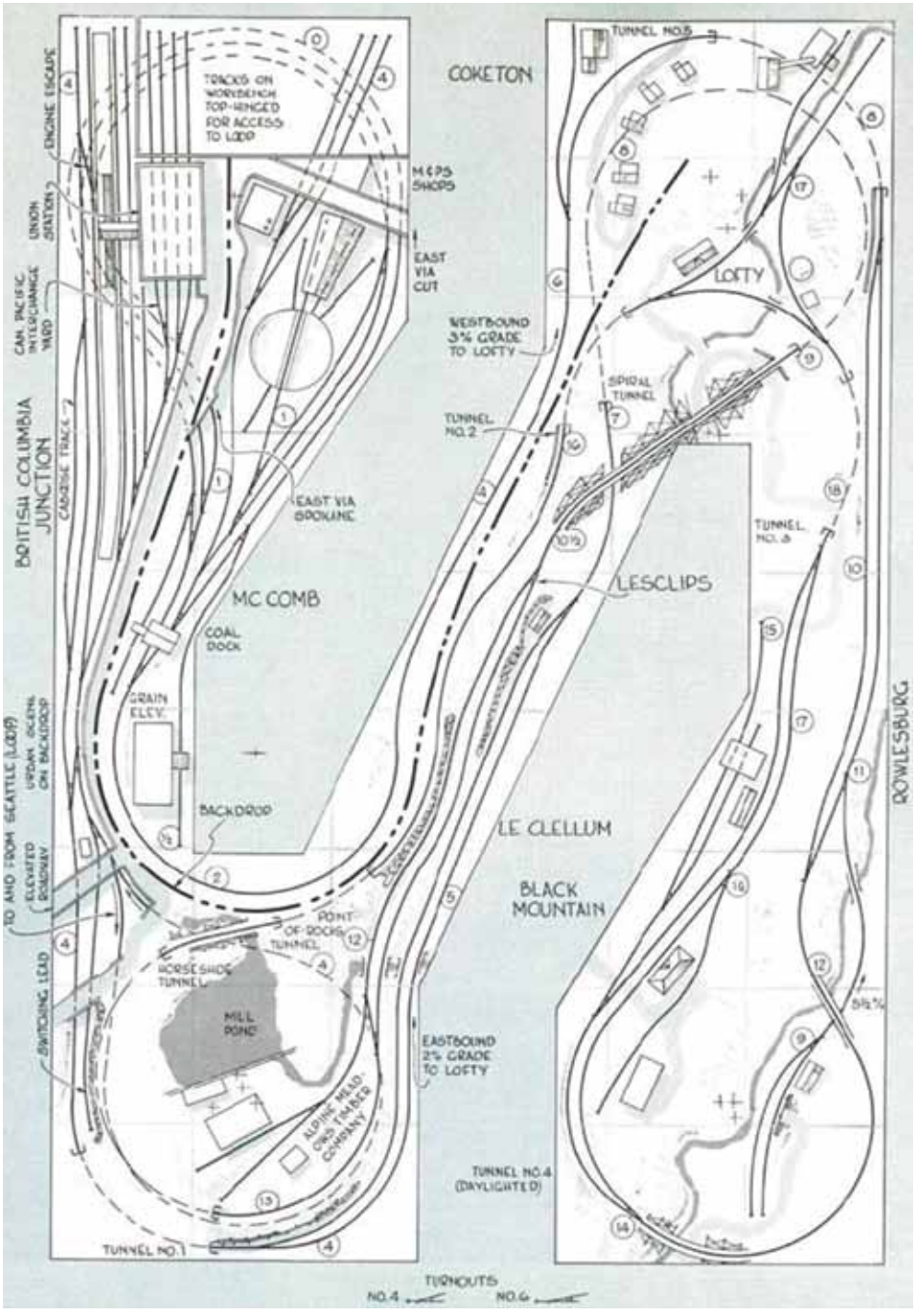
Adapting an Armstrong Classic

The Montana & Puget Sound five decades on

by Mike Chandler

Railroads have been known to run late trains – but in the case of the Montana & Puget Sound, the entire railroad is running late. About 55 years late, to be precise, because it's been that long since John Armstrong's track plan of it was published in the December 1959 issue of *Model Railroader* (below).

