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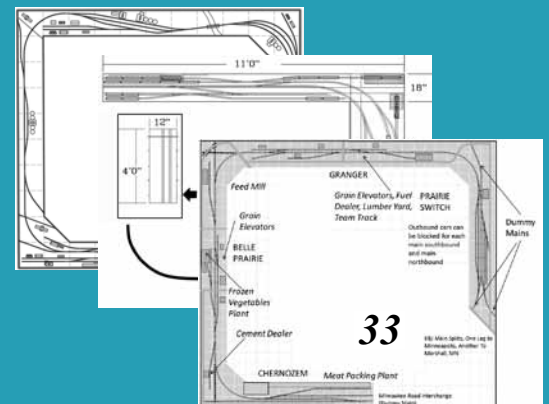
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Northern Pacific St. Paul Division

John Armstrong's design principles lead to emulating the Canandaigua Southern in HO

by Doug Lee

“... I went back to John Armstrong's basic principles for layout planning.”

In 1998 I was in the planning stage for my current home layout. I initially sought a published track plan that I could either adopt outright, or adapt to my available space. After a few unsuccessful months of reviewing published track plans, doodling and drawing, I went back to John Armstrong's basic principles for layout planning. These principles are covered in several publications familiar to most LDJ readers¹.

Using Armstrong's methodology, I was able to draw a walkaround HO Scale plan for my 18 ½' X 20' layout space within a few weeks of starting my more systematic design process. As it turned out, the design for my Northern Pacific St. Paul Division is a virtual mirror image of the home layout that Armstrong's built for himself, his 24' X 34 ½' O Scale Canandaigua Southern. I did not set out to duplicate the Canandaigua Southern, but Armstrong's process led me to essentially the same design.

My layout has been fully operational for ten years. None of my previous layouts were of a walkaround style and I had never operated on such a layout before settling on my own plan. I did not fully appreciate the merits of Armstrong's design before constructing the St. Paul Division. The process of discovery associated with the design, construction and operation of the railroad has been enlightening and rewarding for me. I would like to share some of those discoveries with you.

Design criteria

A model railroad is a major commitment of time and money - typically thousands of dollars and hours of time. From my reading of Armstrong, we should strive to obtain long-

1 One of Armstrong's most holistic discussions of planning theory is contained in Track Planning for Realistic Operation (Kalmbach; 3rd ed., 1998). The application of these concepts is illustrated in a particularly effective manner in two additional books that Armstrong produced with Kalmbach (each now out-of-print): 18 Tailor-Made Railroad Track Plans (1983) and 20 Custom Designed Track Plans (1994).

term value for our expenditures and efforts by creating a reliable, operation-based layout that satisfies the owner's explicit design criteria. Pursuing this objective should complement, not conflict with, our other reasons for being in hobby such as wanting to research and accurately replicate aspects of a particular prototype, or wanting to build finely-detailed, scale dioramas. The layout design criteria, consciously specified by the layout owner, should be reflected in the layout's physical and operational characteristics. Armstrong referred to the criteria as the layout owner's givens and druthers.

Passenger trains key

My givens and druthers are show in Figure 1 (facing page). A key desire was to run the actual passenger trains that Northern Pacific ran in the St. Paul, Minnesota area (see sidebar). Another wish was to model a period which saw both steam and diesel in freight and passenger service. This is significant from a layout-planning perspective since a diesel-only layout might have allowed the adoption of a smaller minimum mainline track curve radius, perhaps as small as 26" or 28" to accommodate 85' passenger cars, rather than the 30" or 36" minimum radius required by my desired models of NP's 4-8-4 mainline steam road power.

My chief wish is to model actual consists and arrival and departure times for as many NP passenger trains as possible that actually used St. Paul Union Depot in the summer of 1953. With my primary modeling interest being Northern Pacific, I want my NP trains to be "good" replicas of the prototypes.

After that, I consider running additional passenger trains for selected other railroads that also used St. Paul Union Depot. These supplemental trains are assessed on the basis of: 1) how well the trains' actual 1953 schedules, if modeled, would fill unwanted lulls in the passenger and freight operating assignments for a three- or four-person operating session; 2) the availability of suitable car and locomotive

a foot less than my 65" eye level and as high as eye level. It is difficult to satisfy both the height and isolation goals using multi-deck benchwork when the elevation of two decks must differ by at least 12" to 16".

