

The Sentinel



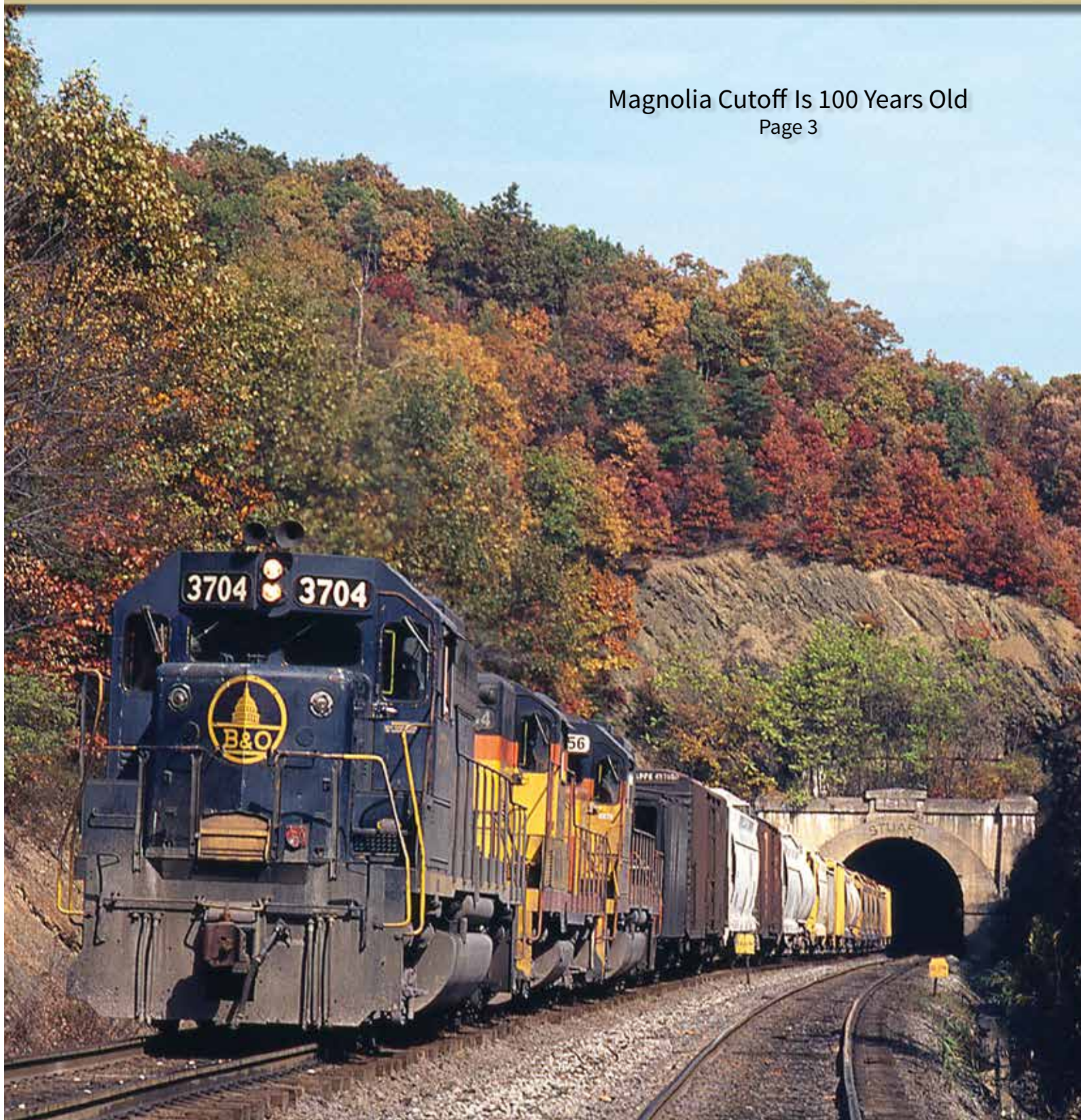
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Magnolia Cutoff Is 100 Years Old
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LETTER FROM THE PRESIDENT

With this edition of *The Sentinel*, I take keyboard in hand to share some of the topics that the Society will be encountering this coming year.

