operating layouts



Tennessee Pass in N scale

Phase one
10 x 30 feet
N scale (1:160)
5/16"= 1'-0"
12" grid

Illustrations by Jay Smith

//The layout at a glance

Name: Tennessee Pass
Scale: N (1:160)
Size: 10 x 30 feet (phase one)
Prototype or theme: Denver & Rio Grande Western and Southern Pacific
Locale: Colorado Rockies
Period/era: 1993
Layout style: walkaround
Layout heights: 48" to 62.3"
Benchwork: open grid
Roadbed: cork on ¾" plywood
Track: code 55
Length of mainline run: 85 feet
Turnout minimums: no. 6 yard, no. 8 main
Minimum curve radius: 18" visible, 15" in helix
Maximum grade: 3 percent
Scenery construction: foam board plus wire screen over cardboard forms
Backdrop construction: .060" styrene
Control system: Digitrax Digital Command Control

The Mitchell Curves are a signature scene on the Tennessee Pass line. This view of a Rio Grande freight descending from the summit was taken in 1985.
Prototype photos by Jim Eager

in my area. Although I enjoy timetable-and-train-order operation, we already have several good model railroads nearby that feature it. I also knew from sessions on JD Smith's Southern Ry. Rathole Division layout that operation on a prototype-based, but schematically simple, layout focusing on through trains can be interesting too.

About the time I was completing the benchwork on the second deck of the second layout, and coming to realize that I had taken on too big a task, I read Mark Hemphill's article on mountain railroading in the April 2004 issue of *Trains* magazine. That article got the juices flowing! I had already been smitten by the D&RGW, thanks to Dale Sanders' book, *Rio Grande, Scenic Line of the World*. Putting the two together led me to Tennessee Pass.

Tennessee Pass

At 10,212 feet above sea level, Colorado's Tennessee Pass is home to the highest main line in the United States. With its sustained 3-percent eastbound grades, it's also one of the steepest. Harsh winter weather also makes the pass a tough stretch of railroad to operate.

Tennessee Pass was the route used by D&RGW trains to cross the Continental Divide on their trek west from Denver. Rio Grande didn't acquire its alternate route west, through Moffat Tunnel (originally part of David Moffat's Denver, Northwestern & Pacific), until 1947. The railroad had trackage rights to the Moffat Tunnel line starting in 1934.

The Tennessee Pass line was originally a narrow gauge branch from Leadville to the mining region at Red Cliff. Later, faced with competition for a transcontinental route through the heart of the Rockies, the Rio Grande somewhat reluctantly upgraded it to standard gauge. Continuous improvements were made over the years, including the first installation of CTC west of the Mississippi River, a concrete-lined tunnel, and grade realignments that allowed for conversion into a heavy-duty main line.

After 1934, traffic on the line gradually dwindled except for the surge in traffic during World War II, as the Moffat Tunnel route and the Dotsero Cutoff assumed more importance. The Rio Grande and SP merged in 1988, and traffic again surged as Tennessee Pass provided access to SP's connections in Pueblo, Colo. Rio Grande coal trains and SP transcontinental manifests, auto racks, and intermodal traffic were all seen at the pass.

The boom was short-lived. In 1996, the Union Pacific took over the D&RGW and SP. After a brief taste of operating over Tennessee Pass, the UP closed the line in 1997, deeming it superfluous and too expensive to operate. Today, the track is abandoned-in-place.

Resurrection in N scale

Thanks to model railroading, I could travel back to the days when SP and D&RGW traffic combined to make the pass a very busy place. Beautiful scenery and heavy trains add up to a mountain railroad that has been a perennial railfan favorite – and, on occasion, an engineer's nightmare.

The prototype railroad had to conjure up all sorts of strategies to conquer the pass, including "doubling" trains (taking them in two parts) to the summit and using sets of up to 12 diesels as mid-train helpers and pushers. Such problems on the full-size railroad translated into unique opportunities on my model railroad.

Before I made yet another false start, I wanted some way to gauge the relative merits of a variety of track plans. I'd sketched scores of plans but needed to organize my thinking. My training as a mechanical engineer kicked in, and I developed a "decision matrix" (see page 13). It helped to pinpoint the optimal layout design.

In the end, I settled on the Rio Grande Tennessee Pass plan, since it was more manageable in scope (priority level 6 in my matrix). It also offered interesting, reliable diesel operations within the limitations of what I could obtain and afford in N scale, and it would obviously be spectacular to look at and to photograph.

But it wasn't all a bed of roses. The matrix revealed that there were other conflicting factors at work. Interchanges ("universal industries"), big steam, and a waterfront setting were where this plan scored a zero. Moreover, in my view, switching isn't N scale's strongest attribute, so I de-emphasized that. Instead, the ability to run long trains with helpers on a single-track railroad through dramatic western scenery played to N scale's strengths. This tipped the scale toward the Tennessee Pass plan.

I also wanted to try something new. I'd already built more than 100 linear feet of Ntrak and OneTrak modules, including a large set based on the C&O at Quinnimont, W.Va., a steel mill, a paper

//Decision matrix

The matrix of my top-contender layout themes, reproduced here, helped me choose what I feel is the optimal layout design for my available space. In the left-hand column, I set priorities for each druther (something I'd like to have) using numerical scores from a low of 1 to a high of 6. For example, ensuring that the project is truly manageable was my highest priority and was therefore assigned rating 6. I then gave each druther a score between 0 (not acceptable) to 3 (exceptional).

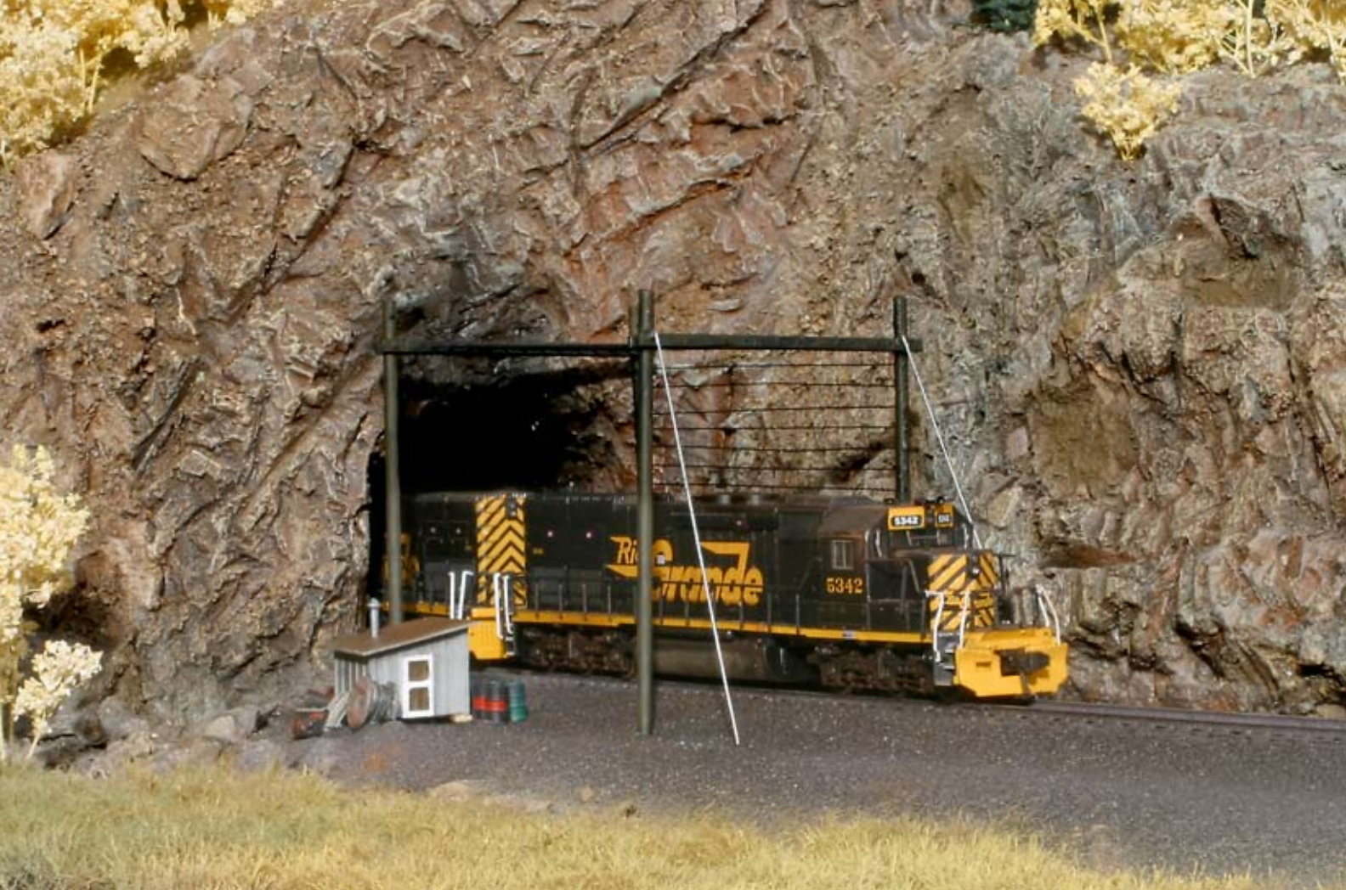
Color coding made it easy to spot each rating level. A lot of red boxes in a column indicated big concerns about that plan, notably the existing Chesapeake & Ohio layout modules I had already built.

I used spreadsheet software to calculate the total of the ratings and the sum of the priorities multiplied by the ratings, creating a weighted score for each design. I sorted the columns by total weighted score and found that, no matter how I fiddled with priorities, the D&RGW Tennessee Pass layout usually had the highest overall weighted score. A C&O Greenbrier plan and a Western Maryland Thomas Subdivision plan were close runners up, but for different reasons.

The closeness of these scores shows why I had such a hard time making a final decision. It was interesting to find that the two plans I actually started building scored lower, thus numerically confirming my dissatisfaction with them. To an engineer, that was reassuring indeed! – *B.K.*

Key to Scores	Score
Exceptional	3
Acceptable	2
Marginal	1
Not Acceptable	0

Priority	Druthers	DRGW Tenn. Pass	N scale transition-era C&O Green-brier Sub	WM Thomas Sub	N scale transition-era C&O Kanawha Sub	DRGW double-deck Craig Branch	DRGW double-deck Soldier Summit	N scale transition-era C&O Alleghany Sub	Existing C&O modules	Notes and extra points
6	Manageable	2	1	1	0	1	0	0	0	Zero for double-track CTC
5	Reliable engines	2	1	1	0	2	2	0	0	2-6-6-6s zero for reliability
4	Single deck over double	2	2	2	2	0	0	2	2	
4	Single track w/TT&TO	1	2	2	0	1	0	0	0	
3	Helper ops	2	0	2	0	2	2	2	0	
3	Interchange	0	2	1	2	0	2	0	0	2-plus interchanges
3	Wide aisles/no duck-under/optimal walkaround	3	3	3	2	1	1	0	0	
3	Heavy industry: paper, steel, or chemical	1	2	2	2	0	2	1	0	
3	Big steam with sound	0	1	0	2	0	0	2	2	
3	Balanced mainline running and switching	1	2	1	2	2	1	1	2	
3	Engine terminal	1	0	1	3	0	0	2	0	Handley engine terminal
2	Mountain scenery	3	2	2	2	3	2	2	2	Western alpine scenery
2	Waterfront area	0	0	0	1	0	0	0	0	
2	Minimum hidden track	2	2	2	2	2	2	1	1	
2	Open staging	2	2	2	2	2	2	2	2	
2	Maximum main line	2	2	2	1	3	3	1	1	If over 5 scale miles
2	Large curves, no. 8 turnouts	2	2	2	2	2	2	2	2	
2	Sincere	2	2	2	2	2	2	2	2	
1	Prototype based	2	2	1	2	2	2	2	2	
1	Big bridge or trestle	1	1	1	3	0	0	1	0	Deepwater Bridge
1	Long trains	2	1	1	2	3	3	2	2	
	Sum of design rating	33	32	31	34	28	28	25	20	
	Sum of ratings weighted by priority	89	85	84	78	68	65	57	44	



3. A slide fence frames D&RGW SD40T-2 no. 5342 as it blasts out of Deen Tunnel with an eastbound manifest freight. The fence is in place to detect sliding rocks that foul the main line.

mill, a Canadian prairie scene [MRP 2001], and a waterfront switching layout [MRP 2003]. The Rockies were new territory for me and would bring many new and exciting challenges.

One more test was in order, however. Before launching this project, I built a small diorama to determine whether I could realistically model the fir, aspen, and spruce trees as well as the subalpine Rockies themselves. I was happy with the results, so I forged ahead.

//Learning points

- If at first you don't succeed . . .
- A decision matrix may help resolve which of several options most suits your current interests and capabilities.
- Locate the lowest parts of a mountain-climbing railroad where ceiling clearance is restricted.
- The slower pace of mountain railroading and need to add and drop helpers help to offset the lack of lineside industries and interchanges with crossing railroads.
- Building a layout in phases lets you learn from experiences on the current segment(s) before committing to additional design and construction.

Construction in phases

For the first phase of construction, I chose the scenic and operationally interesting 20-mile section from Minturn to Tennessee Pass. With 85 feet of main line, just under three scale miles in N scale, the linear compression ratio is a spacious 6:1 (6 modeled miles equals 1 prototype mile). This would allow realistic treatment of signature scenes. By maintaining 11-foot sidings, except at Belden, the layout could handle 28-car trains with five front-end and helper units.

The walkaround plan follows what I feel is the optimum configuration for this room. The lower sections at Minturn are under the areas with the lowest overhead clearance. Conversely, the summit is located where the ceiling is highest. The plan also allows for wide aisles and deep benchwork sections for impressive mountain vistas.

The hidden track between west-end staging and Minturn is long enough to hold a train and thus acts as a pacing (run-extending) transition. By requiring a stop in this section to give an operator time to walk from the staging area to the mouth of Eagle Canyon, the main line will seem to be lengthened.

Minturn was a crew-change point and site of a modest helper terminal. On the layout crews will not change here, at least during phase-one operations, as they have just come from or will soon enter staging. Rear-end helpers with a separate crew are tacked on to eastbounds at Minturn; my relatively short trains will not require mid-train helpers.

There was a wye at the west end of Minturn, which I omitted from my plan since diesels don't often need to be turned. Although Minturn is actually on a 1 percent grade, it's barely perceptible when you stand at trackside, so I made my yard flat. This avoids having to use wheel chocks to keep cuts of cars from rolling away.

Little switching or classification occurs at Minturn. However, the Malta Turn is made up here from blocks dropped by manifest trains. The turn is the only local

A Rio Grande "tunnel motor" – an Electro-Motive Division SD40T-2 – leads a westbound toward Mitchell Curves in the autumn of 1985 in a photo by Jim Eager.

on the line. It switches a lumberyard, sand track, fuel track, and a relocated cement plant (based on the actual plant at Rifle) at Minturn, the mine at Belden, and the house track at Pando. It also picks up gondolas of ore concentrate from Leadville mines at the industry track in Malta.

After the rear-end pushers are added to eastbound trains, both crews throttle up as they encounter the grade. Wireless Digital Command Control will be the key to keep road and helper crews from getting in each other's way with tethered throttles on their way up the mountain.

Leaving Minturn yard, the track slips through Rock Creek Tunnel. The helix in this tunnel is another pacing item; the elevation gain is not as important as the extra seven feet of main line it contains. Once out of the tunnel, the track enters Eagle River Canyon near Belden and passes under Arch Bridge. This section depicts both sides of the steep canyon, with the main on one side and the passing track on the other. The siding here is a bit short, a complication for the dispatcher. To increase operating interest, I've assumed that Eagle Mine is still being worked, even though the prototype closed in 1985.

Beyond Red Cliff, the grade lessens to one percent near Pando, as on the prototype. Downhill trains may have to stop here to recharge air, an event determined by situation cards drawn at random. Little remains of Camp Hale, home of the U.S. Army's 10th Mountain Division during WWII. There's a long siding and stub house track here; I moved the latter to the east side of the road bridge for better access.

The tracks then punch through Deen Tunnel, which I placed on the opposite side of the valley due to the wall configuration. Once through the tunnel, the main approaches the famous S curves at Mitchell, shown in the cover photo. The 18" benchwork width here is sufficient to depict the curves using an 18"-minimum radius and generous easements drawn using the bent-lath technique. The 3 percent grade here is very obvious.

The summit at 62½" caps the climb. Tennessee Pass siding on the east end is a key location and marks the end of the visible run. Helpers cut off here. A bridge at the east end helps to disguise the entrance into staging. I put some basic scenery – ground foam, ballast, and a sky backdrop – in the staging area. I eventually plan to model a slag recycler at Malta, so I added the scenery to help lessen the starkness of a bunch of track in the closet.

It's 1985 and a Rio Grande freight is preparing to leave Minturn yard. The brick depot is on the right, the modern enginehouse in the background.

Since the overall plan is simple and not overwhelmingly large, I'm maintaining high standards for both construction and operation. For example, I'm using code 55 rail with handlaid no. 8 turnouts on the main. I'm also focusing on prototypical scenery such as creating rock formations that reflect the geology of the region, building individual trees, and scratchbuilding models of specific structures found along the line.

Future operations

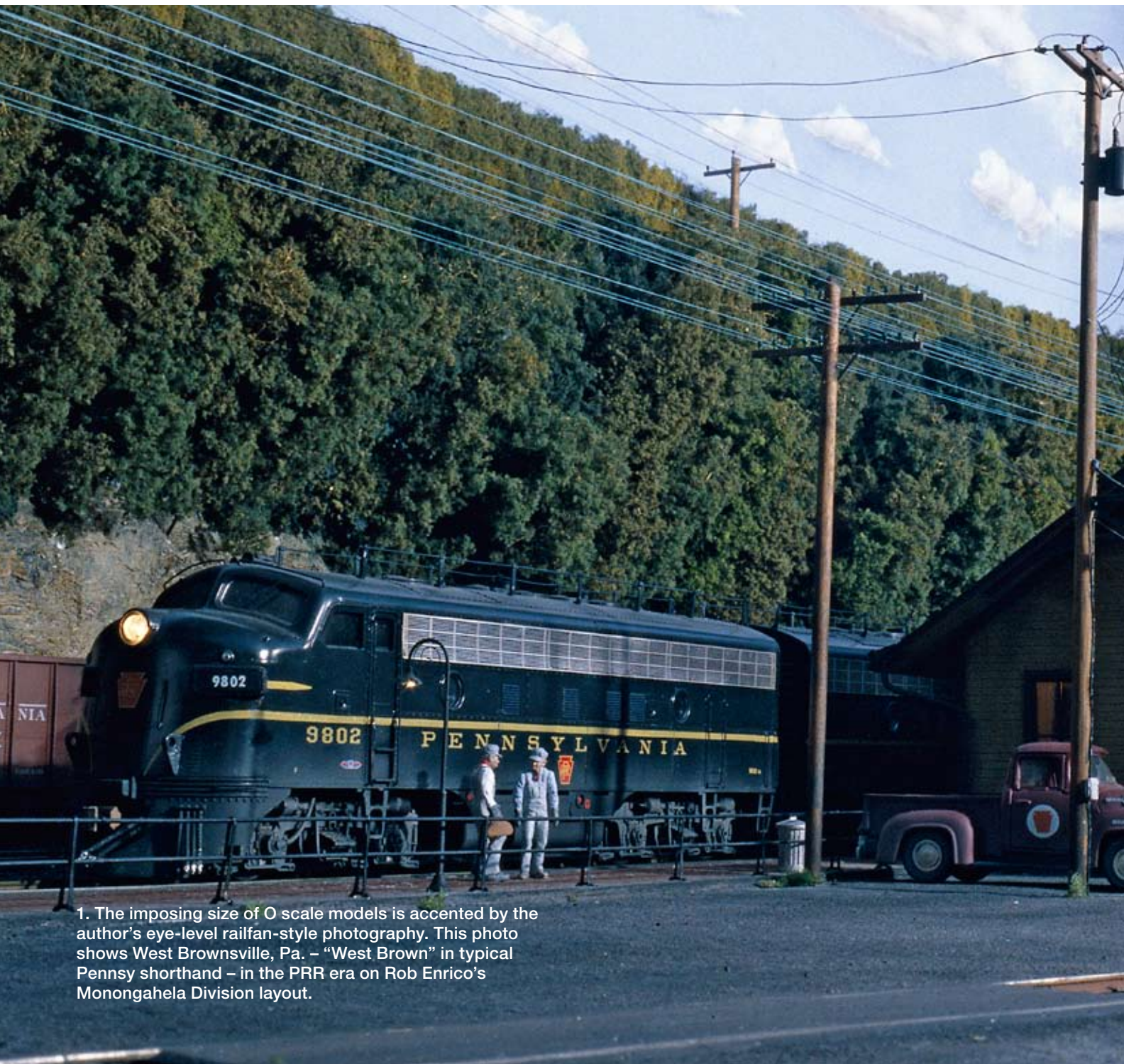
For such a schematically simple layout, every opportunity for realism and interest needs to be sought out. This includes stopping to turn up and turn down air-brake retainer valves at the top and bottom of the grades, waiting to charge the air-brake system before departing a yard, doubling trains up the mountain on occasion, adding and cutting off helpers, servicing engines after each run, and allowing time for work trains to do their jobs on the main. I've thought about incorporating situation cards into operating sessions that cause line-closing rock slides and blizzards up near the summit. Once I have some experience operating the first part of the railroad, I'll add hooded searchlight signals and a CTC system to control mainline switches.

Operations should be well under way by the time you read this report. I've begun planning phase two, which will extend the line to Grand Junction, Colo. That will add a longer mainline run, several new industries, and a large classification yard. Alas, it will also require that I knock down several more perfectly good walls, but that task pales in comparison to what the Rio Grande faced as it built the line over Tennessee Pass. **MRP**

Bernie Kempinski, a defense analyst who lives with wife Alicia in the Washington, D.C., area, is a prolific model builder, layout designer, and MRP contributor. He is also the proprietor of Alkem Scale Models (www.alkemscalemodels.com), manufacturers of N and HO scale photoetched kits and detail parts. This is his third "cover-story" feature.

A layout planned for photography

Modeling the Pennsylvania RR's Monongahela Division from a railfan's perspective



1. The imposing size of O scale models is accented by the author's eye-level railfan-style photography. This photo shows West Brownsville, Pa. – "West Brown" in typical Pennsy shorthand – in the PRR era on Rob Enrico's Monongahela Division layout.

2. The PRR engine terminal at Shire Oaks hosts both first- and second-generation power, including Alco FA-2s and EMD SD35s. A wealth of plastic O scale diesel locomotive models is now available.

By Rob Enrico//Photos by the author

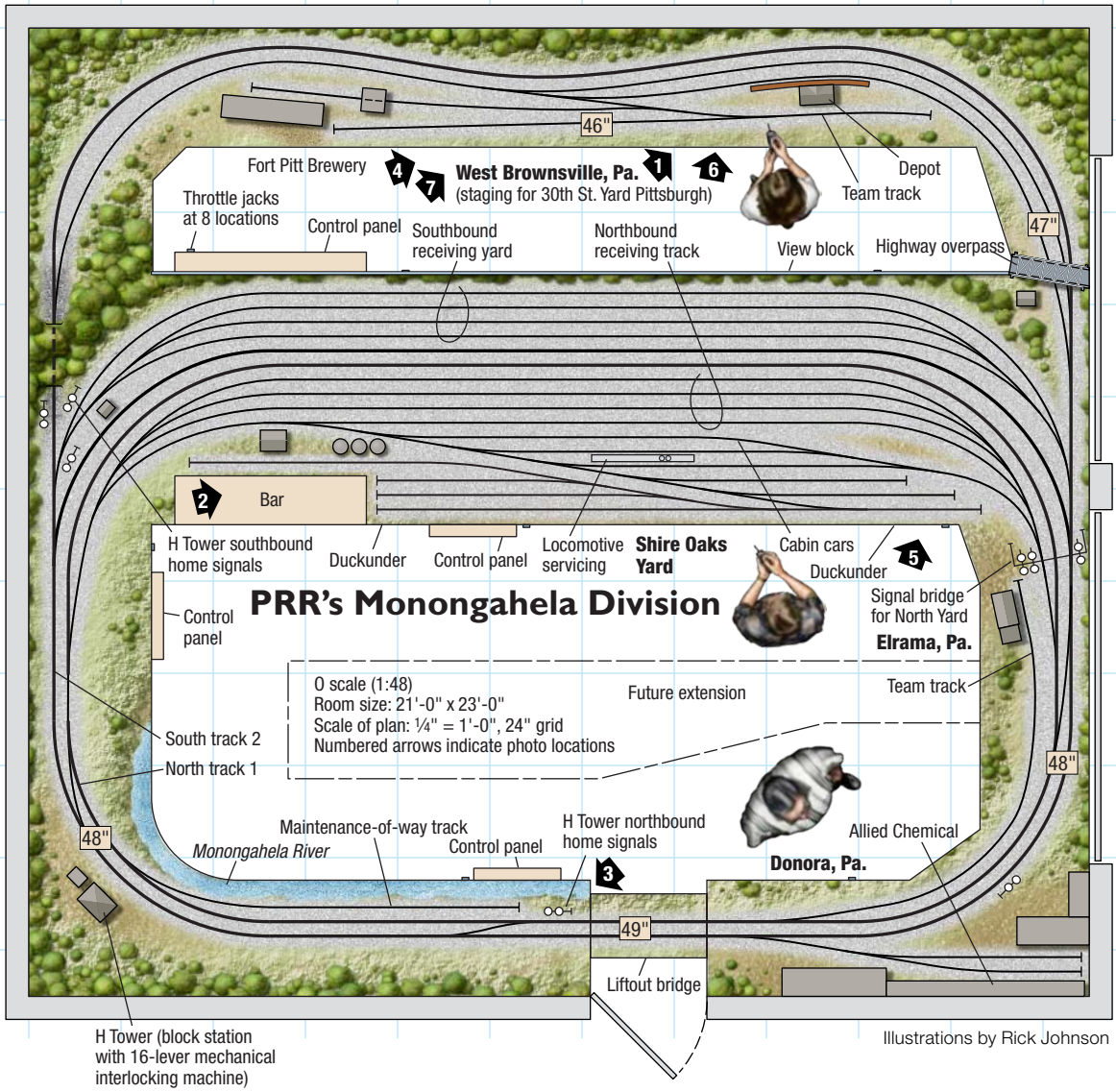
Being a photographer who misses capturing the Pennsylvania RR on film, I wanted to build a model railroad that allowed me to shoot highly realistic photographs of scenes and equipment I had admired as a railfan. Several articles in *Model Railroader* by Ben King, who built his Timber Creek & Northwestern with photography in mind, were especially inspiring.

But in what scale? I had modeled in HO scale for several years in the 1970s, but I found that I preferred the sheer mass of ¼" scale (1:48-proportion) models. I built a hi-rail layout, but in 1992 a friend introduced me to two-rail O scale modeling. Moreover, I remembered a story by J.B. Davidson on the "Zack & Southern," billed as offering "lots of switching on a compact O scale pike," in the October 1966 MR – the first issue I ever bought. Davidson's article proved to me that one could enjoy operating a large-scale layout in a small space.

It wasn't long before my three-rail layout was stripped down to the L girders, and by March 1993, I was ready to start hand-laying O scale track on a new railroad. First, however, I had to choose a theme.

Pennsylvania influence

I grew up in Jeannette, Pa., about a half mile from the Pennsylvania RR's four-track main line. My dad and I spent a lot of time at the depot in the 1960s. When it came time to pick a railroad to model, the Pennsy was an obvious choice. But what part?



//The layout at a glance

Name: Monongahela Div. of PRR
Scale: O (1:48)
Size: 21 x 23 feet
Prototype or theme: Pennsylvania RR
Locale: southwestern Pennsylvania
Period/era: summer 1970
Layout style: single-level point-to-point with continuous-run option
Layout height: 46"-49"
Benchwork: L girder
Roadbed: ½" Homasote on ½" plywood
Track: Handlaid code 148 main, code 125 elsewhere
Length of mainline run: 111 feet
Turnout minimums: no. 6 and curved no. 8
Minimum curve radius: 56"
Maximum grade: 1.75 percent
Scenery construction: Gypsolite over plaster wrap, plaster rocks cast in molds
Backdrop construction: painted ⅛" hardboard and vinyl
Control system: cab control with walkaround throttles

I realized that trying to model the PRR's four-track main in my limited space was unrealistic, so I had to find another segment of the Pennsy to model. I had spent the better part of two decades boating and railfanning along the Monongahela River, so I was familiar with the double-tracked Monongahela Division. That division was clearly a more suitable candidate to model in 1:48 proportion.

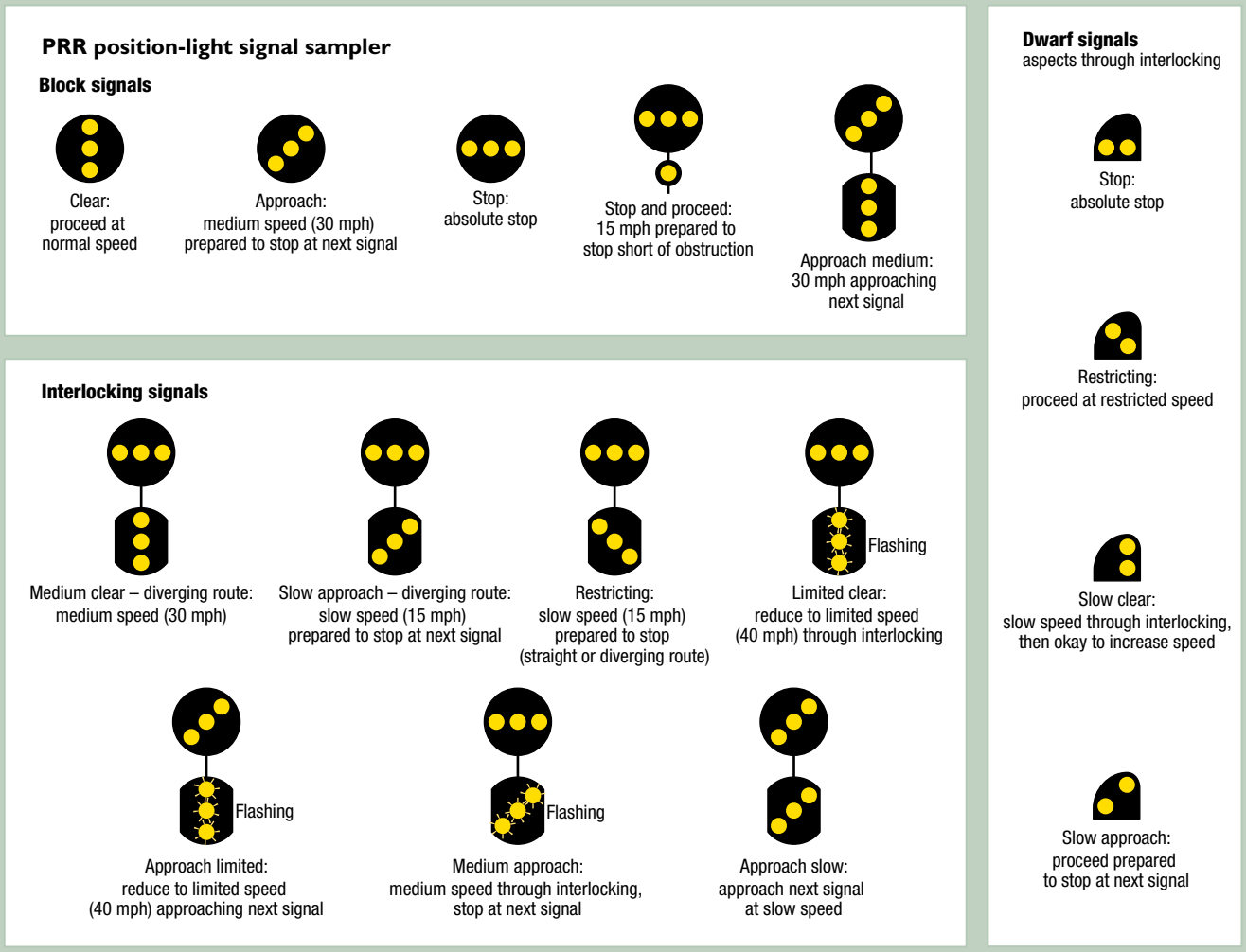
I obtained a copy of the autumn 1989 issue of *The Keystone*, which covered the history of the Monongahela Division. That firmed up the decision to model that line.

I had a 21 x 23-foot area, which is a bit small for big-time railroading in O scale. Rather than trying to re-create a major part of the Monongahela Div., I took Allen McClelland's sage advice and "modeled the ordinary," focusing on a few favorite scenes. Including many small details, which are readily visible in O scale, helped me accomplish a lot in a relatively small space.

I acquired every PRR-related book I could find and intently studied photos of the Monongahela Valley. I also took photos from a boat on the river looking up toward the railroad, which suggested I could get by with steep ridges leading up to the backdrop.

Initially, I built the backdrop from hardboard, but I quickly discovered I could see its top edge when looking through the camera viewfinder. Linoleum proved to be a suitable replacement, as I could curve it around the

//Pennsylvania signaling primer



I'm a student of PRR signaling, and we dispatch the railroad by signal indication. Early on, the Pennsy replaced its original semaphore signals with position-light signals that employ three yellow lights for each indication. The indication is still readable with a burned-out bulb in any one position or by a train crewman who is color blind. The accompanying drawing shows some of the signal aspects and indications used by the PRR. – *R. E.*

overhead garage-door tracks, but it wrinkled along the top edge. As you may be able to make out in some photos, I hid the wrinkles by painting them to look like clouds!

I forced the perspective by using large trees in the foreground and progressively smaller trees toward the rear. The most distant trees are simply clumps of ground foam glued to the backdrop, but they look right when viewed through the camera lens.

As I studied prototype photos, I became aware of little things that convey considerable realism. My early model photos lacked a certain something, and it took me awhile to figure out that what I was missing was line poles!

I was fortunate to have a 1924 edition of a *PRR Pole Line Construction* handbook, so I took an entire year to build

3. Working in helper service, an H10 Consolidation passes a PRR position-light signal. See the above illustration for information about these distinctive signals.

4. Rob likes to use his layout for railfan-style photography. In this shot, the clock has moved forward to the last days of the Pennsylvania RR as a pair of SD35s on a coal drag pause in front of the West Brownsville depot.

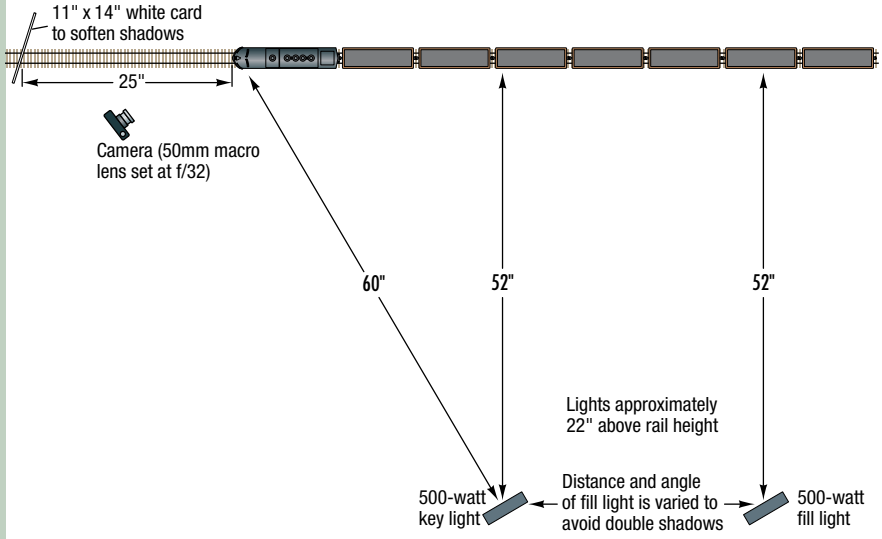
//Photographing the PRR

I use a 35mm Canon AT-1 single-lens-reflex camera with a Canon 50mm macro lens that stops down to f/32. The 50mm focal length is considered "normal" for 35mm SLRs and therefore provides an undistorted image. The small (high-number) f-stop is critical for model photography, as that allows great depth of field (simultaneous fore- and background sharpness).

I shoot Ektachrome ("chrome" means transparency film) Professional 64T and Fujichrome Professional 64T Type II slide film. These films are balanced for 3,200-degree-Kelvin tungsten lighting. Lighting the scene only with 3,200K bulbs ensures true color when using these films.

I keep the lens stopped down to f/32 and vary the length of time the shutter is open to bracket the exposures. Typical exposures are in the 8- to 14-second range with a 500-watt sun (key) light set back about five feet plus a 500-watt fill light. If more light is needed, I use additional 250-watt lights. This setup works well for O, but I typically use about half that light intensity when photographing HO scenes. [Rob photographed Roy Ward's HO layout featured elsewhere in this issue. – *Ed.*]

Camera and light placement



As shown in the diagram, I usually locate the main light source at a 90-degree angle to the camera and at 45 degrees to the model. This creates shadows that define the shape of the subject. To avoid harsh shadows, I use white cardstock to reflect some light into the darker areas. This simulates the late-day "sweet light" that railfan photographers prefer and enhances overall contrast. This technique is well known to black-and-white photographers where it's all about the shadows.

I also try to position the camera at a scale-size railfan's eye level. This adds considerable realism to the finished photos. – *R.E.*

models of the required number of poles and crossarms as accurately as possible. As you can see in the photos, they add a lot of realism and life to each right-of-way scene.

Another key detail on a PRR layout is the pipe-rail (hair-pin) fencing and PRR-style lampposts that line the station platforms. Adding these details was another important step toward greater photographic realism.

Putting yourself in the scene

Perhaps the most important aspect of the scenery planning process was to ask myself where I would choose to stand if I were a ¼" scale railfan photographer. Once I found that spot, I could arrange, and rearrange, the structures and other details to give the photo the realism I sought.

I found that there is no substitute for taking photos and examining them with a critical eye. By analyzing photos of my layout, I found trouble spots like unwanted shadows on the backdrop and spotted the missing line poles.

5. A southbound train rolls under a highway bridge on the outskirts of Elrama, Pa., on its way to West Brownsville.

//Learning points

- Keep a camera handy when creating scenes intended for realistic photography.
- O scale's size helps to create a feeling of "being there" as a railfan, especially when taking eye-level photos.
- A track plan can accommodate both point-to-point and continuous-run options.
- Reviewing readily available documentation, coupled to a site visit, can quickly familiarize you with a potential modeling theme.
- The variety of equipment now available in O scale will support most prototype themes.