As a teenager, I discovered the track plan in an *MR* back issue, and while many years would pass before I built it, the Montana & Puget Sound (M&PS) stayed in the back of my mind during those intervening years. John's design seemed to have all the features I wanted in a layout, and most importantly, I felt it could be operated in a realistic manner. As it eventually turned out, I was correct in this assumption.



Typical of John's farsightedness, the design was years ahead of its time, for it was a walkaround layout in an era when control systems for such were generally still about a decade in the future for most of us. However, this wasn't the case for John Armstrong, who used parts from pinball machines to achieve walkaround capability on his own layout. Fortunately, by the time I got around to building my version of the Montana & Puget Sound, control systems had advanced considerably.

Comparing the plans

Both John Armstrong's original track plan and my "as built" version (facing page) are in HO scale, however, further comparisons soon reveal differences. John intended the design for a

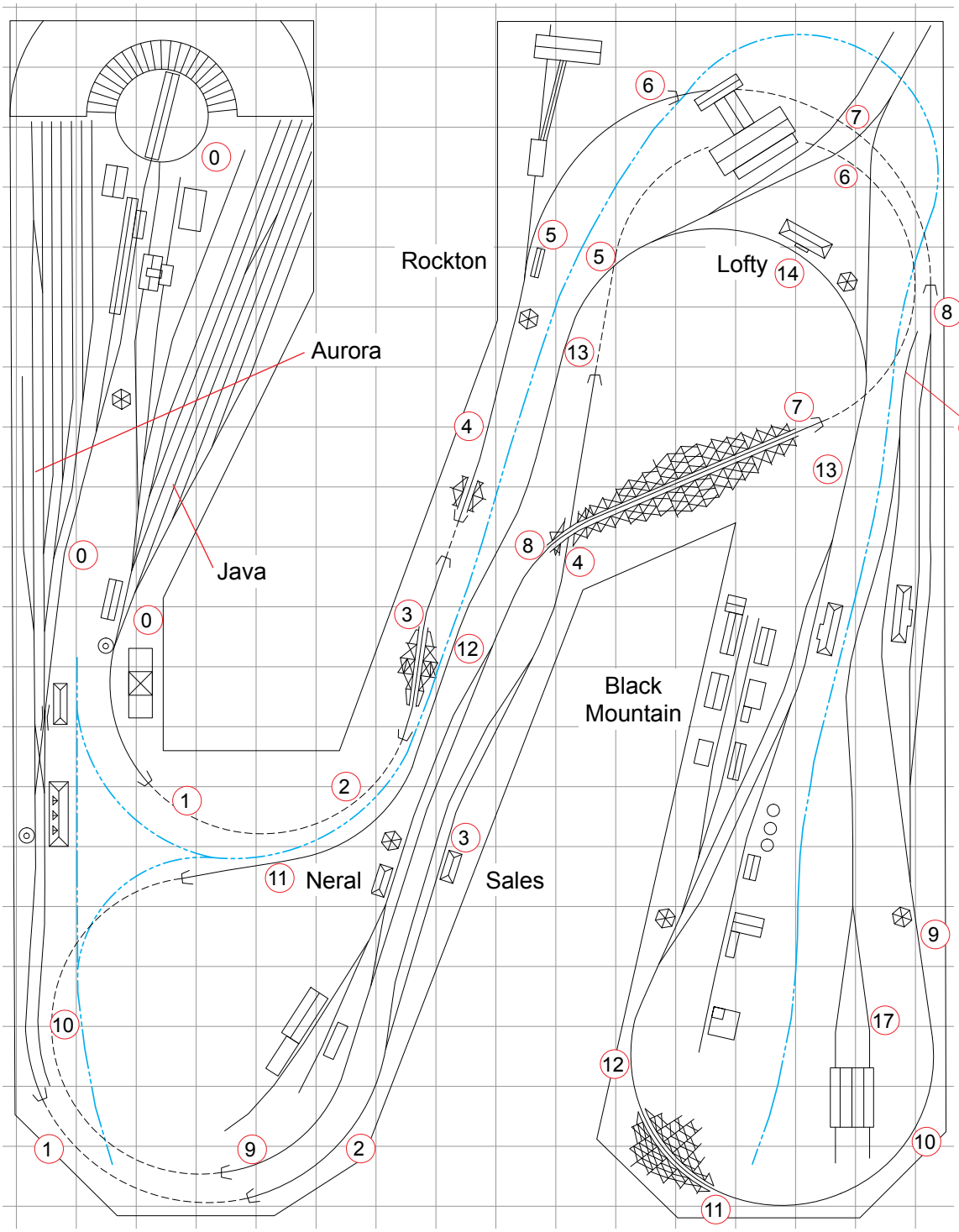
John Armstrong's M&PS was intended to be moveable and useable in a new space, so it was designed as an island layout with aisles assumed all around. This would bring the overall size to about 16' X 22' with the 2-foot aisles typical of the era. Armstrong suggested that the "S" shape maximized the amount of "edge" to interior ratio, allowing a longer mainline to be modeled.