As some of you are aware, we are seeking advice and planning for a funding campaign to find a larger archive facility. Even though the volunteer staff has done a fantastic job cleaning, organizing and processing historical artifacts and records, we are nearing capacity in the space we are renting. Lacking space for other functions there, we are limited in what services we can provide the members and the community of railroad historians.

To be financially responsible in seeking donations and funding we need to reduce and control expenses, so some changes are coming and new challenges will be facing us soon.

Let us start with membership. We have been carrying members and providing them with issues of *The Sentinel* after their memberships have expired. This puts a burden on the paying members to pay for *Sentinel* printing, processing, and mailing information and copies for those who do not renew. With a change of membership chair, the following procedures will be implemented:

Members will continue to get a renewal notice at least one month before their membership expiration date, but if they do not renew by the end of their renewal month all mailings will cease. A second reminder will be sent and, if the Society receives payment for renewal, the membership will be renewed from the past expiration date.

We will establish a committee to seek new active membership through an outreach program. We will phase this program in slowly, but here is how we

will start. There are a few coming hobby activities this year and we are seeking volunteers to get into new territories and show the flag. Here is where you the members can help.

The National Model Railroad Association is having its National Convention in Cleveland, Ohio, in mid-July. We are considering having a booth at the hobby show and we would like volunteers to work the weekend. If you are interested, drop us a line through the Society website.

Second, the St. Louis prototype modeler meet is in early August, and again we would like volunteers. As you know the B&O had a strong influence in both of these areas. For both activities we will provide applications, displays and sales materials to promote the B&O Railroad Historical Society.

If we want the Society to have a future we need new and younger blood, and this is one way to reach those individuals. And since it has been decades since the B&O colors and flag have flown, we have to educate those who show some interest and encourage them to join our merry group.

The Society has started a B&O employee interview program (see page 35). If you know a B&O employee who would want to share experiences, please contact us to arrange for our interview crew to meet with that employee.

If you have old B&O railroad documents, please consider donating them to the Society instead of losing them for future historians. If you are handling an estate that contains artifacts or models, contact us and we will find a way to get them to new homes and for a donation or consignment fee that will help the Society in its fund-raising programs.

(Continued on page 35)

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Memberships, once accepted, cannot be returned.

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ON THE COVERS

FRONT COVER: B&O manifest Extra 3704 West exits Stuart Tunnel at Magnolia, West Virginia on October 21, 1979. Stuart Tunnel, at 3,355.4 feet, is the largest of the four tunnels on the Magnolia Cutoff.

BACK COVER: An eastbound coal drag, led by B&O SD40 No. 7599 and C&O SD40 No. 7562, exits Maryland's Graham Tunnel and crosses the Magnolia Bridge over the Potomac River as it re-enters West Virginia on October 19, 1978. (Stanley Short photographs).

Under Budget and Ahead of Time

B&O's Magnolia Cutoff Is 100 Years Old



This 1913 photograph of Doe Gully, taken in the early stages of construction, looks like the B&O's new passage through this area would be fairly simple. The truth is exactly the opposite. By the time the construction crews were finished, they had replaced the double-track tunnel with a four-track open cut. That required removing approximately 1.4 million cubic yards of material and lowering the existing tracks about 12 feet while keeping the mainline open for traffic.

By Henry Freeman

Photographs From the Society Archives Except as Noted

The Baltimore and Ohio Railroad's opening of the Magnolia Cutoff in 1914, just 21 months after its approval, completed one of the largest improvement projects ever undertaken by the B&O and was quickly hailed as one of the greatest engineering feats of its day.

The 12-mile Cutoff, completed under budget and almost three weeks ahead of schedule, shortened the distance through the Potomac River Valley by 5.8 miles, eliminated 877 degrees of curvature and resulted in a line with little grade while eliminating the constant thorn of an eastbound helper grade that often had six trains or more waiting for helpers.