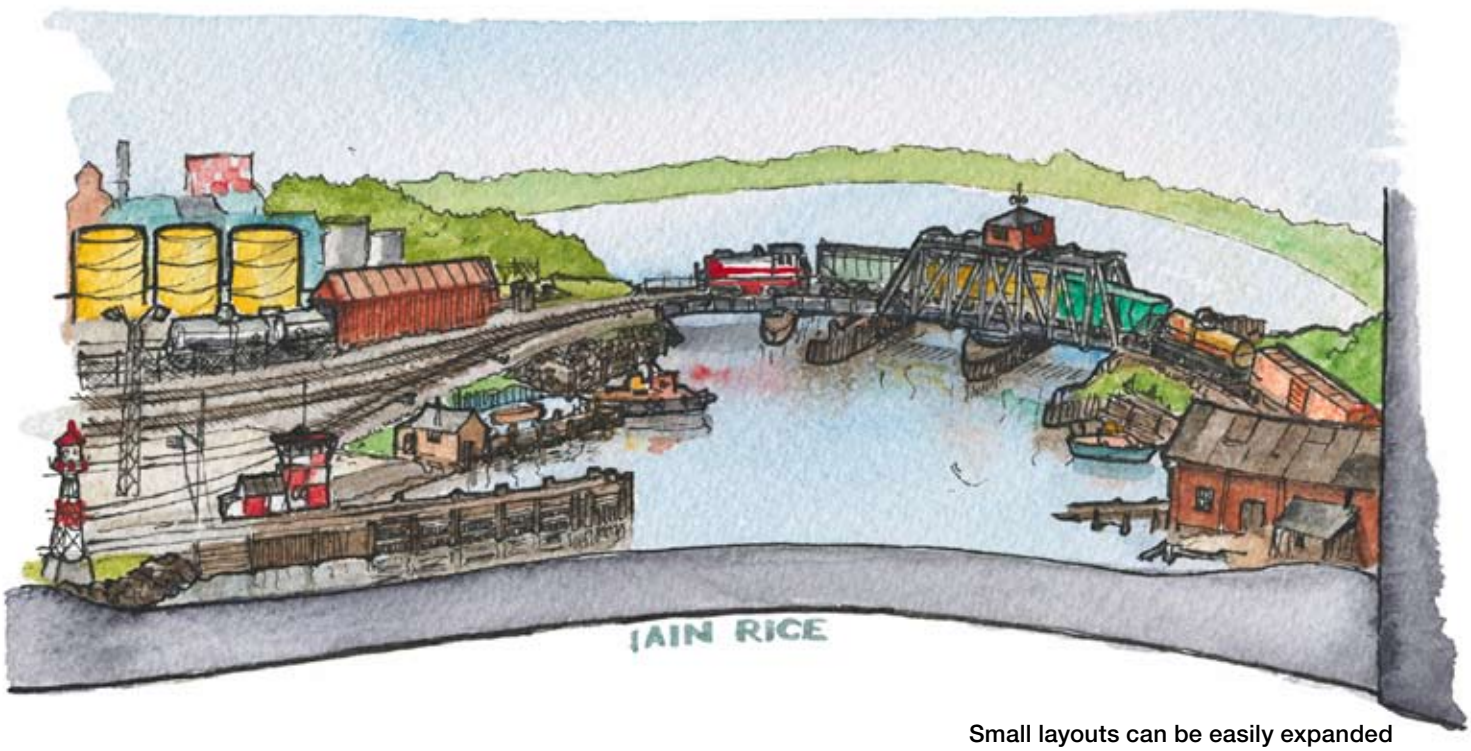
6. You can't safely move a train until everyone is clear as to what lies ahead. Here, a train's conductor discusses a switching move with the rear brakeman.

One last tip: As John Roberts reported in MRP 2004, O scale has gained a lot of manufacturing support in recent years. Today, there is sufficient diversity of equipment types and eras to allow almost any prototype to be modeled or used as the basis for freelancing. Best of all, the high level of detail on these models has made closeup photography a very rewarding experience, as I hope my photos illustrate. **MRP**

7. Simulating prototype scenes makes model photos more realistic. Here the rear brakeman on a northbound train prepares to snag his train's orders.

Rob Enrico is a third-generation baker who lives near Pittsburgh, Pa., and a member of the National Model Railroad Association and the Pennsylvania RR Technical and Historical Society. Rob also enjoys photographing the Norfolk Southern on large-format black-and-white film.

Expandable track plans



Small layouts can be easily expanded into larger model railroads. Follow along as Iain Rice tells how.

Design them in discrete sections that can grow into a larger layout

By Iain Rice//Artwork by the author

The construction of the ideal model railroad has, it seems, come to be a matter of convention. First, we find a large basement with a house of some sort on top of it. Then we expend reams of paper and anxious months, if not years, designing our layout. Next, we consume a forest or two of lumber erecting substantial benchwork, after which we carefully lay hundreds of yards of track and go doo-lally trying to ballast it neatly. Then comes the fun of trying to wire it all up and make it go.

Having accomplished all of that, we'll probably operate the layout for a while as the Plywood Pacific and finally – anything up to 20 years after we started – finish up with a flourish of scenery. All in all, it's an approach that works well enough, but is it the only way of going about the job?

A piecemeal approach

As a layout designer, I'm often asked to create such grand designs, what I call "maybe layouts." I've known a fair few folk who have spent literally decades planning such layouts – model railroads that, deep down, they know will probably never get built.

Usually, my advice is to forget the future and to consider something that can be started today with the time, space, and cash at hand. But, I hasten to add, they should design and execute it in such a way that it can become part of a grander affair if and when the opportunity arises – something along the lines of having your cake and eating it too.

This type of adaptable model railroad doesn't sit too happily with the traditional way of doing things. A somewhat more flexible approach is needed

in that elements of the design will remain fluid, and the sequence of construction will not necessarily follow convention. Some parts of the model may well be completed before other parts are even conceived. It's not that you don't plan or build benchwork or track or scenery; rather, it's more that you do so in discrete chunks instead of as part of a set-in-stone overall design.

A key component of such an approach is the benchwork. Much of the benchwork I've seen in North America is permanent – very permanent. It's often tied to the structure of the building; uses long, unbroken runs of framing; and features massive, continuous scenery. On such layouts, everything is irredeemably tied to the underlying cast-in-stone benchwork. Usually, the only way to move or alter such a model is to send in a wrecking crew and accept the fact that a lot of money and many hours of hard work are going to wind up in a dumpster – and even more money and hard work are going to be needed before there is a viable layout again.

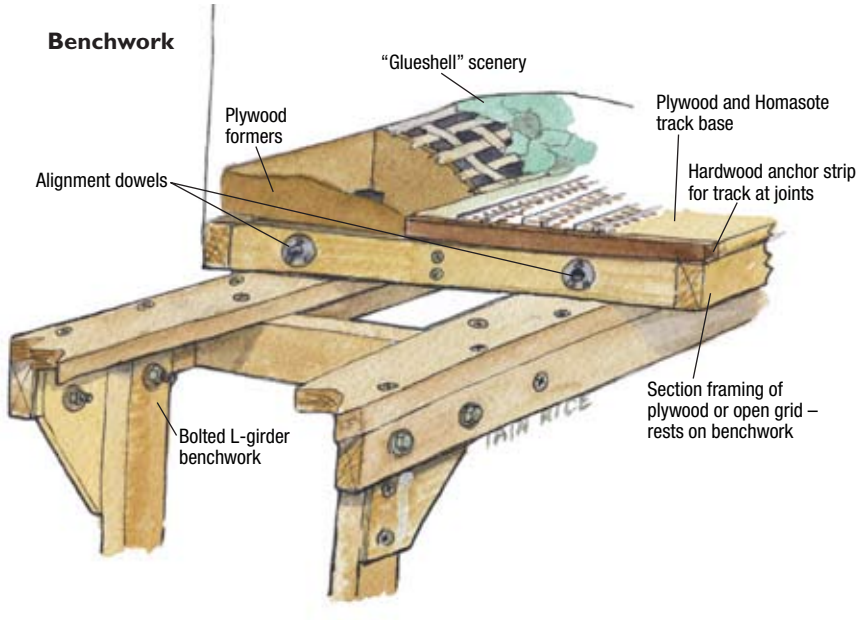
This is in total contrast to the way things are typically done in Britain, where people tend to relocate quite often, and where model railroad exhibitions (and hence portable layouts to display at them) are very popular. Most British layouts are built as a series of discrete, self-contained sections of moderate size, using a variety of methods and materials to build the necessary adaptable benchwork. Section-joining systems, track alignment, and electrical continuity long since ceased to be problems, with established techniques and dedicated components being available for the task.

Something similar has been advocated in the United States by David Barrow: the "domino" segments he uses to reconfigure his Cat Mountain & Santa Fe layouts, including the new prototype-based edition documented in this issue. This is a variation on the popular modular systems, like Ntrak, in that the "building blocks" are a consistent size and shape like the bricks in a wall.

Unlike Ntrak, however, David's domino trackwork is not designed in modular form, so one layout section cannot be swapped at will with any other. Similarly, most British sectional layouts don't have interchangeable sections; instead, they more closely resemble a fieldstone wall made up of irregularly shaped pieces of various sizes that fit together to form the final layout, almost like a jigsaw puzzle on a grand scale.

Separate infrastructure

There are a number of ways to build sectional layouts, but the key is a complete separation of the infrastructure for each section of the model from the framework supporting the whole layout above the floor (or from a wall). This doesn't involve anything particularly revolutionary – L-girder benchwork remains a very good supporting system, but it doesn't have to be a massive structure fixed to the building.



L-girder benchwork is all the support needed for a sectional layout. The benchwork should be lightweight and easy to disassemble.

Rather, it can easily be designed to be free-standing and adaptable, capable of being taken apart, reconfigured, or moved. After all, any L-girder benchwork consists essentially of three basic elements: girders, supporting legs, and cross-members . . . and maybe a few bracing struts.

If you design all of these as separate pieces that bolt together, you end up with a system that can be easily altered and used to support any layout elements you care to place on top of it. This is the principle successfully exploited by Sievers and similar modular benchwork systems.

With the support element taken care of, you then need only come up with something for each section upon which you can base the actual modeling. This can be as simple as a flat board or as elaborate as a three-dimensional plywood structure to hold up a mountain. As long as it's strong and rigid enough to support itself and the modeling on top when it's picked up, and light enough to be easily transported, then it serves the purpose.

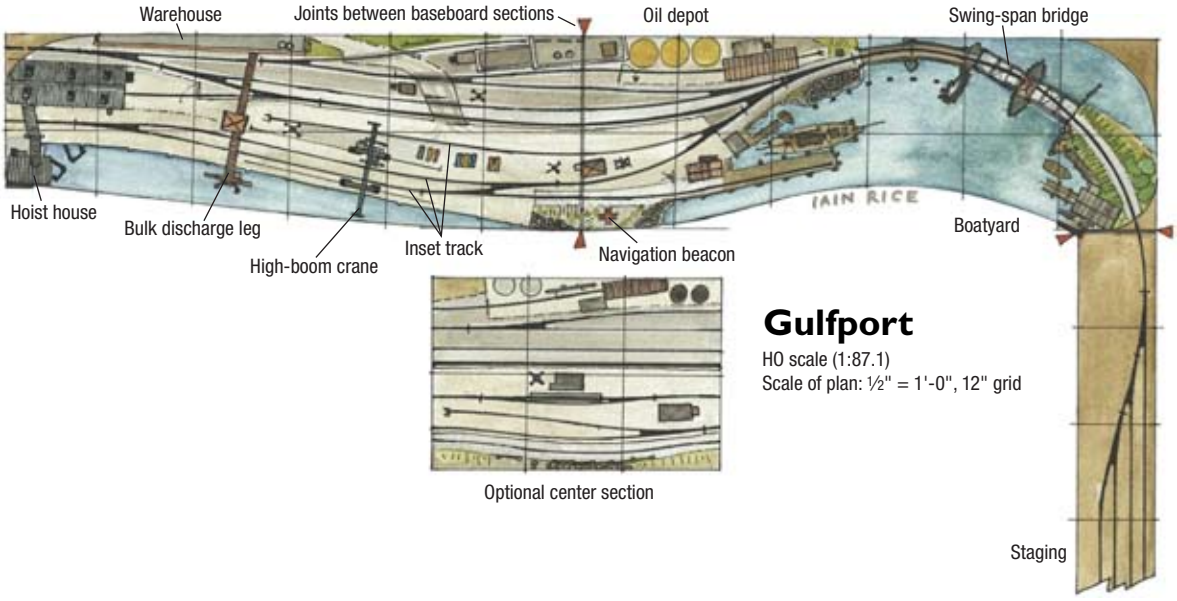
Such layout sections can range from a few inches across to the biggest size you can physically handle, fit in a vehicle, or get through a doorway. Based on my experiences in the United Kingdom, about 3 x 6 feet seems to be a sensible size limit.

The sectional advantage

So what are the advantages of building a layout in discrete chunks? For starters, sectional layouts are easy to move, modify, or extend. This cuts down unnecessary destruction of models, as individual sections or even entire layouts can be moved or sold because of their built-in portability. You'll never need to scrap anything and start over unless you want to, and good modeling can live on to give someone else pleasure. On the construction front, you're always working toward a relatively attainable goal. There are no endless marathons of one task or another such as wiring an entire layout, so variety is assured.

Stemming from these features are other benefits. Once you have the first section up and running, you have a layout of sorts. With even quite a small number of sections completed, you can be well into the operating game. By butting movable staging sections up to either end, you can operate virtually all of the planned traffic through the finished sections.

Since the sections are movable, you're not tied to working on the layout on site. I designed one such layout for a long-haul trucker; he takes a section of the layout with him on trips so he can work on it in his sleeper-cab during layovers. The whole layout, when put together, occupies an old 40-foot trailer parked beside his house. If he ever relocates, all he has to do is hitch up the rig and the layout goes right along with him!



I've also found that it's easier to keep going under this piecemeal system. As you finish each section, your enthusiasm builds for the next one. Often, new ideas can be incorporated simply by adding extra sections, maybe to fit between two existing ones, or in front, behind, or (most often) on one end or the other. I've also found that a section that formed part of an original concept can inspire other sections that weren't considered as part of the plan at all.

As your skills develop and standards improve, you can rework or even replace older sections without having to tear up half the layout. No matter what your circumstances, you can be making gradual, steady progress towards that big layout that you've always wanted to grace your retirement. Best of all, you still have a finished model railroad to operate in the meantime!

//Learning points

- Even if you're thinking big, think small first.
- Since good track planning involves the careful design of individual towns, yards, industrial areas, and so on, it follows that a layout can be designed and built in manageable sections.
- Three by six-foot layout sections can be built off-site or follow the builder to a new location.
- The key is to build the layout structure separate from the supporting system to ensure future portability.
- Linear, sectional plans can be easily converted to another scale with adjustments to track spacing, as aisles are not a factor.

Designing a sectional layout

Almost any type of railroad subject can be the theme of a sectional layout. A model railroad is essentially a series of individual elements (Layout Design Elements if they're prototype-based) – a yard, an industry, an interchange, an engine terminal, a signature scene – tied together. Sectional logic would suggest that each element is built on a separate section or group of sections, which can be completed in themselves without the need to have the other sections completed before they can be used for running trains.

Rather than trying to describe this process in general terms, I'll show you an example railroad that uses popular design elements arranged in such a way that they'll function as discrete layouts while still forming part of a longer-term and more-ambitious scheme. I've called this railroad the Gulfport, Yarde & Industry (GY&I) to signify the three main elements around which it is designed. As I hope you'll see, the project grows from something that could be started in an apartment (Gulfport – short version plus staging in an L-shape); expanded in a townhouse, condo, or starter home (Gulfport plus Yarde in U-shape); and wind up as a medium-size basement layout.

There's no fixed order to the creation of these keynote elements. For the purposes of the exercise, I have taken a fairly modest 2 x 12-foot area as the footprint of Gulfport, Yarde, and Industry. I have also stuck to a maximum section size of 2 x 6 feet to make moving them more manageable.

There's nothing unusual or innovative about the actual railroad design. The track plan could be adapted to suit other prototype themes. I drew the plan for HO, but it could also work for N; on a sectional layout, adjusting aisle width is not a problem.

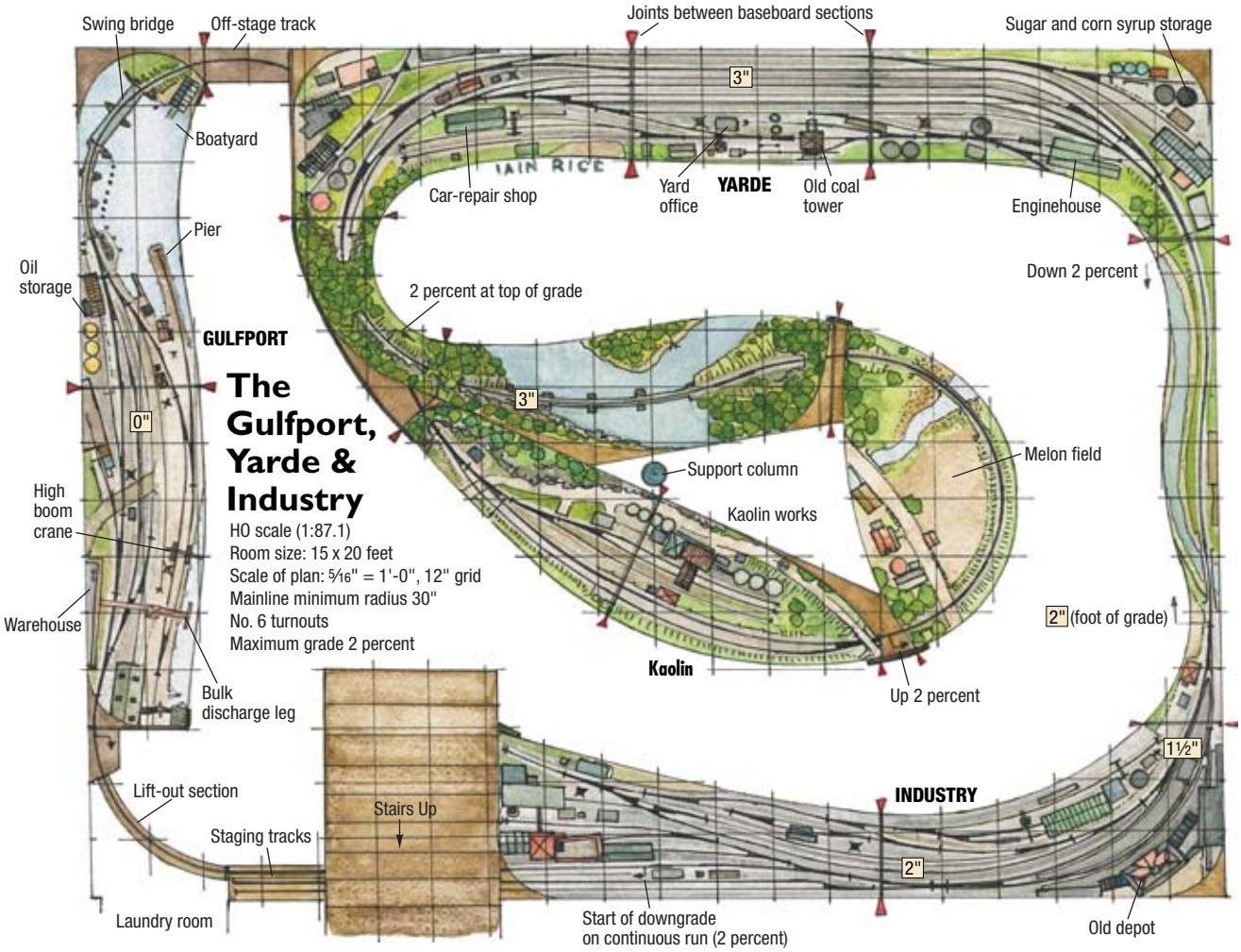
A Gulf Coast short line

The GY&I is a freelanced railroad of "long shortline" proportions, running north from a Gulf Coast seaport to the sizable city of Industry, Ala., a center for steel-making and other heavy industry. If you think of the Louisville & Nashville's Birmingham route on a much smaller scale, you aren't far off.

So we'll think of this as an L&N subsidiary, mixing its own small stable of older switchers and road units with newer L&N power in yellow and gray, working a heavy traffic in steel products and raw materials, oil, fertilizer, sugar, corn syrup, kaolin, export coal from eastern Kentucky, perishable and agricultural produce from the lower Midwest, lumber products from Georgia and Alabama, container traffic, and a wide range of manufactured goods moving both ways. In short, it's an excuse to run pretty much anything that takes your fancy.

The inspiration for this scheme came from *Dixie Lines – The Louisville & Nashville Railroad* by David P. Oroszi and Ron Flanary (Hundman Publishing, 2003). Ron, Dave, and Garland McKee also teamed up to produce *The Louisville & Nashville in the Appalachians* (Old Line Graphics, 1990). Both of these books contained valuable information and photos on railroading in the southern United States.

I had in mind a mid-1960s through '70s time frame for variety in motive power – some older Alco diesels among all the Electro-Motive Division locomo-



//The Gulfport, Yarde & Industry

The basement- or garage-size Gulfport, Yarde & Industry concept is built around the key sections used in the original bedroom design, particularly the Gulfport section and an extended version of Yarde. The three towns all occupy the same basic 2 x 12 footprint. The extent of the various self-contained sections and the joints between them are shown by the red arrowheads.

The overall scheme is simple: a point-to-point system with an optional continuous run. As befits its seaside location, Gulfport is at the 0" datum level. The route remains at 0" through the hidden trackage under the throat of Yarde until it reaches the far end of the river bridge. En route, the GY&I main passes through a stretch of typical Delta farmland complete with a melon field. At Yarde, the elevation is 3½" to provide a minimal clearance over the hidden track, allowing an inch for roadbed and subroadbed thickness.

The line remains level through Yarde, then drops at about 2 percent alongside a polluted industrial ditch to an elevation of 2" at the throat of Industry. The main line remains level by the Industry depot and yard area, then drops back to 0" through the hidden section beneath the stairs and over the lift-out access to the laundry room to complete the continuous run. – *I.R.*

tives. The time frame could easily move either way: forward to the present-day CSX with double-stack containers and large freight cars, or back to the steam era of Mikados and 40-footers.

The visual keynotes are a typical gulf port with drawbridges, low trestles, and modern bulk-handling terminals. There's also a compact, but comprehensive, yard with a small engine terminal and a dense industrial scene based on the Birmingham steel works. In between, there's room for plenty of open trackage, a few small town modules, and plenty of cottonwood trees and kudzu.

Most of the necessary materials are readily available, and sectional modeling doesn't call for anything radically different on the construction front. It's more a different way of thinking about the development of a model railroad than some revolutionary new method of building it. **MRP**

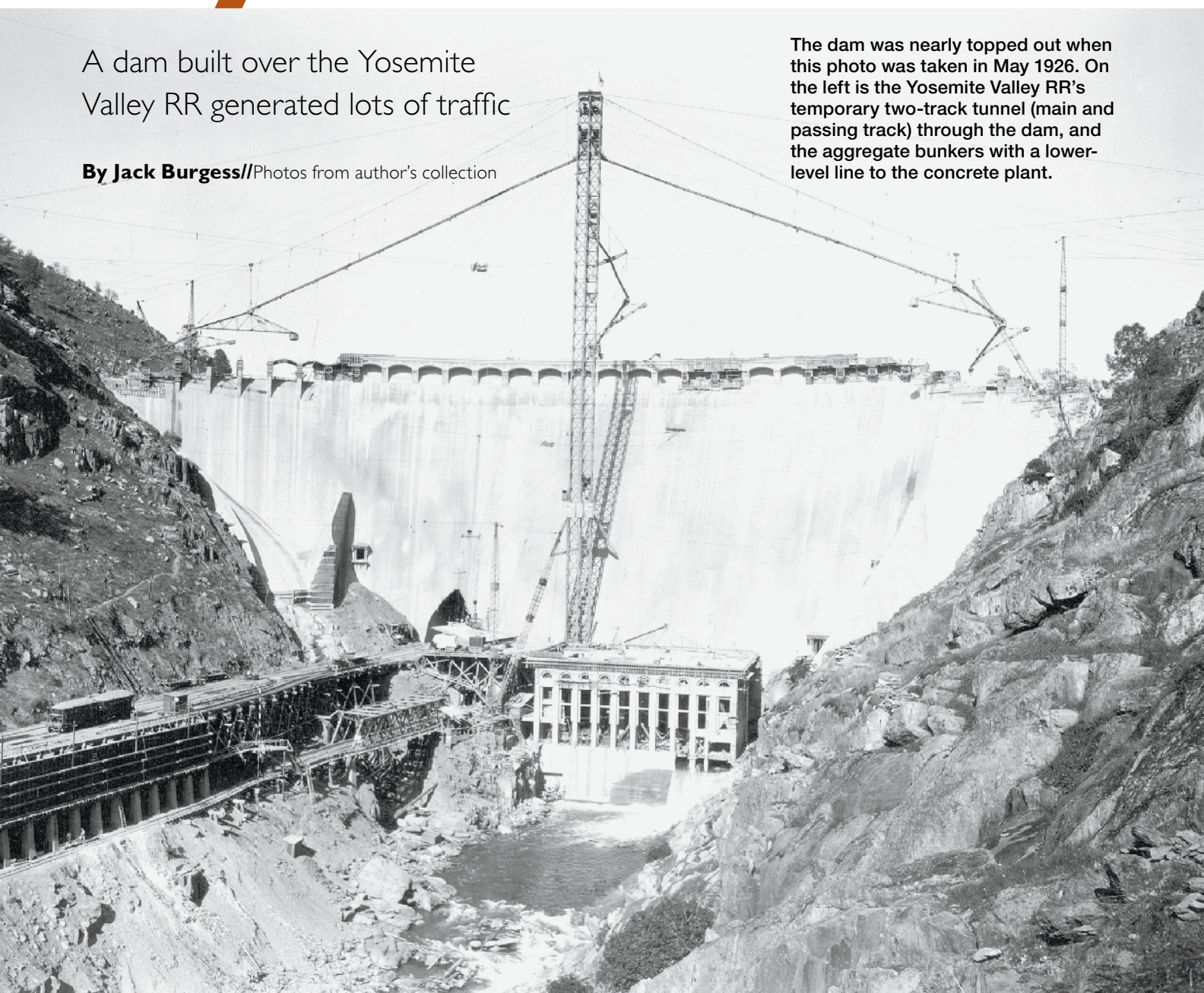
Iain Rice lives in Devon, England, and is a frequent contributor to Model Railroad Planning *and* Model Railroader *magazines. In addition to his magazine articles, Iain has written two track planning books for Kalmbach Publishing Co.,* Mid-sized & Manageable Track Plans (2003) *and* Small, Smart & Practical Track Plans (2000). *Iain's plans draw upon his considerable knowledge of and experience with railroading on both sides of the Atlantic Ocean.*

//Layout design element

A busy bedroom-size layout

A dam built over the Yosemite Valley RR generated lots of traffic

By Jack Burgess//Photos from author's collection



The dam was nearly topped out when this photo was taken in May 1926. On the left is the Yosemite Valley RR's temporary two-track tunnel (main and passing track) through the dam, and the aggregate bunkers with a lower-level line to the concrete plant.

How do you model a prototype railroad, with interesting operating jobs for several operators, in a small spare room or bedroom? My solution to this design challenge is a relatively small and simple plan that can be built and operated within a fairly short time while honing one's skills for a more ambitious project in the future.

An all-too-typical approach to modeling even a shortline railroad in a limited space is to try to cram in as much of the prototype as possible. I used a different approach: I focused on a single operational and scenic Layout Design Element, the construction of the Exchequer Dam, which was built right on top of the Yosemite Valley RR's original right-of-way.

The dam project

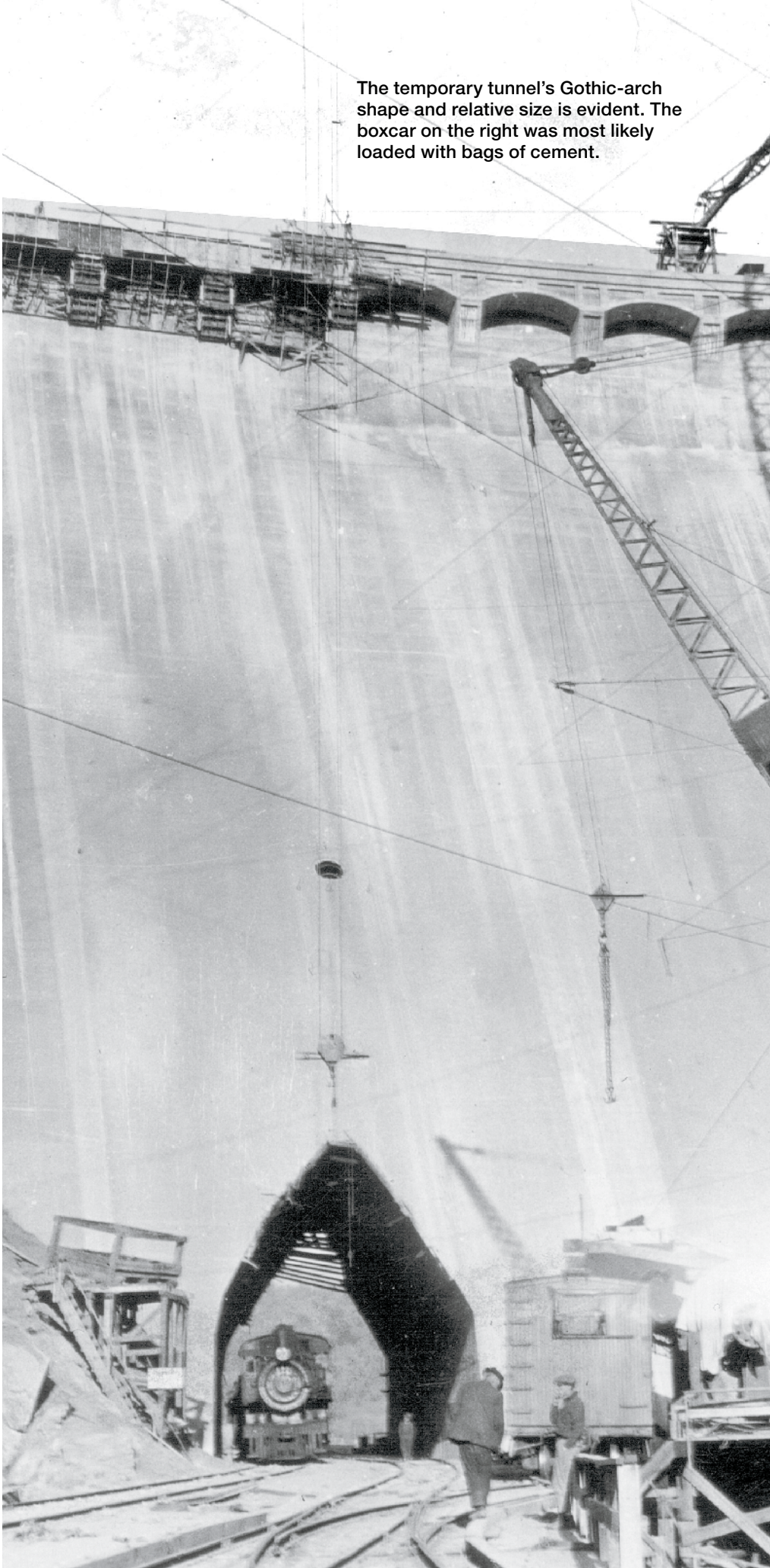
In February 1920, the Merced (Calif.) Irrigation District studied the feasibility of building a dam on the Merced ["mur*sedd*"] River. A 330-foot-high concrete dam resulted from this study, the most ambitious irrigation project in the U.S. at the time.

Unfortunately, the Yosemite Valley RR followed the river through the dam and reservoir area. Relocating the railroad while retaining the original grades required the construction of nearly 17 miles of track, five large steel bridges (including a 1,600-foot bridge over the reservoir itself), and four concrete-lined tunnels. Not only that, a temporary two-track tunnel had to be made through the base of the dam itself to allow the YV to continue running trains during the construction project!

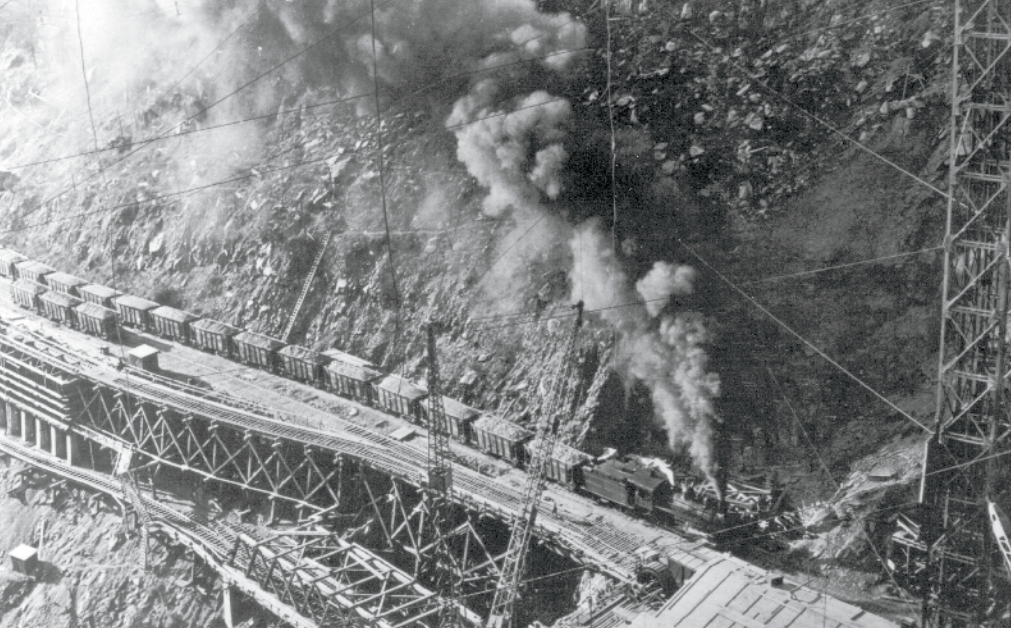
The good news for the builders of the irrigation project was that the railroad provided the perfect means to deliver construction materials to the dam site. A quarry to provide aggregate – dredging waste from former gold-mining operations – for the concrete was located 17 miles downstream. The YV built a ¾-mile spur to serve the construction site and purchased 51 ex-Great Northern Ry. 22-foot ore jimmies, dubbed "rock cars" by the YV, to transport the aggregate and ballast.

Supplying the aggregate storage bunkers at the job site required 75 to 90 carloads per day. With typical train lengths of only 16 to 18 cars, two dedicated train crews made five round trips daily. Also required were six daily boxcar loads of bagged cement. In short, a lot of traffic was generated for the short line.

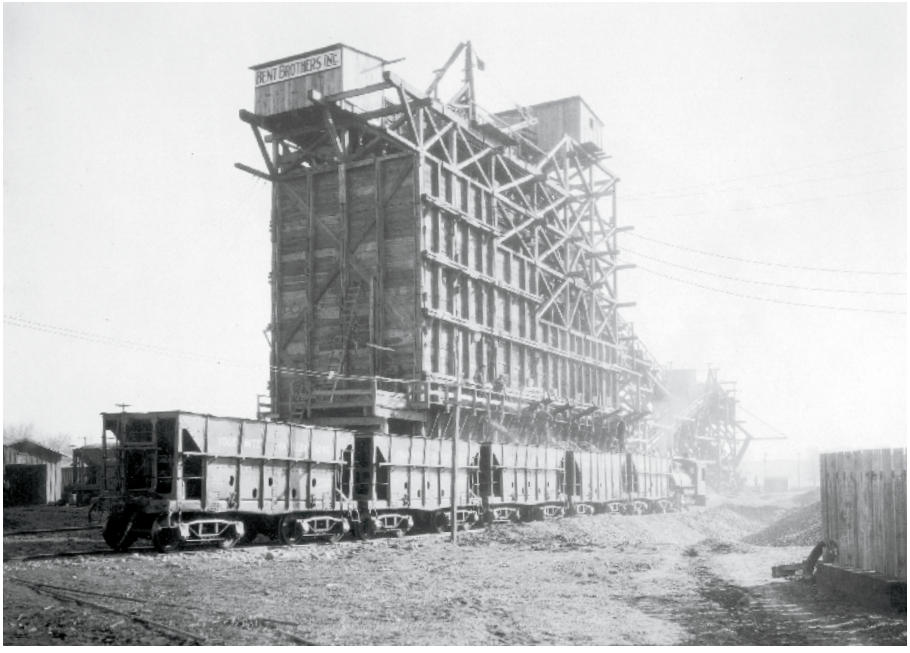
In addition, the YV was still running two log trains, two locals, and two passenger trains through the dam site each day. An all-time traffic high was achieved when a total of 30 trains were recorded



The temporary tunnel's Gothic-arch shape and relative size is evident. The boxcar on the right was most likely loaded with bags of cement.



A leased Southern Pacific RR Mogul on a rock train pulls alongside the storage bunkers located just below the dam. The train continued forward, then backed the cars over the bunkers for unloading.



A contractor's saddle-tank engine moves a string of rock cars – ex-Great Northern 22-foot ore jimmies – past the storage bunker at Bent, Calif.

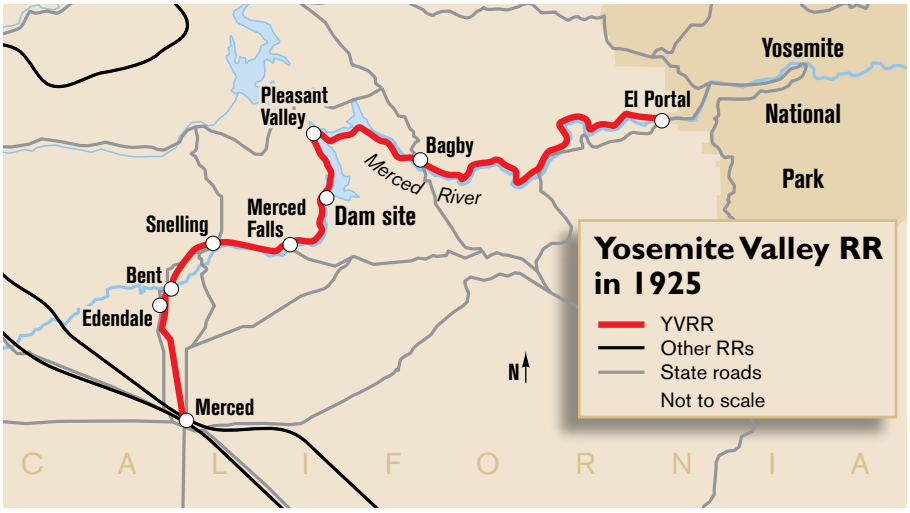


Illustration by Jay Smith

on the YV dispatcher's train sheet in Merced on July 8, 1925.

Double-duty reverse loop

The interaction of normal traffic and trains associated with the dam project was my inspiration for this bedroom-size track plan. I concentrated on modeling the section of the YV between the quarry at Bent and the dam. Except for the two passenger trains and the pair of regularly scheduled log trains, all trains through this area moved as extras.

Reverse loops are commonly used to accommodate trains that need to run to a point and then return. To save space, I used a single loop with two connections to provide the equivalent of reverse loops and staging for both ends of the railroad.

This allows the morning eastbound (toward spectacular Yosemite National Park) passenger train to run from west-end staging (Merced) around the layout to the reverse loop (east-end staging representing El Portal). The train can then return later in the afternoon as the westbound passenger run. I'd model the railroad in the summer, when Pullman cars were operated over the YV.