Montana & Puget Sound
HO scale, 12' X 18' plus aisles
2-foot grid
Mainline min. 24" R
Turnouts as shown
Mainline max. 3% grade
Reprinted with permission from Dec. 1959 *Model Railroader*

two-car garage with approximate overall dimensions of 16 by 22 feet while I had the good fortune of possessing a layout room measuring 20 by 24 feet. When it comes to layout design, one can never have too much real estate – but how could I best use this extra space? Two obvious answers came to mind: One was to increase the width of aisleways and the other was to enlarge the layout itself. In the end, I did both, albeit with some compromises in both categories.

Although 24" radius curves were considered quite generous in 1959 when John conceived the design, this is not the case today.

When Mike re-designed the plan to permit broader curves and turnouts, it expanded substantially in size compared to Armstrong's original design. Shifting to a point-to-point short line concept and minimizing passenger traffic eliminated the need for staging tracks below the visible deck. Numbers in circles are elevations in inches from the 40" baseline elevations of the end-point terminals (which share a turntable and no other connection).



Western Midland
HO scale, 16' X 20'
(20' X 24' with aisles)
1-foot grid
Mainline min. 30" R
#8 min. turnout
Mainline max. 2.6% grade

Therefore, my first step was to redraw the layout with 30" minimum radius curves. Six inches doesn't seem like a great change, but this had the unexpected effect of causing the layout to "balloon" outward occupying much of my extra space. As a result, while I was able to increase the width of some aisles, two remained at 24 inches. Our hobby is full of compromises (and this is just another example), but I did manage to maintain a minimum radius standard of 30" throughout.

Turnouts on John's original design were generally number sixes on main tracks with number fours on some industrial spurs. For my layout, I standardized with number eights throughout. As well as appearing more realistic, I believe the larger turnouts have resulted in additional reliability of operation. As we all know, larger turnouts require more space – but my layout was larger than John's original design and my sidings could be shorter as a result of adopting a short line concept. So for those reasons, the shortened sidings didn't impact me in a negative way.

The unique side-by-side, but operationally separate, terminal yards of Aurora (left) and Java share a common engine terminal. The turntable provides the only track connection between the two yards. Note the "basic black" telephone handset mounted at the bottom of the fascia at middle lower right (see sidebar page 9 for a description of the phone system). All photos by author.

Short line vs. mainline

The concept of John Armstrong's Montana & Puget Sound and my version could hardly be more different: John's intention was to have the M&PS represent a mainline mountain railroad extending from Montana to the West Coast – while my layout is a short line which never leaves Montana. In order to minimize any confusion between the two, I've named my freelanced version the Western Midland (WM).

This simple change of concept necessitated major changes to the terminals. Instead of an out-and-back design, which was a popular style of operation in the 1950s, I revised the railroad's end points to become two separate terminals (Aurora and Java, photo lower left) with a common engine servicing facility between them.

Looks like one, works like two

From a visual perspective, the two yards appear as one large terminal with a receiving and a departure yard, but in reality these yards are only connected by the turntable. Since the Western Midland represents a complete railroad, the need for staging yards is eliminated and trains are run from terminal to terminal with provision for interchanging with Class 1 roads at each end.

The end points on my Western Midland are Aurora at the south end and Java at the north end. My connecting roads for interchange purposes are: Milwaukee Road and Northern Pacific at Aurora; and Great Northern at Java. There are no specific interchange tracks. Instead, the yardmaster for the yard concerned (there is one for each yard) simply designates one of the yard storage tracks for interchange traffic.