One hundred years later, the route remains a critical east-west link for CSX Transportation, the B&O's successor,

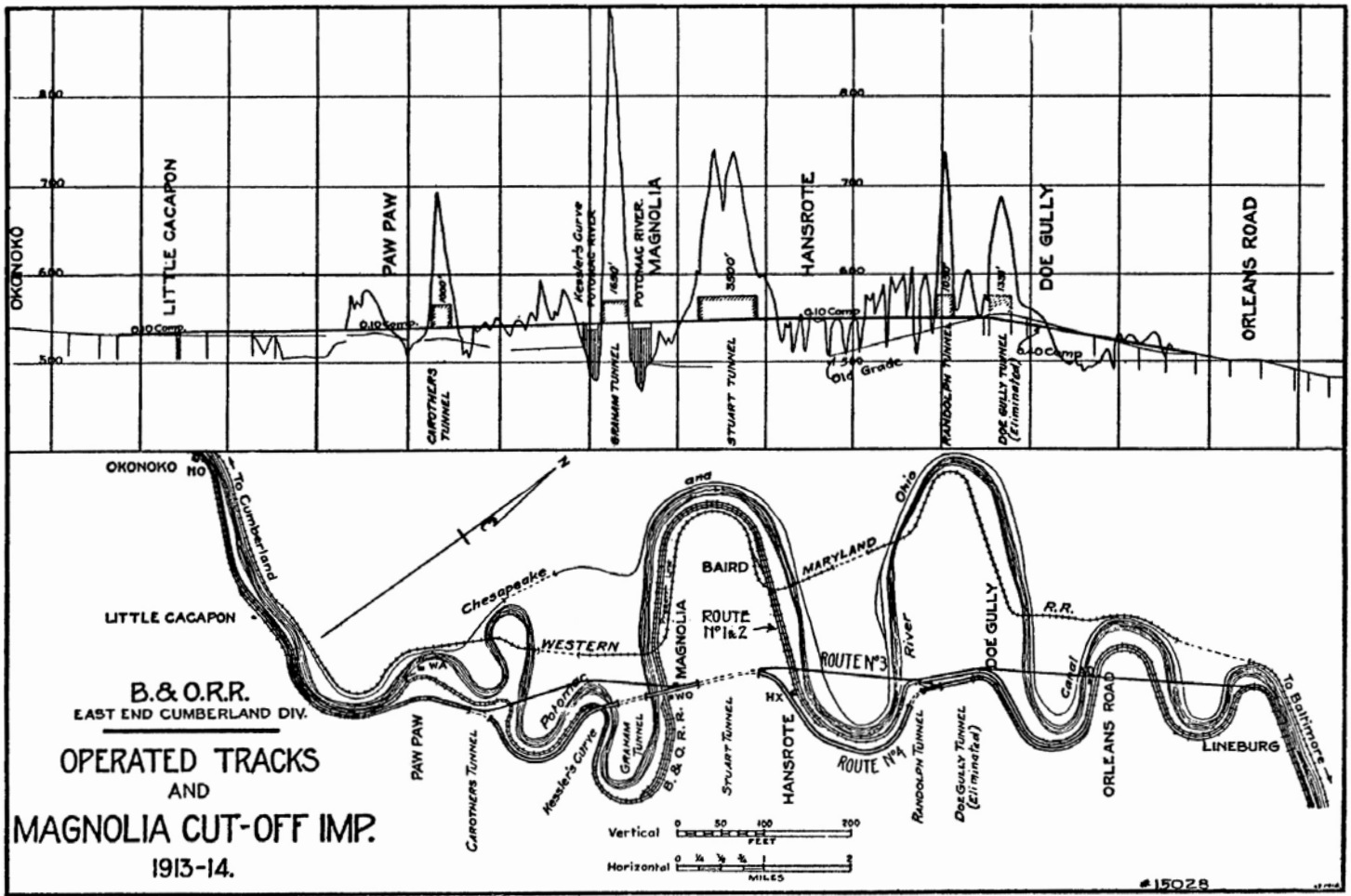
which—along with state and federal grants—has spent nearly \$60 million in improvements to clear the way for double-stack trains. The current work is the most significant upgrade to the line since its construction during the early days of Daniel Willard's 32 years as B&O president.