Similarly, the daily log train, listed as No. 8 in the employee timetable, can run eastbound from staging around the layout on its way to Incline near El Portal to pick up loaded log cars. After No. 8 arrives in staging, the locomotive and caboose can be turned and logs manually placed on the cars before it returns as No. 9 later that day. Between sessions, the log cars must be unloaded.

Rock train operations

To complicate matters, one or two rock trains will be shuttling loaded rock cars from Bent to the dam site, where the loads will be exchanged for empties going back to Bent. The double-ended siding at the job site makes dropping off the loaded cars and picking up the empties relatively easy. With no turntable here, engines will have to run in reverse to the quarry. The siding at Bent can be operated as a spur into the quarry, which requires the locomotive to run around the train at Snelling in order to shove the empties into the spur.

Loading and unloading the rock cars may be a bit more challenging than dealing with the log cars. You could leave the cars loaded or empty, but the connection between the dam site and Bent allows a more-realistic option. On the prototype, the contractor used an 8-ton Plymouth diesel at the dam site to switch cars. On the model, a small "critter" could be used to take loaded rock cars back to Bent via the staging loop

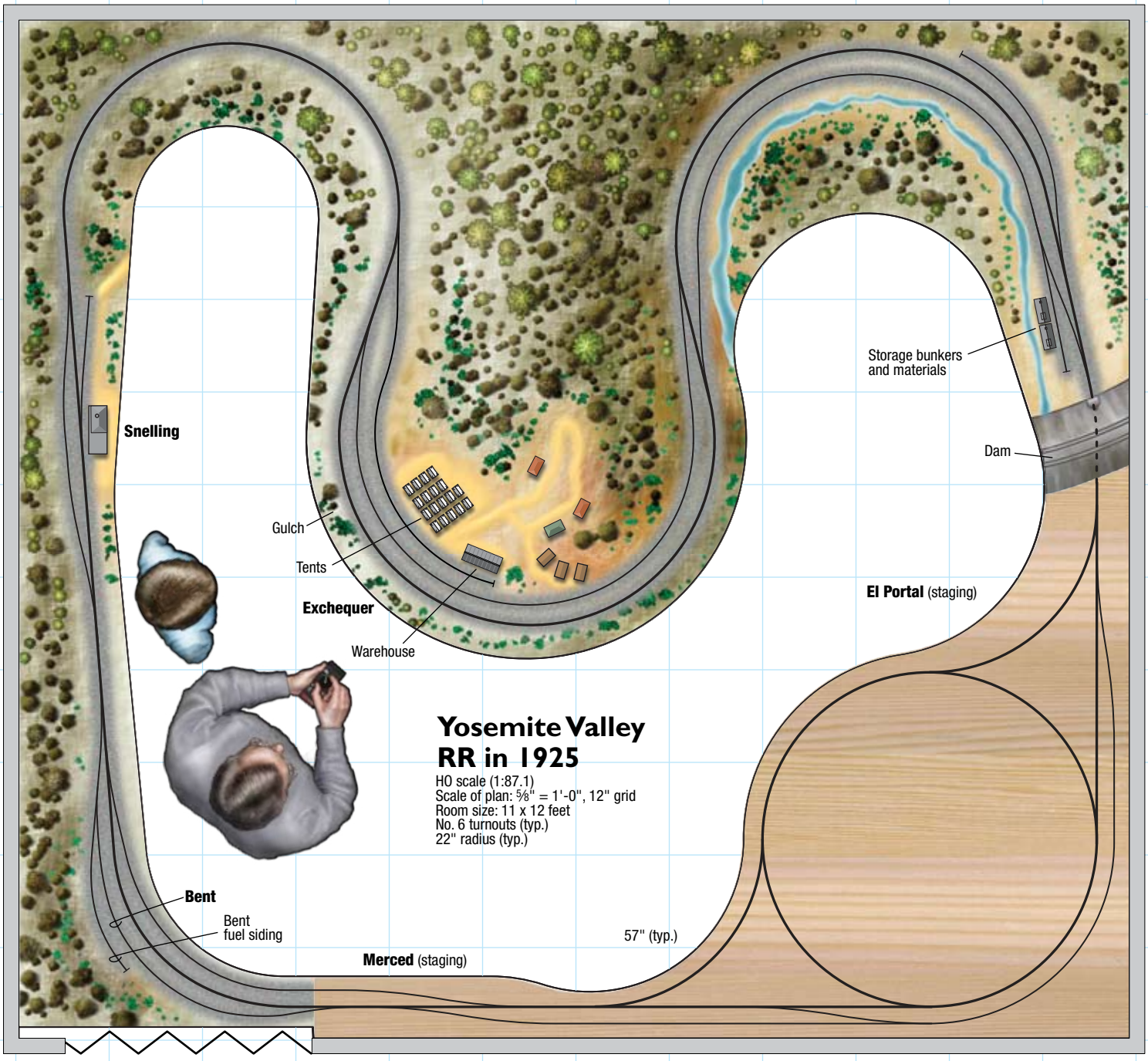


Illustration by Jay Smith

and return with empty rock cars to be spotted at the dam.

On the YV, locals typically left their home terminals at Merced and El Portal late in the day. I'd change the departure times for these trains so they run during the middle of the session, something I do on the much larger edition of the Yosemite Valley RR I built in my home. [See January 2000 *Model Railroader*, *Model Railroad Planning 1998*, and *Great Model Railroads 1994*. – *Ed.*] The interaction of the locals with the timetable trains and other extras would add considerable operating interest and extend the running times of all trains.

Switching opportunities

Despite the layout's small size, there are numerous spurs and many switching opportunities. Bent should receive an occasional tank car of Bunker C fuel oil for the saddle-tank engines that worked the quarry. The spur at Snelling will need a tank car of gasoline at least every few days to power a generator that provided electricity for the gold dredges that are working the nearby river bottoms. Snelling would also receive an occasional boxcar or flatcar of replacement parts for the dredges.

The spurs at Exchequer and the dam site would continually receive boxcars of bagged cement and other construction materials such as lumber for concrete forms. Once the dam powerhouse was under construction, items such as turbine parts and penstocks would start arriving by rail. The construction camp would also need a steady supply of groceries and other supplies for the large contingent of construction workers living there.

The contractor responsible for erecting three of the large steel bridges that were part of the track relocation project chose to stockpile steel at the east end of the project. An occasional extra train with 80-foot steel I-beams on a

The construction camp at Exchequer included a few frame structures and neat rows of tents used for worker housing, as shown in this 1925 photo.

//Learning points

- A joint reverse loop can save space while enhancing what appears to be point-to-point operation in a small area.
- Modeling a segment of even a shortline railroad will concentrate operations and keep the project more manageable.
- Modeling a specific prototype in a carefully selected time and place makes it easy to appreciate the modeling and operating possibilities from the outset.

The depot at Snelling would make a fine scratchbuilding project using Grandt Line window moldings for the Bagby depot, which are also correct for Snelling. Plans appear in the author's book, *Trains to Yosemite*.

flatcar coupled to idler flatcars would add an interesting twist to an evening's operating session.

This small layout could be operated sequentially by sending out one train when another arrives back in staging, but it would be more interesting to develop a simple timetable to set the pace for operations. The timetable need provide only departure times for the passenger and log trains from staging at Merced/El Portal and arrival times at Snelling and Exchequer. Engineers of extra trains will then be responsible to clear the main line ahead of the arrival of the scheduled trains. Meets between extras could be handled by written train orders from a dispatcher or orally between train crews.

Layout height and grades

The grades around Exchequer averaged around 1 percent eastbound as the tracks ascended alongside the Merced River. Although it would be nice to add this feature to the layout, the connection of both ends of the main line into the staging area and reverse loop complicates such aspirations. I therefore kept everything level.

To help camouflage the lack of grades, I suggest that the entire layout be constructed relatively high – somewhere around 57" – off the floor. Trains look more realistic from close to eye level, and the elevation opens up that space under the railroad for other uses such as bookshelves and a desk.

Since the layout is designed to accommodate several operators, I tried to maximize aisle widths. The most obvious constriction is between the peninsula and the reverse loop. To maximize aisle width, I located the layout edge only 2" from the center line of the reverse-loop trackage. Building the layout near shoulder height will minimize the possibility of crew members bumping into trains negotiating the loop.

Extending the fascia above the track level in this area would provide extra equipment protection, but you might want to make it transparent or include viewing ports. A relatively high layout also converts the duckunder at the door into a nod-under.

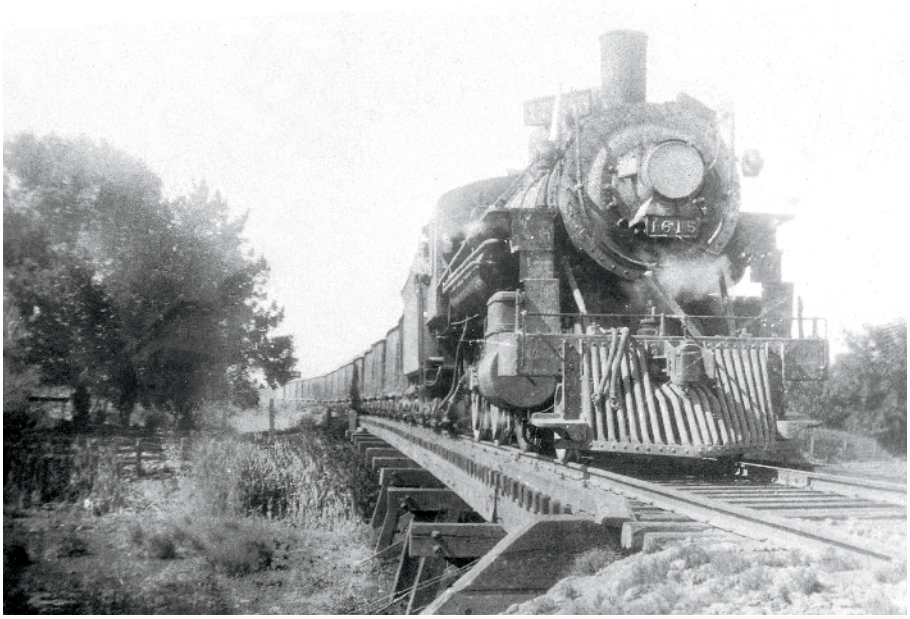
Running several trains at the same time and in the same small area greatly favors the use of a command control system. Wireless throttles would also eliminate tangled cords. The reverse loops with multiple exits (actually wyes) may appear to create a wiring nightmare, but a mainline-polarity reversing switch mounted on the fascia near the loop would allow an operator to set the correct polarity.

There are also reversing modules for Digital Command Control systems that can automatically change the polarity in reversing loops.

Few structures, many cars

One of the concerns about modeling a specific prototype is the need to tediously scratchbuild or kitbash models of lots of actual structures to ensure that the model reflects the look of the prototype. But in reality this portion of the Yosemite Valley RR had very few structures – a cookhouse, warehouses, a few other buildings, and lots of tents at Exchequer, and a small depot at Snelling. This should give you time to enjoy building a model of the dam with the railroad tunneling through the base.

Modeling the dam may seem challenging, but I'd build the basic structure from extruded foam insulation board and cover it with sheet styrene to simulate concrete. Wood or styrene strips could suggest the wood forms.



The construction of the Merced dam provided much traffic for the Yosemite Valley RR during the 1920s. Here a borrowed Southern Pacific Mogul is rolling a long train across a low trestle.

The 330-foot-high Merced dam required a steady flow of materials, including dedicated rock trains.

For those wanting to model the Yosemite Valley RR in 1925, as opposed to using this plan for a freelanced railroad, well-detailed HO YV 2-6-0s that run as nicely as they look were imported in brass by Beaver Creek Models in the 1980s. They show up occasionally on eBay and dealer lists.

To accommodate the extra traffic generated during the dam construction, the YV leased four locomotives – nos. 1615, 1626, 1630, and 2248 – from the Southern Pacific RR. These were soon joined by 1618 and 2217. The 1600s were Moguls (2-6-0s), the 2200s Ten-Wheelers (4-6-0s). This opens up modeling opportunities for the prototype modelers while providing general guidelines for the freelancer.

The layout could absorb a half-dozen or more locomotives (the YV had nine Moguls in service in 1925) depending on whether they die in staging or are reused on other trains.

The 22-foot ore jimmies are available as resin kits from Westerfield complete with YV decals. Beaver Creek imported brass models of these cars in the 1980s. And Athearn has 21-foot Roundhouse ore jimmies that could serve as stand-ins. Since the runaround siding at Snelling can accommodate eight cars, about 32 hoppers are needed to run two rock trains simultaneously.

If log loads are added and removed in real time, you'll need only five to eight cars. Accurate kits for YV log cars are available from Rio Grande Models (P.O. Box 4463, Santa Clara CA 95056; www.riograndemodels.com).

Scenery suggestions

Scenery on the YV varied from lush river-bottom vegetation in the vicinity of Bent and Snelling to oak-tree-covered Sierra Nevada foothills cloaked with golden-hued grass in the summer from west of Exchequer to the dam site. Although Californians often refer to this part of the Sierra range as "foothills," the terrain near the dam site is actually quite steep.

Shortline merits

Although shortline railroads don't have the dynamics and glamour of their larger, Class 1 relatives, their compact nature makes them natural subjects for smaller layouts.

Moreover, if you have regarded prototype modeling as the exclusive haven of skilled model builders, I hope this plan provides some insights into ways that building an authentic depiction of an actual railroad at a specific time and place can be a very manageable project, even for a relatively new modeler.

Best of all, I think that the knowledge you'll gain during the construction of this railroad will give you a huge head start if the day comes when you want to expand your horizons. In this case, you may decide, as I did, that modeling more of the Yosemite Valley RR offers a very rewarding lifetime project, or you may find that you would rather move on to another time and setting. Meanwhile, you'll have an enjoyable railroad on which to refine your modeling and operating skills. **MRP**

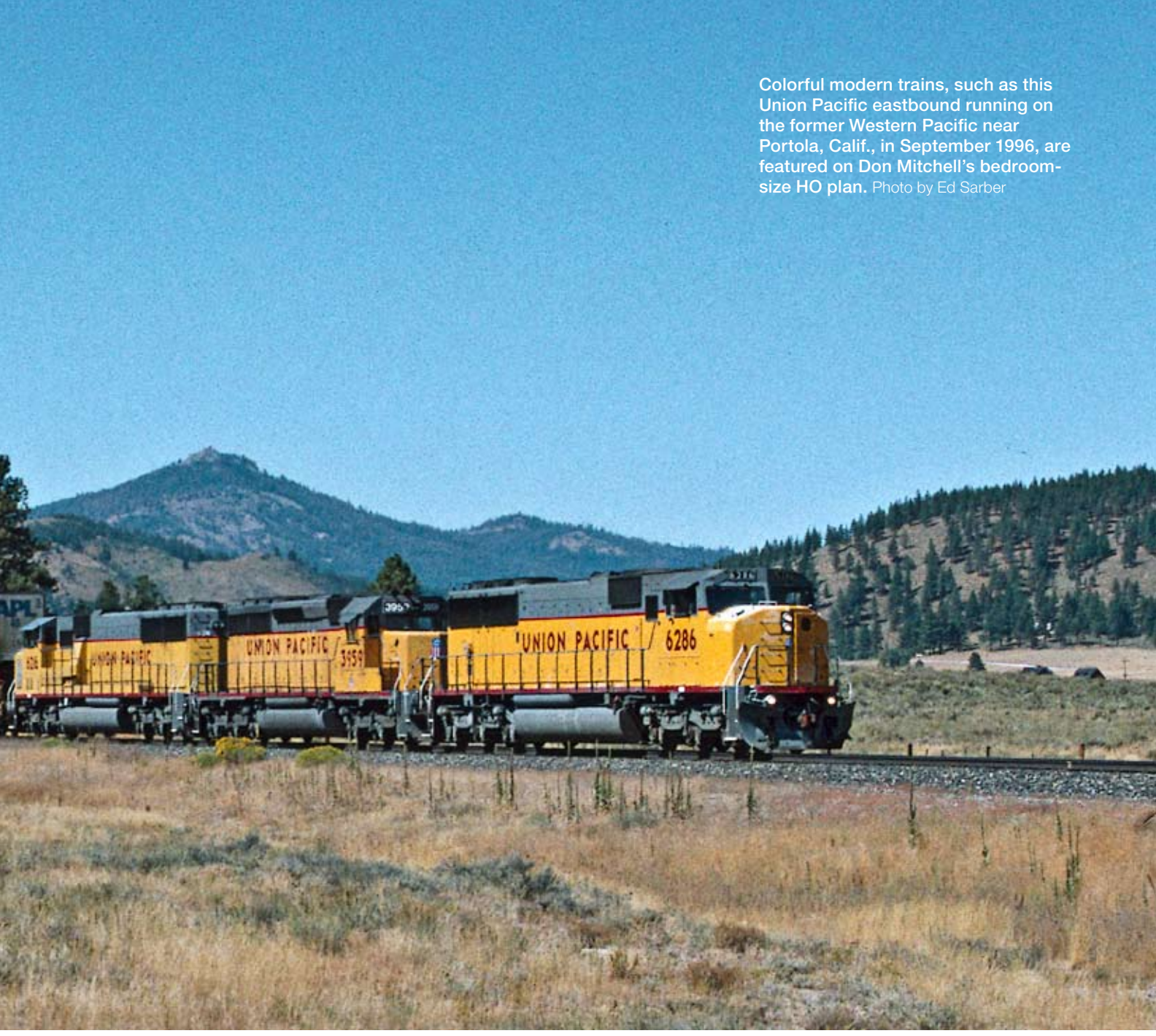
Jack Burgess is the author of Trains to Yosemite*, a book on the Yosemite Valley RR published by Signature Press.*

Union Pacific main line in a bedroom

Would you believe a 300-foot HO main line in less than 13 x 13 feet?

By Don Mitchell

The HO track plan includes several 15-foot-long passing tracks where opposing trains can meet. Here UP no. 1575 waits for no. 6360 at Sunol, Calif., in May 1997. Photo by Ed Sarber



Colorful modern trains, such as this Union Pacific eastbound running on the former Western Pacific near Portola, Calif., in September 1996, are featured on Don Mitchell's bedroom-size HO plan. Photo by Ed Sarber

Modeling any major-league modern railroad strains the space available for a layout. Still, a reasonable HO layout depicting today's railroading can be built in a room less than 13 feet square if the vertical dimension is put to good use. This requires overcoming "helixphobia," but once that fear is set aside, there are several possibilities for designing a layout capable of handling 15-foot-long trains.

The Union Pacific track plan presented here uses a double-track helix to connect three decks to form a single-track railroad. It includes a large yard, two towns with sidings and industries to switch, and an unduplicated mainline run of more than 300 feet. Not bad for a bedroom railroad!

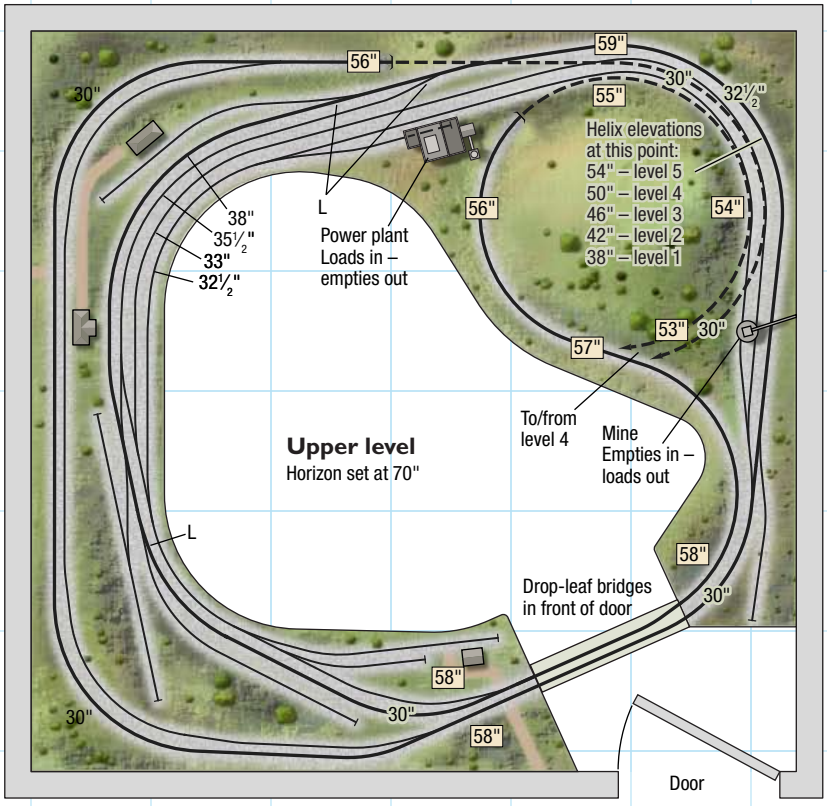
The helix: curves on grades

Helixes are simply extended curves on grades, and there are many ways to build them. A technique that has proved successful is the use of threaded rods for support and adjustment. This approach has been offered as a commercial kit, so at least from a construction standpoint, helixphobia should be relegated to the past.

In rooms like this one, locating the helix in the corner by the entry door won't work. Placing it in the diagonally opposite corner will shorten the sidings and yard tracks by forcing them to fit between the helix and the drop-leaf bridges across the doorway. Thus, the most advantageous location for a helix is in one of the remaining corners.

What appears to be a single helix connecting the three levels is actually a stack of three helixes. The outer track runs uninterrupted between the lower and upper decks. The inner track forms a second helix running from the lower deck to the middle deck. It has a third helix stacked on top that connects the middle to the upper deck.

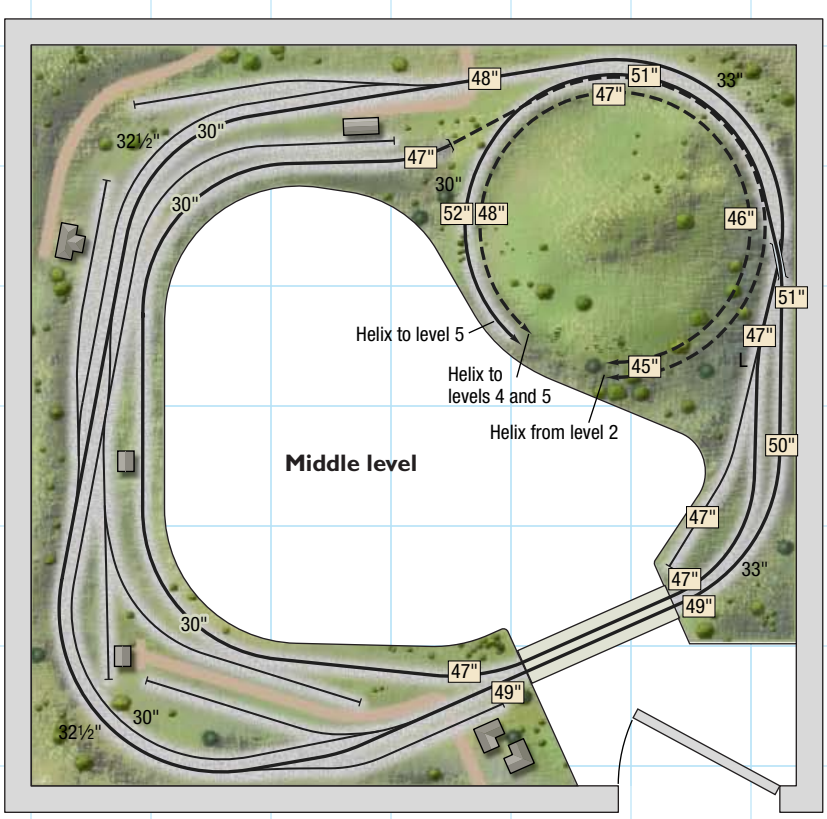
The decks are set at 38", 47", and 59" above the floor. Ergonomically, the best operating range is between elbow and underarm heights, with the optimum height limits being between waist and shoulders. Access to the center of a helix will require crawling underneath, which sets the minimum height. Shorter operators may need a step stool to comfortably switch the upper level.



Modern UP on three levels

HO scale (1:87.1)
Room size: 12'-6" x 12'-9" feet
Scale of plan: 5⁄16" = 1'-0", 24" grid

Designed using Walthers code 83 track
All turnouts Peco medium except where noted as large (L) turnouts
27" radius except where noted
2" track centerline spacing unless otherwise noted
48" Track elevation



Illustrations by Don Mitchell and Dick Skover

Maximizing the run

To obtain the maximum length, the main line circles around the perimeter of the room on each deck. This requires bridges across the entryway. Permanent spans will require an awkward crawl, so I recommend using drop-leaf bridges. They can be constructed using door-hinge hardware and microswitch interlocks to cut power in the approach tracks when a bridge is down. Hardwood guides can be drilled for a metal locking rod to align the open ends, as shown in the photos of Jim Hanna's similar installation on page 36.

Purists may not like having trains run through each scene twice, but it provides room for 15-foot train lengths. The longer trains add to the illusion of modern UP operations, as it would be unusual to see an entire prototype train in one glimpse.

The twice-around arrangement on each deck lengthens the overall run within the confines of the room. The run becomes about 74 feet per deck vs. 35 feet for a once-around plan. Add the distance traveled in the helix, and trains will cover about 315 linear feet of unduplicated main line before returning to the starting point!

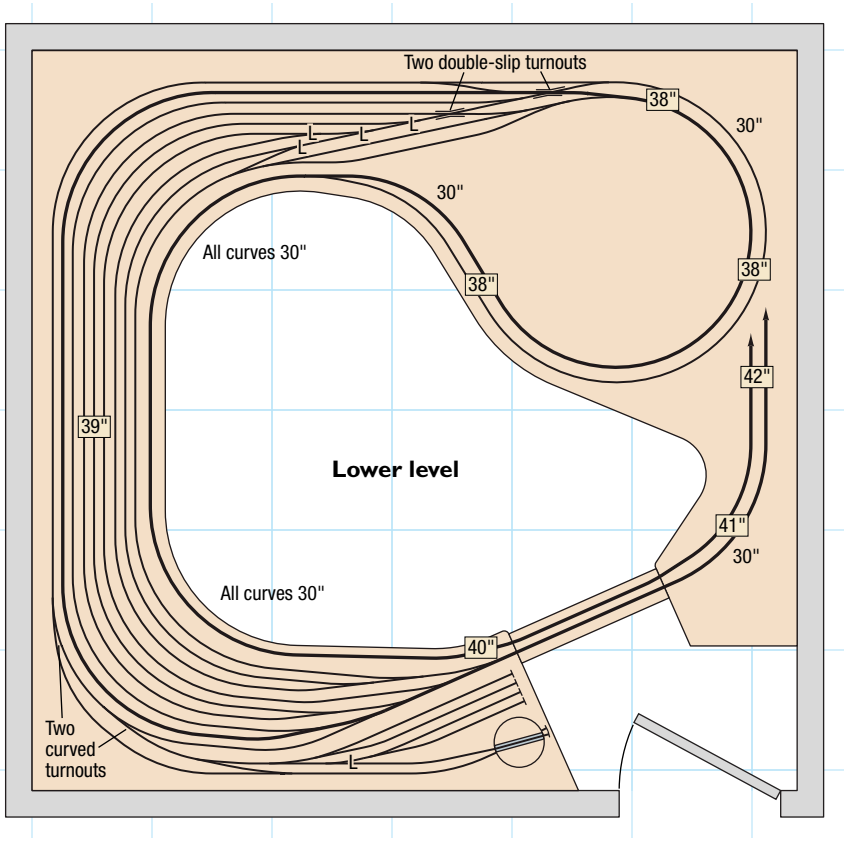
Significant but manageable grades are necessary to make all of this work. They reach a maximum of 2.4 percent on the 27" radius of the inner helix and 2.1 percent elsewhere. The multiple-unit locomotives typical of UP trains should handle these grades with ease.

Yard and staging

The lower deck is devoted to a yard and turnback curve, the latter allowing trains to be dispatched in either direction. The yard is sized to handle 15-foot trains on the four outermost tracks without doubling over.

The yard can be operated either as a working yard, a staging yard, or both.

Don's track plan provides room for three- and four-unit consists of UP's huge fleet of C-C road locomotives. It isn't all for show as multiple units will be required to haul trains up the 2.4 percent grades. Photo by Ed Sarber



There's a small engine terminal near the entryway plus a couple of caboose tracks at the other end. Both tracks in the turn-back loop connect with all the tracks in the body of the yard, so either can serve as a switching lead while keeping the other track open for arrivals or departures.

To fit the turnback tracks under the helix, the yard has a grade just over ½ percent (that is, a half-inch drop for each 100" of run). The mainline grade gets steeper on the drop leaf to gain the elevation necessary to enter the helix above the turnbacks.

Note that these turnback tracks are not reversing loops. The track arrangement is a disguised continuous loop. If an out-and-back arrangement is preferable, you could add crossovers at the end of the turnback tracks or a double-crossover on the drop leaf.

Middle level

Climbing up the outer track on a grade of 2.1 percent brings us to the middle deck at 47" above the floor. This main track loops around the room on the aisle side of the deck until it gets back to the helix. There it ducks under the other track and starts a gentle climb up through the town. A vertical separation of one or two inches helps differentiate the town from the inside loop.

The town has lap sidings that can combine into a 17-foot-long passing track. The lap-siding turnouts in the middle of town provide easy access to the industry tracks. They also help to shorten runaround moves.

The climb to the upper level starts after crossing the drop-leaf bridge. Note that the three drop leaves are offset from each other so any single bridge may be lowered without interfering with any other bridge.

The plan includes both through-train operation and switching, as UP 2532 and 2503 are doing at Boise, Ida., in November 1998. Photo by Ed Sarber

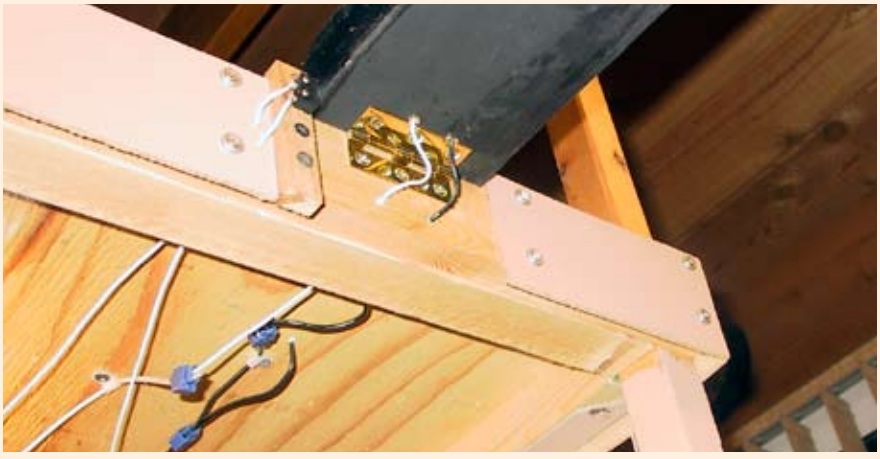
Upper level

The upper level has passing tracks on both laps around the room, as congestion is most likely to occur on the top deck. Trains will be coming up on the inner track directly from the yard as well as from the town on the middle deck. The outer track of the helix comes up near the back wall and splits into a simple main and siding without industry tracks. It then crosses the drop-leaf and circles around outside the helix up into the town area.

Just past the drop leaf, however, two spur tracks diverge into a loads-in and empties-out arrangement serving a mine and power plant. Each of these tracks will hold 15-foot trains. The power plant and mine can be served either by unit trains or by switching individual hoppers or cuts of hoppers.

At the top of the helix, a large S curve provides a turnback connection to the inner track of the helix. This inner track circles down through almost five turns of the helix to eventually connect back to the bottom-deck yard.

//Drop-leaf entry



These photos show the construction of three drop leaves on Jim Hanna's layout. A micro-switch powers the approach and on-leaf tracks. The open end has vertical guides, a locking rod, and another approach-track micro switch. Jim offset the drop leaves so they wouldn't interfere with each other.
Photos by Don Mitchell

Operation

This is a single-track railroad with four meeting points – the yard, towns on the middle and upper decks, and the siding on the upper deck. Some form of traffic control will be required, but an informal operation with three operators should provide a lot of enjoyment.

A yardmaster could sit on a rolling stool to attend to switching and locomotive hostling chores while two standing road engineers move around to run trains up the helix, one on the outer track to the middle deck, the other on the inner track directly to the top deck. Each engineer would handle the switching chores in the first towns they encounter and then move to the next two, arranging a meeting point as required.

If all trains were staged ahead of time in the yard, then a yardmaster wouldn't be needed. Instead, that operator could run hopper trains from the yard up to the mine or power plant on the top deck and then return to the yard. A regular passenger train, or even a steam fan trip, would also be a nice addition now and then. Such operations would spice up the local switching in each town, as a track would have to be cleared to permit these trains to run through without delay.

Of course, more-formal operating schemes could be adopted as desired. The limit hinges mainly on the number of people that can fit comfortably and still be able to move around the room to operate the different trains.

//Learning points

- Think in terms of not only area but of cubic space, and make good use of the vertical dimension of a room.
- Long trains, especially those typical of modern mainline railroads, and long runs can be accommodated in a modest space with creative, multilevel track planning.
- Commercial products make it relatively easy to construct a helix to link different decks.

UP = Universal Plan?

Instead of Union Pacific, UP could stand for "universal plan," one that could accommodate another prototype or freelance railroad. All of the elements of a successful track plan – yard and staging, industrial switching, and mainline run – are present. By changing the scenic setting and rolling stock, the layout could easily represent many other regions of the United States. The track arrangement is flexible as long as the general concept of the helix location and turnback curves are retained.

The main lesson to be gained from this plan is to think in three dimensions, to make the most of the vertical as well as the horizontal dimensions of a room. Overcoming helixphobia to use the available space makes it possible to fit a sizable layout with generous curves into a relatively small area. **MRP**

Don Mitchell considers himself "fully retired" and now limits himself to occasional custom layout-design work. He has been a valued contributor to MRP since the 1997 edition.

Landmark scenes in 4 x 8

A pair of beginner's layouts with prototypical roots

By Bob Chapman

The first model railroad built by newcomers to the hobby is usually a 4 x 8 – the size in feet of a standard sheet of plywood. These small layouts are a good starting point as they can be built with limited amounts of benchwork; you can support them on a pool table or a simple pair of sawhorses. They're also fairly portable and can be stored by leaning them against a wall if needed.

However, when building that first layout, beginners seldom have much knowledge about prototype railroading. This typically leads to using plans that are either snapped together from sectional track or chosen at random from a plan book. The result is a model railroad that seldom has little to do with actual railroading, and that can discourage a new hobbyist from thinking beyond this initial layout.

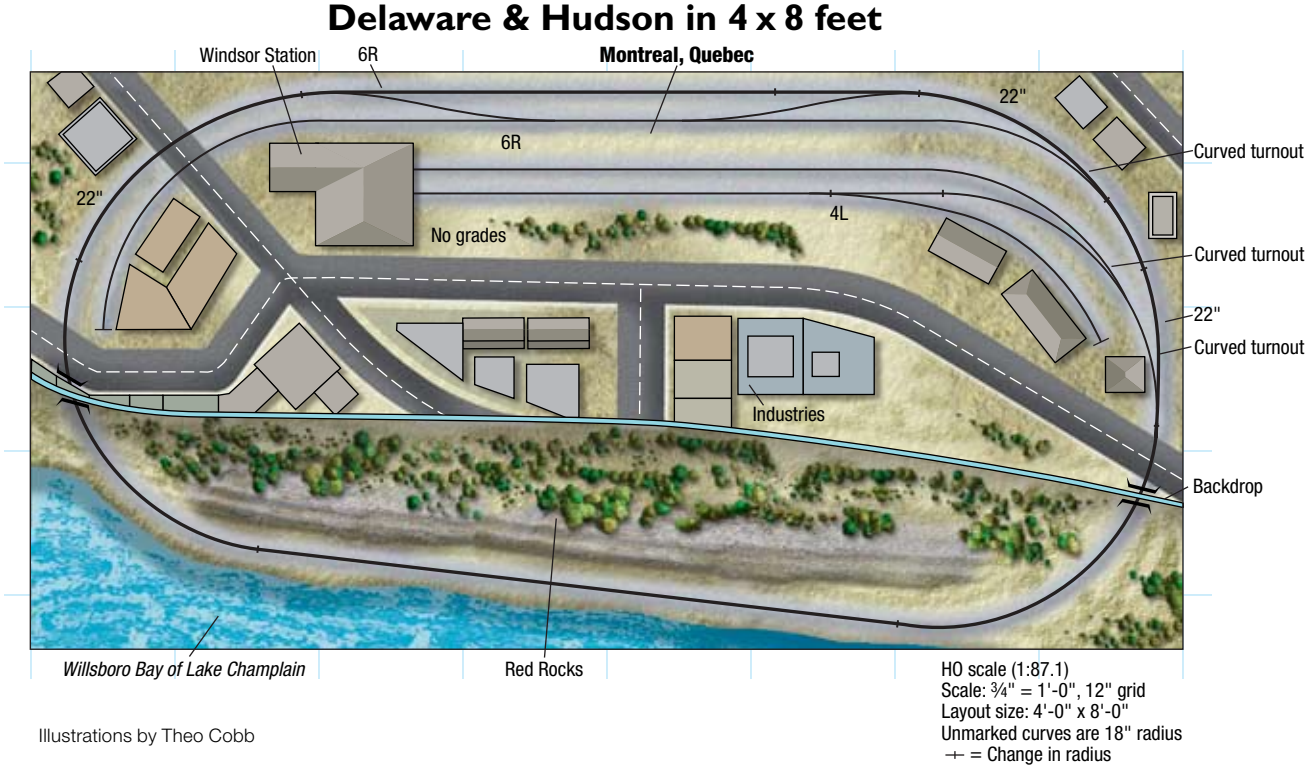
One way to avoid these disappointments is to base the layout on an actual railroad and include a scene or two for which it is well known. Though Horseshoe Curve or Tehachapi Loop might be a bit much for a 4 x 8 layout, there are many smaller, distinctive features of full-size railroads that can be emulated in a modest space or mid-size features that can be compressed to fit.

The accompanying HO scale plans feature key scenes from two well-known prototype railroads, and both could be easily adapted to N scale. The plans are drawn for sectional track, although you could use flextrack in place of some or all sections, making it easier to achieve flowing curves.

Red Rocks on the Delaware & Hudson

This Delaware & Hudson layout models two scenes of the prototype railroad. One scene includes the famous Red Rocks, high above Willsboro Bay of Lake Champlain. The other is a greatly simplified version of the north end of D&H passenger runs at Windsor Station in Montreal, Quebec, which is actually on the Canadian Pacific. A dummy CPR passenger train parked on one of the depot tracks might drive this point home and offer some good additional modeling opportunities.

The plan has no provision for staging yards, so there is no way to vary the traffic to any degree. An early goal might be to expand the railroad off either or both ends into staging.



Illustrations by Theo Cobb

D&H passenger trains ended their northbound runs at Canadian Pacific's Windsor Station in Montreal. Mike Schafer took this photo of a CPR train at Windsor Station in 1978.