With major connecting roads at both ends of the Western Midland, one might expect to see a lot of bridge traffic, but that is not the case. Almost all traffic originates or terminates on line. Initially, I had considered setting up the WM as a serious bridge line but that would have required staging yards at both ends.

Since my preference tends toward local traffic with the switching opportunities that offers, I decided early on during the design stage to put the space the staging yards would have required to better use.

Limited passenger, lose the loop

Passenger service does not play a major role in the Midland's operations and in keeping with the short line nature of the layout, generally consists of nothing more than a daily-except-Sunday train comprised of just a locomotive and a single combine car. John's innovative reverted loop, which was part of his original design, would have been an asset had I chosen to operate medium length passenger trains as he envisioned for the M&PS.

However, with such minimal passenger service, it was difficult to justify a turning loop; so it was deleted from the design. Instead, the combine is simply rotated on the turntable after each run and placed on the caboose track to await its next scheduled departure. In his 1959 article John briefly wrote that the Seattle loop (reverted loop) could be eliminated and the railroad operated as a branch line. As it turned out, this statement was prophetic and became the basis for my short line concept. However, my redesign of the terminals went far beyond anything John envisioned in his article.

Changes reflect preferences

The subject of era did not come up in his article but as it was common practice in the '50s to model contemporary railroading, we can probably assume that the M&PS was set in the late steam era. The Western Midland's era is more clearly defined as being September, 1938 – a result of my preference to model a period of short trains, local traffic, and motive power that converted water into steam.

Aside from the terminals, the only other track change of any consequence occurs at Rowlesburg (or Silver Cliff, as renamed on my Western Midland). With a mountain setting on a model railroad, I find it visually more appealing if the terrain slopes upward as it moves *away* from the aisle from which one is viewing. With this in mind, rather than have the spur at that location descend on a 5.5 percent grade to pass *under* the mainline, I realigned it to climb upward on a 5.5 percent switchback to reach the Silver King Concentrator. At 57 inches, this industry is the highest point reached by rail on the railroad (photos above).

Mike prefers that the layout surface rises moving away from the aisle where there are elevation changes. At Silver Cliff (above), he replaced Armstrong's branch (at Rowlesburg) that dropped below the mainline with a similarly steep 5.5% grade switchback climb, seen here in the background as a way freight passes the Silver Cliff station.

(Below) The short, but difficult, switchback climbs to the Silver King Concentrator, which resides at 57", the highest track elevation on the layout.

Broadening the backdrop

Backdrops can be an asset on any model railroad, but on a large free-standing design such as the Western Midland they take on vital importance. John included a backdrop in his original plan, but (for reasons known only to himself) he ended it at Lofty. Realizing the double-sided backdrop's importance in preventing what would otherwise be a visually cluttered layout, I extended the backdrop all the way to the end of the Black Mountain/Silver Cliff peninsula (photos page 8).

The above view is along the Silver Cliff aisleway and illustrates the mainline and 5.5% switchback spur leading to the Silver King Concentrator that dominates the scene in the left foreground. Black Mountain is on the other side of the double-sided back drop which was constructed from 4' X 8' sheets of .060" styrene (a useful material Armstrong likely didn't anticipate!).

The author likes to think of Rockton Canyon as a "half canyon". In the photo below, Rockton is on the left with Java Yard on the right. Neral and Sales lie beyond the backdrop on the left. The magnificent mountain scene on the back drop was painted by Steve Stark. Note that a small band of fascia at the bottom of the canyon scene protects the scenery. In contrast to Armstrong's track plan, Mike stopped the backdrop short of the end of the Java/Aurora peninsula to allow for the shared engine service leads.

At the opposite "terminal" end of the layout (Aurora/Java, photo lower left), it was necessary to shorten the backdrop by a few feet to accommodate the common engine terminal's lead tracks, which are located between the two yards. As well as reducing clutter, the double-sided backdrop has the effect of dividing the layout into three or four separate viewing sections with the result that the layout appears larger than it really is. Without the double-sided backdrop, the layout might resemble a double-deck design compressed into one level.

Grades and elevations

Grades play a major role in the construction and operation of prototype railroads and the situation with model railroads is no different. On Armstrong's original M&PS design, the mainline climbed on a constant 2% grade from the British Columbia Junction terminal to the Lofty summit, then descended on a continuous 3% grade until reaching the Mc Comb terminal.