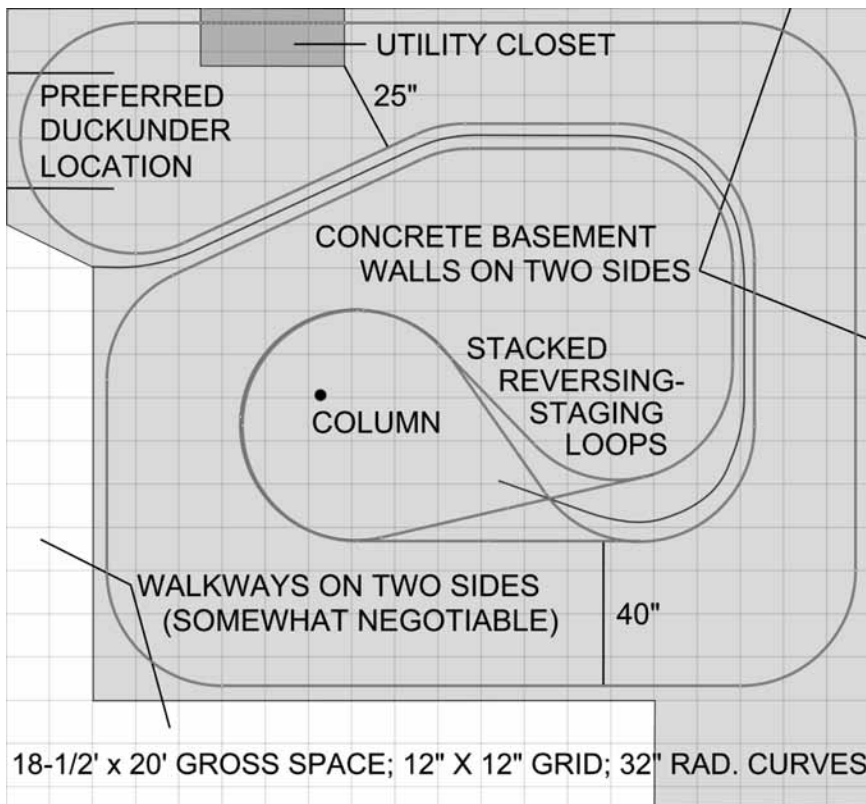


Figure 3. Exploratory track plan with single, spiraling peninsula

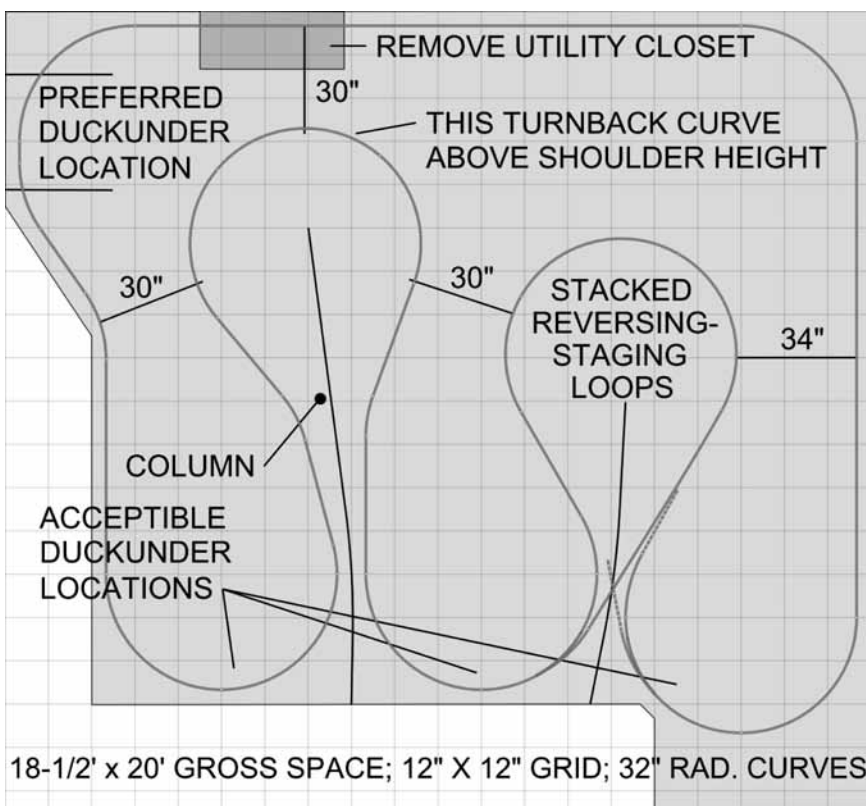


Figure 4. Exploratory track plan based on multiple peninsulas

What about a mushroom layout design? A mushroom, like a double-deck layout, is more complex to design and construct. As it was, I was contemplating the construction of a walkaround layout, something I had not previously done. I wanted to ensure that the benchwork, track, and electrical construction were all first class. My father-in-law, a retired carpenter, would help build the benchwork; but I was largely on my own when laying and wiring the track. That allowed me to be responsible for the quality of the work, but it also meant that I was leery of undertaking too large or too complex a project. Therefore, I chose a single deck design for the visible track, but allowed the staging tracks to be stacked to save space.

Northerns set the target minimum radius for a single spiral

When I planned the layout in 1998 I chose a target minimum mainline curve radius of 30". At the time, I hoped that it would be adequate given the passenger train emphasis in my Northern Pacific layout, and especially my desire to run models of NP's 70"-drivered 4-8-4 "Northern" steam power (per Figure 1). I was not able to test my hopes fully until I acquired my first NP Northerns in 2007. After much tinkering with the locomotives and the relaying of a mainline turnback curve, the Northerns make it around the layout reliably, but only on curves of at least 30" radius.

Using a 30" target minimum radius, I found that I could fill the layout room with a single peninsula of mainline track spiraling toward the center of the space (see Figure 3 at left). The two sides of this peninsula could be visually separated with a double-sided backdrop. Each end of the mainline terminated in stacked reversing-staging loops. [The diagram is actually based on 32" radius curves, recognizing Armstrong's typical allowance for passing sidings, or in my case, a 30" / 32" curving double-track mainline.] The operating aisle ended up to be about two feet wide for much of its length. Increased width at the far ends of the aisle provided some space for people to meet and pass. For this preliminary sketch the total length of the mainline was about 134', or 2.2 scale miles in HO.