Editor Tony Koester photographed the D&H's southbound *Laurentian,* led by Alco PA-1s, in the Red Rocks section above Willsboro Bay in April 1971.

A local freight could switch the industry to the left of the station; it would stay out of the way of the two- or three-car passenger trains as required before venturing out on the main line to work.

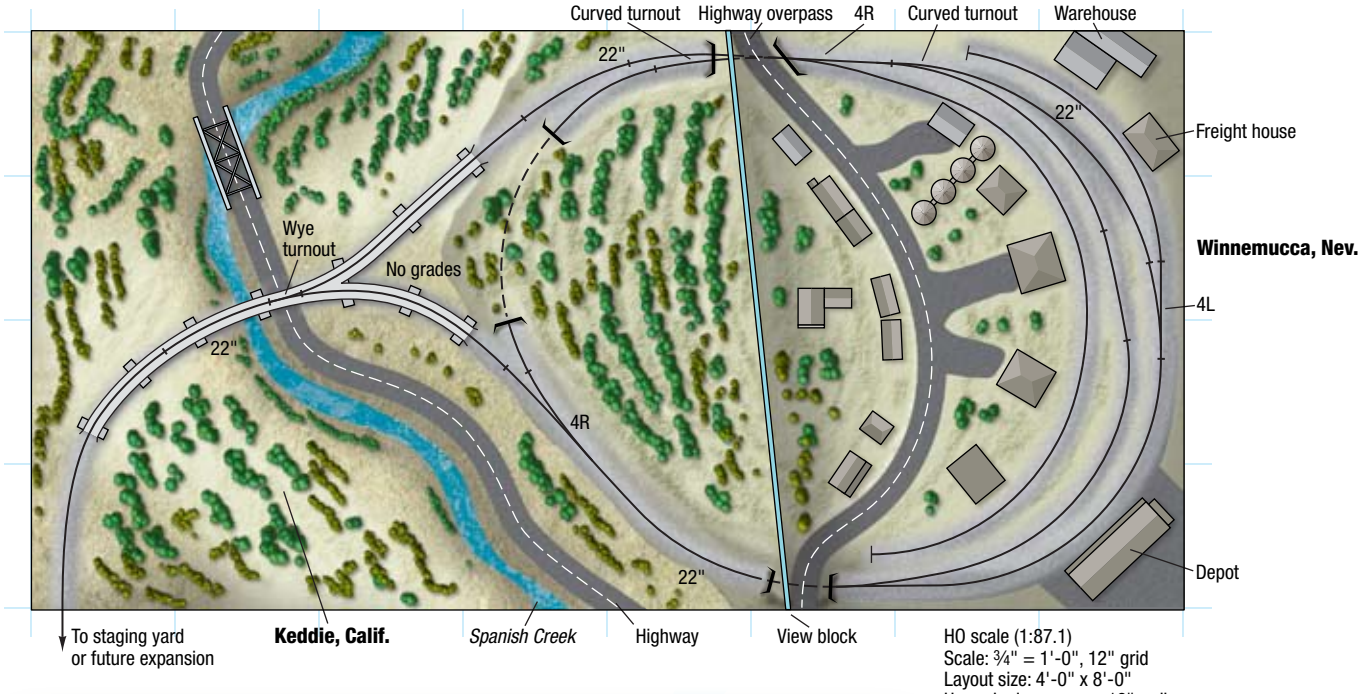
This layout would provide a nice setting on which to operate a pair of passenger trains, the *Laurentians*, which ran behind ex-Atchison, Topeka & Santa Fe Alco PA-1s. (See the photo at right.) It also offers a chance for the new modeler to develop layout-building skills before moving on to a room-size project.

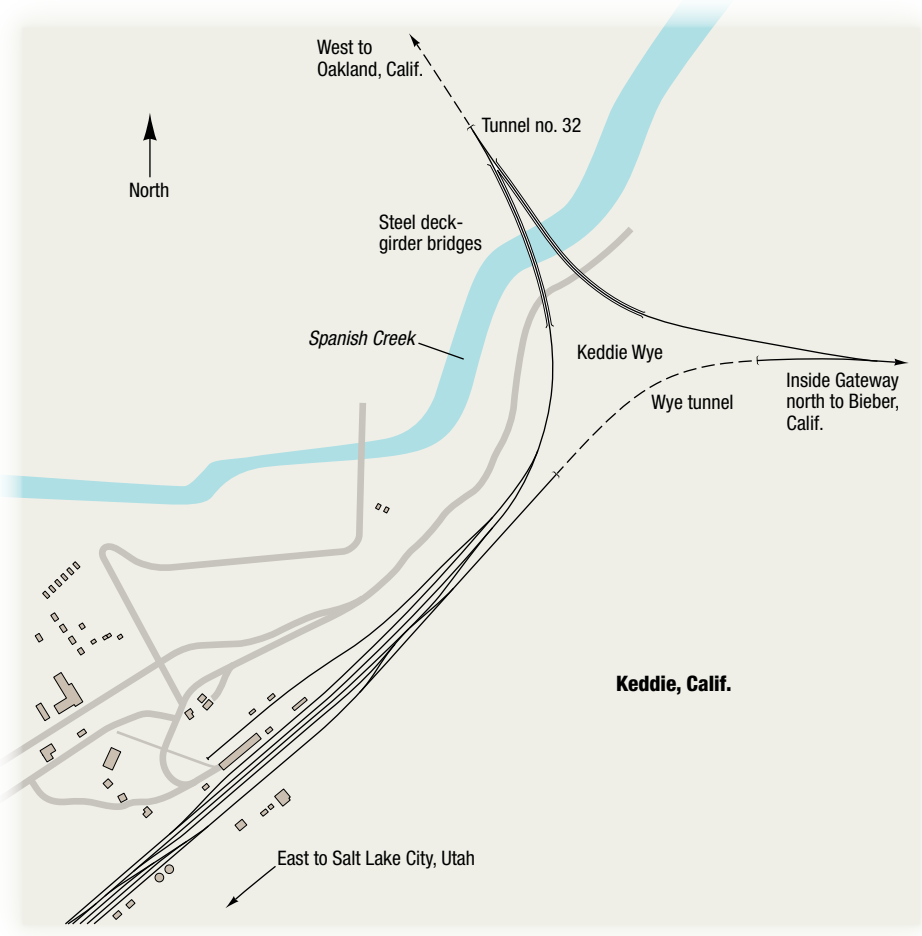
The 4 x 8 base would form the lake level. The scenery above it could be built up with layers of 2"-thick foam-insulation board. I'd use HomaBed from California Roadbed Co., since it holds track nails well. If you choose to glue down the track, then cork or another type of roadbed could be used. Be sure to cement the roadbed to the foam with white glue or special foam adhesive; some cements will attack foam.

The curves are a combination of 18"- and 22"-radius sectional track. Turnouts are nos. 4, 6, or curved as noted, and there are no grades.

The backdrop down the center of the layout can be made from ⅛" or ¼" hardboard or plywood. The foam scenery should be sufficient to hold the backdrop in place.

Keddie Wye in 4 x 8 feet





Keddie Wye on the Western Pacific

If you're willing to try your hand at bridge construction and have room for a staging yard attached to a corner of the 4 x 8, you can build a key section for a future Western Pacific (today, Union Pacific) layout in California's Feather River Canyon. Like the D&H plan, this railroad's 4 x 8-foot baseboard establishes water level, and the landforms are built up using slabs of 2"-thick foam.

Most curves are 18" radius, but there are a few 22"-radius sections. The turnouts are no. 4s and will accommodate most equipment, but I'd stay away from long cars such as full-length passenger cars or auto racks.

One end of the layout features a simplified version of the steel Spanish Creek Trestle at Keddie, Calif. (see the photo and map), while the other side features a desert scene at Winnemucca, Nev. Road overpasses help to hide the holes where the tracks cut through the backdrop. This layout would be ideal for learning scenery and bridge-building techniques, since once you've completed this layout, you'll be well-equipped to tackle the bridges and scenery on any model railroad.

The deck-girder bridge and tower kits from Micro Engineering are ideal for this project, but you'll have to modify them somewhat to make the wye-shaped section of the bridge. Assemble the girder sections upside down on a flat surface, then add the towers. This will be challenging, but developing such skills will give you the confidence to build a more complex model railroad later on. Don't rush; patience here will pay large dividends.

A small oval runs through the south (tunnel) leg of the wye for continuous running, which lets you enjoy putting your new equipment through its paces while fine-tuning your locomotives. The tail of the wye, which on the prototype heads west toward Oakland and San

The wye at Keddie, Calif., is the junction where the Inside Gateway via Bieber provides connections to the north with the main line between Salt Lake City and Oakland. The trestle spans Spanish Creek. Photo from the R.R. Wallin collection

Francisco, could connect either to a future expansion of the layout or to a narrow shelf along a wall of the room. Here you could stage a shortened edition of the WP's *California Zephyr* or Amtrak's version of that train, plus a WP or UP freight or two. These trains could roll onto the layout, run a few laps, and then head back into staging.

A wye track is like a reverse loop (the oval plus the left-hand leg of the wye form the loop), which means you have to provide a way to change the polarity of the running rails if a train's direction is reversed on the wye. If you insulate ("gap") all four rails just to the right of the turnout over the highway and river, you can wire a double-pole double-throw (DPDT) switch to change the polarity of the rails through and to the left of that turnout. Once a train has entered the loop, you can throw the DPDT switch and reverse the polarity of the exit track to match. You can learn how to wire the wye from Andy Sperandeo's book, *Easy Model Railroad Wiring* (Kalmbach Books). If you're using Digital Command Control (DCC), you can make the change in polarity automatic by using a DCC reversing module.

Whether you choose one of these two plans or develop one on your own for your favorite railroad, starting a first layout with a prototype as inspiration can lead to many years of rewarding and exciting model railroading. **MRP**

"Boomer Bob" Chapman and wife Sharlain are originally from Seattle but now live in southwestern Ohio. The Chapman's have traveled extensively in their RV, stopping to help fellow modelers with their layouts. Bob can be contacted via e-mail at bcrails@go-concepts.com.

//Learning points

- Looking to the prototype for inspiration may suggest a theme for even a 4 x 8 beginner's layout, one that may later be expanded.
- Developing one's skills on a modest project helps to avoid being overwhelmed by the scope of something more complex.
- Mixing sectional track and flextrack makes it easier to create flowing curves and fit a layout's track into nonstandard configurations.

Planning the new Sunset Valley Oregon System

A shift toward prototype modeling leads to dramatic changes on the home front

On Bruce's HO scale Sunset Valley Oregon System above, he models Southern Pacific's *Shasta Daylight* as it appeared in 1955, running behind Alco diesels. In this view, Mount Shasta is seen from a different vantage point than in the prototype photo at left. Bruce Chubb photo

Mount Shasta looms in the background as Southern Pacific's *Shasta Daylight* behind a trio of Electro-Motive Division E7s graces its flank. Photo from Shasta Division archives courtesy Tony Thompson, Signature Press

By Bruce Chubb

I had often said that it would take a bulldozer to get me and my model railroad out of our house. However, when you draw a line in the sand, it's just a matter of time until something crosses it. In this case that "something" was my new-found interest in prototype modeling. But starting over on a new layout didn't happen over night; it took me a while to warm up to the idea.

My original HO scale Sunset Valley RR was a freelanced line with Southern Pacific influences but few ties to the real world. Started in 1959, the SV had nevertheless hosted more than a thousand operating sessions and had been visited by guests from around the world. [The plan for Bruce's original SV is posted at www.modelrailroader.com – *Ed.*]

However, my increasing interest in prototype modeling led me to look for a rational justification for the railroad's existence. I initially hoped that by changing a few town and industry names and some of the rolling stock and motive power, I could find a suitable real-world match for my SV.

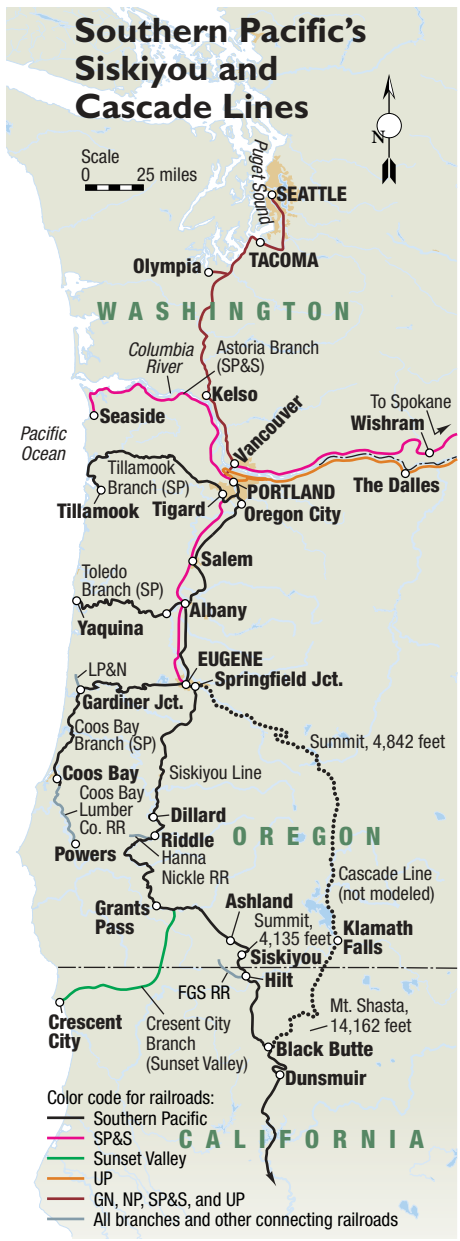
I already knew where to look. My favorite prototype railroad has always been the Southern Pacific. On a trip west when I was 12, I was impressed by the SP's unique AC-class 4-8-8-2 Cab-Forwards and the beautiful *Daylight* streamliners. Consequently, my freelanced SV's color scheme for its structures, locomotives, and rolling stock reflected the SP's. By 1990 I was well along the path toward changing the SV to better represent a specific region. For example, the old layout had featured Hell Gate Bridge (a New York City prototype) that my crew and I had removed and replaced with western scenery. Also, we'd placed a growing emphasis on lumber-related industries, and much of the SV's original scenery seemed to fit with the northern California locale.

Narrowing the choice

As my desire to replicate the real world increased, I drafted three potential scenarios for marrying the Sunset Valley with the real world:

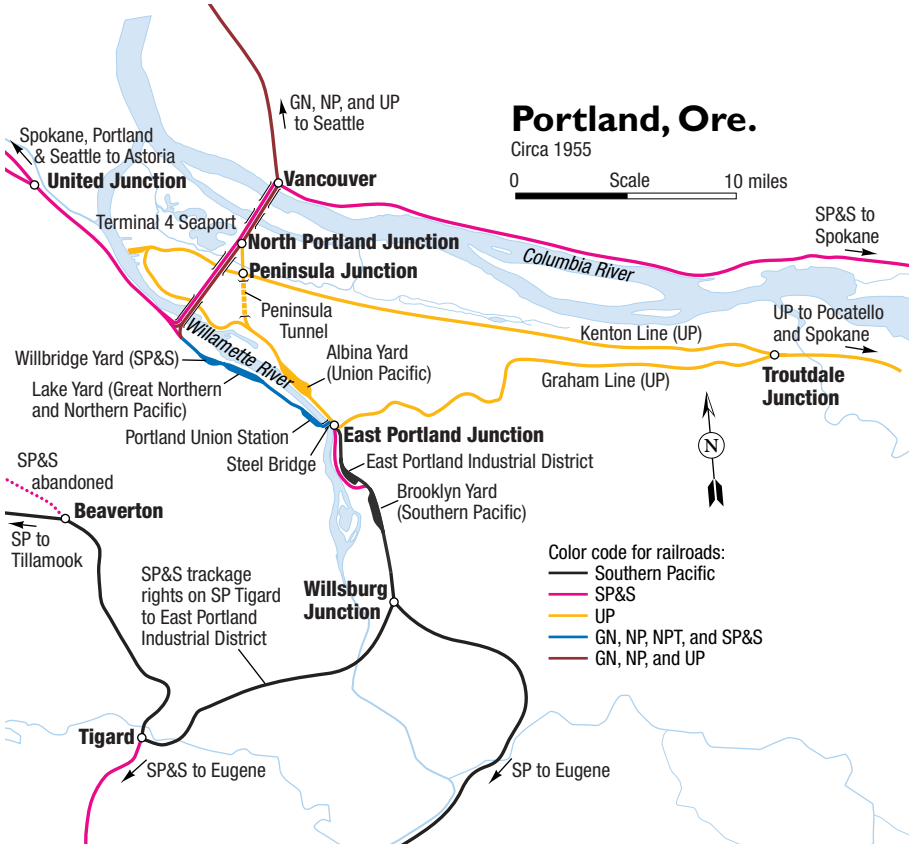
- Oakland east – a Sierra crossing over Carson Pass, Pacific Grade Summit, or Sonora Pass.
- Seattle south – a route somewhat parallel to the Northern Pacific giving the SP a direct connection into the Seattle market.
- Oakland north – a route to Dunsmuir following portions of the Northwestern Pacific RR.

I prepared reports defining the pros and cons of each selection, including suggestions for renaming layout towns after prototype towns, and mailed them to modelers having an interest in layout design and, where possible, firsthand knowledge of the area. As a member of the National Model Railroad Association (www.nmra.org), its Layout Design Special Interest Group (www.ldsig.org),



Illustrations by Rick Johnson

In a scene that inspired the author, an SP AC-class 4-8-8-2 Cab Forward works upgrade out of Eugene, Ore., and past a sawmill with westbound lumber. Photo from Shasta Division archives courtesy Tony Thompson, Signature Press



//The layout at a glance

Name: Sunset Valley Oregon System
Scale: HO (1:87 proportion)
Size: 55 x 66 feet (2,556 sq. ft.)
Theme: Southern Pacific plus SP&S, UP, NP, GN, NP Terminal, LP&N, Fruit Growers Supply, Coos Bay Lumber, Hanna Nickel Mine, and freelanced SV
Locale: Oregon, Washington, and northern California
Period: 1955
Layout style: four-level linear walkaround
Layout height: 22" to 79½"
Benchwork: ¾" plywood movable sections
Roadbed: ½" Homasote
Track: codes 55 through 100 flextrack and handlaid
Length of mainline run: 500 feet Portland-Dunsmuir, 185 feet Seattle-Portland, 1140 feet all routes
Turnout minimum: nos. 5 industrial, 6 yards, 8 main line
Minimum curve radius: 34" main, 28" branch, 24" industrial and logging
Maximum grade: 3.5 percent main, 8 percent logging
Scenery construction: plaster over screenwire and plywood forms
Backdrop construction: drywall and hardboard
Control: NCE Corp. Digital Command Control

and the SP Historical and Technical Society (www.sphts.org), I sent copies of my reports to members living in the geographical areas of interest to get their comments. Most responders supported an Oakland-east routing.

However, Eric Simpson of Redding, Calif., got my attention by recommending that I model SP's route from Portland south over the Siskiyou Line leading to Dunsmuir – a route that I hadn't considered. Eric forwarded a drawing mapping the SV into the region. As an example, Eric thought Fillmore, with its large industrial base, could be a good fit for Portland, Ore.

Eric recommended I look at the book *Southern Pacific in Oregon* by Tom Dill and Ed Austin. A companion book, *SP in Oregon Pictorial*, soon appeared, and I also purchased *Rails in the Shadow of Mount Shasta* by John Signor. The more I studied these books, the more I was taken with route south from Portland.

As I did this homework, the more I discovered and the more I wanted to learn. Conversely, the more I learned, the more discontented I became with making small changes to convert my existing SV into a reflection of the SP. Instead of trying to change the world to fit the SV, what I needed to do was totally rework my railroad to better match the real world.

Siskiyou Line

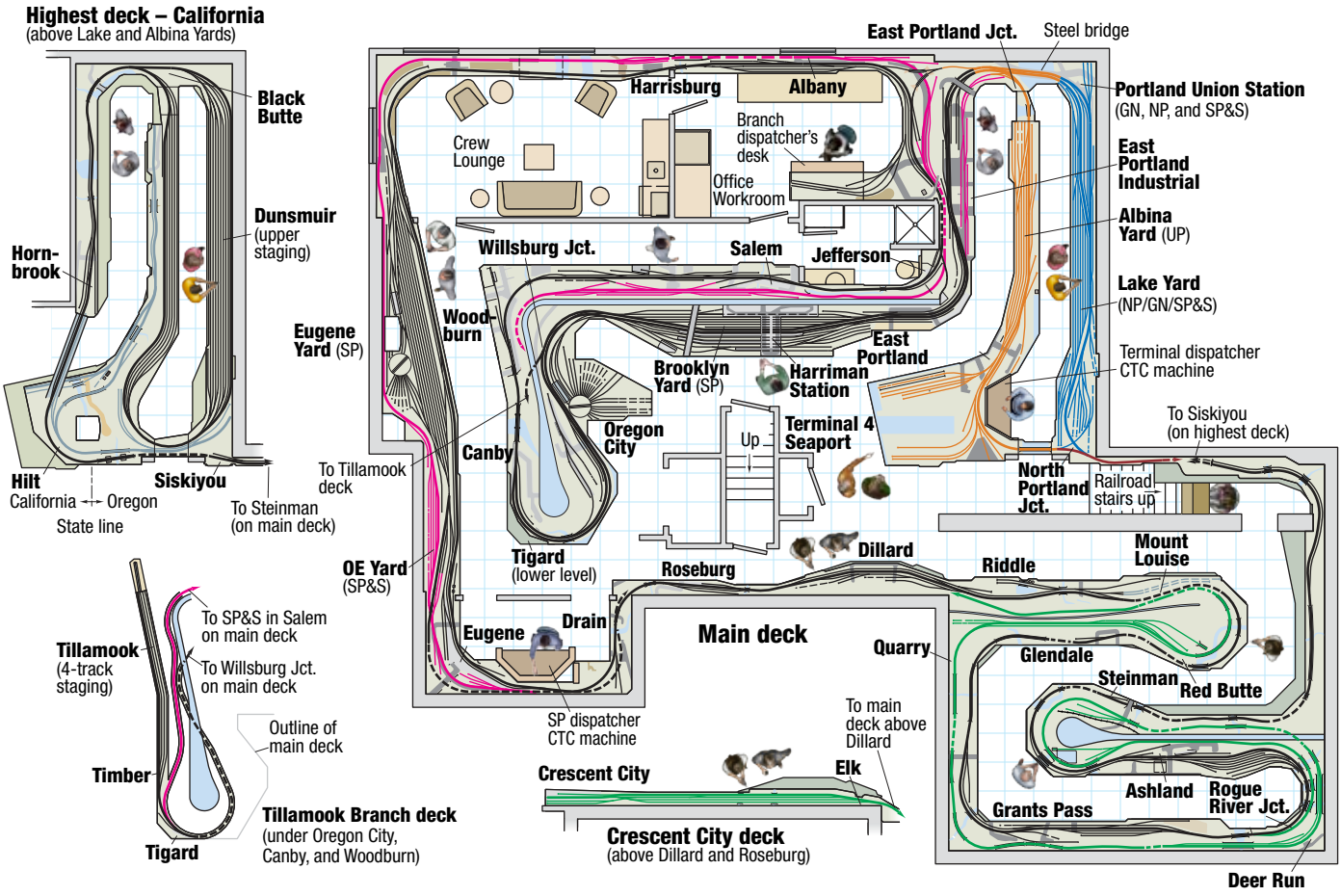
The SP's route south from Portland over the Siskiyou Mountains into northern California has spectacular scenery with heavy foliage plus lots of waterways. The Siskiyou Line includes 40,400 degrees of curvature, more than 112 full circles. Many of those curves traverse 180 degrees or greater, making the territory ideal for a model railroad.

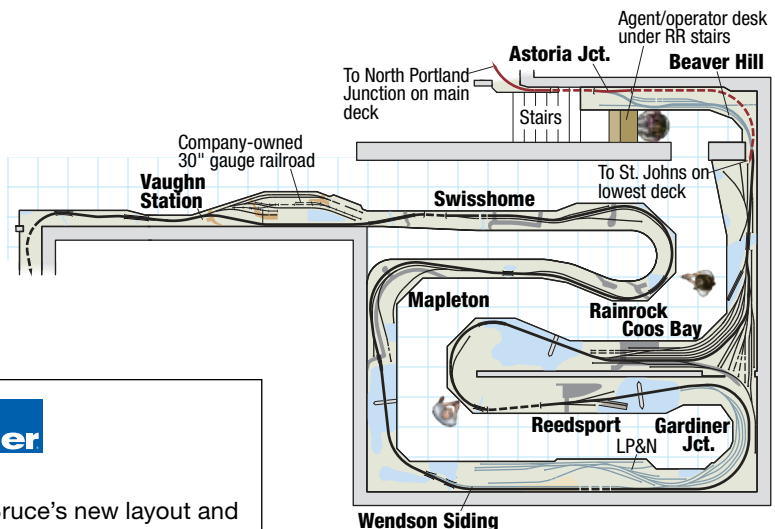
The southern part of the line is mountain railroading with tall trestles, 14 tunnels, and steep grades leading to the 4,135-foot summit at Siskiyou. Another helpful feature is the very close spacing between stations along much of the line.

Sunset Valley Oregon System

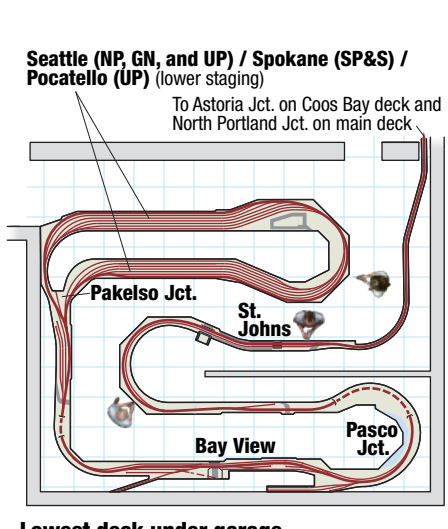
HO scale (1:87.1)
Room size: 55 x 66 feet (2,546 sq. ft.)
Scale of plan: 5/64" = 1'-0", 24" grid
Numbered arrows indicate photo locations

Color code for railroads:
- Southern Pacific
- SP&S (Portland to Eugene)
- Sunset Valley (Crescent City Branch)
- UP (in Portland area)
- GN, NP, and NPT (in Portland area)
- GN, NP, SP&S, and UP (Portland to lower staging)
- Fruit Growers Supply, LP&N, Hanna Nickel and Coos Bay Lumber





Middle deck under garage – Coos Bay Branch



Lowest deck under garage – Portland to lower staging

Model Railroader MAGAZINE

For a tour of Bruce's new layout and an overview of how it operates, take a look at the February and March 2006 issues of *Model Railroader*.

Even in HO scale, a Southern Pacific Cab-Forward is an imposing sight. Lumber was an important industry to the railroads in this region during the 1950s. Bruce Chubb photo

Portland Union Station is reached via the famed Steel Bridge over the Willamette River, which was engineered to allow the lower railroad span to be raised independent of the upper roadway. Henry R. Griffiths, Jr. photo

Friends warned that everything would be narrowly focused on logging and lumber, but that isn't the case. In 1954 there were 758 industries in Portland served by rail. They were very diverse and covered most everything anyone would want to model.

In 1966, the closest data I could find to my 1955 modeling period, Eugene had 130 industries served by rail, Salem 84, and Albany 43. Much of the industry in the Willamette [wil-*lam*-it] Valley communities is related to agriculture. In the late '40s, for example, the Harry and David Co., located in Medford, Ore., shipped entire trainloads of fruit gift packs during the Thanksgiving and Christmas holiday seasons.

Of course, there was a lot of lumber-related business too, but it was diverse. Companies specialized in rough and dimensional lumber, poles and piles, plywood, particleboard, veneer, millwork, structural shapes, and all types of wood products.

Paper mills were also prominent in the valley, and in the 1950s and '60s wood chips were shipped by rail from sawmills to paper mills. Two of the modeled industries – Roseburg Lumber and International Paper (served by the Longview, Portland & Northern off the Coos Bay Branch) each provide 40 to 50 outbound carloads per day.

The Cascade Line

The Siskiyou Line was opened to traffic in 1887, and it performed well as the SP's key north-south main line for nearly four decades. But even before it opened, the SP was searching for a better route through the mountains between Oregon and California.

The SP's problem with the Siskiyou Line is best explained by its frequent comparison to a roller coaster. Within its 300-mile length there are 10 summits, and the track twists and turns as it goes up and down each grade. Curves on the line are very sharp.

These operating hassles led to the construction of an improved line, originally referred to as the Natron Cutoff and now as the Cascade Line, which was completed in 1926. Virtually overnight the Siskiyou Line took on secondary status in spite of the fact that many of the largest shippers in Oregon were located along it.

As shown on the map on page 43, the Cascade Line runs from Eugene to Black Butte via Klamath Falls. At 275 miles, it's 25 miles shorter than the Siskiyou route. Though it has a peak elevation of 4,842 feet (707 feet higher than on the old line), its ruling grade is much less – 2.2 compared to 3.6 percent – and the amount of curvature was cut in half.

The layout's multilevel design is evident as John Thompson (seated) and Jim Thompson run trains on different levels. Bruce Chubb photo

I gave serious thought to modeling the Cascade Line, for as the John Armstrong article "Main line through the mountains" in the April 2005 *Model Railroader* showed, it has great layout potential. However, way-freight switching, which requires a solid industrial base, is high on my interest list. The Cascade Line runs through country with relatively few population centers and industries. By contrast, the Siskiyou Line follows much of the original stagecoach route with a resulting abundance of closely spaced communities and considerable local industry.

Adjusting history

I needed to change history a little to achieve the level of traffic and motive-power utilization I wanted. I assumed that instead of constructing the Cascade Line, the SP decided to upgrade its Siskiyou Line. Improvements included reducing grades and curvatures, as well as increasing tunnel clearances. These updates were important not only to handle heavier traffic more smoothly, but also to permit the AC-class 4-8-8-2 Cab-Forwards to operate over the line.

Moreover, to support the heavier traffic, I upgraded the semaphore-based automatic-block signaling (ABS) to Centralized Traffic Control (CTC) using searchlight signals. This is justified when you consider that top-tier passenger trains such as the *Shasta Daylight* and *Cascade* needed to operate alongside drag freights heavily laden with lumber, faster expedited freights, and an abundance of way freights.

SP branch lines

From my studies, I became equally fascinated with SP's branch lines in the region, especially the Coos Bay Branch that runs from Eugene to the ocean port of Coos Bay. From just outside of Coos Bay, the line extends, under the ownership of the Coos Bay Lumber Co., to Powers, Ore., making the total branch length 156 miles.

In the '50s, Coos Bay Lumber (CBL) ran up to four daily log trains into Coos Bay. The SP had trackage rights over the CBL and ran one daily local. Between Eugene and Coos Bay, the SP ran as many as four through daily freights (called "Haulers"), several locals, and one overnight passenger train.

In addition to the Coos Bay line, I wanted to model a couple of additional branches: the Tillamook Branch from Portland to the seaport city of Tillamook, and the Toledo Branch from Albany to Yaquina via Toledo. Ultimately, due to space limitations, these two branches had to be limited to staging.

Other railroads

The Spokane, Portland & Seattle, using trackage originally owned by the Oregon Electric RR, closely paralleled the SP from Portland to Eugene. For added interest, I included this SP&S line with its own industrial trackage through Salem, Albany, and Harrisburg. It includes live interchanges with the SP in Salem and Albany.

The deeper I got into the project, the less I was inclined to include ties to the freelanced Sunset Valley. After all, how could I fit in some SV trackage and still retain the prototypical accuracy I was seeking? My answer was the Oregon & California Coast RR.

In the early '50s, the O&CC operated out of Grants Pass. Although its goal was to reach the California coast at Crescent City, a distance of 91 miles, it got only as far as 30 miles from Grants Pass. The O&CC served several customers including a limestone quarry. Owing to extensive flood damage and financial woes, the line was abandoned in 1957.

In my history book, however, the SV bought the O&CC early on, completing it to Crescent City. Because of Crescent City's natural seaport, the railroad prospered. By 1955 the SP owned 51 percent of the SV's stock, but we still refer to the line as the "SV Crescent City Branch," and it still operates some SV-painted motive power and rolling stock.

Modeling Portland

I found Portland to be an intriguing modeling subject. As the map on page 46 shows, the Northern Pacific came in from Seattle to the north; it also carried trains of the Great Northern and Union Pacific. The SP&S arrived along the north bank of the Columbia River from Spokane. The UP arrived from the east along the south bank. The SP&S's Astoria Branch came into Portland from the west via United Junction.

No model of Portland, Ore., is complete without the imposing brick Union Station. As shown here in September 1969, Union Pacific's eastward *City of Portland* is preparing to leave the station. Wayne Depperman photo

Several researchers from Portland said that to accurately model the city required four things: Portland Union Station with its prominent clock tower, Steel Bridge (a double-decked bridge crossing the Willamette River), street trackage serving the industries, and the various railroad yards.

Steel Bridge, shown on page 46, is a massive lift bridge with a lower railroad span that can be raised separately from the upper highway level. If additional clearance is required, both the rail and highway portions are elevated as a unit.

Geographically, Portland is bounded on the north by the Columbia River and split down the middle by the Willamette. Located on the west side of the Willamette was SP&S's Willbridge Yard. Lake Yard served the GN and NP as well as Portland Union Station.

Occupying the east side of the Willamette River is UP's Albina Yard and Terminal 4, one of several seaports in Portland and the only one modeled. Union Pacific freight trains typically arrived and departed Portland using the Kenton Line connecting to Albina Yard while its passenger trains, except those going to Seattle, made use of the shorter but curvier and steeper Graham Line.

Southern Pacific's Brooklyn Yard was located in the southeast part of town along with the East Portland Industrial District. This district was served by four different railroads, each running down the middle of adjacent streets serving its own set of industries.

Even with significant simplifications, modeling Portland seemed almost overwhelming. But I wanted to include separate facilities for the five railroads that served it.

The new house and track plan

It became apparent that what I wanted to model far exceeded what could be accomplished with any reasonable changes to the existing railroad. The final plan includes ten different prototype railroads: SP; SP&S; UP, GN; NP; Northern Pacific Terminal; LP&N; CBL; Fruit Growers Supply; and Hanna Nickel Mine. Conclusion: Janet and I needed to build a new home with a basement designed to contain the region I wanted to model.

Although this may seem extravagant, model railroading and the Sunset Valley play a major role in our lives, and we felt that a new home would better allow us to enjoy our retirement and the hobby. Janet picked the style of the house and its location. My only requirement was that it have a large-enough basement to hold the new layout.

I could easily write a book covering the evolution of the final track plan. The process took more than a year and involved several additional research reports. Approximately 60 reviewers provided input to the final plan, and I'm grateful to them all.

To gain additional railroad real estate, I extended the basement under the garage. This yielded considerable added space at a relatively low cost. [See "Dream basements for dream layouts" by Paul Dolkos beginning on page 78. – *Ed.*] The garage floor is made from pre-stressed concrete beams with a poured concrete floor on top. This increased the basement space by 30 percent, providing an additional 575 square feet of railroad, with an increase of only 4 percent to the overall cost of the house. You can't beat it in terms of value. I gained even more space by extending the basement under our three-season porch.

To obtain ideas for the new house and to find a builder, Janet and I toured all the ranch-style homes in the Grand Rapids, Mich., Home Builders Association Parade of Homes. One feature Janet latched onto was adding a separate stairway, connecting the basement directly to the outside via the garage.

Incorporating these stairs, with no connection to the living quarters, turned out to be a great idea. The new railroad is much like a club layout built in a home. Many of the 38 regular crew members attend work sessions held several nights a week, during weekdays (I'm retired), and on weekends.

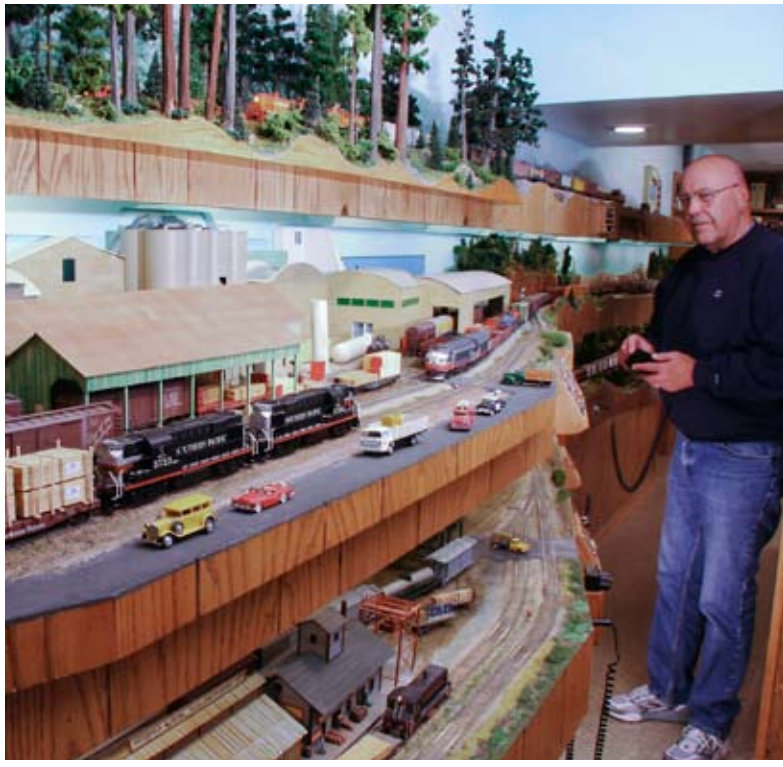
All heavy benchwork construction is done outdoors or in the garage and then carried down these stairs. It's also great for open houses. Having this kind of traffic through "Janet's upstairs" would have been a nightmare. Also, the extra set of stairs and its associated landing provided a few extra square feet underneath to fit in more railroad. In fact, I could have just about reinstalled the original SV in the space provided under the stairway and garage!

Expanding the research base

With the house plans finalized and the area to be modeled and the general flow of the railroad around the basement defined, it was time to pin down details. Using membership lists from several railroad societies, I expanded my list of researchers to include people living in the areas being modeled. Nearly every town being modeled is represented by one or more model railroaders living in that town!

As the design gelled, I published status reports and requested critical feedback. The researchers scoured local museums and historical societies, and provided hundreds of era-specific photographs and Sanborn fire insurance maps. In the end, they supplied enough material to completely fill a four-drawer file cabinet. Nearly every one of the

This aerial view of the mile-long Roseburg Lumber complex at Dillard, Ore., is a key traffic source as well as an obvious candidate for selective compression. The mill's log piles stretched for another full mile. Roseburg Forest Products photo



Long-time crew member Jim Wells works an SP freight past the HO edition of the Roseburg mill at Dillard. The lower deck features the Coos Bay Branch, while the top one holds the SV's Crescent City Branch. Bruce Chubb photo

industries, stations, bridges, trestles, and tunnels has its own file folder filled with prototype information. One person located a 1956 SP marketing handbook for all of its branch lines in Oregon. This book lists each industry served with corresponding track drawings and car loading data for a three-year period.