After initially laying out my Western Midland on paper using the same grades, I was surprised to find the Lofty summit to be considerably higher than that of the M&PS. This was the result of my longer mainline run on what had become a larger layout. Unfortunately, this would have made it difficult for anyone of less than six feet in height to operate with a good trackside view of the higher portions of the railroad.

Flattening towns a solution

My excessive elevation problem was solved by reducing the grade between Aurora (B. C. Jct.) and Lofty to 1.7% and from that point to Java (Mc Comb) to 2.6%. Of even greater significance from an operations perspective, passing sidings, which on the original M&PS were all on continuous grades, were now level (with one exception).

Level sidings are essential for performing run-arounds on a model railroad with extensive way freight or local switching. Sales (Le Clellum) remains as the one siding still on a grade. But with a total lack of shipper/

receivers at that location, a level siding is clearly unnecessary.

As a result of these changes, the elevation gain was reduced to 14 inches – three less than John had intended for the M&PS and yet enough to establish the feeling of a serious mountain railroad with all the operational challenges that encompasses. Consequently, on my Western Midland the yards are 40 inches above floor level and the Lofty summit resides at 54 inches.

At the head of the aisleway is the summit station of Lofty. To the left are have Neral and Sales with Black Mountain on the right. The mainline loses elevation by passing through the Lofty-Neral-Sales locations without piercing the backdrop – which means that operators need not run around a peninsula to keep up with their trains (see page 11). The greatest concentration of shipper/receivers is at Black Mountain, and not surprisingly, it also has the most structures. Silver Cliff is on the other side of the Black Mountain backdrop to the right while Rockton Canyon lies beyond the Neral backdrop to the left. The Western Midland is currently about 55 percent scenicked and most of the remaining 45 percent without scenery is visible in this photo.

Operating challenges

John Armstrong described his design as being for the man who is a demon for operation and dispatching. After having built and operated it for a number of years, I would agree with his statement. To write that the Western Midland's early operating sessions presented unique operating challenges would be an understatement. We quickly learned that "visual flight rules" do not work well in a railroad environment. With as many as five trains operating on the main track at one time, some form of dispatching system was obviously required.

In keeping with the Midland's 1938 era, the traditional timetable and train order system was established. But communication became a problem in dispatching, since the double-sided backdrop seriously limited visibility and verbal communication. The solution was to install a telephone system (see sidebar at right).

Operating with TT&TO

After a great deal of experimentation, operating session positions evolved to include a dispatcher, four station agent/operators (who each generally handle more than one station), two yardmasters (one for each terminal), and four or five train crews consisting of one person each. Like the prototype, train crews do not talk directly with the dispatcher, and instead, rely on station operators to report passing trains in the form of an "OS" report.

Operating instructions from the dispatcher to train crews are issued in writing through the operators by Form 31 train orders. While prototype railroads generally favored Form 19Y

Adding a Line

At the time I decided to install a dispatchers' phone line everyone seemed to have an old black surplus rotary desk phone that they were only too happy to get rid of. So these formed the basis of the phone system.

The phone's base was mounted behind the fascia, the rotary dial bypassed, and the system set up as a large party line as per prototype practice during the timetable and train order era. A simple plywood cradle allows the handset to be hung in such a manner that it becomes partially recessed into the fascia when not in use.

Since the hand sets are all mounted along aisleways, particular consideration was given to their height in order to prevent operators from bumping into and dislodging them. With this in mind, the hand sets were mounted 27" above floor level – low enough to avoid passing hips, yet within easy reach see photo page 6).

To complete the installation, a hook switch was fabricated using an SPDT limit switch, which by-passes a phone when its hand set is hung up and in so doing prevents pickup of unnecessary background noise. Currently, the WM has eight such phones at key locations. – *MC*

[LDSIG-member Seth Neumann has posted a clinic online with a discussion of phone systems for model railroads: **www.modelrailroadcontrolsystems.com/content/Communications/ModelRailroads2015.pdf** (one line URL) – *BH*]

Tips ...

- Quality published plans may be an excellent starting point, especially when modified for one's own preferences.
- A multi-pass climbing scheme allows elevation changes while eliminating a need for operators to run around a peninsula.
- Older plans may be based on minimum radius, turnout numbers, and aisle clearances that seem too tight today – but a change in concept and equipment may help.