Aisle trade-offs

I confess that I am physically slim and typical visitors range from average to slim. I acknowl-

The Chicago & Mackinac, Part 2

Multideck and a partial mushroom in a “California Basement”

by Bob Osborn

Bob Osborn described his first Chicago and Mackinac (C&M) layout in LDJ-48. In this issue, he explains how he compressed the operations and locales of that basement-sized railroad into a much smaller space. – BH

It took nearly 15 years to finally decide to rebuild the Chicago & Mackinac Railroad. Life went on and our kids grew up, went to college and moved out of the house. Like many Californians, we used our “California Basement” (two-car garage) as a storage facility for our stuff and not for parking cars. Life is a give-and-take game, so one day my wife agreed to give me the garage for my model railroad in exchange for remodeling the kitchen. A no-brainer, Done!

Build an “attic” to get a “basement”

Luckily the roof of the garage was steeply pitched, which yielded a nice tall area above. So I added a floor in our new storage “attic”, installed a pull-down stairway, and either moved our stuff upstairs or disposed of it. Room prep included adding several electrical circuits for lights and power, insulating all of the walls and ceiling, and adding drywall to the entire garage. California has a rather mild climate, but I also added an outside-vent gas furnace and a wall-unit air conditioner. Looking back, both additions were very prudent, especially the air conditioner.

The incredible shrinking railroad

Planning the new railroad was pretty easy: my vision and goals for the C&M #2 were the same as for the C&M #1. In fact, because the first C&M worked out so well, I just wanted to duplicate it in my garage. Unfortunately, I had to do it in about *one half of the space*. I needed to stuff 750 square feet of model railroad into a 400-square-foot “bag”.