I also ordered U.S. Geological Survey topographic maps covering the areas I was modeling. I purchased every book and periodical I could find concerning the different railroads in that region.

//Learning points

- The availability of railroad-specific, well-detailed models has made prototype modeling easier and more attractive.
- Contacting other modelers who live in the area you're modeling can pay huge dividends and broaden the scope of the project.
- Modifying an existing layout has its limitations.
- When building new homes, basements can be expanded under garages and porches at modest additional cost.
- Combining a prototype theme with freelanced elements may embrace the best of both worlds.

A multilevel plan

Data in hand, I made a ¼"-scale drawing showing all the basement's fixed walls. I then made photocopy cutouts of the original SV track plan, enlarged to the same scale for easy positioning within the basement. Next, my crew and I drew new layout sections to connect the salvaged SV sections to create the final track plan.

I knew early in the process that a multilevel track plan was essential to get the main line I wanted. However, it was close to the end of the design process when I realized that four levels would be needed – and even then, some things had to be left out. I didn't want to take up floor space with a helix, so the final plan uses grades between the towns to climb between levels.

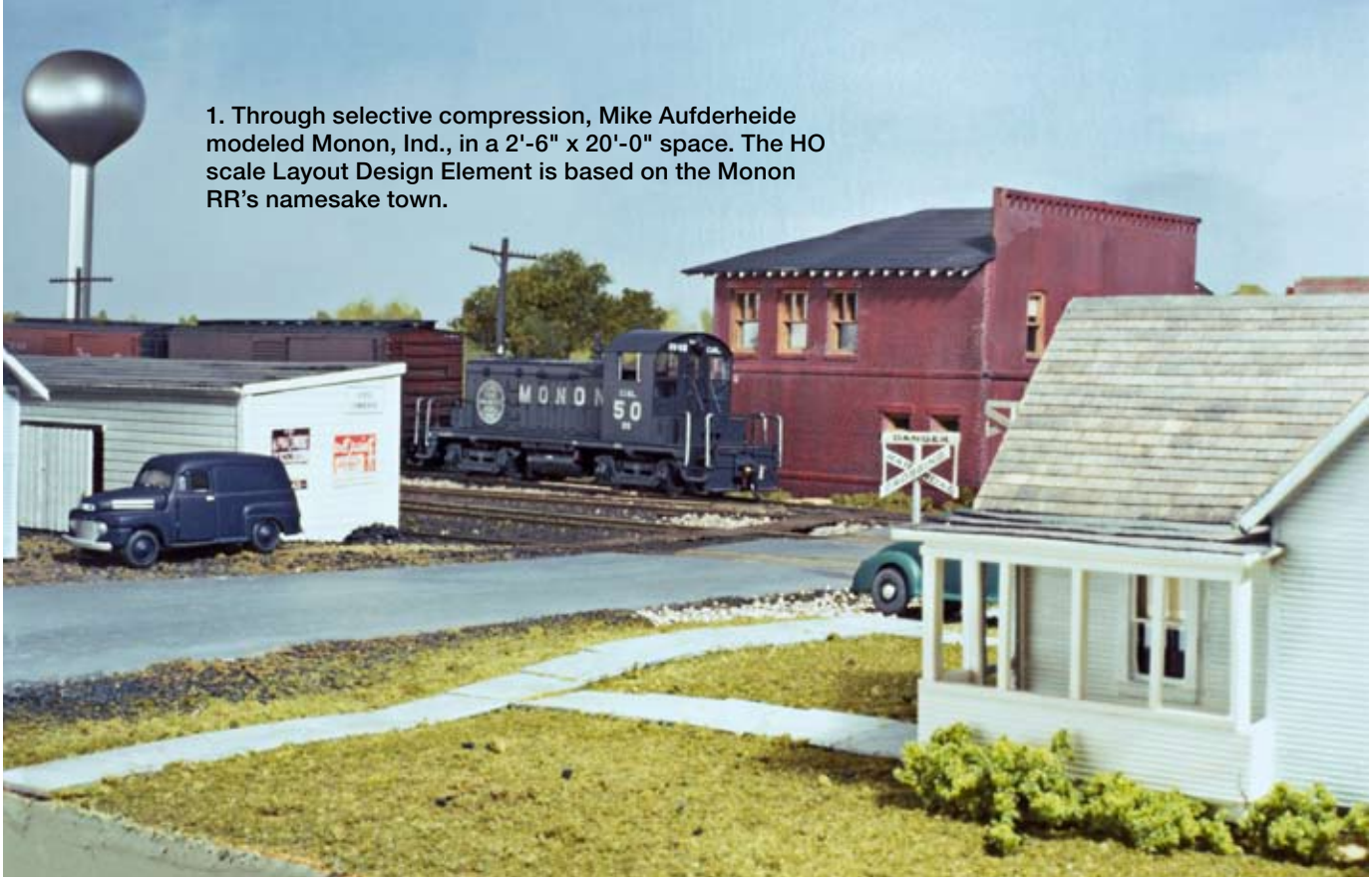
As the design for each town and its basic Layout Design Elements evolved, my crew and I drew them by hand full size on brown kraft paper. We used actual turnouts to accurately position the track. The drawings were helpful for determining the placement of scenic features and (in almost every case) the actual footprints for each structure to be modeled. During the process, I revised and redrew each drawing several times. In areas where the elevation was critical, I also drew full-size cross-sections. These helped highlight visibility issues.

In the end, we found that with certain modifications we could reuse 10 of the 25 sections saved from the original SV layout. Overall, about 40 percent of the old SV is now part of the new layout. These were important savings, especially considering sentimental value – many of these sections were constructed with the aide of Janet's father back in the late '50s. However, because the new SVOS is seven times larger than the previous layout, that 40 percent accounted for less than 6 percent of the new layout. The new, prototypical portions therefore set the tone for the model railroad.

More SVOS in MR

My crew and I hope you've enjoyed this preliminary look at the planning behind the new prototype-based SVOS. For more information on its construction and operation, please refer to the articles in the February and March 2006 issues of *Model Railroader*. **MRP**

Bruce Chubb, a retired electrical engineer in digital systems applied to aerospace, is a Master Model Railroader and the author of the model railroading books, How To Operate Your Model Railroad, The Computer/Model Railroad Interface (C/MRI) User's Manual, *and* The Railroader's Application Handbook, *as well as more than 45 articles in* Model Railroader *magazine.*



1. Through selective compression, Mike Aufderheide modeled Monon, Ind., in a 2'-6" x 20'-0" space. The HO scale Layout Design Element is based on the Monon RR's namesake town.

//Layout design element

Modeling the Monon's Hoosier hub

An architect finds it easier to design a Midwestern town Layout Design Element by arranging track components

By Mike Aufderheide//Photos by Matt Kosic

When we think of Layout Design Elements (LDEs) – visually and operationally recognizable models of actual areas of full-size railroads – a yard or industrial area usually comes to mind. It's not as common to see an entire town used as an LDE, but that's the approach I took when modeling the Monon RR in HO scale in its namesake Indiana town.

What makes Monon, a town with less than 2,000 residents, an interesting LDE? The community was important because it was where the Monon's Michigan City-Louisville and Chicago-Indianapolis lines crossed. Monon also had two yards, an enginehouse, and several local industries, all of which could be incorporated into a layout. Throw in the fact that I have family ties to the north-central Indiana town, and it made perfect sense for me to model the Monon in Monon.

A plan takes shape

As I unearthed my collection of periodicals and books and began working on locomotive and freight car models, the idea of building a miniature Monon started to take form. My list of druthers (things I wanted) began with modeling the Monon, a railroad my great grandfather worked for. He hired out in 1911 and was the engineer on nos. 48 and 49, a daily turn from Monon to Michigan City, during the 1940s.

But what part of the railroad and time period should I model? Monon Historical & Technical Society (MH&TS) members helped me narrow the period to the late 1940s. A color photo of a new EMD F3 in the gray-and-red passenger scheme arriving at the Monon depot in the summer of 1947 influenced my decision to model this period. During this time, the Monon was making the transition from steam to diesel and from stodgy heavyweight passenger cars to new streamlined equipment.

With an era selected, I proceeded to design a layout based on the Monon. Even the modest-size Monon RR was still too large to model as a whole, so I had to narrow my focus.

Fortunately, about the same time I was debating what part of the Monon to model, Mahlon "Cookie" Eberhard posted an e-mail message that made the location-decision process easier. Cookie, a native of Monon, worked in the town's depot. He described the Monon's two yards, and he identified which trains dropped off and picked up cars, and which yards each train used. He documented the location of local industries, the freight house, and the engine facility.

On several visits to Monon and local historical societies, I uncovered useful photos and maps. I located copies of Sanborn fire insurance maps for Monon through Environmental Data Resources (www.edrnet.com), and the MH&TS had information and a map book for that segment of the railroad. It quickly became apparent that Monon would be an excellent candidate for modeling.

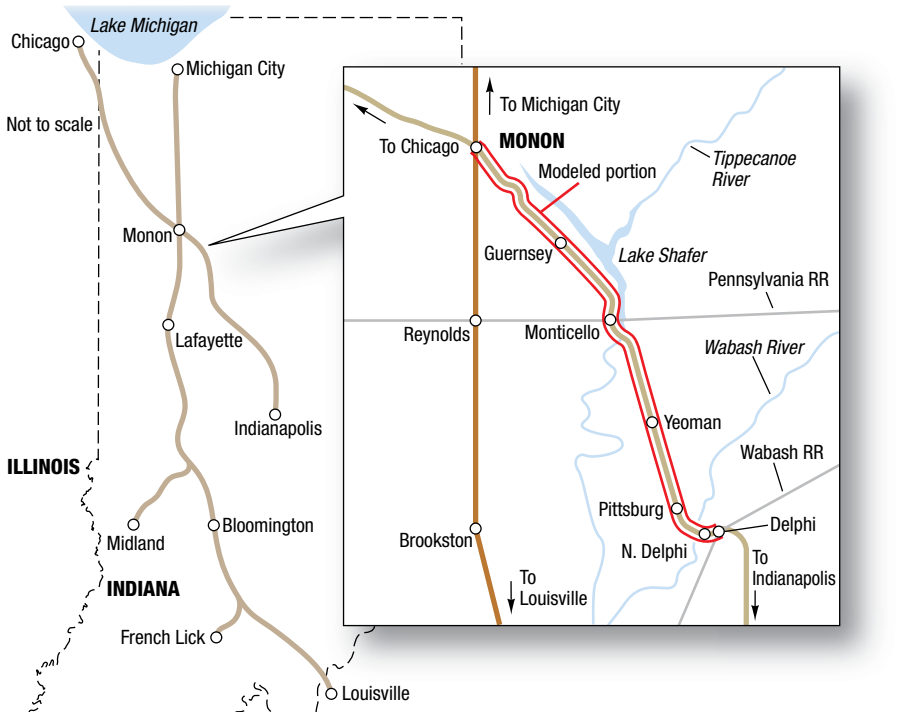
I used the information I'd been gathering to assemble a comprehensive scale diagram of the prototype track arrangement in Monon. As an interesting – and eye-opening – exercise, I reduced the plan of this modest Hoosier State town to the equivalent of HO scale, or an LDE, and superimposed it on a scale plan of my house (page 53). I found that the HO version of Monon would fill at least half of my basement (and more if modeled in its entirety)! Clearly, selective compression would be required.

Tracks on "doorminoes"

Although I'm trained as an architect, the mechanics of layout design were a mystery to me. I felt that I needed experience with the actual track components so I could begin to visualize things in three-dimensions. I therefore decided to jump into construction. Even there I was stymied until I visited fellow Monon modeler and frequent *Model Railroader* contributor Lance Mindheim's custom-layout-building Web site (www.shelflayouts.com).

One of his benchwork techniques employs hollow-core doors as a rigid base, with foam insulation board laminated to the top surface. The doors are inexpensive, strong for their weight, and don't react significantly to changes in temperature and humidity. Moreover, they lead toward designing and building a layout in manageable chunks, as David Barrow's domino technique recommends. Another MRP author, Dave Clemens, has dubbed this approach "doorminoes."

Since I had several standard 30" x 80" doors lying around, I decided to give

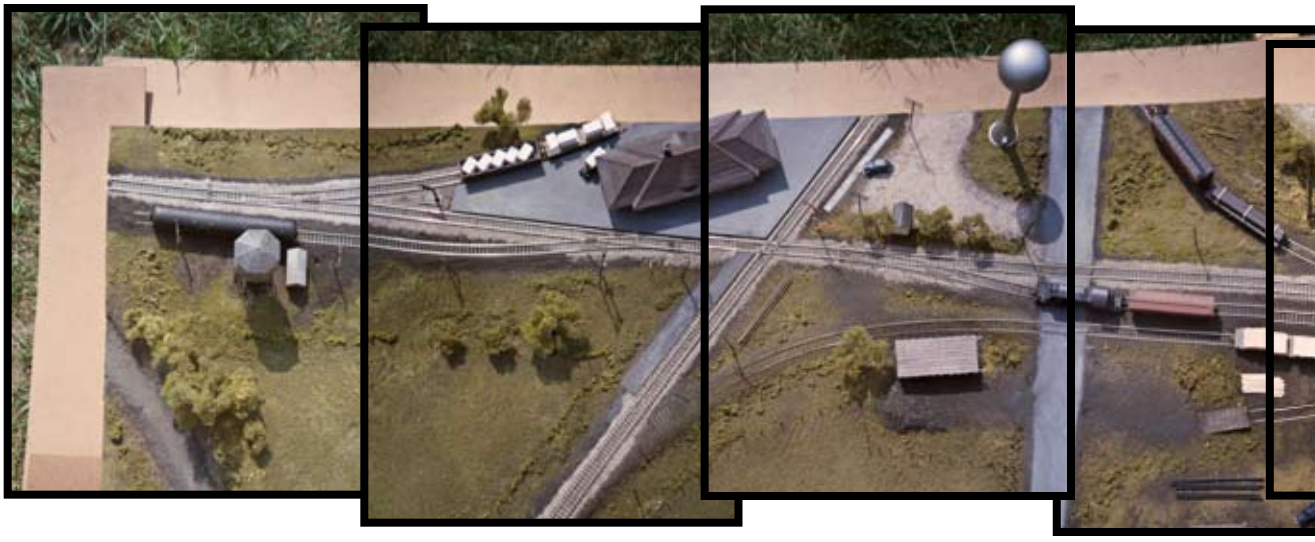


//The Hoosier Line's hub

Monon, Ind., was the Monon (pronounced *moe*-non) RR's namesake town and its hub. What began in 1847 as the New Albany & Salem RR grew into the Chicago, Indianapolis & Louisville RR when the railroad purchased a failed narrow gauge line, the Chicago & Indianapolis Air Line Ry. Co. The Chicago-Indianapolis line crossed the original Louisville-Michigan City line at Monon.

In 1956 the railroad's nickname, "the Monon Route," became its official name, and the reporting marks changed from CIL to MON. The Monon survived until 1971, when it merged into the Louisville & Nashville (now CSX). Trains still pass through Monon, but they no longer go north to Michigan City or southeast to Indianapolis. Those lines were abandoned, and the town's status as a hub is an increasingly distant memory. – *M.A.*

2. Mike used signature structures to help convey to viewers that his LDEs represent Monon, Ind. Here, Monon SW1 no. 50 switches the Conoco distributor; across the main line is Monon Mills.



The entire HO scale Layout Design Element (LDE) for Monon, Ind., is shown in this composite photo. Other LDEs will be added to form the complete layout. Photos by Mike Aufderheide

the benchwork-before-track-plan method a try to see if it would work. I put two doors end to end to get a platform that could accommodate Monon. Using sectional and flextrack, I was able to model the junction by the depot and several small industries. The line north to Michigan City was flanked by a lumberyard, coal bins, and two elevators and fuel dealers. The doors were wide enough for the backs of non-railroad buildings to be kept a respectable distance from the clamor of the railroad. In effect, I'd created an interesting switching layout. After five evenings of work I was running trains, so I'd say this benchwork method worked very well.

I chose not to draw a detailed track plan. Instead, I found it easier to work in place on the layout. By moving turnouts around I could check their placement against the prototype plan and make adjustments. The flat insulation board was an excellent canvas for drawing track lines with felt-tip markers.

One of my major considerations for this layout was the streets. They would help to convey the physical nature of Monon. Spaced at regular intervals, the streets also provided a framework to determine track and industry locations. I adjusted the locations of streets and turnouts so switch points weren't embedded in the pavement.

Since local switching is the main function of trains on this initial segment of my layout, I made sure that I retained as many spots for car placement as possible. Each industrial track was tested using cuts of cars to be sure it would accommodate the desired number of 40-foot cars.

The operational key to the plan is the runaround track. I found that I could locate it in the prototypical place, but it would have to be much shorter – about four car lengths.

Making compromises

Since LDEs are model versions of prototype locations, I tried to retain the accuracy of the track arrangement in Monon. Despite my best efforts, two deviations from the actual track and street arrangement were required.

First, I reversed the orientation of the Monon Mill and Standard Oil track. I angled this siding off the main going north rather than south. Placing the siding as it was on the prototype would have placed the oil dealer in the middle of downtown Monon.

//The layout at a glance

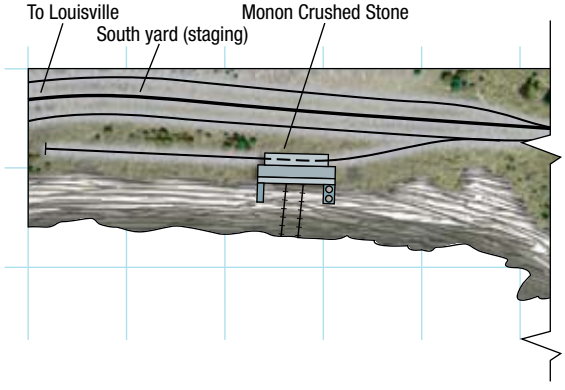
Name: Monon (C&IL) RR
Scale: HO (1:87.1)
Size: 2'-6" x 13'-4" plus 2'-6" x 6'-8" staging
Prototype or theme: hub at Monon, Ind.
Locale: northwest Indiana
Era: 1947-48
Layout style: sectional along-the-walls
Layout height: 60"
Benchwork: "Doorminoes"
Roadbed: none
Track: code 100
Length of mainline run: 20 feet
Turnout minimum: no. 4
Minimum curve radius: 24"
Maximum grade: 0
Scenery construction: foam board
Backdrop construction: vinyl sheet flooring
Control system: cab control

Second, I eliminated one of the downtown streets to save space, so Dye Lumber's location on Fourth Street (rather than a block farther north) might confuse local residents.

Another important step in making LDEs believable is having the distance between structures and scenery as accurate as possible. Like other towns of its size, Monon has a heavily built-up center section of two- and three-story commercial buildings. Wood- or metal-sided light industrial buildings and neat wood houses flank the downtown, with the houses at the edge of town often next to cornfields and pastures.

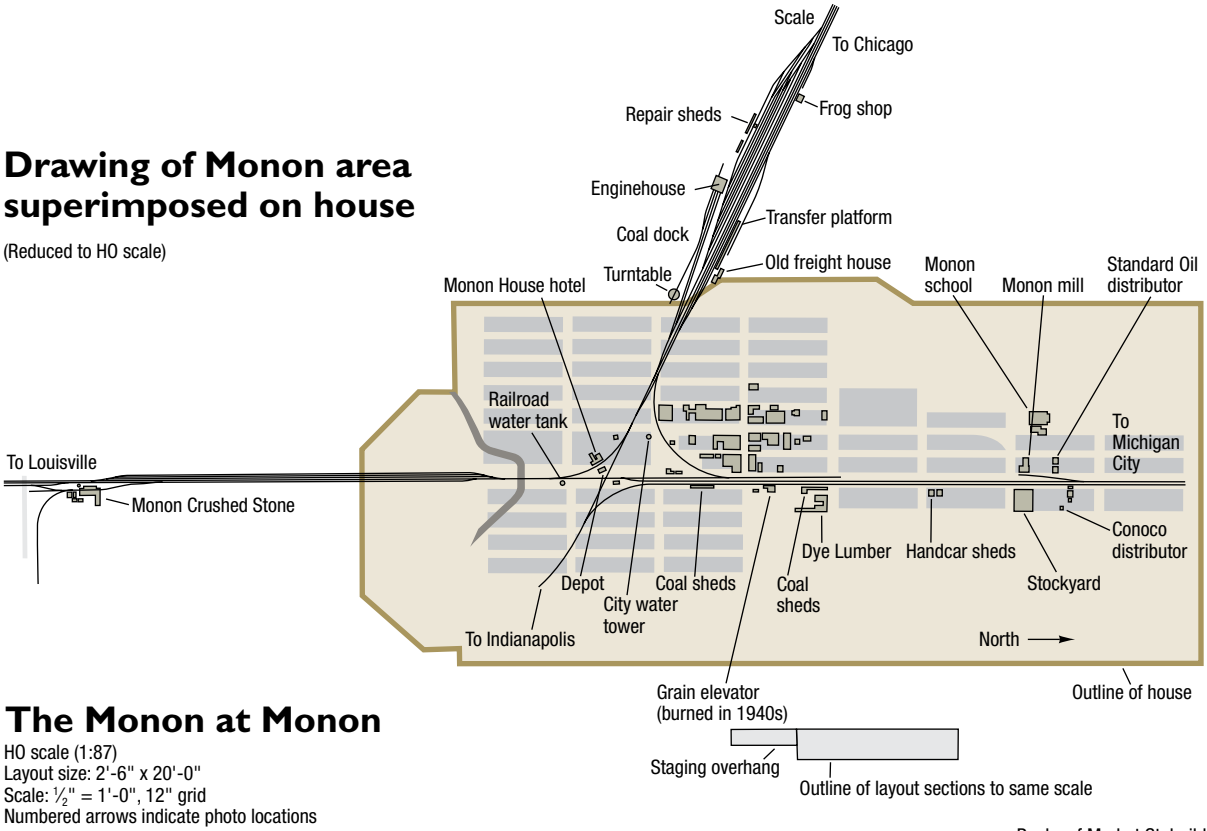
To maintain this sense of openness, I angled the track through the scenery. This made the layout seem larger and created large track-free areas on each corner. I was able to move the mill track away from the main, as on the prototype, in one of these open areas. The other let me include an open pasture near the depot.

With final track positions confirmed, I glued down the track and started to run trains, which was the fastest way to check the workability of the plan. I made



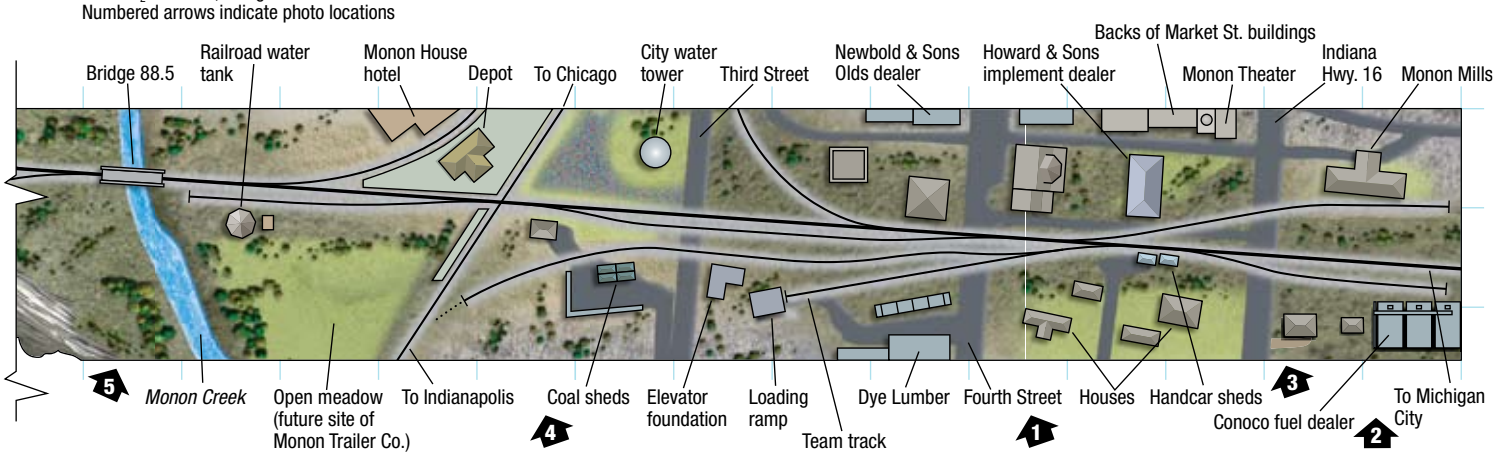
Drawing of Monon area superimposed on house

(Reduced to HO scale)



The Monon at Monon

HO scale (1:87)
Layout size: 2'-6" x 20'-0"
Scale: ½" = 1'-0", 12" grid
Numbered arrows indicate photo locations



Illustrations by Theo Cobb

3. The author models the steam-to-diesel transition period. In this scene we see Consolidation no. 283 heading south toward Louisville as SW1 no. 50 waits in the hole near Howard Implement.

4. With the caboose clear of the diamond, BL2 no. 34 is ready to begin its journey to Louisville. The original Monon depot was a limestone structure that was demolished by a derailment in 1951. It was replaced by a brick building.

some minor track adjustments over the next six months. Instead of trying to reshape the foam in an already scenicked area, I usually removed an entire section of foam from the door's surface and replaced it with a new piece.

My initial goal was to have the edge of the layout lined with the buildings along Main Street. It would have been nice to model the theater marquee with the name of the latest Roy Rogers movie in lights to further convey the era I'm modeling. But as I laid out the streets, I found that the space was too small for the buildings to be believable. A friend reminded me that I was primarily modeling the railroad, with the town providing a subtle context for it. The buildings therefore became flats along one side.

Running the railroad

Another way I conveyed to operators that my LDEs were based on Monon was operating the trains following the real railroad's schedule. When I first operated the layout I switched cars around by trading one for another, but this became boring. I then used car cards and waybills to determine where cars would go. I soon found the lack of staging, which creates a way for cars to move to and from the modeled scene, made it difficult to move cars around at all.

I solved that problem by adding another section of layout on a door that serves as a visible staging yard with a gravel quarry and its crusher. The three-track yard and quarry will be scenicked to match the rest of the layout.

The staging tracks will serve to simulate the locations where through trains drop cars. One track holds cars to or from Louisville, another to or from Chicago. The central track remains open as the main and is used to hold cars during

5. An interchange between two railroads or, as shown here, between two lines of the same railroad serves as an industry handling widely varying types and quantities of cars. Monon BL2 no. 34 sets out cars on the Indianapolis-line interchange track as Consolidation no. 283 waits on the main.

switching. Cars for Indianapolis and Michigan City are placed on the wye.

Timetable-and-train-order ops

My initial layout configuration seemed okay until I spent some time on a large model railroad operated by timetable and train orders. My switching layout lacked the excitement of crews keeping a wary eye on the clock as they worked local freights and cleared the main for superior trains. How could my one-town layout hope to emulate such operation?

Well, Monon was a busy junction. Why not *pretend* the traffic is coming through and clear the main for scheduled trains? I checked Monon employee timetable no. 80 for 1947 – 28 trains, more than one per hour, were listed – and matched the times against several fast-clock ratios. It seemed that 3:1 (an hour elapsing every 20 actual minutes) was a good compromise between work and wait time.

This added the missing dimension. Let's say No. 56 from Louisville to Michigan City is due. This train would have traversed my entire layout, so I'd have to clear the north-south route five minutes before the train is due. When a Chicago-Indianapolis train is scheduled to arrive, I have to keep the diamond area clear. A Louisville-Chicago train requires the south and northwest main lines to be cleared prior to the train's arrival.

The addition of a timetable has doubled the length of my operating sessions while making them far more interesting than when I simply forwarded cars to their correct destinations without regard to what should have been happening on the rest of the railroad.

Looking ahead

The scenery is mostly complete on the Monon section of my layout, including a model of my great grandparents' house on Pine Street. It's a bit closer to the tracks than Great Grandma Alice would have recalled or appreciated. The quarry and staging yard section is unfinished because I'd like to operate this section a while longer before gluing down the track and scenery.

The next phase of the layout will be constructing LDEs for part of the Indianapolis branch that my father rode as a boy to visit his grandparents in Monon. It will include Monticello and its RCA television-cabinet factory plus an interchange with the PRR's Effner branch. The branch line will then extend south across the Tippecanoe and Wabash Rivers on the high bridge to Delphi, featured in a Howard Fogg painting. Delphi had a Wabash RR interchange, a stone crusher, and a variety of industries.

I also plan to expand the town of Monon to include LDEs for the west yard, freight transfer platform, and engine terminal. Soon enough I'll be able to have mainline operations, featuring those red-and-gray Monon passenger trains that used to come through the railroad's namesake town. **MRP**

Mike Aufderheide is an architect who lives in Chicago with his wife Colleen, son Henry, and daughter Frances.

//Learning points

- It can be especially meaningful to model a prototype railroad that has family ties.
- There's no substitute for talking to the men and women who worked for a railroad to learn how it actually operated.
- Hollow-core doors as layout sections provide a rigid and inexpensive platform that can be expanded as time, knowledge, and space permit.
- Arranging track components may make it easier to visualize track layout opportunities than drawing a plan on a sheet of paper.
- Modeling a specific town as a Layout Design Element, even if you're freelancing, ensures that it can be operated prototypically.
- Staging is a key to operation, even on a small switching layout.

From model railroad to railroad

By David Barrow//
Layout photos by Tommy Holt

Many readers of *Model Railroader* and *Model Railroad Planning* will recall a number of earlier versions of my HO scale Cat Mountain & Santa Fe Ry. I enjoy making changes, some of them substantial, as my interests develop and change. The CM&SF industrial-switching track plan that appeared in *MRP 2004* was the tenth version of the Cat Mountain Line. It reflected my desire to have wide aisles, a linear track arrangement, and staging in a separate space.

Cat Mountain version 10 benefited from my interest in sectional "domino" construction. The domino approach allowed me to experiment with several different table configurations to fit the available 30 x 36-foot area.

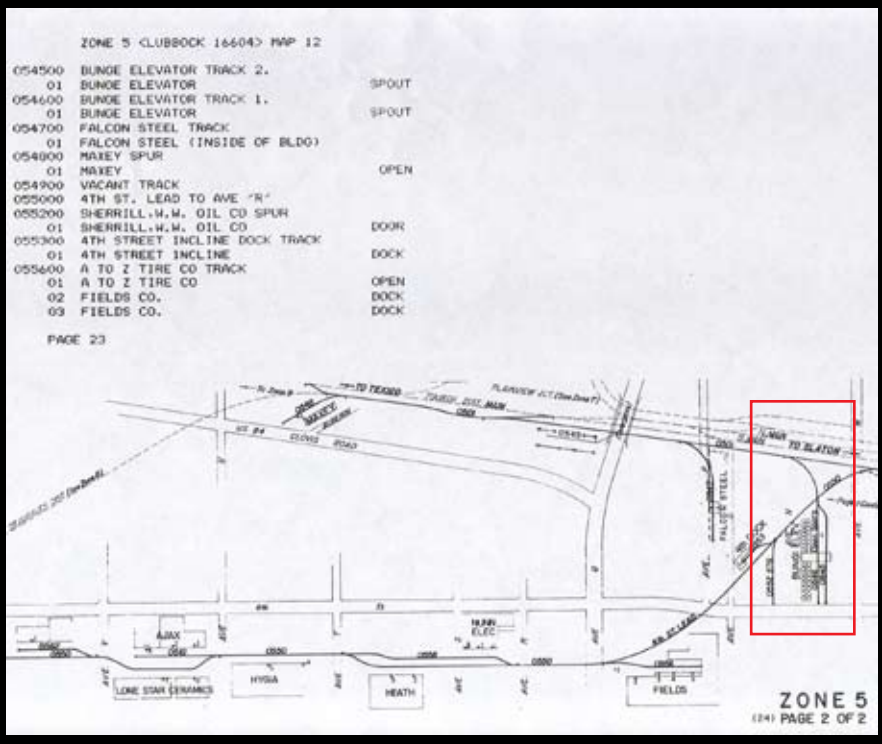
The track design that resulted from these deliberations followed a freelanced model railroad perspective. That is, I used my knowledge of Atchison, Topeka & Santa Fe Ry. practices and my own preferences to develop a prototype-based but freelanced track plan.

Along the way, I learned that time spent researching the prototype pays off in greatly enriched layout operation. I also made extensive use of Layout Design Elements (LDEs).

1. David Barrow (foreground) and Tommy Holt switch David's HO scale Cat Mountain & Santa Fe. This part of the layout models the Shop Rite and El Paso warehouses shown in David's prototype photo below.

model

An evolutionary step toward modeling a specific place



This red area in the Santa Fe diagram above and in the lower photo of Lubbock, Texas, represent the same location although the views are oriented differently. The photo looks east toward Zone 03 (center of photo). The Bunge grain elevator in Zone 05 is at the lower right. Texas Tech University photo

The LDE approach

Back in the first (1995) issue of MRP, editor Tony Koester introduced the Layout Design Element concept. An LDE is a visually and operationally recognizable model of an actual town, yard, industrial complex, engine terminal, scene, and so on. The LDE approach can be employed to design a freelanced model railroad, and I think it's a natural way to design a prototype-based layout.

In recent years, and especially in preparation for version 10, I'd gathered a lot of information about industrial switching areas in Lubbock, Texas. Take it from me, it pays to talk to the professionals who actually worked the area being modeled. Santa Fe "footboard yardmaster" David Bunch was very helpful as I tried to learn how the railroad went about its business in Lubbock. I also found copies of Santa Fe track schematics and switching guides.

Version 10 was designed to emulate the Santa Fe in Lubbock from both operational and appearance standpoints, with plenty of switching opportunities. As a freelanced design, however, I was able to make extensive use of structures salvaged from previous CM&SF layouts.

I began to wonder how I might model the actual track arrangements and industries in Lubbock circa 1978. The new plan would feature the correct relationships between the main yards and industrial switching areas the Santa Fe calls "zones." Soon I discovered I could design a plan that included some of those zone and yard LDEs in prototypical relationships, more of a "railroad model" than a model railroad.

Choosing key features

Lubbock had many more industrial areas than I could fit in the available area. But I found that if I located Santa Fe's Upper Yards, Zone 01, along one wall and Lower Yards, Zone 02, as staging in an adjacent room, I could put the combined Zones 01 and 04, Zone 03, Zone 01, and Zone 05 right where they should be relative to both yards and to each other. The track plan, which I call version 14, is shown on page 60. A copy of a sample zone map is reproduced above right.

I needed to selectively compress Lubbock's actual buildings and yards in both length and width to fit my available space. For example, Zone 01 was compressed in length, and some yard tracks were eliminated. The staging tracks represent Zone 02 as well as Sweetwater to the east and Amarillo and Clovis to the west. Because Zone 03 comes off the main south of the Lower Yards in Lubbock, access to this zone actually begins through the staging room.

Modeling Zone 04 was an interesting exercise. I began with an aerial photo and a Santa Fe track diagram. There is a cross street at each end of the modeled area plus another one in the middle. My table is 24 feet long, so I enlarged the aerial photo to scale 24 feet from end to end at 1" = 60'-0". I could then measure each building's footprint using that relative scale. As it turned out, the dimensions I used for the model buildings are about 75 percent of each structure's length and width. (I obtained the actual vertical dimensions with a tape measure during a trip to Lubbock and used them to build the models.)

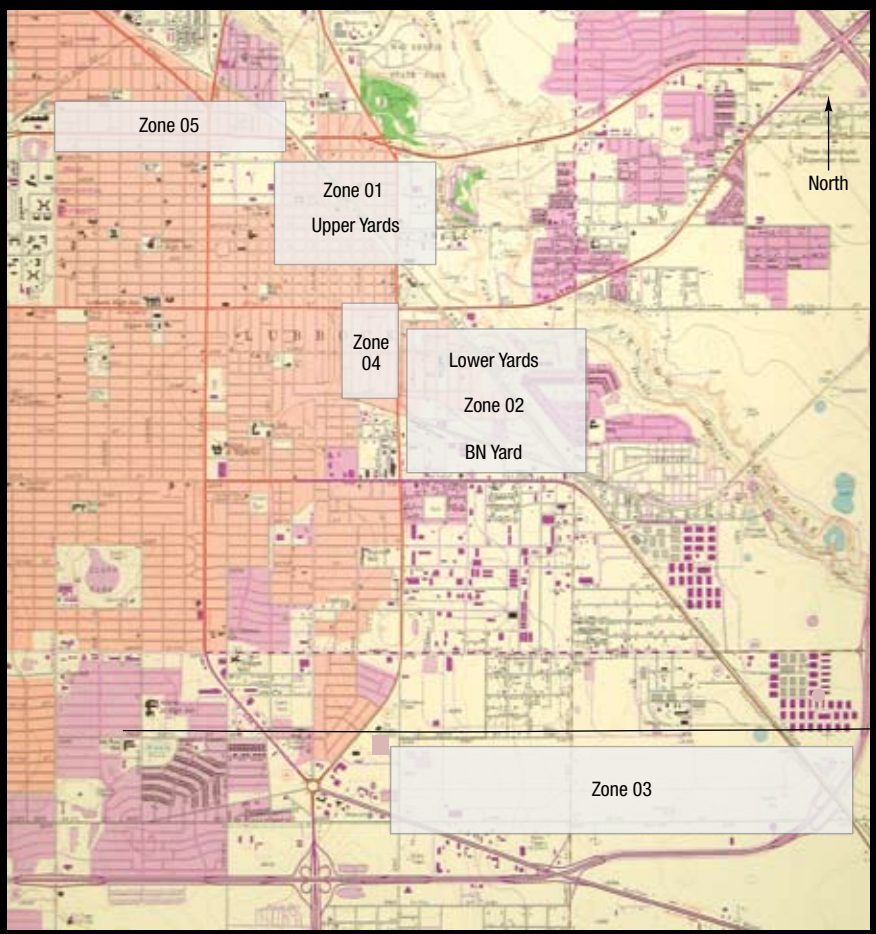
I built my structures from Strathmore, which is a high-quality cardstock. This is a speedy way to see how each structure fits in the available space, and I can later add surface finishing materials to these shells. Another quick way to represent an industry is to glue a color photograph of it, printed to HO scale, onto a thin piece of plywood or Fome-Cor sheet stock.

My research also uncovered a copy of the Santa Fe's work plan for Lubbock, which lists the days the different industrial zones are switched. For a given operating session, I pick a specific day of the week and follow the prototype's operating plan, doing only the work allocated for that day and time.