… and Trade-offs

- Increasing radius and turnout number may cause plans to grow larger than expected.
- Revisions to published plans may create elevation challenges which must be addressed.
- Double-sided backdrops nicely isolate scenes visually, but may create operator communication challenges. – *BH*

and Form 19R orders to expedite train movements, the Western Midland uses only Form 31 for the opposite reason. Since the train must be brought to a stop to receive Form 31 orders, they help to create the illusion of greater distance having been traveled by lengthening the running times over the road.

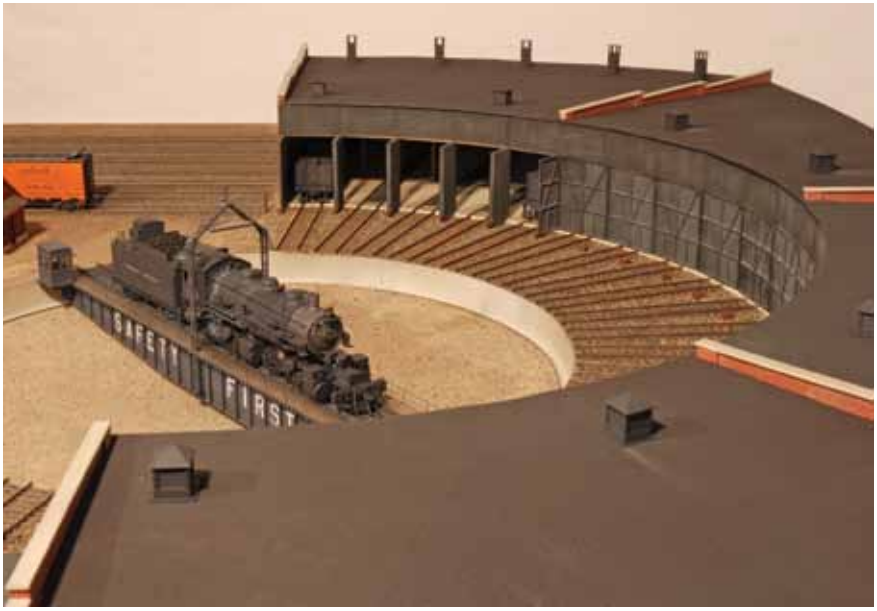
A better fit

In conclusion, I am hesitant to write that I have improved on a John Armstrong design and therefore will just state that I have simply modified one to better suit my needs.

(Right) A Midland Mallet wheels a drag freight past the lonely train order station of Rockton. The 2-6-6-0 compound engine, which was acquired second hand from the Denver & Salt Lake Railroad in 1934, has proven very popular with the Midland's operating department by eliminating helpers on most trains.

(Lower left) One of the WM's several mainstay 2-8-0 Consolidations wheels number 58 over the terrifyingly high Dry Gulch trestle.

(Lower right) A Midland 2-6-6-0 Mallet rides the turntable in this view from the roundhouse's roof. Note that Mike truncated the center stalls of the turntable to save space at the end of the peninsula. Closed doors hide the fact that these aren't full-length stalls.



John Armstrong's M&PS (and its Kin)

by Byron Henderson

Even if one hasn't read the December 1959 Model Railroader, there is something mighty familiar about John Armstrong's plan for the Montana & Puget Sound (M&PS) Mike Chandler used as the basis for his layout. For one thing, the "S" shape recalls Armstrong's later "alphabet" of layout footprints from *Track Planning for Realistic Operation* (Kalmbach; 1st Edition 1963, 3rd Edition 1998).

But beyond that, Armstrong also used a very similar design as a step-by-step example of designing a layout in the same book. This is found in the illustrations 8-6, 8-10A, 8-10B, and 8-14 in Chapter 8 in the 1st Edition (3rd Edition 9-6, 9-10A, 9-10B, 9-14 in Chapter 9). As in the M&PS plan, this is a free-standing layout with many of the same elements in roughly the same locations.

And in the Virginian & Ohio

Another appearance of the *Track Planning for Realistic Operation* version is in W. Allen McClelland's *The V&O Story* (Carstens, 1984; now available from White River Productions). This design (Figure 3.3, page 27) was done before McClelland's house was purchased, so it was somewhat generic in overall arrangement so that it might fit in a variety of spaces. (This is reminiscent of Armstrong's concept for the M&PS – which was intended to be moveable and useable in a new space).