To review, my “must have” goals were still:

1. Point-to-point railroad with a yard on each end
2. Walk around train control
3. Loop staging in the south and stub-track staging in the north

4. Maximum length of single track main with passing sidings (300’ if possible)
5. Maximum amount of distance between stations (towns)
6. Ample areas for switching
7. Operating (switching) areas isolated from each other to minimize operator congestion
8. Ample aisle space

To get all of these “must haves” I knew that I would have to make many design compromises. I started my design just as before, by photocopying a stack scale drawings of the garage. The garage also contained our laundry facilities, so that was just one more design challenge with which to deal. Early on, it became very clear that I would need a three-deck layout to come close to accomplishing my goals. My sketches (following page) seemed to show that I could indeed meet my goals, even in the dramatically reduced space.



Before and after: when offered the garage as a layout space, Bob leapt at the chance, building a storage “attic” above the garage and performing a major “junkectomy”. All photos by the author.

“The mushroom design allowed for much more switching in a finite area.”

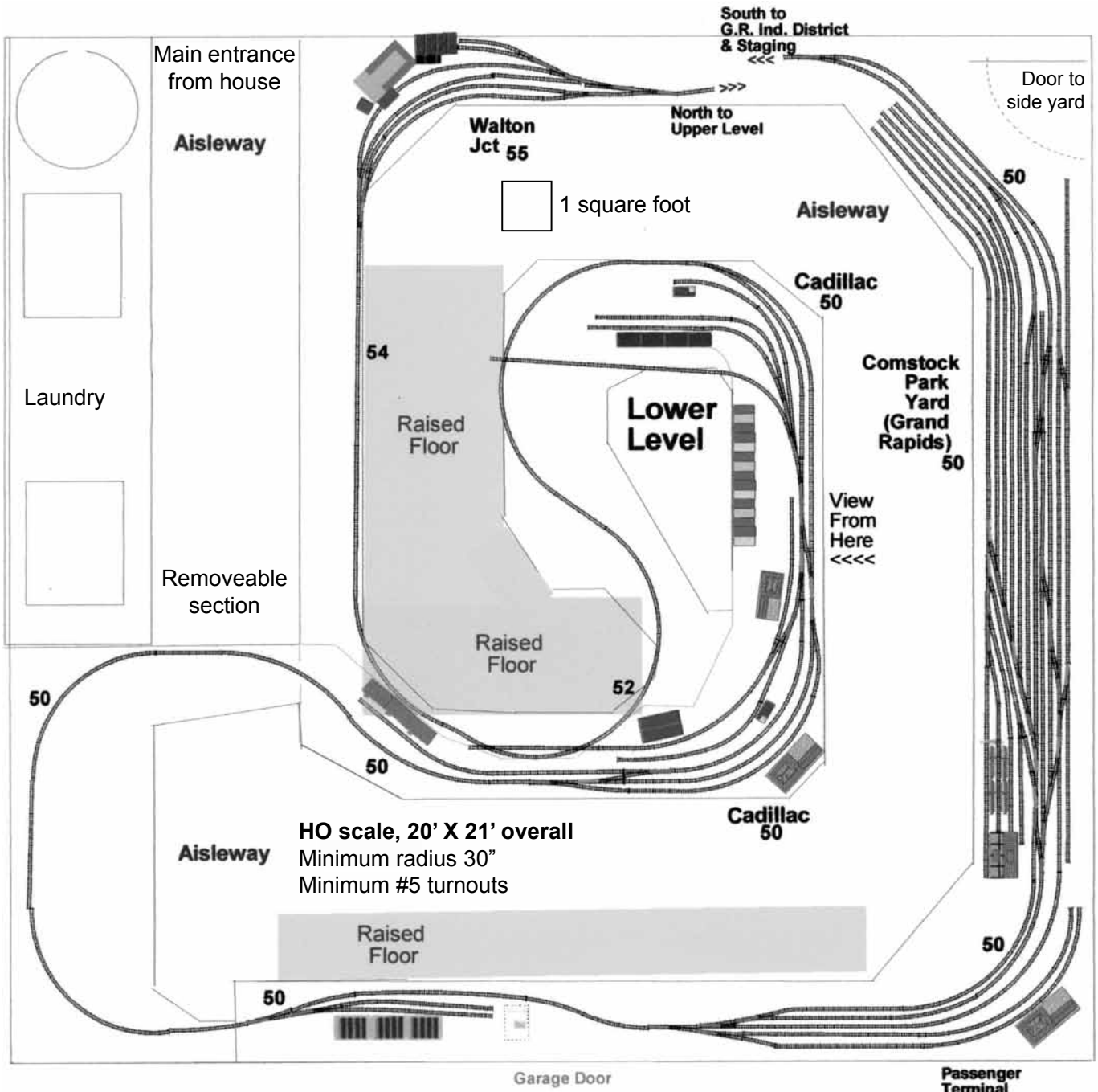
and grades did not negatively affect the operations to any major degree.