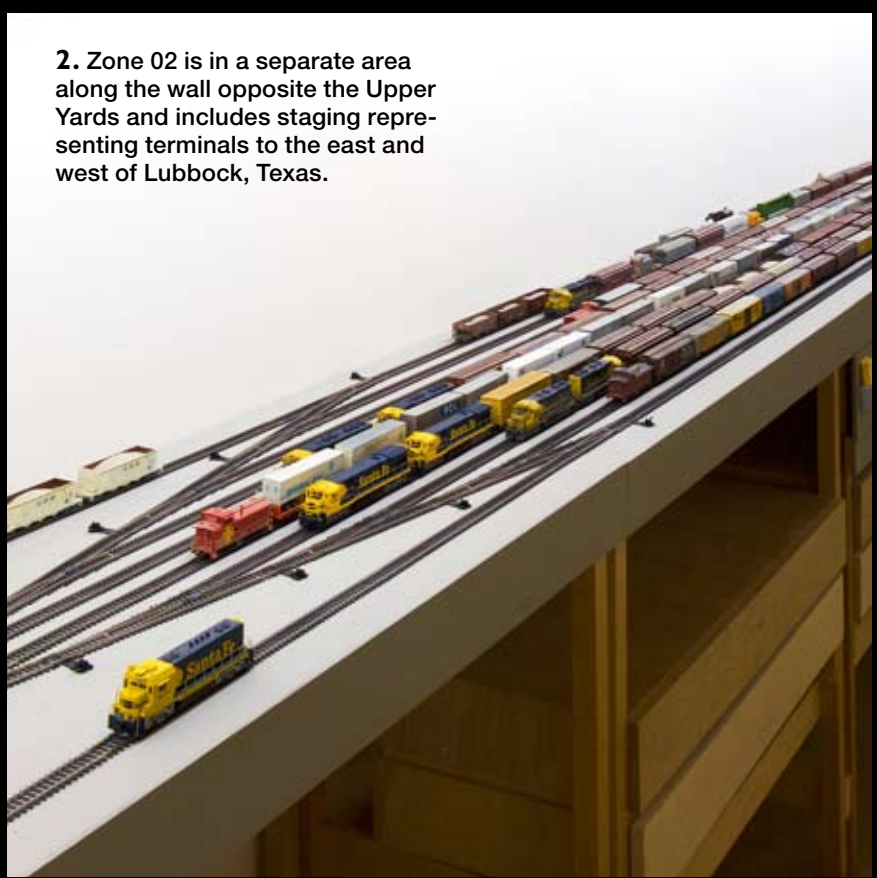
During an eight-hour shift or trick, this part of the Santa Fe saw five or six through trains plus a local or two. On my

//The layout at a glance

Name: Cat Mountain & Santa Fe Lubbock Industrial District
Scale: HO (1:87.1)
Size: 29'-6" x 35'-6"
Prototype or theme: Atchison, Topeka & Santa Fe Ry.
Locale: Lubbock, Texas
Period/era: 1978
Layout style: linear walkaround
Layout height: 55"
Benchwork: sectional benchwork (dominoes)
Roadbed: ¼" lauan plywood
Track: code 100 flextrack
Length of mainline run: 76 feet
Turnout minimum: no. 6
Minimum curve radius: 30"
Maximum grade: none
Scenery construction: models of actual Lubbock buildings
Backdrop construction: sky-blue walls with coved corners
Control system: EasyDCC Digital Command Control with radio throttles



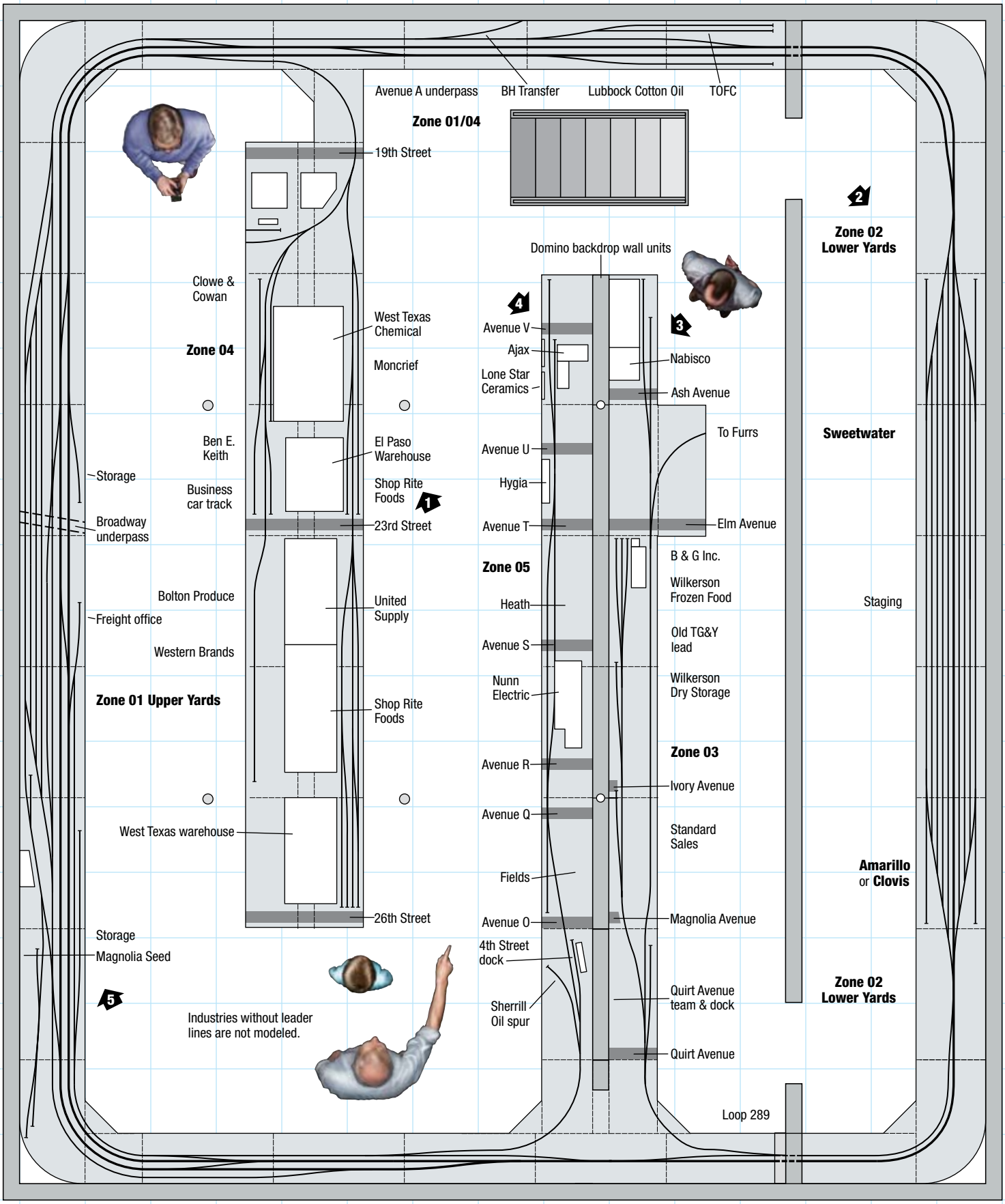
This section of a United States Geological Survey map shows the area David models. The highlighted areas are Santa Fe's industrial switching zones.


2. Zone 02 is in a separate area along the wall opposite the Upper Yards and includes staging representing terminals to the east and west of Lubbock, Texas.

Lubbock Industrial District

HO scale (1:87.1)
Layout size: 29'-6" x 35'-6"
Scale of plan: ¼" = 1'-0", 24" grid
Numbered arrows indicate photo locations

Illustration by Theo Cobb



//Learning points

- The domino sectional-table system David pioneered allows rapid changes to support new interests.
- His new track plan embraces two trends in the hobby: urban industrial switching layouts and prototype-based modeling.
- There's no substitute for making field trips and talking to the professional railroaders who actually worked at the modeled locations.
- The LDE approach – copying prototype trackwork, structures, and operating patterns – avoids the task of creating logical, realistic settings based on one's often-limited knowledge.

layout, these trains run from staging at the proper times and are then switched in the Upper Yards. This operation provides the connection with the rest of the Santa Fe system and the North American rail network.

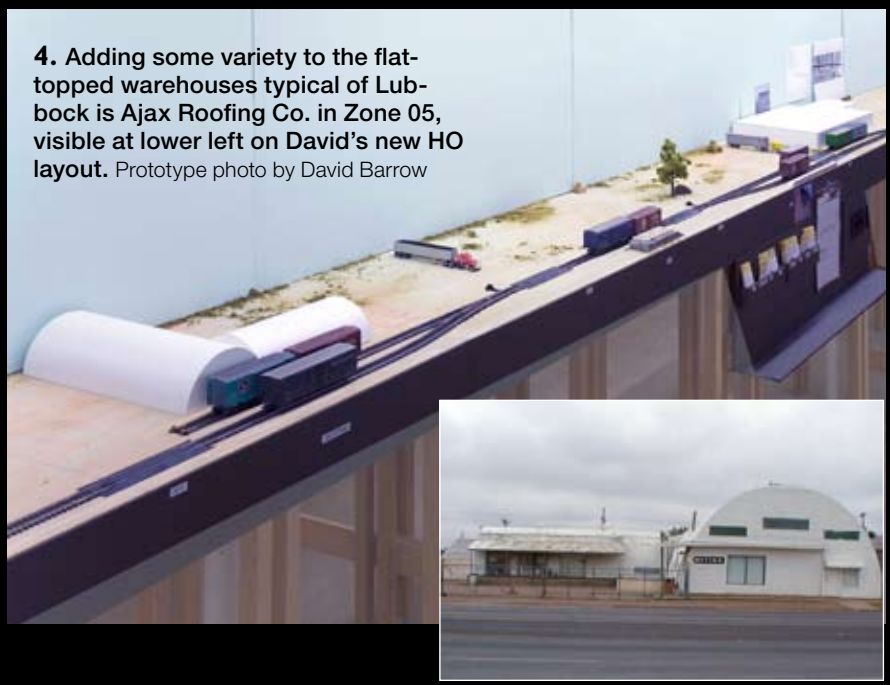
An enjoyable change

The move from designing a track plan from a model railroad point of view to attempting to more closely model the prototype has been fun twice over. I've enjoyed doing the research and talking to professional railroaders, and now I'm enjoying operating the model railroad as closely as possible to the way it was actually done in 1978. Some of the zones have runaround tracks, for example, and some don't. As railroader David Bunch told me, this requires thinking about what will happen farther down the line and taking time to block cars in the right order before leaving the yard.

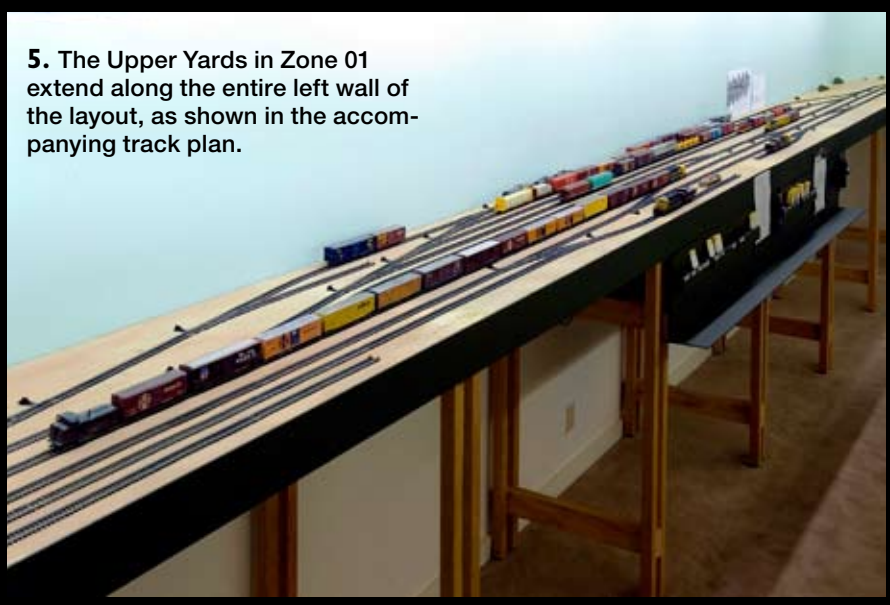
As an increasing number of modelers are discovering, a layout based on prototype modeling means simply doing what a real railroad did at a particular place and time. This approach neatly avoids the need to draw up a track plan from scratch, select appropriate industries, come up with a freelanced paint scheme and roster, and "imagineer" a way to make the whole thing work in a realistic manner. This layout was my first foray into prototype modeling, and I've found that this approach is a truly rewarding experience. **MRP**

David Barrow, a regular contributor to MRP from Austin, Texas, never tires of taking yet another look at a given space to see if an even more intriguing model railroad can be designed to fill it.

3. Zone 03 is separated from Zone 05 by a backdrop and includes the Nabisco Foods warehouse in the foreground and several other industries.

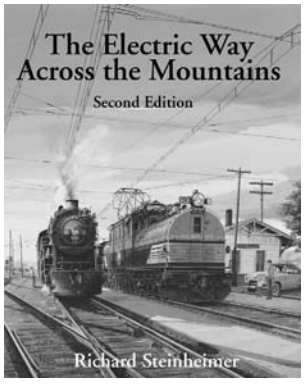


4. Adding some variety to the flat-topped warehouses typical of Lubbock is Ajax Roofing Co. in Zone 05, visible at lower left on David's new HO layout. Prototype photo by David Barrow



5. The Upper Yards in Zone 01 extend along the entire left wall of the layout, as shown in the accompanying track plan.

Outstanding Books on Railroad History from Signature Press



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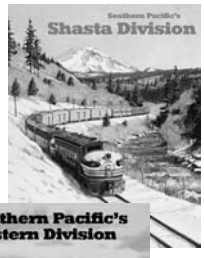

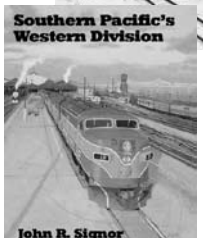

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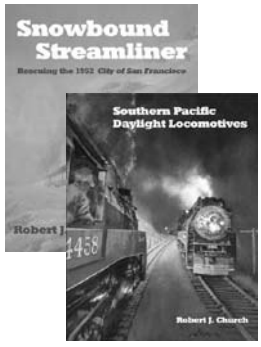

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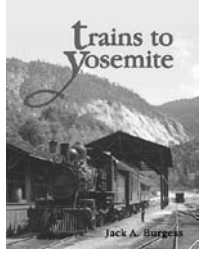

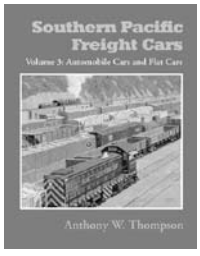

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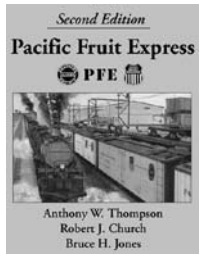

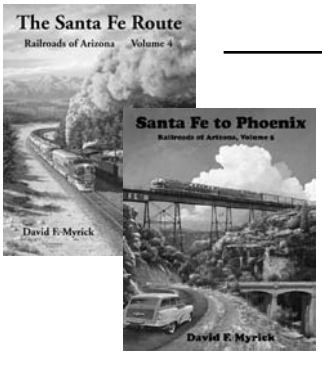

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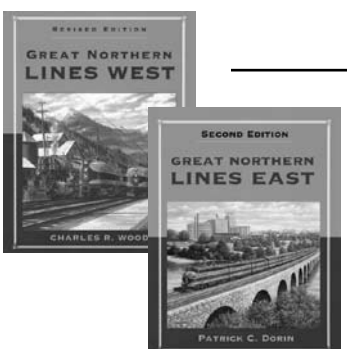

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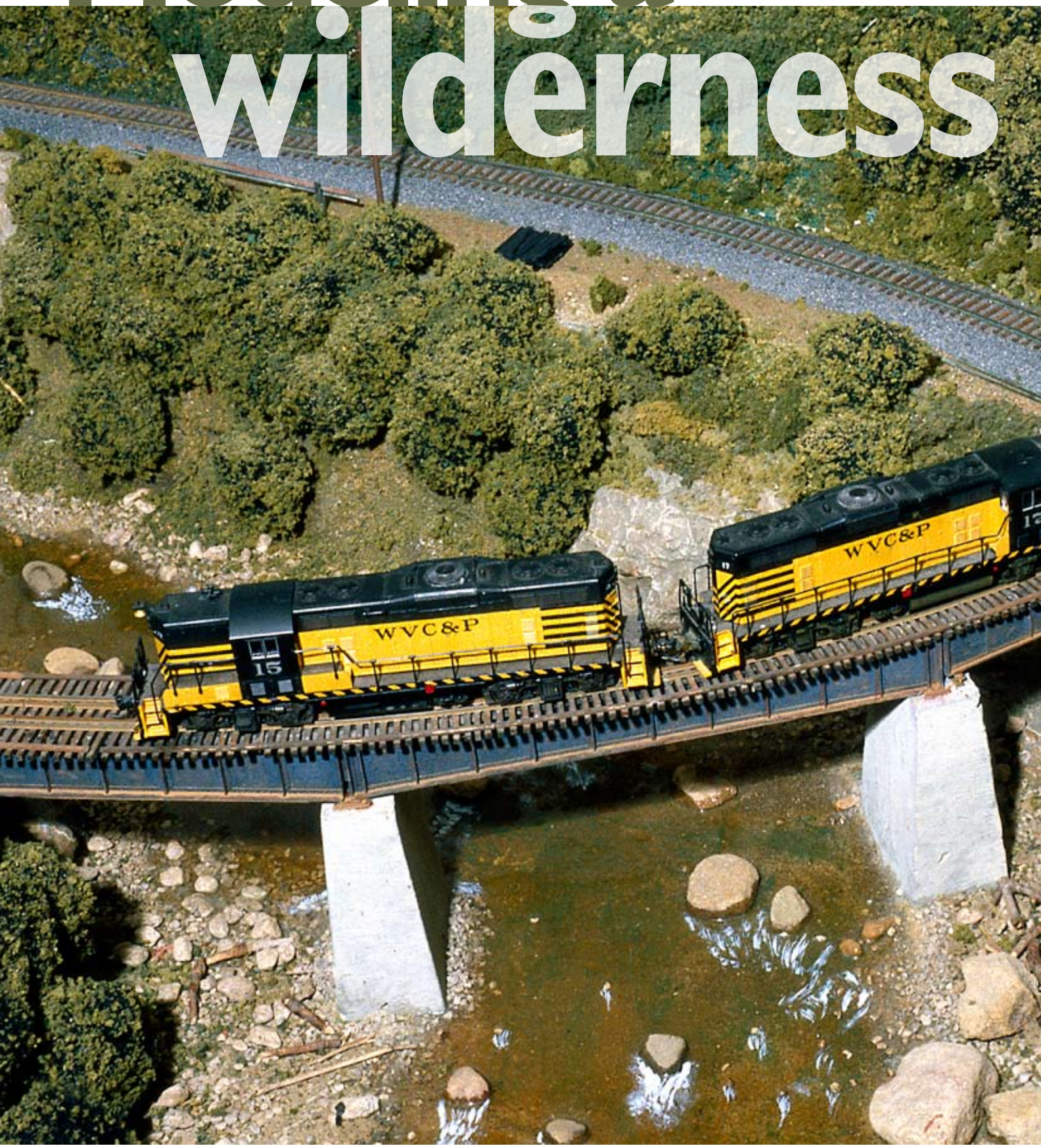
Modeling a wilderness



junction

A chance discovery became the centerpiece of a new railroad

By E. Roy Ward//
Photos by Rob Enrico

My "discovery" of Cheat Junction on the former Western Maryland occurred about the same time I was planning a new layout in anticipation of a move into a new home. I wanted a freelanced system representing my interest in several Appalachian railroads, but the WM's lines in West Virginia would exert the greatest influence. Once I saw Cheat Junction, I knew it would become the centerpiece of the new layout.

Diamond in the rough

My wife and I enjoy backpacking into the mountains. In the summer of 1973, we were hiking in the Monongahela National Forest along the Shavers Fork of the Cheat River near Elkins, W.Va. We planned to camp nearby and use the WM's right-of-way to return to our car.

From a study of WM timetables, I knew there was a junction in the area, but what is generally known as Cheat Junction is actually three different places: Cheat, Greenbrier, and Elk River Junctions with each name referring to one corner of a folded-over wye. What I didn't anticipate is that a diamond crossing formed the centerpiece of the junctions.

Approaching from the west, we first found Greenbrier Junction. It looked more like a switchback on a logging line than a junction because the new connection disappears down a 2.5 percent grade. We walked farther along the tracks and soon spotted the railroad bridge over Shavers Fork. I was perplexed! What line was that, and how could it possibly connect with the track we were hiking along?

Then I saw the diamond just off the end of the bridge, and it all started to fall into place. Here deep in the wilderness was a unique junction, a twisted wye that crossed itself to allow the WM's line down from Elkins to reach both Durbin and Webster Springs. The narrow river valley precluded dividing the Elkins line with a simple turnout.

1. West Virginia Central & Pittsburg Extra 15 North, the Glade Shifter, crosses the diamond and deck girder bridge over Shavers Fork at Cheat Junction on Roy Ward's freelanced HO railroad.

2. The Texas & Pacific heritage of the WVC&P's paint scheme is evident in this view of Extra 13 North easing a coal train across the Shavers Fork bridge.

3. The end points of the two lines south of the junction were swapped on the WVC&P, so Extra 84 North – the "Termite" – is bringing four loads of wood products up from Durbin as it heads toward Greenwood Yard.

Hitting the books

I explored the area that day and began to research the junctions after I got home. The three junctions were about a mile apart, but they weren't all built at the same time. The Coal & Iron Ry. entered the area from the north, following the river around 1903. It made a U-turn to climb out of the valley on its way to the Chesapeake & Ohio connection at Durbin, and this turnback curve laid the groundwork for the future junctions.

Fifteen years passed before Cheat Junction was built to connect the C&I with the Greenbrier, Cheat & Elk RR, a logging line built down Shavers Fork from Cass, W.Va. (Cass is now the site of a state park that features operating Shay and Heisler geared locomotives.)

The third leg of the wye was built in 1932, four years after the WM had purchased the GC&E. This leg allowed coal trains from Webster Springs to move north (railroad east) to Elkins without a runaround move. (See Roy's in-depth description of the chronology and operation of the junction area in the Summer 2006 issue of *Classic Trains*. – *Ed.*)

No interlocking tower was needed at the diamond, as the junction never saw a heavy volume of traffic. All of the switches were manually operated. There was a signal at the spring switch at Elk River Junction, which was normally lined for the GC&E line to Webster Springs. The three-way junction's busiest period was probably the first 25 years when the lumber industry still flourished and Shays pulled the log trains that shared the tracks with WM freights and passenger trains.

The lumber industry waned as the virgin forests were logged out, and coal traffic became the mainstay of the WM's lines below Elkins. A mixed train to Durbin, the WM's last scheduled passenger train, survived through the 1950s. The WM was absorbed into the Chessie System in 1973 and then into CSX the following decade. In 1983, CSX filed to abandon the Durbin Subdivision west of Elk River Junction. The former GC&E line survived, but for all practical purposes, Cheat Junction was no more.

You can visit the junction area today by riding the Tygart Valley Flyer out of Elkins, W.Va., during the tourist season (mountainrail.com, 1-877-686-7245). The old diamond now lies in the weeds near the former crossing, but the stunning

4. On the WVC&P, the line that loops across the diamond connects to the coalfields on the Cheat Subdivision, and the straight leg goes to Durbin – just the opposite of the prototype arrangement. The coal train shown here is the "Connellsville Coal" Extra 15 North with midtrain helpers.

majesty of the mountain valley remains intact for visitors to appreciate.

Modeling Cheat Junction

With the Cheat Junction theme in mind, I named my new railroad the West Virginia Central & Pittsburg Ry., which was the original name of what became the Western Maryland's route between Cumberland and Elkins. This name describes the area served by the railroad, and its slogan recalls another predecessor line at Cheat Junction: "The Coal and Iron Route."

The WVC&P is set in 1958. Its main line is a bridge route connecting the Pittsburgh & Lake Erie, Pennsylvania RR, and Pittsburgh & West Virginia at Connellsville, Pa., with the C&O at Durbin, W.Va. As on the WM, a branch into the coalfields splits off this trunk at Cheat Junction near the midpoint of the layout.

The two main terminals are Greenwood Yard in Connellsville on the north with Slaty Fork on the branch to classify coal headed north and south (the WM yard here was known as Laurel Bank). Durbin has only a small interchange yard with the C&O. The main line is a loop-to-loop configuration with staging in both loops. The coal branch is stub ended.

Building in sections

At the time I began to sketch track plans that supported the traffic I envisioned, I didn't have a place to build the new layout. That came in 1977 when we moved to our current home that has a 19 x 24-foot basement. The first L-girder was erected on March 28, 1978.

I had drawn the track plan and worked out all the switching moves before construction began, so I could push ahead with confidence. To get something running quickly, I built the coal branch and Slaty Fork yard. I built the layout in sections connected by temporary tracks, so Durbin was the second section built. I also built the C&O connection and the staging loops, which provide an outlet for coal coming down the branch.

The Cheat Junction and Blackwater area was the third section built and the most challenging. It's actually what we now call a Layout Design Element, an actual place that I wanted to model in a simplified but recognizable form. All three junctions are represented on the WVC&P, but I had to revise the destinations of each leg.

I handlaid the track using code 83 nickel-silver rail. To fit the junction's turnback curve, I had to use a 24" minimum radius. That's sharp, but the WM also had very sharp curves and used four-axle units on the coal trains operating in this area. If the WM could do it, so could I!

I eventually extended the main line north to Connellsville and Greenwood Yard. We could then operate transfer runs to the Pittsburgh & Lake Erie, Pennsylvania, and the Pittsburgh & West Virginia out of Greenwood.

Cheat Junction has become the heart of my railroad, connecting the branch line (Cheat Subdivision) to the main line, which is divided into the Youghiogheny ["*yock*-a-gany"] Subdivision to the north and the Greenbrier Subdivision to the south. More than two dozen trains can be run during a four-hour operating session, but only a half-dozen or so are called. And only a few of the mine runs don't pass through the junction.

Operating in the dark

The WVC&P is operated by timetable and train orders and is what railroaders call a "dark" railroad, meaning that it's unsignaled. There are six scheduled daily trains: two passenger trains and four time freights. Everything else runs as extras, including a pair of local freights and the coal trains. Seven mines on the Cheat Subdivision and two on the Youghiogheny Subdivision provide an ample amount of coal traffic as mine shifters distribute empties and pick up loads.

The outbound loads are classified at Slaty Fork for northbound and southbound destinations. We use a car-card-and-waybill system for car routing.

Northbound coal drags encounter a long twisting climb exceeding 3 percent out of Elk River Junction through the

//The layout at a glance

Name: West Virginia Central & Pittsburg Ry.
Scale: HO (1:87.1)
Size: 19 x 24 feet
Prototype or theme: freelanced based on WM coalfield operations in W.Va.
Locale: West Virginia, Pennsylvania, and Maryland
Period: 1958
Layout style: single-level
Layout heights: 34"-44"
Benchwork: L-girder
Roadbed: ¼" Campbell milled white pine
Track: handlaid codes 70 and 83, and code 100 flex track
Length of mainline run: 154 feet main, 113 feet branches
Turnout minimum: no. 6 main, no. 4 industrial spurs
Minimum curve radius: 22" branches, 24" main
Maximum grade: 3.5 percent main, 4.5 percent branches
Scenery construction: plaster-soaked gauze over screen
Backdrop construction: painted hardboard
Control system: cab control with stationary and walkaround cabs

West Virginia Central & Pittsburg Ry.

HO scale (1:87.1)
Scale of plan: ¼" = 1'-0", 24" grid
Numbered arrows correspond to photo locations

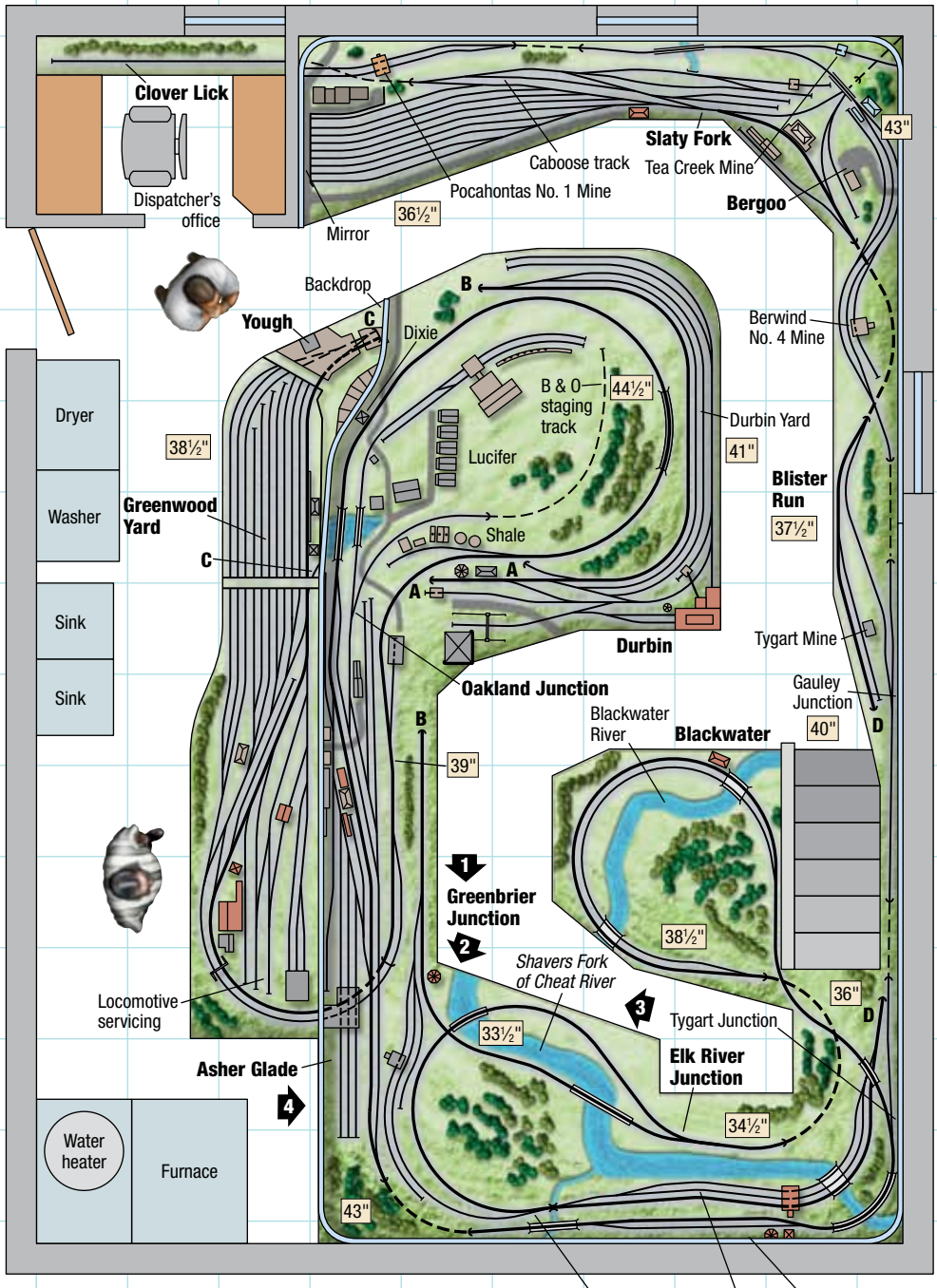
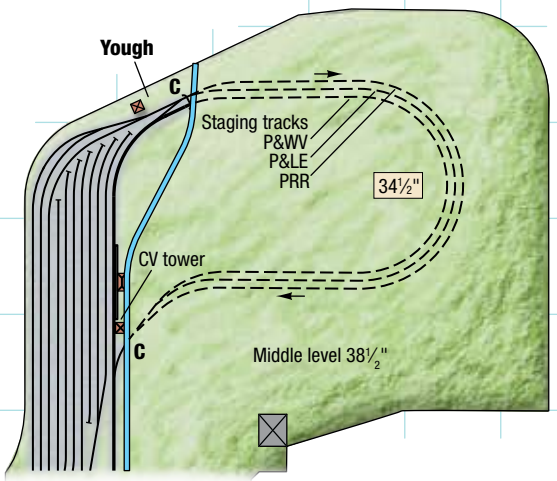
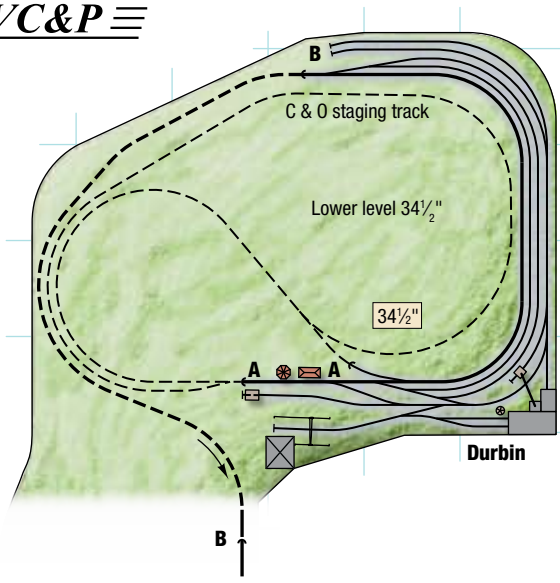


Illustration by Theo Cobb and Joe Sparico

WVC&P





Looking south, the yellow lines show Elk River Junction at the lower left, Cheat Junction is just out of sight on the Durbin branch, and Greenbrier Junction is off to the south. The direct connection with the Webster Springs line crosses Shavers Fork and the Durbin line on the diamond near the bridge. Photo by Roy Ward

Blackwater Canyon area, which represents the WM's infamous Black Fork Grade east of Elkins.

Locomotives are rated at six loads per unit, a little more than the WM's five-car rating for Fs and Geeps on the Laurel Bank and Black Fork grades. Trains longer than 12 cars get a mid-train helper out of Slaty Fork as far as Spruce Gap. (This may sound a bit short, but even a beefy WM 2-8-0 could handle only a dozen cars or so up Black Fork Grade.) Northbound coal and ore trains from the C&O at Durbin usually get a pusher. Southbounds slowly ease their way down the steep descent and through Cheat Junction, making it a great place for railfanning.

Creating an image

Choosing a paint scheme for WVC&P units involved a bit of luck. I came across several Atlas EMD GP7s painted for the Texas & Pacific at a good price, and the light orange-and-black paint scheme quickly grew on me. This saved me the need to design a plausible freelanced paint scheme and then paint the units. Details such as the nose-mounted bells, five-chime horns, and the short hood being the front were influenced by two other coal railroads: the Norfolk & Western and Chesapeake & Ohio.

The 14 Geeps have since been joined by an Alco switcher and an EMD F9 used on passenger runs; all fit into the WM's numbering scheme. Run-through power and trackage rights – the WVC&P runs over the WM in two locations – add visual variety to my operating sessions.

One long op session

The WVC&P is almost three decades old. The layout restages itself, so in effect we have enjoyed one continuous operating session for the past 28 years! Despite its setting in one of the most scenic regions of North America, the railroad was designed and built with realistic operation foremost in mind. When compromises were required, they were made to the scenery, not to the operation, which at times made creating plausible scenery quite a challenge.

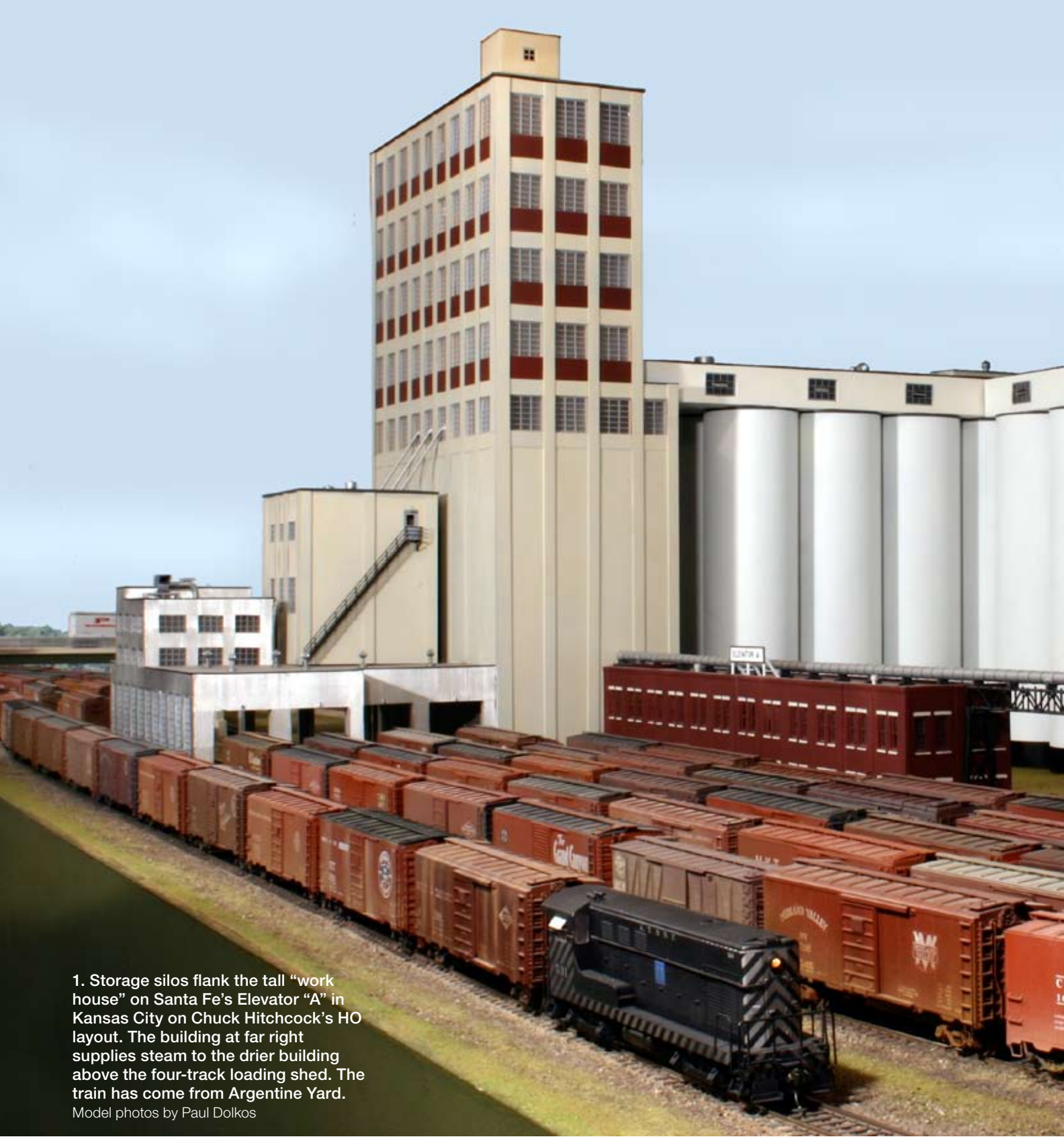
My operators are mostly experienced railfans who understand the WVC&P's concept. As we've found ways to enhance the railroad, we've made subtle changes to the trackwork and operating scheme, but the original plan remains intact. Some crew members have gone on to careers as professional railroaders, and they enjoy pointing out that they got their early training on the West Virginia Central & Pittsburg!