McClelland doesn't mention the provenance of his design or Armstrong in the book, but there are so many similarities that McClelland must have been influenced consciously or unconsciously by Armstrong's plan.

One of the key instructive elements of these plans is the way that the track descends in multiple passes from Lofty through Lesclips and Le Clellum without passing through the two-sided backdrop (see Armstrong's M&PS track plan at right or on page 4). This eliminates the need for the operator to race around an arm of the layout to follow the train.

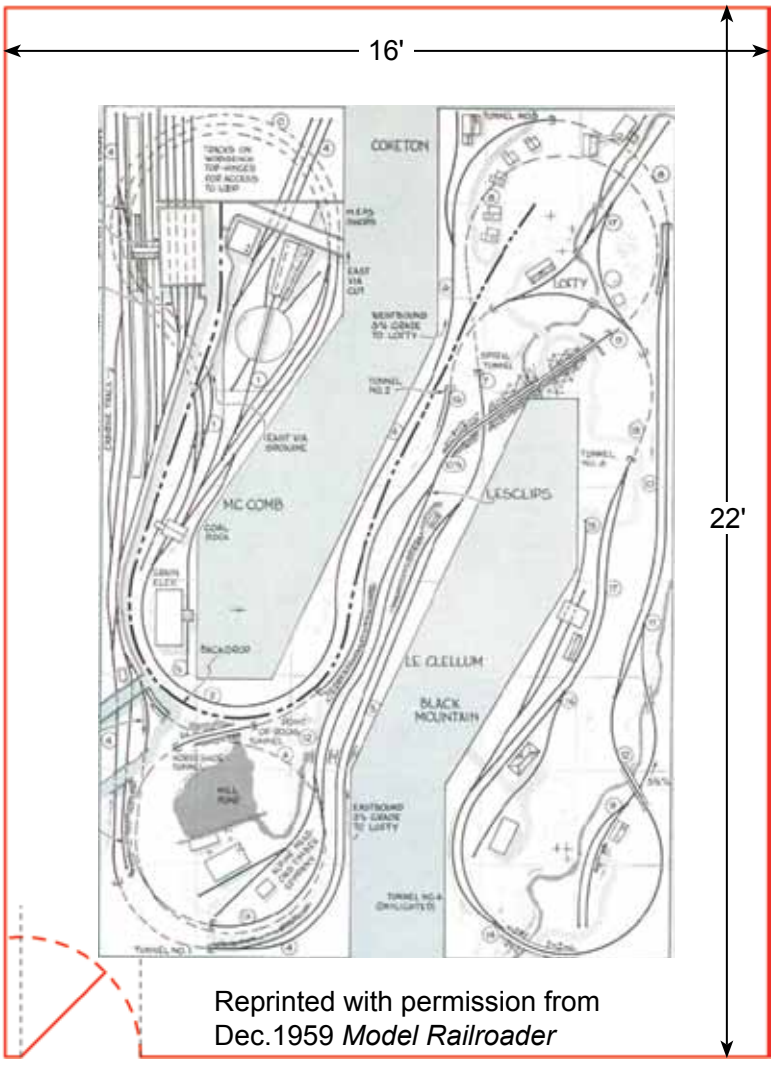
In talking about his own layout design process, McClelland notes that he carried over this back-and-forth climb on the same side of the peninsula from the earlier (Armstrong-like) plan for the Clinton-Dawson Spring area of the ultimate Viginian & Ohio track plan.

And as a Mountain Challenge

The LDJ Mountain Design Challenge for a 16' X 22' bonus room was described in LDJ-55 and is also found here:
www.layoutvision.com/ldj_challenge.html

With the increase in curve radius and turnout number, Mike Chandler's Western Midland doesn't fit in the Challenge space (with aisles), but Armstrong's original M&PS just does with roughly 2-foot aisles (see the coincidental result below). The free-standing footprint would be adaptable to new spaces more easily, but is likely not the most efficient use of the overall space for a "lifetime" layout intended for one location.

This is a good kick-off for what we plan will be several Mountain Challenge articles, the first of which is Don Winn's piece beginning on page 12.



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