When Willard returned to the B&O in 1910 the bottleneck created by the path through the Potomac River Valley was a major obstacle to the railroad's ability to handle current traffic as well as being a competitive disadvantage for growth. Ultimately, the solution would be construction of the Magnolia Cutoff, a \$6 million project that required the construction of four tunnels, a long cut at Doe Gully, two bridges over the Potomac River and a concrete retaining

wall required where space was limited next to the river. It was officially opened on Dec. 6, 1914, and quickly brought an operational savings of \$500,000 a year.

Under the direction of F. L. Stuart, the railroad's chief engineer, the work was completed with no significant interruption in service and was mentioned in the same engineering discussions as the Delaware, Lackawanna and Western Railroad's 28.45-mile Lackawanna Cutoff across the state of New Jersey and the long-delayed completion of the Panama Canal.

There is a touch of irony in the fact that CSX's current National Gateway Project is also connected to the Panama Canal. In this case, it is the 2015 opening of a new set of Canal locks with a deeper draw, which will allow larger container



ships to reach Eastern ports directly from the Far East. The race between CSX and Norfolk Southern to capture the increased containerized traffic to the Midwest required CSX to raise clearances along this historic stretch of railroad.

CSX ran the first double-stack trains through the Magnolia Cutoff on Aug. 31, 2013. The cost to upgrade the clearances for the four tunnels and to construct a new interlocking at Magnolia was nearly \$60 million and the project was months behind schedule. The completion of Phase 1 of the National Gateway Project provides double-stack clearance from northwest Ohio to Chambersburg, Pennsylvania, by way of the former Western Maryland tracks at Cherry Run.

CSX's overall Phase 1 construction was budgeted at \$180 million or \$7.7 million in 1913 dollars, with \$2.6 million in 1913 dollars being spent on work along the Magnolia Cutoff. The B&O's budgeted \$6 million cost in 1913-14 to construct the Magnolia Cutoff would have been \$142 million in 2013 dollars, proving the long-term value of the century-old construction.

Four Construction Options Were Considered

Proposed Lines	Cost of New Constuction	Annual Operating Costs
1. Temporary third track along the present line retaining the eastbound helper grade.	\$2,235,000	\$615,087
2. Additional tracks, providing four tracks along present line and retaining the helper grade.	\$3,375,000	\$615,087
3. Four-track low grade cutoff, abandoning the present grade.	\$15,575,000	\$258,724
4. Two-track eastbound low grade cutoff, using present line for westbound movement.	\$6,000,000	\$284,580

Source: A. W. Thompson, 1914 report to The Engineering Society of Western Pennsylvania

In addition to the many engineering challenges presented by the Magnolia Cutoff construction, others in the engineering world of 100 years ago were impressed with the meticulous planning and engineering skills that completed the project in just 21 months at a cost of \$500,000 a mile. The Lackawanna Cutoff had taken three years (1908-1911) to complete and was abandoned in 1983. And the long-delayed Panama Canal, first started by the French on Jan. 1, 1881, was finally completed by the United States on January 7, 1914.

The most comprehensive account of the Magnolia Cutoff's construction can be found in a 124-page report presented to The Engineer's Society of Western Pennsylvania on November 24, 1914 by A.W. Thompson, the B&O's third vice president and chief operating officer. This *Sentinel* article, along with every other significant piece written on the Magnolia Cutoff, ultimately draws from that document. His report also appears to be among the first places where this part of the railroad was officially called the "neck of the bottle," an apt description of the problems.