Mushroom separates scenes and operators

My biggest concern was making sure that a station/town was not located directly above or below another station/town. The mushroom design allowed the Grand Rapids Industrial District to be directly below the City of Petoskey (see photo page 24); but it was worked from a different aisle (the mushroom effect) and the operators were totally isolated from one other. The same is true for portions of Cadillac being below Petoskey, but those opera-

tors were again totally isolated from one other. The mushroom design allowed for much more switching in a finite area. This isolation of scenes and operators was totally different than the original layout, but I grew to like that design feature and would strongly consider using it again in the C&M #3 (if it ever materializes).

A couple of interesting observations regarding the new design: I ended up with a mainline of approximately 300 feet, nearly the same as on the C&M #1, and with four main stations (towns/switching areas). This was one more station than on the original layout and made the towns a little closer together on the C&M



The Calamity & Uproar

Designed for the train-handling challenge of the “sag scenario”
by Rick Mugele

The Calamity & Uproar layout design was inspired, in part, by an article in *Trains* magazine about D&H Consolidation 2-8-0 steam locomotives. This included a description of operation through the Schoharie Creek sag through Central Bridge, New York:

“The hogger dropped down Schoharie hill at 40 mph; kicked off the air; widened on the throttle; picked up speed over the bridge at Schoharie Creek; barreled down the main street of Central Bridge; and with pops lifting and Walschaerts gear a blur; went into the bottom of Howes Cave hill at 55 mph – all the law allowed plus 5.”
(*Trains*, June 1967, pg. 45)

This scenario was motivating and I designed an expansion of my layout to include a sag that could be operated like the drama at Schoharie Creek. I never built it, and the realities of model train operation in the 1970s made it clear that we had enough to do to make things run at all, let alone realistically.

Sags on the Sierra Railway

Some years later, I learned about a sag on the short line Sierra Railway that challenged oper-

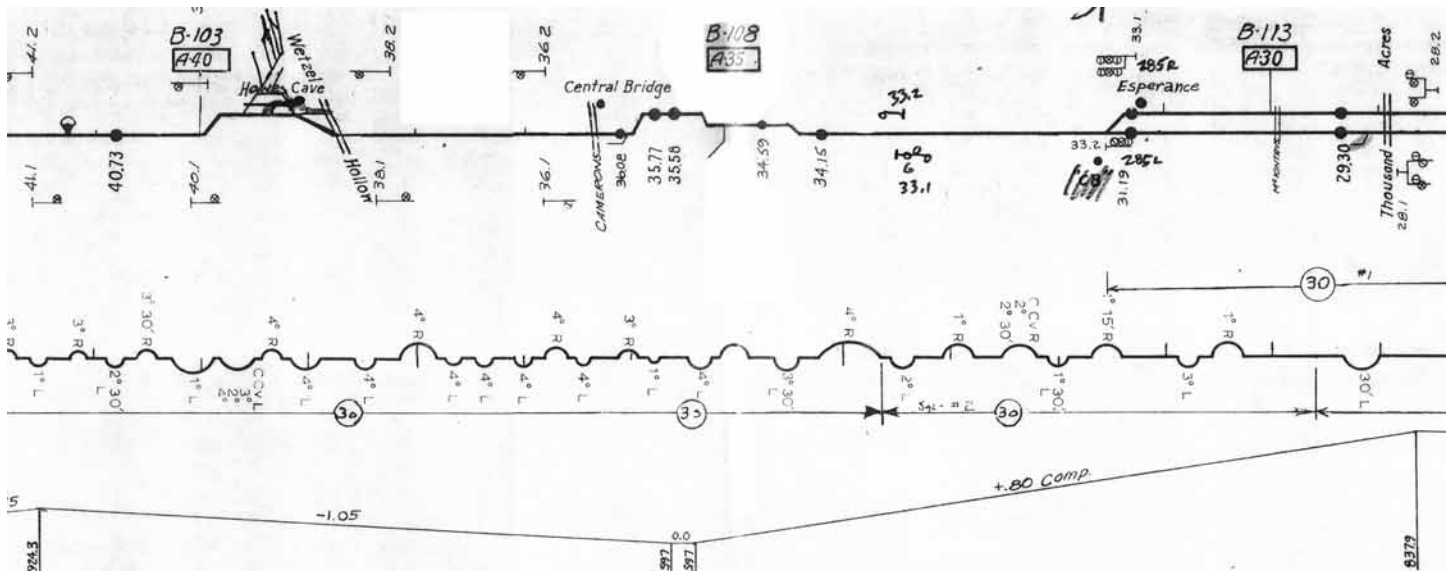
ations during the construction of the Melones Dam (see *LDJ*-38):