My hat's off to my crew, all of whom have helped me realize a dream that began deep in the Appalachians at a remote place called Cheat Junction. **MRP**

//Learning points

- Thoroughly planning a layout's concept and operation before construction lets you proceed with a reduced potential need for major changes later on.
- Basing a freelanced track plan on one or more key prototype sites (Layout Design Elements) helps to tie the fictional railroad to reality.
- Interchanges, trackage-rights arrangements, and power pools with actual railroads from the modeled region and era enhance the plausibility of a freelanced model railroad.
- Commercial diesel locomotive paint schemes can often be adapted for use on a freelanced model railroad, since Electro-Motive Division sometimes sold the same design to more than one railroad.
- Adding details typical of other railroads in the region adds character to your locomotives.

Roy Ward, who retired from a 39-year career as an electrician with U.S. Steel, has been a model railroader since the mid-1950s. He's a second-generation railfan and his photos have appeared in magazines and books. Roy and his wife Judy enjoy backpacking, canoeing, and skiing, especially in the Appalachians.



1. Storage silos flank the tall "work house" on Santa Fe's Elevator "A" in Kansas City on Chuck Hitchcock's HO layout. The building at far right supplies steam to the drier building above the four-track loading shed. The train has come from Argentine Yard.
Model photos by Paul Dolkos

Switching Santa

Fe's Elevator "A"

A railroad employee provided key information

By Chuck Hitchcock

I wanted the Atchison, Topeka & Santa Fe's mammoth Elevator "A" to be the centerpiece of operations on my new Argentine Industrial District Ry. [See "Kansas City industrial railroad-ing" in MRP 2002, page 68. – *Ed.*] Although the prototype elevator that once towered above Argentine Yard near Kansas City, Mo., was torn down in 1995, a long-time acquaintance had given me a book from the 1940s titled *Elevators of North America*. It contained 15 pages about Elevator "A," including lots of details, drawings, and photos, so building a realistic model wasn't a concern.

The challenge became one of condensing this elevator complex to something that I could fit into my available space as a Layout Design Element – that is, without compromising its main visual and operational features. I did my best to selectively compress the prototype structures and trackwork, but a question continued to nag at me: How did the Santa Fe really handle the switching for this elevator?

Fortunately, not long after I completed the track plan and construction was well under way, I met Don Parsons, a retired Santa Fe yardmaster whose 40-year career was spent working in Argentine Yard. Armed with a tape recorder and track diagrams of the elevator, I sat at his kitchen table for two hours listening, taking notes, and asking many questions. Were it not for his detailed explanations of how the railroad switched the elevator, I would not be operating my model correctly.

Looking to the prototype

I could see that my original plan was fine, except I needed to add material

A '40s photo shows the east end of Elevator "A" with the six tracks that pass through loading and unloading sheds next to the tall work house. The west end of the Bowl Yard is visible at right. Santa Fe photo.

track 132 where boxcars were cleaned and grain doors installed. Next to track 132 were six receiving tracks under the shed. Tracks 139 and 141 (see CLIC diagram) received corn and beans; tracks 131 through 137 received and loaded grain. I put only four tracks under the shed, using two tracks to receive grain and two more to load grain. I decided not to deal with corn and beans.

It's important to know that Elevator "A" was worked from west to east with 200-foot continuous-loop cables pulling cars into the sheds for loading or unloading – a locomotive was not used. The cable was located between the tracks and attached to five-car cuts. Cars were pulled into the shed one car at a time, and the cable could move in either direction for precise car spotting.

The processed cars were kicked out the east end to roll down a slight grade. A man rode the cars downhill using the hand brakes to stop them before walking back to the shed. To simulate this activity, I move the cars by hand when my crew takes a break.

Don recalls that coupler knuckles were often left closed, so cars bunched together but didn't couple up. Crews then had to spend extra time opening

The Santa Fe's Car Location Inventory Control (CLIC) diagrams for Zone 1 (pages 1 and 2) show the tracks west of the elevator. Chuck learned how it all worked by talking to a yardmaster who supervised switching at Elevator "A."

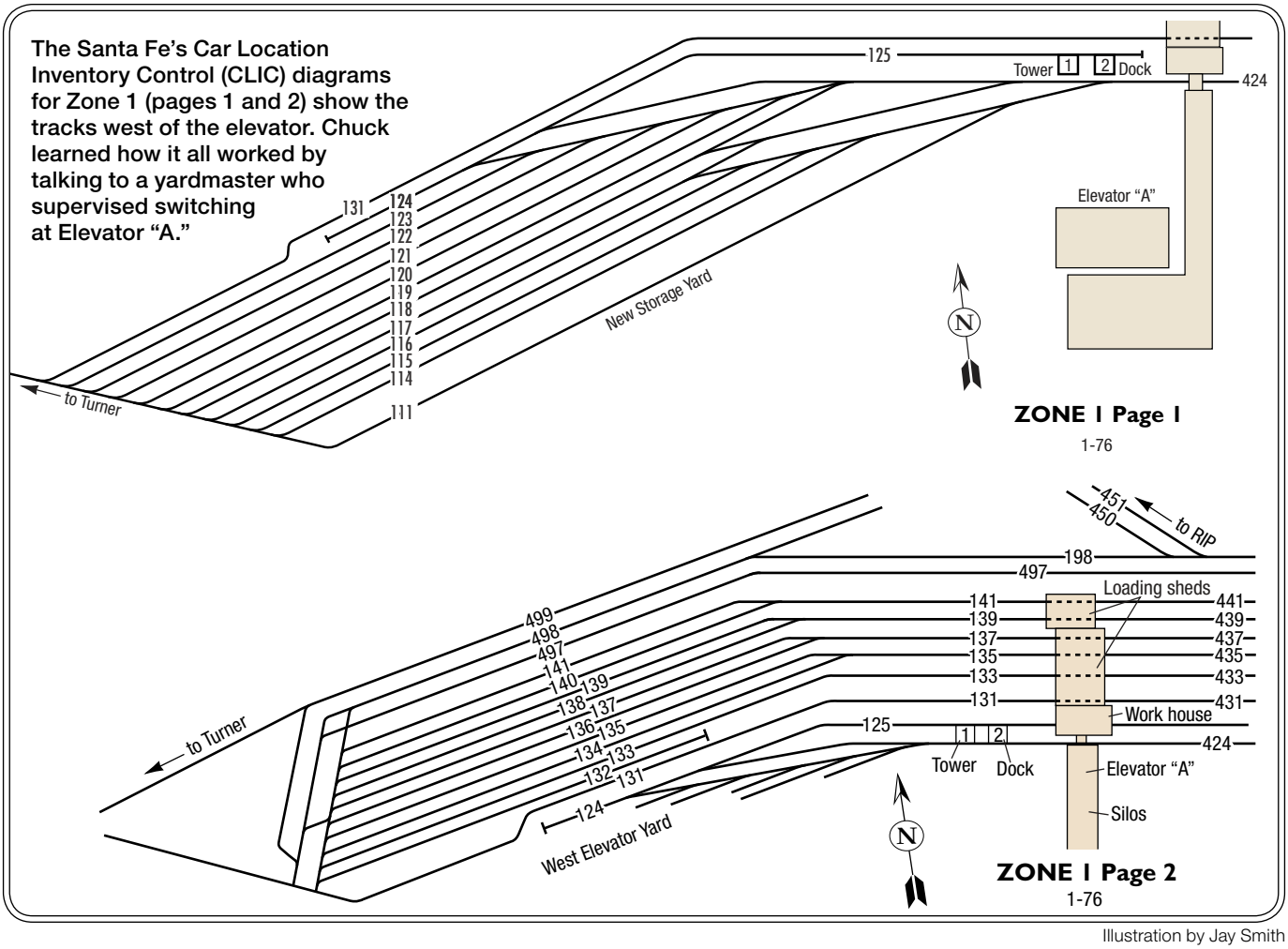


Illustration by Jay Smith

//Advantages of switch lists

In my 40 years as a professional railroader, I've never seen a crew using a stack of waybills to switch cars. They refer instead to a switch list. The switch list is a tool for train crews, while waybills are billing office documents.

A switch list is an inventory of the cars in a yard or industry track, or even in a train. Prototype switch lists are normally written by a yard clerk, who walks (or drives) along each track and writes down the car reporting marks (initials and numbers) in the order the cars stand on the track. (In the model world, an abbreviated car initial and the last two or three digits of the number are usually sufficient – CB&Q 43156 thus becomes Q156.)

When the clerk returns to the yard office, he compares his list to the stack of waybills and adds each car's destination to the column on the right side of the list. His list now shows each car's location and its destination. It's easy to add the number of the track into which each car should be switched – say, cars going to the Burlington on track 1, Union Pacific on track 2, "propers" for local industries on track 3, through cars on track 4, "hot" cars (perishables) going to the Chicago Great Western on track 5, and so on. This process is repeated before each eight-hour trick. Occasionally, a yardmaster may direct the clerk to recheck a track where cars have been "sloughed" (shoved randomly into a track) during switching.

On Bill Hirt's Chicago, Burlington & Quincy, the town of Elsberry has several industries on a common siding. Usually, this entire track is pulled, switched, and the "hold" cars (not yet ready to depart) are returned to the proper spots. Thus, upon arrival at Elsberry, a prudent conductor immediately makes a list of the cars as they stand on the siding so he can respot cars where they originally stood.

During an operating session on Chuck Hitchcock's Argentine Industrial District Ry., 90 to 110 cars may be spotted at Elevator "A." About 50 cars are pulled from the four east elevator tracks and are classified at 5th Street Yard, about 50 remain to be loaded or unloaded, and another 25 to 30 are inbound. To manage this large inventory of cars the clerk makes five switch lists, and switch crews never handle actual waybills.

For example, the Elevator "A" grain train departs Argentine Yard (staging) with 30 to 40 cars for the elevator, including loads of grain to be dumped and dirty cars headed for the material track for cleaning and grain-door installation. Accompanying the train is a switch list and a packet of corresponding waybills. Upon arriving at 5th St. Yard, the conductor hands the waybill packet to the yard clerk, who will hold them until the switching is done.

When the crew arrives at the west end of the elevator, they cut off the inbound cars and run to the east end to pull the outbound cars out of the four elevator tracks. The clerk has prepared four lists of the outbound cars, one for each of the four elevator tracks. As each track is classified at the 5th St. Yard under the direction of the yardmaster, the conductor marks in the "remarks" column of his list the yard track on which the cars were placed.

The completed list is handed to the clerk so he can sort the waybills in the proper pigeonholes above his desk that represent the seven yard tracks. That is, he "switches" the bills into the assigned "tracks," just like the train crew switched cars into tracks.

The train crew now goes to beans (lunch) while the elevator crew (usually Chuck) moves the inbound loads through the elevator to the east end. When the train crew returns from lunch, the first task is to spot cleaned and coopered cars (with grain doors installed) on loading tracks 1 and 2. They can then spot the cars of the inbound train to their assigned tracks.

Some inbound cars are empties to be cleaned and have grain doors installed, plus loaded cars that are headed for the dump (pit) tracks 3 and 4. As the cars are spotted, the list for those cars is handed to the clerk so he can file or "pickle" (PICL, for Perpetual Inventory Car Location) the associated waybills into the proper pigeonhole.

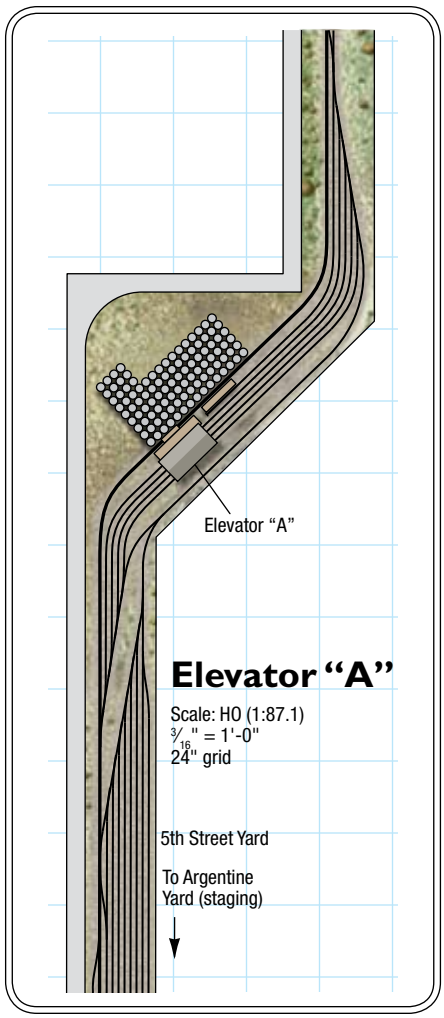
Once all of the elevator work has been done, the grain-train crew will confer with the 5th Street yardmaster to see if there's any yard work they can do. Often, the yardmaster will have the crew block each track by destination before they tie up at the 5th Street engine terminal and go off duty.

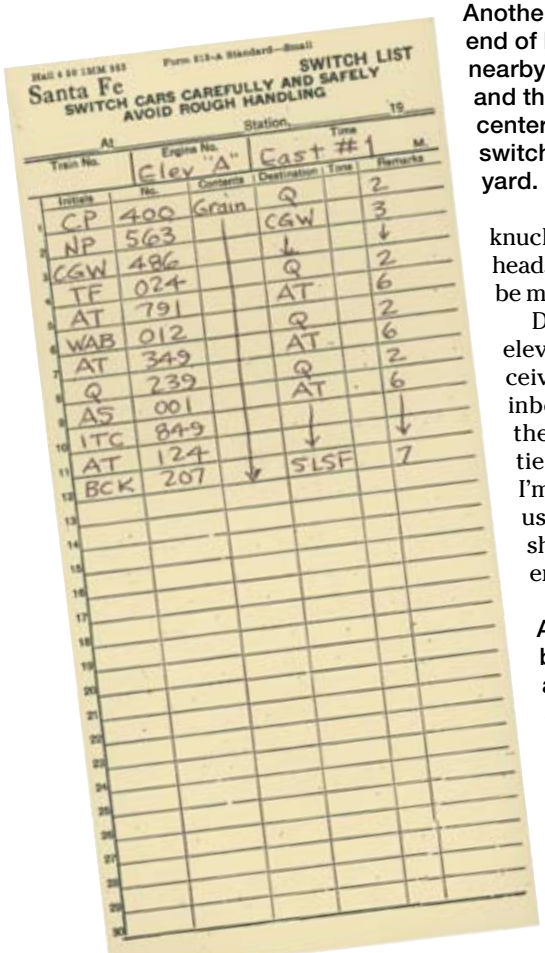
The advantage of switch lists is the conductor has only five pieces of paper to handle as opposed to fumbling with 90 or so waybills in car cards. Blocks of cars can be noted and handled accordingly, something that's very hard to do with individual waybills. The conductor notes any variations on the list to alert the clerk to the changes. The lists also form permanent records of movement. – *Mike Porter*

Yard clerk Mike Porter makes a list of cars on each track, checks the waybills for their destinations, and adds a track assignment for each car to the list. Each

track is represented by a box where the waybills are stored. Conductor Chuck Hitchcock then uses the list to place cars at the proper spots at Elevator "A."

Another late 1940s view of the west end of Elevator "A" shows the nearby West Elevator Yard at left and the New Storage Yard in the center. Two Fairbanks-Morse switchers are working the latter yard. Santa Fe photo.





Santa Fe
SWITCH CARS CAREFULLY AND SAFELY
AVOID ROUGH HANDLING
SWITCH LIST

Station
Time
19

At
Train No.
Engine No. Cley "A"
Cast #1

Initials	No.	Contents	Destination	Time	Remarks
CP	400	Grain	Q		2
NP	563		CGW		3
CGW	486		Q		2
TF	024		AT		6
AT	791		Q		2
WAB	012		AT		6
AT	349		Q		2
Q	239		AT		6
AS	001				
ITC	849				
AT	124		SLSF		7
BCK	207				

A typical switch list prepared by the clerk shows the initials and number for each car on a track. Waybill data is used by the clerk to determine to which track each car should go. Switch crews can then easily move each car to its proper spot.

knuckles and coupling these "bull heads" before the cuts of cars could be moved.

Don also pointed out that the elevator operated year-round, receiving about 60 percent of its inbound cars as loads of grain; the other 40 percent were empties for loading. In 1960, the year I'm modeling, the Santa Fe still used mostly 40-foot boxcars to ship grain rather than the covered hoppers used today.

Modeling the operations

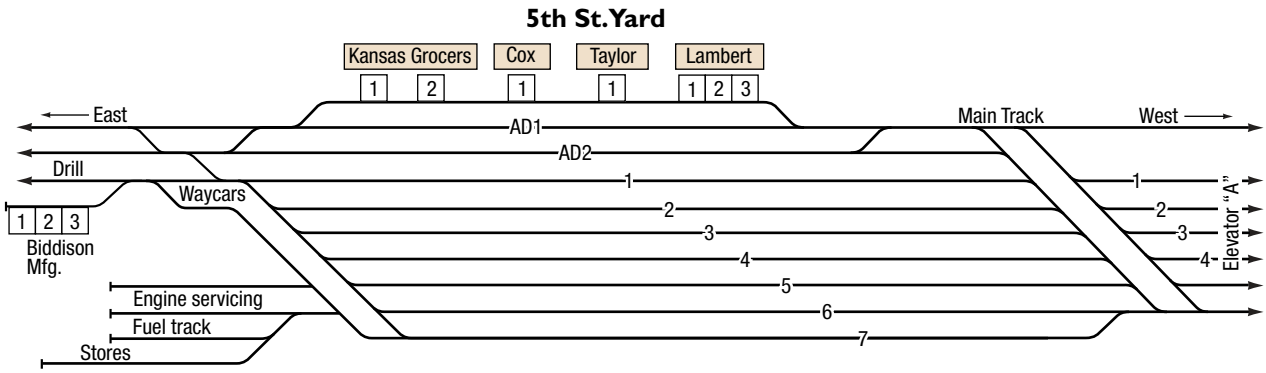
Elevator "A" switch jobs work all three eight-hour "tricks," or shifts, seven days a week. Each trick begins with a crew pulling from Argentine Yard (staging) a 25- to 30-car cut of 40-foot boxcars, a random mix of loads and empties. The crew uses a Santa Fe-style CLIC (Car Location Inventory Control) book with job descriptions and track diagrams to plan their work.

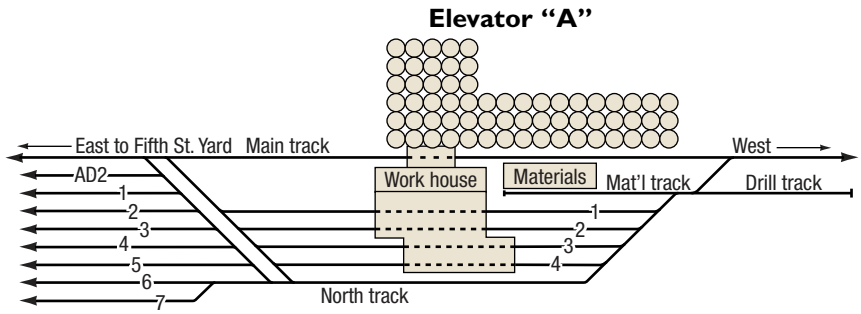
Using switch lists greatly eases the work load. In the sidebar, "Advantages of switch lists" on page 73, another professional railroader, Mike Porter, explains the sequence of operations as well as how switch lists are created.

LDE advantages

Because I based my Elevator "A" on the prototype, even though I didn't fully understand how it functioned, it was ready and waiting when I was fortunate to meet a retired Santa Fe yardmaster who knew how the job really worked.

Had I freelanced the plan to suit my own design whims, it could have been difficult to re-create the actual operating scenario. There's no substitute for looking to the prototype where realistic





The Elevator "A" pages from Chuck's "C.L.I.C. Bulletin No. 2" (note that east is to the left) show how he selectively condensed the prototype trackage.

operation is the goal or for talking to the folks who literally have been there and done that.

If you'd like to see how Elevator "A" is switched, that operation is discussed in Allen Keller Productions' videotape no. 50 featuring my Argentine Industrial District Ry. **MRP**

Chuck Hitchcock, a regular contributor to MRP, has modeled the Santa Fe in HO since 1960. The Argentine Industrial District replaced an earlier semi-freelanced edition of the Santa Fe in and west of Kansas City in 2001.

//Learning points

- Basing a track plan on actual railroad installations as a series of Layout Design Elements helps to ensure that the model's operation can replicate prototype practices when that knowledge is acquired.
- Talking to professional railroaders provides insights about how they actually do or did their jobs and often shows that assumptions made by even very experienced modelers may be incorrect.
- A handful of car cards with waybills can be converted to a switch list, which is easier to handle, helps to avoid spotting errors, and mimics what a pro would do.

Researching and then reproducing the numerous operating details is part of the fun of switching cars at a major railroad customer like Elevator "A."

Howard Zane created his dream layout room by building two additional basement areas that let him create new vistas. Paul J. Dolkos photo

Dream basements

It pays to plan ahead, whether or not your "basement" is underground

By Paul J. Dolkos

An old witticism among model railroaders is that a house's living area represents nothing more than a thick roof to keep rain and snow off the railroad in the basement. That's why we check out the lower environs first when we're house shopping.

When we venture downstairs, we will, likely as not, mutter curses at the misguided architect, builder, or previous homeowner responsible for mucking up the potential layout area with utilities, a rec room, storage bins, or laundry appliances. If we buy the house, we'll spend a lot of time conjuring up workarounds to deal with the problem areas.

But what if you're building a new home or addition? What would you do to create a dream space for your next railroad? Although some features will vary among modelers, most would say that the dream space should be large, obstruction-free, properly heated and cooled, and accessible without having the operating crew traipse through the family quarters as they enter, leave, or visit the bathroom.

Some factors to consider are listed in the "Basement builder's checklist" found on the facing page. Your available space and personal preferences will probably suggest additional items. I created the list with a very large layout space – 1,200 square feet or more – in mind. Minimizing the impact of obstacles can be much easier with smaller layouts.

Ceiling height

The nominal clearance below the joists in many basements is 8 feet. But below the joists, there is often a support beam 10" or so deep, and there may be ductwork and pipes that go under the support beam. A sunken living room upstairs can create another annoying intrusion. Vertical clearances can get pretty tight even with a nominal 8-foot ceiling. This is doubly true if you're contemplating a mushroom plan where the floor rises in tune with the upper deck.

On the other hand, by building the basement a foot or two deeper, it's much easier to accommodate those overhead elements while maintaining comfortable clearances. This means adding another course or two of blocks or using deeper forms for poured concrete foundations. (The latter are more resistant to moisture than block, by the way.) If you specify the extra depth in the initial planning stages, it doesn't add much to the cost.

Found space

Basement walls usually follow the footprint of the living area above; they are, after all, the foundation. Porches are often built outside this footprint on shallow foundations. But with a little extra excavation, full-depth porch foundations can add additional layout-room space, again at relatively low cost.

//Basement builder's checklist

• **Increase ceiling clearance:** Ask the contractor to make the basement a foot or two deeper.

• **Run ductwork and pipes out of the way:** Don't let an odd pipe or duct location dictate layout design.

• **Group utility systems together:** Place HVAC, water heaters and softeners, circuit-breaker panels, etc., in a single location to minimize impact on the layout footprint.

• **Manage stairway and door locations:** Consider how room entrances impact the layout plan and how bulky items such as building materials can be moved in and out of the space, and consider fire-escape routes.

• **Check support column locations:** Carefully manage their placement or eliminate them with stronger joists.

• **Reserve space for workshop, storage, crew lounge, bathroom, and dispatcher's office:** You need to provide room for more than just the layout.

• **Test your assumptions:** Draw several proposed track plans to see whether the space will accommodate desired benchwork and aisle widths. – *P.D.*

Jeff Otto extended the basement under a four-car garage to create a generous L-shaped area for his HO scale Missabe Northern RR. A peninsula will occupy the center, and the break in the backdrop will accommodate the second level's supporting joists. Pat Student photo

for dream layouts

Excavating under garage floors is even more fruitful, although it's also a more expensive and more complex approach because of the loads the garage floor must support. (See "Room under the garage" on page 81.)

Locating ductwork

Architectural plans and construction drawings are detailed, but they usually don't show the placement of ductwork and plumbing. The location is left up to the installers. They usually do their best to run pipes and ducts between joists and along the edge of the ceiling, but sometimes installers take the course of least resistance. That's especially so in a basement, as it's not prime living area. So all of a sudden a soil pipe appears right in the middle of what was going to be your main yard. Not good.

How do you prevent this? Right from the start, you have to make it clear to all parties what you're trying to achieve. Once pipes get buried in a concrete basement floor, it's very tough to make changes. Seek alternative approaches such as flexible ducting that runs out of the top of the main duct between joists, not out the sides. Draw diagrams and put instructions in writing. And remember that specifying a high ceiling in the first place makes things much easier for all concerned.

You'll probably have to accept some compromises, but before your builder starts pouring concrete, running pipes, and installing ductwork, everyone needs to understand what the installation will look like when it's finished. To minimize surprises, spend some time on site while the work proceeds, communicating not only with the general contractor but also with the installers.

Utility systems

Fortunately, modern heating and cooling systems are not only more efficient, but also compact. They may even be conveniently located upstairs, as it's more efficient to push cool air down than up. But systems that must be located in the basement should be grouped in one corner, under the stairs, or in the center of the room where they are accessible yet clear of the layout footprint.

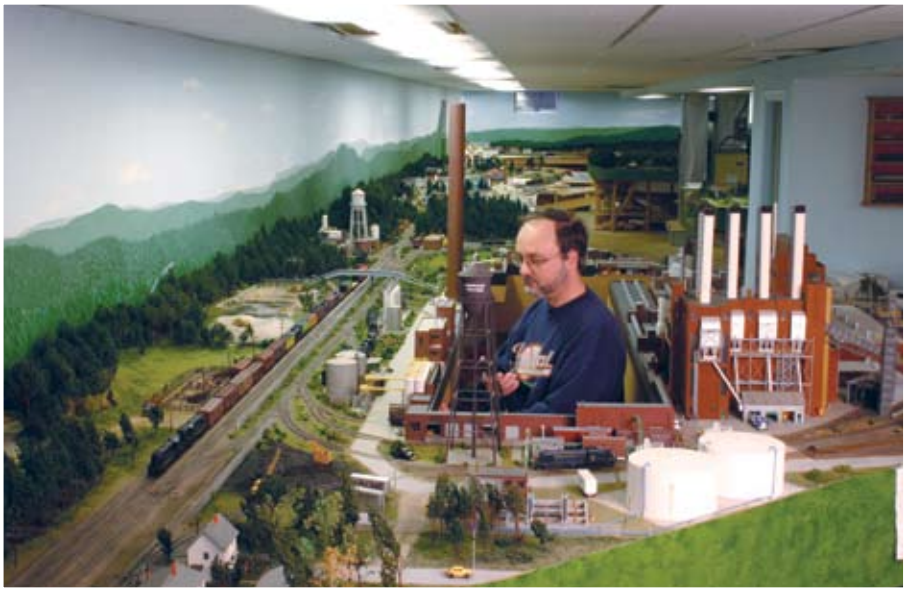
In existing homes, relocating appliances such as the water heater before layout construction starts may pay big dividends. It may be possible to relocate the clothes washer and drier upstairs, freeing up layout space while ending the need to carry laundry up and down the basement stairs.

The circuit breaker panel needs to be located clear of the layout area. Electrical codes require a certain amount of open space in front of and to either side of the panel (typically 36" in front and 30" side-to-side), so be sure you know your local requirements before building benchwork near a panel. Remember to locate the water and gas main shut-off valves where they'll be accessible after the railroad is in place. Put the water softener where it will be easy to replenish the salt.

Stairways

It's usually a good idea to have your basement stairs come down into the center of the room rather than being located along a wall. That allows entry into the center of an around-the-room layout without a duckunder.

A second, outside entrance into the basement makes it easier to lug in building materials, and it can provide a fire-escape route. It may even preclude the need for your operating crew to enter



Jim Brewer (top photo) specified 9-foot ceilings for his 3,000-square-foot basement that's home to his Norfolk & Western layout. Staging and a workshop (middle) are in an adjoining room, and the stairs come into the center of the room, much better than placing them against a outside wall. Jim had chimney flues (bottom) laid on end to pierce a fireplace foundation. Paul Dolkos photos

through the family space. However, such entries are typically like stairs against an outside wall in their impact on layout design, so consider them very carefully.

Increasing clear spans

A big clear space without columns is what most of us envision when we think of a dream layout room. With various types of wood floor joists, a clear span of about 24 feet can be achieved. Wider spans are possible but may require a support beam under the trusses, typically at the midpoint, with the beam supported by posts. It's worth taking time to discuss floor-support options with an engineer, who may be able to recommend a system that will maximize the post-free space.

If support posts are unavoidable, the layout design often can be adjusted to minimize the visual impact of the posts. Frequently the posts can be hidden within backdrop running down the center of a peninsula.

Testing the space

When you look at the plans for your new house, you may see a lot of square footage and be giddy with joy at the prospects. Only after moving in do you discover a change, such as moving the stairway or entrance door a bit to the right or left, that would have materially improved the track plan.

To avoid or at least minimize the possibility of such a dilemma, develop some possible layout footprints before home construction begins. They don't have to be detailed track plans, but they should show where the main line could run and what benchwork width is required. Pay special attention to aisle widths (the wider the better) and gauge whether peninsulas with a turnback loop at the end will fit while still maintaining adequate passageways.

Where tight spots appear, perhaps you can adjust the location of posts, appliances, stairs, or even walls before construction starts.

This may be a good time to become familiar with one of the computer-aided design packages tailored especially for model railroaders. The learning curve can be steep, but since you're between layouts anyway, you may find the time well spent. It's impossible to cheat to make a curve fit when the software is helping you locate the curves accurately. [See "Designing the Deepwater District using CAD" by Gerry Albers in MRP 2005. – *Ed.*]

Also, be careful using the dimensions of the architect's plans. The house will be built per those drawings, but there will be some discrepancies because of

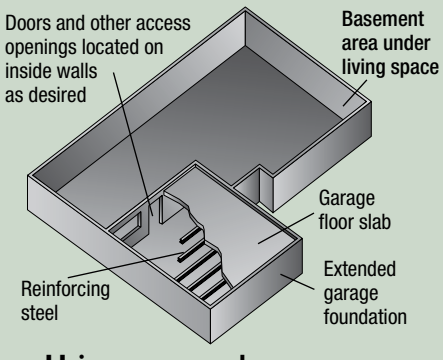
//Room under the garage

Rick McClellan gained 1,100 square feet by having the area under his garage excavated. Additional support beams and posts would have eliminated the need for a concrete wall between the under-garage area and the rest of the basement. Rick McClellan photo

If you're planning to build a new home with a basement and need more layout space, consider the area under the garage (see drawing below). This area is not usually excavated due to the weight of the vehicles that occupy the garage. At a relatively low cost per square foot, however, it can be excavated to create additional basement space. The secret is in reinforcing the garage floor with steel beams and rebar to support the vehicles.

In many home designs, two full walls abut the garage area, and a partial foundation surrounds the remainder. Increasing the space means moving some additional earth, building a basement wall along the garage perimeter, and reinforcing the garage floor. In fact, it may be easier for the builder to fully (instead of partially) excavate the garage area. He will have the manpower and equipment in place to do that work.

The four walls around the garage support the steel beams, reinforcing bars, and garage floor slab. It may therefore be difficult or impossible to eliminate the wall between the conventional basement and the expanded basement under the garage. Careful planning will certainly be required to allow for a door and other openings for the railroad to pass through. Alternately, the added space could house a workshop, crew lounge, and/or utilities, thus opening up more floor space in the rest of the basement for the railroad.



Using space under garage

Illustration by Jay Smith

Builders may not readily accept such a deviation from standard practices. A way around that is to provide a set of engineering drawings that detail the required supports. Mike Fyten, a modeler and engineering consultant, offers a service to draft the needed plans. You can contact Mike at 913-268-1114 or mfyten@planetkc.com. The plans will have to be approved by a certified professional engineer in your jurisdiction to meet local building codes. The drawings typically cost $300 to $400.

Mike estimates that the additional construction cost for extending a basement under a garage is $10 to $20 per square foot, depending on the region and other factors, considerably less than the typical $100-plus per square foot for the rest of the house or the cost of an outbuilding. The cost would typically be included in the mortgage with minimal impact on monthly payments.

Rick McClellan, who lives in the Kansas City area, figures the 1,100 square feet of basement he gained under his garage cost roughly $10 per square foot unfinished. Rick also asked the contractor to leave the garage floor forms ("cribbing") in place so he would have wood "joists" in place from which to hang his suspended ceiling. Installing the suspended ceiling reduced the room height from 7'-4" to 6'-6", however.

Rick had the contractor add a heating/air-conditioning duct down the middle of the under-garage area's ceiling. He also had the contractor leave 16"-square access holes in the wall between the basement and the under-garage area so trains could pass through the walls, not the two 48"-wide doorways. He belatedly discovered that this wall could have been avoided if more steel beams and support posts had been added to support the load.

Rick noted that the garage floor isn't watertight, as it's designed to "float" on its supports. One winter, about a gallon of water from ice melting off his pickup truck found its way into the basement. "Don't forget to install a sump pump," Rick cautions. – *P.D.*

Ed Rappe specified additional courses of block to increase the basement depth (ceiling height) to 9'-7" (8'-7" under the beam). A thicker beam eliminated a support column at a bad location. The other photo shows the porch foundation, which Ed assumed wouldn't be fully excavated. He thereby forfeited a 6 x 34-foot space that could have housed utilities or a staging yard. Ed and Judy Rappe photos

the materials used, builder interpretations, or even mistakes on the drawings or during construction. For planning purposes, assume that the space may be a bit more restricted than shown.

Other considerations

If you're going to build a dream basement or an addition to your existing home, then you'll probably also want to provide for a workshop, storage area, crew lounge, dispatcher's office, and bathroom. Such features add a lot to your enjoyment and that of your crew.

Find a spot for your spray-painting booth that allows outside venting of paint fumes. Consider installing a good stereo system and perhaps a television and personal computer near the workbench. You can get a lot of modeling done while "watching" a ball game.

Local building codes may require basement windows, so consider how windows will impact the design of your layout. (Swing-open windows can be handy when it comes time to move long boards into the basement.) Give some thought as to how people will get out of the layout room in case a fire or dense smoke blocks the stairs or main exit.

If a sump pump or radon-abatement system is likely to be required, determine how it will impact layout design. Even though a below-grade basement tends to maintain moderate temperatures year round, it will quickly warm up during a summer operating session. At the least, removing the humidity from the air is mandatory to ensure against corrosion of your precision models and their electronic control systems.

Backyard basements

Howard Zane expanded his basement in concert with a pair of additions to his home (see February 2004 issue of *Model Railroader*). He contemplated adding even more layout space by extending his basement into the backyard with no house above it; a slightly sloped roof projecting just above ground level would have covered the basement with a deck over the roof.

As you might expect, the local building permit authority raised its collective eyebrow and said they might take up to two years to study the proposal. As it turned out, the proposal was approved within two months, but Howard dropped the idea when concerns arose about getting construction equipment into the backyard. Nonetheless, this is an example where "bunker mentality" might save the day.

"California basements"

In some parts of the country, such as California, basements are few and far between. West Coast modelers often call garages "California basements." The good news is that garages seldom have intrusive low ceilings, ductwork, furnaces, and stairways. The bad news is that they can be drafty with lots of dust infiltration, and sometimes people even want to park cars in them!

If you're building a garage for the purpose of housing a model railroad, there are several things you can do to make it more accommodating. Build it as big as the lot lines allow, and add storage areas outside the garage for lawn tools and such. Try to locate the doorway into the house so that it doesn't interfere with the proposed layout footprint or require a duckunder. Insulate the walls and ceiling, and provide heating and cooling. Install adequate electrical circuits for layout power and lighting. If you can banish the car(s) to the driveway, seal the garage door to eliminate outside dirt infiltration.

Some modelers combat the dust problem by building an enclosed room inside the garage. Dust infiltration is minimized by maintaining a slightly higher air pressure in the room. Another approach is to add a room above the garage, which is where David Barrow's Cat Mountain & Santa Fe (see page 56) is housed. He has expanded that space to the point that the layout room now cantilevers out over the garage walls.

West Coaster Jim Providenza recommends using sliding barn-style garage doors instead of the common overhead variety. Sliding doors eliminate the side and overhead tracks that can get in the way of the railroad's right-of-way.

Bob Hayden followed a different path. He lives near heritage-conscious Santa Fe, N.M., so erecting a corrugated-metal outbuilding in his backyard was out of the question. Bob worked with an Albuquerque-based manufacturer (Preferred

//Learning points

- Adding a course or two of blocks to the height of a basement adds little construction cost and accommodates mushroom-style track plans.
- The space under a garage floor or porch can be excavated at relatively modest extra cost.
- Clear specifications and pre-construction conversations with the architect and builder are essential.
- Avoid change orders.
- Group intrusive elements such as stairs and utilities in the center of the room away from perimeter walls.
- Don't forget to provide space for a workshop, storage area, crew lounge, and possibly a bathroom and dispatcher's office.
- Determine layout footprint before finalizing building design.

Monroe Stewart, a civil engineer and architect, roughed out a layout plan for his N scale Hooch Junction, then designed the rest of the basement and the house above it, and finally bought land that fit the design. Paul Dolkos photo

Building Systems, 505-822-0800) to construct a 28 x 60-foot freestanding structure that looks like an adobe building. It was built off-site, then all 70,000 pounds of it was moved in by truck.

Bob says, "It's basically a starter home reconfigured into what most people would call an art studio and office suite. It worked out great – best thing I've ever bought!"

The railroad-room portion is 27 x 27 feet with a 9'-6" ceiling. The rest of the building houses two offices, a workshop, and a full bath. Rather than avoiding windows in the railroad room, Bob – a former submarine officer – even added skylights to ensure that he didn't lose touch with the outdoors.

Bob Hayden had this adobe-style home-office and layout building factory-built to meet stringent local zoning codes and then transported the 28 x 60-foot building to his lot near Santa Fe, N.M. Bob Hayden photo

Making it happen

Since you, like most of us, may be a layman when it comes to home construction, you'll probably have to learn a lot about current building practices and new technologies in a relatively short time. Building a new home is a significant effort even without special provisions for a model railroad. Shop around for architects and general contractors who seem genuinely interested in your special needs. Check on local building codes to see what unforeseen obstacles they may raise. If someone seems intent on blocking your creativity, get a second opinion, or even a third.

The perennial question: "How much more will my dream basement cost than the standard variety?" The amount can vary tremendously, but the important thing is to make sure that you specify everything from wall height and insulation to ceiling and floor finishes very clearly right up front, as change orders can kill your budget. A few instances of "as long as you're at it, let's do this" can cost big bucks.

Before you start, take the time to visit under-construction or recently built basements, garages, additions, or outbuildings. Make notes of what looks good and what designs are a potential problem for your railroad. Be sure that you discuss all your concerns and goals with both your architect and builder. With a modest amount of planning, you'll probably discover that creating a truly ideal place for your next model railroad won't cost much more than the plain-vanilla variety. **MRP**

Paul Dolkos, a regular contributor to MRP since the inaugural 1995 issue, continues to provide insights about planning and building more-realistic, esthetically pleasing, and enjoyable model railroads.