The entrance to the Magnolia Cutoff from the east is located at Orleans Road and guarded by AD Tower, which opened in 1906 and was on the north side of the tracks. From here, the line rises on a 0.4 percent compensated grade to a summit immediately west of Doe Gully, where it begins to descend westward on a 0.1 percent compensated grade to Little Cacapon, a distance of 12 miles. When these two photographs were taken on October 17, 1947, Orleans Road still had semaphore signals, which were converted to CPL-type signals in 1957. The top photograph looks eastward and shows the interlocking rods that connected the tower's Armstrong levers with the switches. The photograph at the left looks to the west and shows the series of crossovers. The tower was removed from service in the late 1960s and its interlocking was remoted to FN Tower at Patterson Creek. (Bruce D. Fales photographs, BORHS)

Why Was the Magnolia Cutoff Needed?

To understand the long-term significance of the decision to build the Magnolia Cutoff, one needs to understand the B&O's position more than 100 years ago and how it got there.

Part of the reason can be traced to considerations for the construction of the original mainline between Harpers Ferry, West Virginia (then Virginia) and

Cumberland, Maryland. During that 17-year period it took to construct the line between these two points, several lines were surveyed on both sides of the Potomac River. The railroad was, however, forced to adopt a route south of the river because of a lapse in the company's Virginia charter and a provision in the law extending the charter.

A location south of the river had the advantages of access to the fertile valleys along the tributaries to the Potomac,

avoidance of interference with the Chesapeake and Ohio Canal construction on the north bank of the river and a lower cost of construction—\$2,650,000 less than that for a line considered north of the river. The final location of the line was made in September 1839, as the railroad engineers settled on a line with a heavier grade but a shorter route to avoid heavier construction costs. As train lengths and tonnage increased, this resulted in an unintended eastbound helper grade at Hansrote.



The magnitude of the construction of the Magnolia Cutoff required a huge amount of manpower and equipment to make it possible. A total of 22 steam or air shovels were used on the project with 19 Marion, two Marion Osgood and one Bucyrus shovel being employed. On most of the sidehill work, steam drills were used while air lines were installed for the tunnel work and the work at Doe Gully Cut. A total of 66 air drills and 50 steam drills were needed. The photo shows an air-operated Marion shovel employed for use in the tunnels. (Photo previously appeared in *East End: B&O's "Neck of the Bottle"*)



The original line, opened to Cumberland in November 1842, was a single-track mainline with numerous passing sidings. It included three tunnels, which were all eliminated by the time the Magnolia Cutoff was completed. The line quickly became a hauler of eastbound coal, the B&O having been awarded a contract in January 1844 to haul 175 tons of coal, pig iron and bar iron for 300 days at a revenue rate of 1 1/3 cents per ton mile. By the early 1900s the B&O's semi-bituminous coal traffic had grown to 300,000 tons per year at gross revenue of 0.4 cents per ton mile.

The railroad studied several ways to create a more economical operation for eastbound traffic from the Fairmont, West Virginia, area to tidewater. On the east side of the Allegheny summit the grade descended eastbound until the line reached the area where the Magnolia Cutoff would be built. The completion of the Cutoff would create a 0.1 percent eastbound grade and eliminate the need for helpers.

The railroad had been experiencing serious congestion issues on the 102-mile freight division between Cumberland and Brunswick as early as 1900.

A good deal of the problem was created by the coming together at Cumberland of two double-track mains—one from Pittsburgh and Chicago and the other from Cincinnati and St. Louis—that joined to continue east. The congestion in Cumberland had been relieved previously by the building of a freight cutoff, opened in 1904, for the Cincinnati-St. Louis traffic that rejoined the mainline at Patterson Creek, 8.1 miles east of Cumberland.

At that point, the two double-track mains merged into three tracks to travel the 13.9 miles from Patterson Creek to Little Cacapon, where there was a westbound passing siding. For the 7.5 miles from there to Magnolia, there were two tracks with a westbound siding at Magnolia. An additional freight running track existed for the 9.5 miles east to Hansrote, which was the foot of the helper grade. The 4.7 miles from Hansrote to Orleans Road consisted of two tracks with a 0.8 percent eastbound grade, against the ruling movement from Hansrote to the summit at Doe Gully Tunnel. The 25.3 miles from Orleans