Then when they built Melones, I hauled all that stuff out of Oakdale. I stayed in Oakdale and I give ‘em forty cars a day out of there. I had Engine 28. Twenty cars was all we could get over Arnold Hill, and you had to really work her to get it over. One time we was down there on the curve below Arnold – you had to go like the devil around this curve – and when we went around it I told Ronnie Hall, I’m gonna go in the ditch there. I says we shouldn’t go that fast. “Oh,” he says, “That’s all right, we gotta get ‘em over the road.” (Jim Baker interview, *Sierra Railway Journal*, July 1996)

[See photo page 32]

The Calamity & Uproar

While waiting for the model train-handling technology for reproducing sag scenarios and similar challenges to develop (see sidebar page 32), the track plan for the Calamity & Uproar (facing page) was created in 1970. The grade climbs from Calamity to Tuolumne Pass then



The Schoharie Creek “sag” is shown on a 1985-era Track Chart provided by Tony Steele. Grades are shown by the lines at the bottom. The scenario above describes a train moving from right to left (westward). Note the compensated .8% grade (less grade in curves) approaching Central Bridge and the effectively significantly steeper uncompensated grade climbing westward to Howes Cave. By this time, the speed limit had been reduced to 30 miles per hour, but an earlier 1966 chart indicates a 50 mph speed limit through the sag.

32-Square-Foot Challenge, Part 1

Shelf designs from Tulsa 2012

Plans and text by Olaf Melhouse, Larry Munro, Dave Salamon, and Charles J. Tapper with additional text and editing by Charles J. Tapper

The Design Challenge at 2012's Tulsa Layout Design and Operations Weekend was to create an "operationally satisfying" layout within the confines of a benchwork footprint up to 32 square feet. This is the nominal size of the 4'x8' sheet of plywood that is often viewed as the traditional beginner's starting point. Layouts were to be:

- Operationally sound alternatives to the traditional beginner's layouts, which quickly lead to boredom.
- Small layout designs to suit the apartment dweller, the modeler on a budget, or someone wishing to experiment with operations before committing to a larger layout.
- Layouts in the "attainable" category; layouts that have operational interest yet are of a scope that is easy to build and maintain, even on a limited budget.

- Optionally, an operations-oriented module or set of modules, to enhance NTRAK layouts, for example.

The 32 square feet could be configured in any way. Hidden under-deck staging or return loops were not counted in the surface area as long as they were within the overall footprint. The scale, gauge, theme, railroad (real or free-lanced), place, era, and layout room setting were entirely up to the designer.

In this first article, I'll focus on the shelf-style and around-the-room approaches. A number of island-style layouts were also presented, and I'll address those in future issues of the *LDJ*.