Industrial railroad on a shelf

A fictional history helped to determine the track arrangements

By Linda Sand

When designing a freelanced model railroad, I find it helps to begin by sketching out its history. For me, the challenge of developing the accompanying small HO scale switching layout was to find a believable way to get cars on and off the railroad without a space-consuming yard, thus retaining some open space for scenery. Here's the story I came up with.

Sherman's paper mill

Many years ago, Max H. Sherman built a small paper mill on the south bank of the Tomowa River just west of the mouth of Shansung Creek in Wisconsin. The river provided power to run the plant's machinery as well as a means to transport logs to the mill.

When the Chicago & North Western extended its main line across the river, they persuaded Mr. Sherman to let them build a spur to serve his paper mill despite the fact that the Wisconsin Central ran right past it. Where the C&NW's track crossed the WC main line, the C&NW erected an interlocking tower to protect the crossing and built an interchange with the WC.

//Learning points

- Developing a fictitious history for a freelanced railroad or industry will help you understand its purpose and its chronological plant development.
- Be sure to provide an interchange connection with the rest of the rail network for inbound and outbound cars.
- A large industry may have a small in-plant switcher that conserves track space while providing the chance to model something off the beaten path.

As the mill grew, more tracks were laid. When the mill was converted from water power to steam, the railroad supplied necessary carloads of coal. Some time later the WC abandoned its line, and the Sherman Paper Co. bought a portion of the track. It also acquired a small yard engine for in-plant switching so cars could be moved as desired.

That arrangement continued into recent times. Today, C&NW successor Union Pacific delivers cars to the mill through the old interchange track. The mill still does all of its own switching, and it sets outbound cars back on the interchange for the UP to pick up.

Note that a street crosses through the middle of the paper mill. The switching crew can block it for a few minutes at a time, but it has to be kept open for auto and truck traffic as well as emergency vehicles.

Car types and movements

Cars for the paper mill come from the C&NW (or UP), which is represented by a dummy crossing and a tower at the WC crossing. The mixed cars for each day's work are simply placed by hand onto the interchange track, which allows different cars to be used on different days to create a wide variety of switching scenarios.

Appropriate rolling stock includes pulpwood flats, wood-chip hoppers, coal hoppers, chemical tank cars, boxcars fitted with roof hatches or covered hoppers for kaolin clay (or tank cars carrying kaolin slurry in more recent times), machinery flats, and high-grade boxcars to load with paper. If you have more cars than will fit on the layout, you can store unused equipment in a nearby bookcase or on shelves under the layout.

Scenic opportunities

Although it's compact, this railroad offers scenery opportunities. I happen to

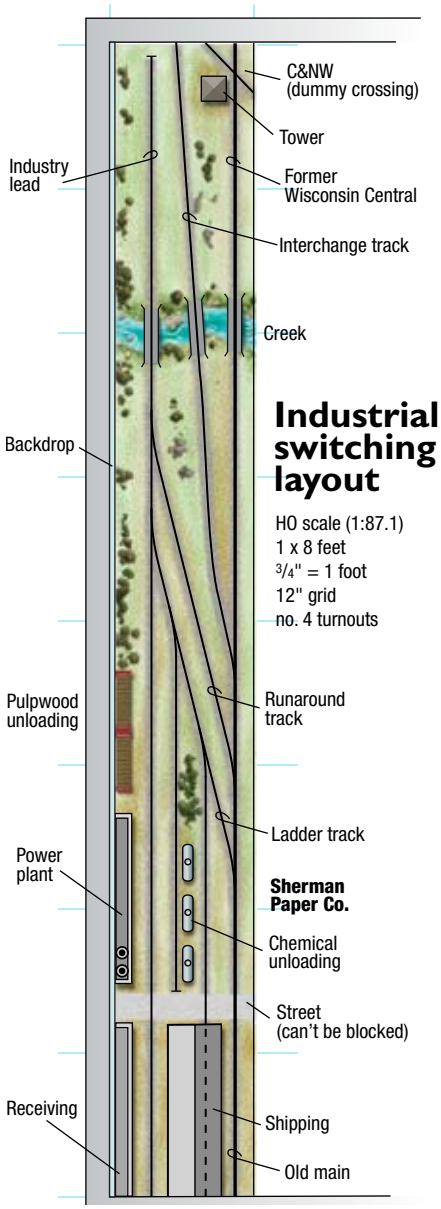


Illustration by Jay Smith

love buildings that dwarf railroad cars, so I provided three really tall ones. They're all simple, four-sided structures to make kitbashing or even scratchbuilding more manageable for beginners. It will also be fun to build the three bridges over the creek. Of course, the WC bridge should have a different type of construction to show its heritage from a separate company.

Since you'll never actually see a train on the truncated C&NW (UP), you could indicate ownership by painting the tower in the old C&NW medium gray, parking a North Western or UP maintenance-of-way truck nearby, and using C&NW's famous "pink lady" ballast. The track inside the paper mill would probably be ballasted with cinders.

Historical changes

Since I had done some basic track planning before I developed the history, I made a few revisions to the track plan to match this sequence of events. The narrative suggested that I needed to move the receiving location from an extended chemical track to the long track of the industrial lead.

"History" also encouraged me to make the shipping and receiving buildings separate. The receiving building would have been the original mill, but shipping space would have been added later. And I moved the turnout for the interchange from the runaround track to the old main, since the interchange supposedly predated the runaround.

The mill's switch engine is serviced by the nearby C&NW shop, which is reached by the ex-WC track that crosses its main line at the old tower. This explains why the diamond remains even after the WC abandoned this line. However, I'd model the tower in a boarded-up state, as its purpose ended with the WC's abandonment.

Add your own touches

Anyone building this layout has the opportunity to develop its history in more detail. Many choices remain open.

What era will it depict? What type of locomotive switches the paper mill? How is it painted? Is the mill still owned by Sherman Paper Co., or does a conglomerate now run it? These are all questions you can resolve during the layout's construction. **MRP**

Linda Sand enjoys planning layouts where large industries are switched with specific spots for cars bringing in or taking out specific commodities. She and husband Dave are often found helping others enjoy realistic model railroad operating sessions.

Paper mills are big, sprawling complexes of buildings. Here, a pair of spurs serve a chemical receiving area on one side of the main track, while boxcars are loaded with finished paper from the warehouse on the right. Photo by Jim Hediger

Ten years of MRP

Matt Kosic

Arnt's Ann Arbor

Arnt Gerritsen's depiction of ferry operations in and around Frankfort and Elberta, Mich., in the 2005 issue brings back many great memories, as I was stationed at the U.S. Coast Guard Lifeboat Station Frankfort in 1976 and '77. The station is in the background of the photo on page 18.

I spent many hours watching ferries being loaded and unloaded, which was a fascinating operation. The "Arthur K" (*Arthur K. Atkinson*) wasn't in service then, so we used it for docking practice with our small boats. I thought then that this would be an interesting operation to model.

Arnt has done an excellent job in capturing the essence of the operations of the Ann Arbor as well as the area's scenery. Thanks for the memories.

Michael E. Lee, USCG retired
League City, Texas

The anniversary issue

Great 10th anniversary issue! In the six years I've known Arnt Gerritsen, builder of the Ann Arbor layout featured in 2005, he's shown himself to be a truly fine gentleman. I, too, was saddened to learn of his health problems, but I'm happy he's found ways to work around them and continue to enjoy model railroading. Here's wishing him many more years of operation on his Ann Arbor!

I grew up in Missouri and railfanned all over central Illinois and am intimately

M. Schafer/R. Wegner

familiar with Steak 'n' Shake restaurants, so the emblem Mike Schafer uses for his Illinois & St. Louis nearly jumped off the page at me. I was really tickled to learn that the I&StL business car is named *Chief Takhomasak*.

One question: Aren't the labels for Illinois and Indiana at the state line reversed on page 29?

Gary Roe
Moberly, Mo.

[Yes, they are. – *Tony Koester, editor*]

The long and short of it

I especially liked the mix of longer articles and shorter tips, but a couple of the large articles were just too big. I would like to see the longer articles trimmed back to a maximum of six pages to allow more of those smaller ideas to be put into the magazine.

Ironically, both MRP 2005 and MRP 1995 (I purchased the inaugural issue on eBay) arrived in the post on the same day, so I was able to compare the two issues side by side. It was a good magazine then, and it's an even better one now.

Adrian Morris
Taumarunui, New Zealand

Tenth year, 100 great pages

Congratulations on the 10th anniversary issue of MRP – one hundred pages of great articles and information. I felt close to home with features by my friends Arnt Gerritsen and Lloyd Miller and other modelers I've had the pleasure of meeting. Steve King's commentary added a lot of depth to the article on Steve Sherrill's On2½ railroad. Paul Dolkos' piece on John King's Baltimore & Ohio layout was also excellent.

I especially enjoyed Mark Olstyn's Central Vermont layout. In September 1954, I was a new freshman at Amherst College, busy entering a new world but still with time enough to occasionally watch the CV local switch Elder Lumber or the college heating plant.

However, the map on page 40 shows the alternate line from Bellows Falls to Essex Junction as CV. It's the Rutland RR, of course, meeting the unlabeled Chatham-to-Bennington line at Rutland, Vt. This hadn't been CV since it lost its lease of the Rutland in 1896.

Bill Jewett, Coordinator
NMRA Operations SIG

[We were saddened to learn of Bill's passing in January 2006. Our sympathy is extended to his family. – *T.K.*]

Prototype pics mix

I was surprised to see a familiar Alco hood unit pictured on page 85 of MRP '05. Upon closer examination, I see it is my picture! Thanks for using it.

I've been a Kalmbach customer for more than 45 years. In response to a letter published in the Reader Forum section, MRP especially needs plenty of prototype photos and data. We're all trying to model the prototype, even when we're freelancing!

James Rogers
Laurel, Md.

[In the caption for James' RS-3 photo, we said the East Tennessee & Western North Carolina's parent was the Southern Ry. Not so: The ET&WNC was

an independent dual-gauge railroad. Quoting reader Mike Baskette of Lexington, Ky., "RS-3s 209 and 210 came to the railroad in Southern colors when they were received in trade for two ET&WNC 2-8-0s. These units wore the Southern's 'tuxedo' livery shown in the photo for only a short while, as they finished the 1970s decked out in ET orange and black." – *T.K.*]

Photos provide yardstick

In response to the letter about MRP '04 having too many prototype photos, it's hard to judge how well a track plan meets its goals without having enough information about the prototype. For, me, MRP's balance between model and prototype is A-okay.

By the way, MRP readers may enjoy checking on some of the "micro layouts" shown at www.carendt.us. Some of these are indeed prototype driven, even the simple circles.

Jonathan Caswell
Worcester, Mass.

Side-by-side comparison

Since MRP is about layout design, it seems appropriate to compare a proposed or just-started model railroad to its prototype with side-by-side photos of the model and the real thing. Since the art of model railroad planning is advancing at a fast pace, we do not want to wait 20 years to see photos of the completed model railroad.

Rick Mugele
La Grange, Calif.

Farmer visits YVRR

In a sidebar to his article on John King's Baltimore & Ohio layout in MRP 2005, Paul Dolkos mentioned Bob Lunoe, a former brakeman on the Yosemite Valley RR who's been a great resource and inspiration for those of us researching and modeling the YV. Paul told how we'd offered to fly Bob from his Missouri farm to California to spur his recollections, but that Bob felt he "couldn't leave his herd."


Jack Burgess

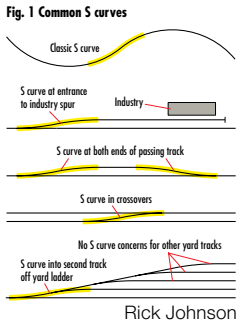
Well, Bob finally retired from farming and consented to the trip in September 2004. He visited my YVRR layout, checked the restoration work being done on a wood YV observation car, and met a group of fans of the YV at our annual get-together. He also got a tour of the abandoned right-of-way and was amazed at the changes around Merced.

The accompanying photo shows him posing in front of one of the tunnels. It was an honor to have him share some time with us.

Jack Burgess
Newark, Calif.

Prototypically tight turnouts

Kenneth Anthony's MRP '05 article on S curves and switches struck a resonant note. I occasionally work with the track engineering department at New York city Transit in developing new interlockings or redesigning older ones, and we face a lot of the same issues mentioned in the article. We don't focus on S curves as much as on allowable speeds through turnouts, especially for diverging movements through facing points, but its really the same thing.



Rick Johnson

On the subway, we actually use the same size turnouts as model railroaders – no. 6s and no. 8s predominate, no. 10s are an absolute luxury, and no. 12s are almost unheard of. In really tight spots we have no. 4 and no. 5 turnouts.

Glenn Lunden
New York, N.Y.

Small, medium, and large

I noticed the layouts in MRP 2005 fell into two categories at the opposite ends of the scale: shelf switching railroads or large home layouts (private clubs?). This may reflect an attempt to introduce new modelers to the hobby while showcasing the work of increased resources of the baby boomers.

I think MRP needs to maintain a balance by also featuring layouts that can be run by a small crew as well as built, operated, and maintained by the owner alone. Many of Iain Rice's plans fall into this category.

Ernie Colwell
Flagstaff, Ariz.

Converting HO plan to O

I would like to convert the HO industrial switching plan by Scot Osterweil, on page 50 of MRP 2005, to O scale. I have a 3 x 10-foot area along a wall.

Gary Gross
Groveport, Ohio

[Since O scale (1:48 proportion) is 1.8 times larger than HO (1:87.1 proportion), I used an office copier to enlarge the plan by 180 percent. In O scale the track plan measures 1'-8" x 10'-10".

If you're limited to 10 feet in length, you'll need to shorten the enlarged plan to fit. I'd take the 10" off the left end, making tracks A, C, N, and S each one car length shorter.

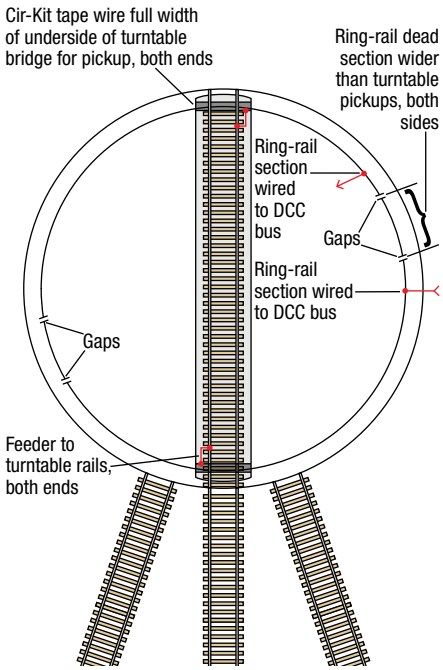
The 1'-8" width fits your space easily, and you may want to allow extra room at the front and back for structures and scenery. You can make it up to 2'-3" wide and still have everything within easy reach. – *Andy Sperandeo, editorial director*]

Manual staging turntable

I saw Mary Miller's Planning Tip on a manual staging turntable in MRP '05. Unfortunately, the information on how to wire what appears to be a brilliant design lacked enough detail for me to understand exactly how the turntable is hooked up. I use Digitrax DCC. Please provide more detailed information.

Ken Currie
Arlington, Texas

Wiring for manual staging turntable



[Ken, each half of the split rail in the turntable pit is wired to one DCC bus wire. The turntable's ring rail has two dead sections so the Cir-Kit tape pickup strips, which run the width of the bottom of the turntable bridge, can't cause a short circuit across any one gap when the table is turning. The dead sections must be located so that the ends of the bridge aren't over them when the bridge is aligned with any of the lead or stall tracks. A single gap on each side of the ring rail would be adequate for DC. – *Mary Miller*]

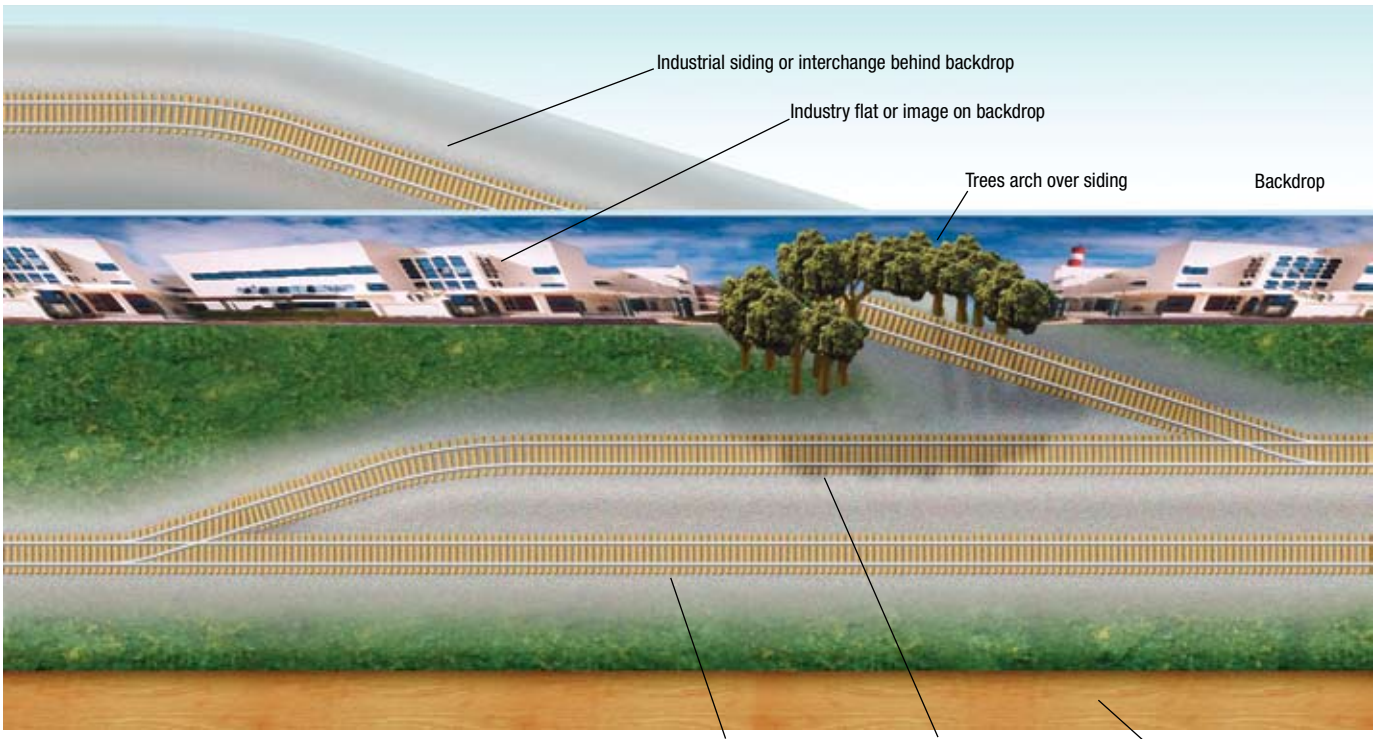


Illustration by Theo Cobb

Hiding the hole in the wall

It can be as simple as planting a few trees

Paul Dolkos, writing in *Model Railroad Planning 1998*, described many ways to make trains disappear from the scenicked part of a layout into hidden staging or storage tracks, or even to go on to a different scene. Achieving such stage magic without unduly compromising realism can be especially challenging on a flatland railroad, as there are no mountains with tunnels or other intervening geological features to come to our rescue. When there aren't even many hills, the old run-the-track-under-a-bridge trick isn't always appropriate or effective.

Paul showed how to use a row of trees between the viewer and the disappearing track to screen a hole in the backdrop from ready view. However, a track that penetrates the backdrop directly in your line of sight presents a trickier challenge, and one that's a lot harder to handle successfully.

But as the photograph at the right shows, even this problem may have a completely prototypical solution. This spur passes through the overarching trees to reach the elevator in the distance, a perfect setting for a model track that has to disappear from view. Such foliage would never be permitted so close to a busy main line, but in this case the trees weren't enough of a nuisance to warrant trimming or removal.

Following the example of this prototype, an industrial track could be extended as in the illustration above to pass though the backdrop into a hidden storage area representing an industry some distance from the main line. Or the industry might tower over the trees as in the prototype photo, in a backdrop representation carried out with flats, photos, or simply by painting. Similarly, an interchange track, the so-called "universal industry," could pass through such an opening to connect with another railroad. Either type of track might extend for some distance out of sight to increase its capacity. – *Chris Webster*

Here a track runs under some trees to reach a distant elevator. But imagine this as a model scene with the elevator on the backdrop and trees around a hole. Chris Webster photo

//Planning Tip

Visualizing layout elevations

Another use for a bookcase

Steve King used an empty bookcase and string to help visualize the heights of major operating levels and grade profiles when planning his new N scale layout. Steve King photo

Many multilevel layouts continuously spiral upward as they progress from end to end, but I designed my N scale Virginia Midland RR with an undulating profile. That resulted in a railroad that passes through a range of different operating levels and track elevations as it traversed its 375-foot run. While the resulting sawtooth profile is a realistic feature typical of many Appalachian prototypes, the various ups and downs made it more difficult for me to visualize potential layout problems and opportunities before construction began.

First, I decided to fix the lowest and highest operating levels. I settled on approximately 38" and 63" above the floor. The railroad actually starts out from staging at a mid-level height, 52.5", rises to the highest point at Bishop, 62.4" elevation, descends to the lowest level at Cedar Springs, 37.8", then rises again to a higher level as it completes the run into the other staging yard at 62".

Using a spreadsheet to calculate elevations, figuring distance traveled at certain grade percentages, I knew what the elevation would be for each major operating area. That was still just a two-dimensional representation, however, and my railroad would be very much a three-dimensional undertaking.

To actually see the elevations, I set the shelves in an empty bookcase to simulate the key operating heights. I put a building or two and a few cars or engines on each shelf to help me appreciate the effects of elevation on viewing angle and reach-in accessibility.

Then, to tie all the levels together and to help illustrate the railroad's undulating grade, I connected the shelves with a string line representing the grade profile. This helped me visualize my layout design, and it proved to be a great aid in explaining the concept to others. – *Steve King*

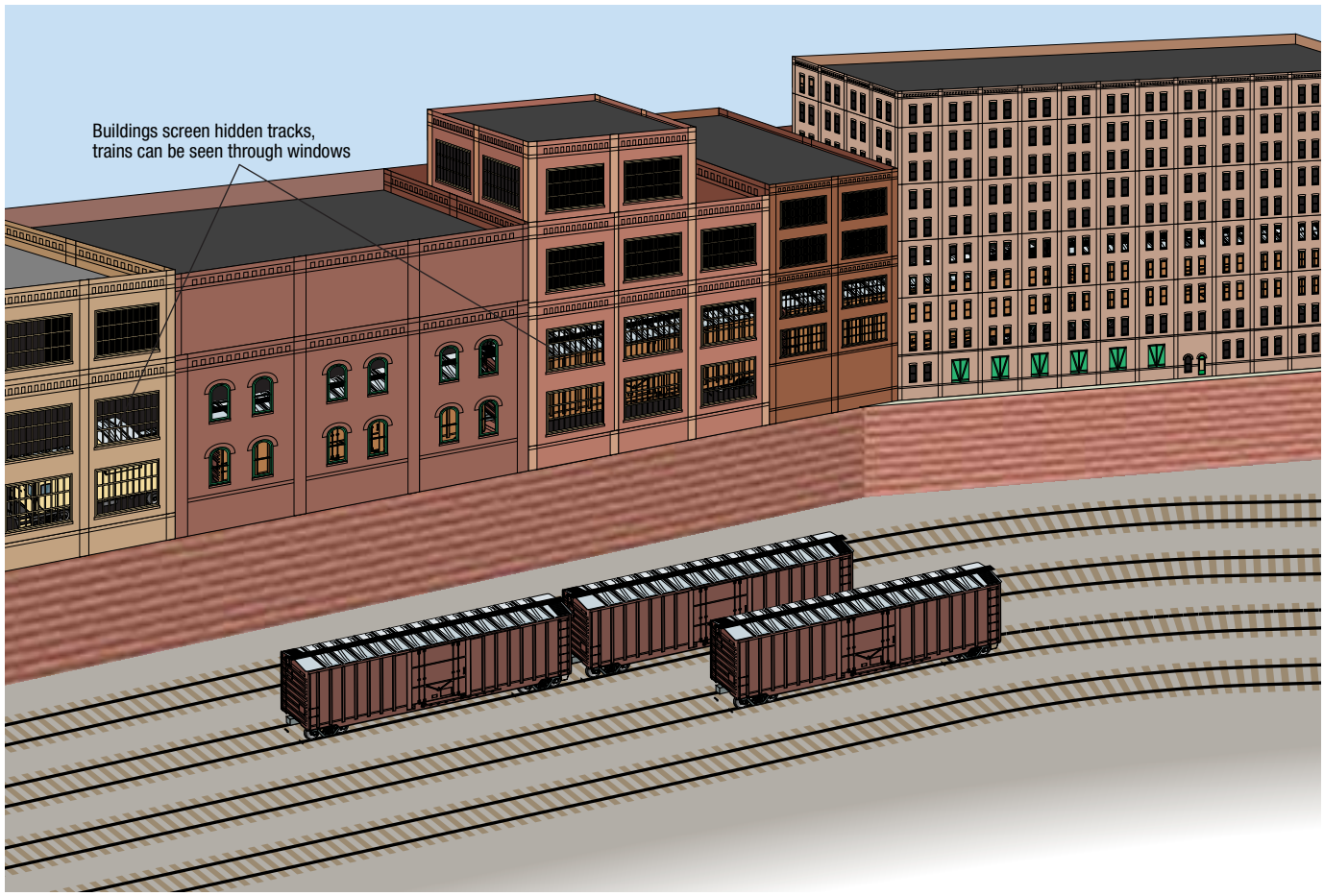


Illustration by Rick Johnson

Window on the world

Seeing hidden tracks

Hidden tracks allow us to keep trains out of sight until they're needed "on stage" or after they've completed their runs. But ensuring that unseen trains are still moving and going where we want them to can be a problem.

One solution is to use building flats as view blocks in front of hidden staging tracks. As shown in the illustration, open windows and doors in those buildings allow us to catch a glimpse of what's happening backstage without spoiling the realism of a scene. – *Linda Sand*

Trains running behind the backdrop on *Classic Toy Trains* associate editor Kent Johnson's O scale layout are visible through the windows of a building that normally stands in front of this opening. Kent removed the building to clearly show the train on hidden track when he took the photo.

//Planning tip

Don't put your trains away

Getting around the need for large staging yards

This train has been left where it was (with its paperwork) when David Popp's last operating session ended. It can continue its run from this point next time, simulating a continuous operating cycle. David Popp photo

Maybe it's a carry-over from the days when Mom yelled at us to put our stuff away when we were done with it, but most modelers – including this one – seem to carry the practice too far.

When you're done operating your trains for the evening, take a hard look at your railroad. If it looks like mine, I suspect that most trains have completed their runs and the main line is empty. Isn't it amazing how all our trains make it home as the day ends?

This rather odd state of affairs has a direct impact on track planning. If, say, a quarter of the trains we plan to run during a typical operating session were out somewhere on the main line when the session began and another quarter were still out there when the session ended, we could cut the required number of staging tracks and perhaps even yard tracks by a substantial amount!

A possible downside to leaving trains out on the main is that they could be in the way when other trains have to be moved between sessions for restaging purposes. But at least they're handy if a "civilian" stops by to see your "train set" run; just fire up the power supply and move something that's already out on the main. – *Tony Koester*

//Planning Tip

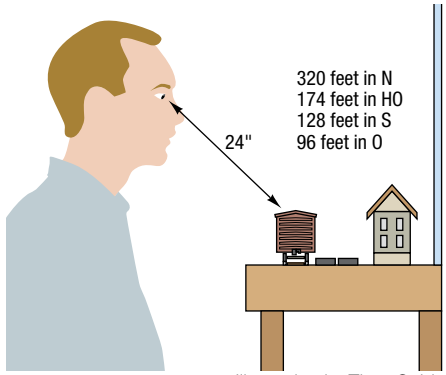


Illustration by Theo Cobb

Choosing layout height

The smaller the scale, the higher the layout

Following an operating session on *Model Railroader* associate editor David Popp's N scale New Haven layout, we got into a discussion on layout height. His layout is set 42" above the floor. I felt it might have been easier to see where I was trying to insert the uncoupling tool if the layout had been higher – say, around 58". Closer is better when the models are small.

To a large degree, such considerations are subjective. But there are some quantifiable considerations you may want to keep in mind as you set the height of your next layout.

The "slant range" from a viewer's eye to an object on a model railroad is actually a function of layout scale. As shown in the illustrations, if the actual distance is 24", that's 320 scale feet in N (1:160 proportion, or 160 scale feet per actual foot times 2), 174 feet in HO (1:87.1), 128 feet in S (1:64), and 96 feet in O (1:48).

Put another way, for us to get the same closeup view of an N scale model that we had of an O scale model at 24", the model would have to be just over 7" from our eyes (96 feet x 12" = 1,152" divided by 160). That suggests an N scale model needs to be about 24" – 7" = 17" closer than an O scale model to give the same up-close-and-personal view. So an O scale layout 48" off the floor is roughly equivalent in viewing terms to an N scale layout set at 65".

But what's too high? Use Steve King's book-shelf Planning Tip on page 89 to find out. – *T.K.*

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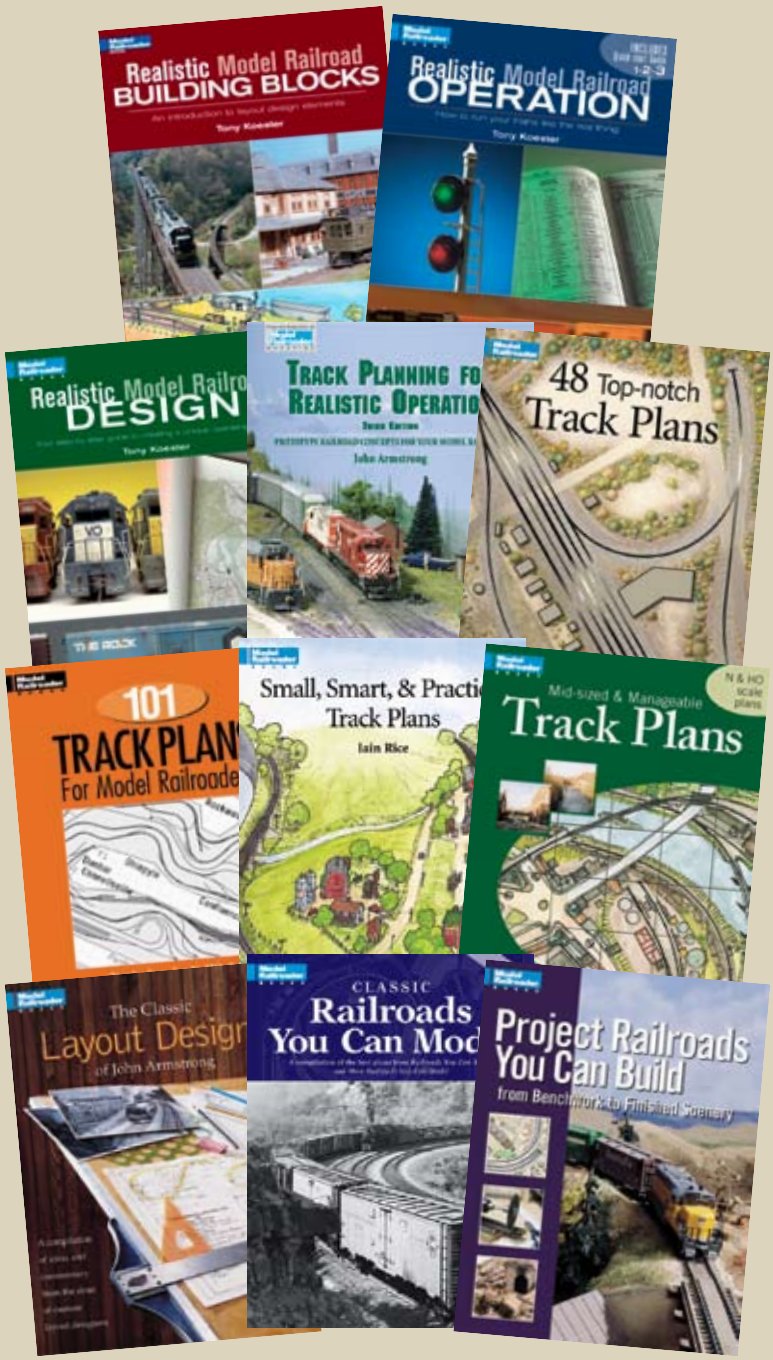

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C-clamps and alligator clips

The new frontier

By Steve King

Why shouldn't Steve King be a happy man? He's used expedient construction methods to hustle a major segment of his N scale Virginia Midland into operation. Bill Miller photo

A move from Illinois to Maryland necessitated rebuilding of my N scale Virginia Midland Ry. for the fourth time in 25 years. Fortunately, the railroad had stayed at each location long enough to get into operation.

My first VM, VM-1, fit into a 10 x 10-foot bedroom. I say "fit" in the fullest sense of the word, as the track plan wasn't as much a design as a happening. It grew to fill the room save for two pop-up areas just large enough to allow two people in each one to operate the railroad. The dispatcher sat in the hall. That bedroom reverted to its intended use when our second child arrived.

Then VM-2 rose in half of a two-car garage in the same house, and the Eternal Flame of Operation was transferred to the new railroad after the last session on VM-1. It too filled the entire area, the only improvement being slightly larger open areas for crew members.

After a move to a new home came VM-3. We were in the same suburban Chicago area, but this house had a basement! The railroad grew to nearly 300 feet of main line occupying an 18 x 40-foot area, not including staging and crew lounge. Although this railroad's genesis was on a sheet of paper, the design was a compromise because I – like many others – tried to salvage parts of the previous incarnation. Most notable of these was the yard at Marion, Va., now in its third home. Therefore VM-3 was basically what happened to the rest of the room after Marion Yard was in place. The result worked out very well, however, lasting 10 years and hosting more than 100 operating sessions.

Which brings us to VM-4. I've skirted the fact that I'm known among friends as a wiring whiz when it comes to the creative, and virtually permanent, use of alligator clips. Maybe I knew all along that the VM had a nomadic gene, or maybe soldering sounds a lot like work.

As if this weren't tragic enough, I've also become addicted to the use of C-clamps. In fact, the progress of the new edition of the VM recently ground to a halt. Questioned about the sudden lack of progress, I responded, "I've run out of C-clamps!"

I've never been one to agonize over the quest for a perfect design. So I used masking tape to rough in the position of the benchwork in my new 27 x 38-foot basement, constructed a ¾"-scale foam-board mock-up, and employed a bookcase to evaluate elevations [see the Planning Tip on page 89 – *Ed.*]. I found that I could build a 375-foot-long, double-deck, single-track railroad, ideal for the timetable and train-order style of operation I enjoy. My layout-design philosophy was summed up by friend Frank Bryan: "Let the flextrack flop!"

That's where C-clamps enter the picture. Build it, clamp it together, stop when you run out of clamps, let the track flop into place, and wire it up using alligator clips. Then put a portable staging yard at the temporary end of track, see what it looks like, and run some trains. If an operating session goes well, then drive in some screws and move the C-clamps, alligator clips, and staging yard on down the line. What could be simpler? **MRP**

Steve King is the author of the book, Clinchfield Country. *This is his third byline in* Model Railroad Planning.

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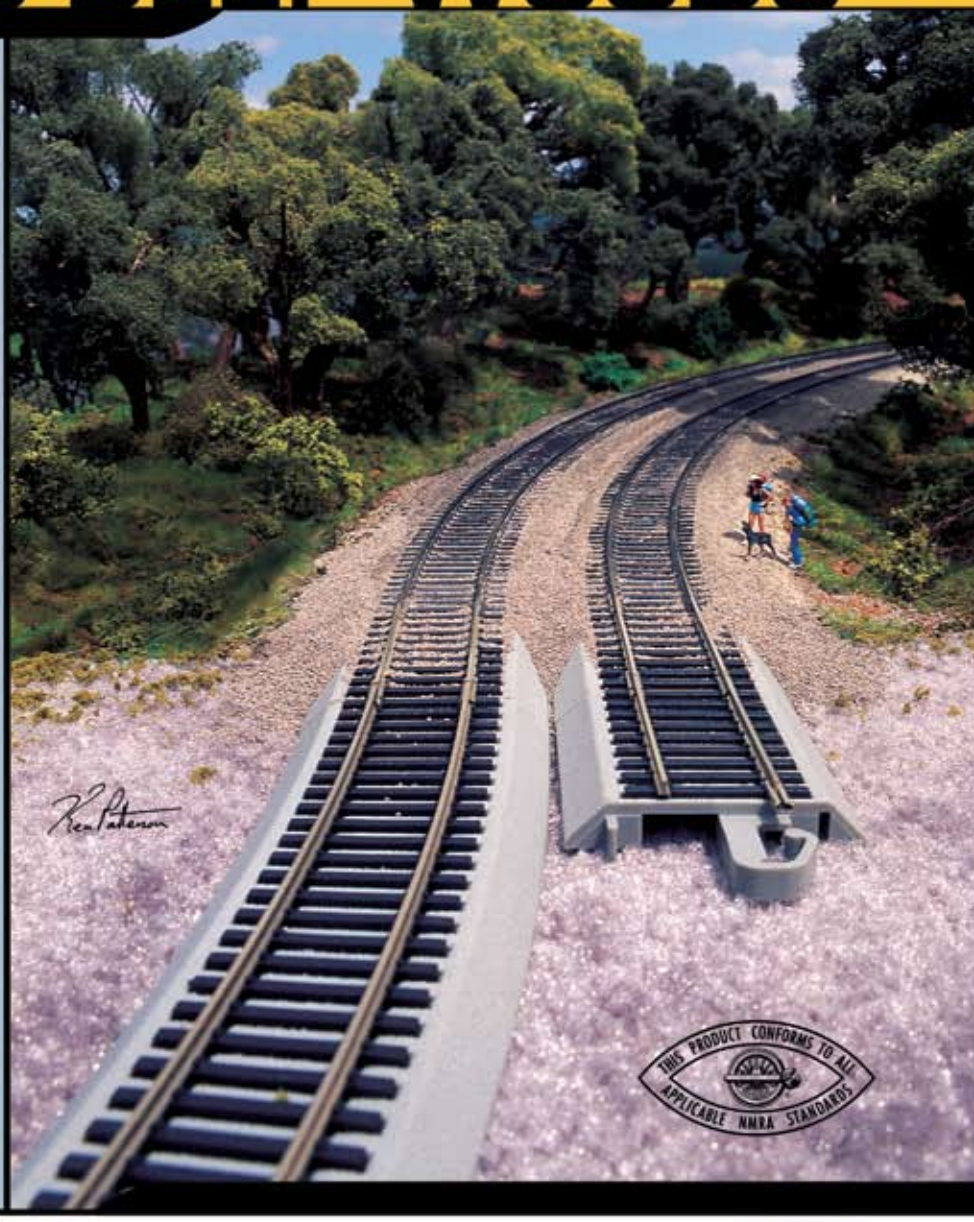

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