Shelf layouts offer many advantages for the operations-oriented modeler willing to concentrate on rail lines of smaller scope. They are easy to construct, provide a longer linear surface ideal for a rail line, may coexist in a room with other functions, and are small enough to be a realistic goal for most modelers. – *CJT*

NP Carrington-Sheyenne Branch in N Scale

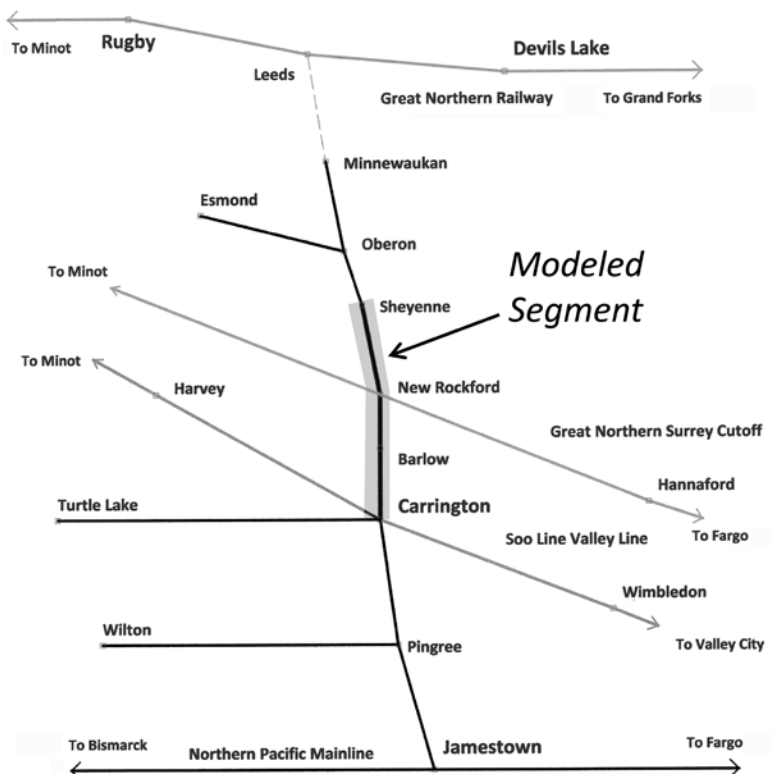
by Olaf Melhouse

This track plan represents the former Northern Pacific branch line that ran from Jamestown to Minnewaukan, ND. Because of space restrictions, only the portion from Carrington to Sheyenne, ND is modeled. Time frame is the 1960s. The junction switch for the line to Turtle Lake is modeled but not operated.

Carrington and its small yard was the operational center for the branch. On the prototype, trains ran north from Jamestown to Carrington and then up the branch line to Minnewaukan, Esmond, Turtle Lake, and Wilton. All these trains were made up in Carrington yard and returned there for switching.

Planned around two turns

The layout is designed for a crew of three to four. A typical day begins with the arrival of the train from Jamestown (staged in the yard). The Carrington yard crew (one or two operators) breaks down this train and makes up the



plan with turning facilities for rod locos with tenders (page 38). The operational concept for each of these layouts consists of servicing a locomotive for a run, making up a train in the lumber mill yard, and proceeding to Logging Camp 9.

At the logging camp, loaded log cars and empty supply cars are swapped for empties and loaded supply cars. The train then returns to the lumber mill. Supply cars are spotted for re-loading and log cars are taken to the log dump. The engine and caboose are tied up.

Since layout speeds are minimal, the operating session would take up a considerable amount of time. I've described a more-or-less solo operation, but additional trains could be added. If geared engines are used this will be a lengthy run at slow speed. I included a plan with a provision for turntables, perhaps Atlas turntables disguised as gallows turntables.

Design Standards

For a quick Challenge entry, this layout was designed without grades, but they could eas-



(Top right) TT scale is definitely a scratchbuilder's pursuit in the US. This photo shows some of the fine modeling on George "Pete" Peters' TTn3 Westside Lumber Company layout, for which nearly all rail equipment must be scratch-built using N scale mechanisms. Pete's layout was the inspiration for Dave Salamon's conceptual design for a freelanced TTn3 Logger. Model photos this page by George "Pete" Peters.

(Middle right) This in-progress photo of George "Pete" Peters' layout includes the massive prototype mill at Tuolumne, CA. The Westside Lumber Company was famous for being one of the last West Coast narrow-gauge logging operations, lasting into the 1960s and then continuing for a time as a tourist line.

(Bottom right) Charlie Tapper's first CAD rendering of Dave's concept incorporates the key elements, assuming bidirectional engines with no turning facilities.

