ISSN 1053-4415

The Sentinel

A QUARTERLY MAGAZINE PUBLISHED BY THE BALTIMORE & OHIO RAILROAD HISTORICAL SOCIETY $8.00

VOLUME 33, NUMBER 4 FOURTH QUARTER 2011

Letter from the Editor

We've reached a historic turning point regarding the B&O. Almost four decades since it formally disappeared from history as a living entity, the railroad's historic monuments are in danger of disappearing too.

You know the stories of many individual places and objects, from buildings to signals to rolling stock. Great work has been done by the B&O Museum, many localities and individuals in saving things. Of course, a lot of the railroad's remnants continue to be in use, though except for track, they are now coming to the end of their usage due to technological developments or just plain wearing out (think CPLs). So if things are going to be saved, it has got to be right now.

On a quiet night in suburban Maryland, I can hear the freight trains running on the ex-B&O line, past the Rockville station where I joined the model railroad club when the B&O was still a railroad linking a lot of great states, not just a memory. Across Bradley Boulevard the B&O bridge still stands, though not marked, and the hiking trail was once the Georgetown branch (though the sign explaining its history is a bit inadequate). We could list scores, even hundreds, of such places.

If you've never visited Ellicott City, Maryland, believe me you should. There the oldest passenger station and freight house built for railroad purposes in North America, in 1830-31, are perfectly preserved. The setting is beautiful both in terms of the terrain—a creek, bridge and surprisingly rocky surroundings—and of the jewel of the downtown architecture. Just across the way is an old inn that once served interurban trolley passengers. And of course, the station includes a B&O museum and just next door, a B&O caboose.

Contrast this, though, to the second-oldest station—featured in this issue—in Duffields, West Virginia. The Civil War raiders of Colonel John Mosby spared the building, but time has other intentions. Compare the drawing of it in pristine condition with that of its present state, near to falling down. Alex Mayes tells the story of the station's history and the efforts to win support to save it.

One of the services of *The Sentinel* is to highlight things saved and yet unsaved from the B&O. I think that this is pretty much the last moment in history when relics will be discovered, preserved, and restored or will disappear forever. So keep your eyes open and report what you see and hear, please.

Jim Rogers writes about Airslide covered hoppers on the B&O. As you probably know, the B&O was a pioneer in the use of this car type, which seemed to take over so much of freight traffic, especially associated with the 1950s era. I'm interested in the early history of this car and here are a few words about that, drawing heavily on the research of Chris Barkan.

The B&O built its first covered hoppers around 1934, when the ACF covered hopper design was being built. The first experimental wagontop design was the single Class N-31. Some open-top hoppers were converted into covered hoppers (sounds simple enough!). Those from BR&P hoppers were called class N-23a and those from Class N-13 were reclassified as N-25.

(Continued on page 35)

In This Issue

The Sentinel
The official publication of
THE BALTIMORE AND OHIO RAILROAD HISTORICAL SOCIETY
P. O. Box 24225
Baltimore, Maryland 21227-0725
e-mail: info@borhs.org
website: www.borhs.org
Missing Sentinel: magazine@borhs.org

The Baltimore and Ohio Historical Society is a non-profit corporation dedicated to preserving and disseminating historical information about The Baltimore and Ohio Railroad.

On the Covers

FRONT COVER: There was no sight more spectacular than a steam locomotive, in this case a B&O Big Six, moving tonnage upgrade, here eastbound on Sand Patch in February of 1951. *(Courtesy Bob's Photos)*

BACK COVER: Dave Shackelford and his team at the B&O Railroad Museum have finished the restoration of another victim of the 2003 roof collapse, Number 305, which was for years displayed as Number 217.
See Running Light on page 34. *(Mike Shylanski photograph)*

Westbound at Swan Creek, Maryland, engine 5204 exemplifies the B&O's class P-5 USRA Pacifics, delivered in 1919 and the mainstay of the motive power on the Royal Blue Line. In 1926 it would be the first B&O locomotive class to work through from Washington to Jersey City, only to be displaced in 1927 when the class P-7s arrived. The photograph is circa 1920, prior to the track pan area's being paved with Belgian blocks. Note the covered steam line running between and parallel to the tracks.

Track Pans and the B&O *Royal Blue* Line

By R.N. Nelson

Photographs from the B&O Railroad Historical Society Collection

Providing much-needed water to steam locomotives was an ongoing struggle that had to be won. An adequate water level was essential since it was also a cooling agent for the locomotive boiler and firebox jacket and without it, locos would overheat and cause an explosion.

Track pans, which were actually metal water troughs between the rails that enabled steam locomotives to scoop water on the fly, were an essential part of the B&O's relentless effort to provide competitive passenger train service between Washington, D.C., and Jersey City, New Jersey, which began in 1832 as a rather awkward combined rail and water route and finally emerged as an all-rail route on December 15, 1886.

Penstocks were provided at both water stations—Swan Creek and Stanton—for freights, which did not scoop. They were also a backup for passenger engines in the event of a track pan or scoop malfunction. The storage tank at Swan Creek is in the left foreground. The train is eastbound.

The route, a joint effort of the B&O, the Reading and the Central Railroad of New Jersey (CNJ), would have several modifications over the years, with through passenger service finally ending on April 26, 1958. Passengers used the CNJ ferries at Jersey City to make the one-mile crossing of the Hudson River to New York City.

On the B&O, several significant changes, some relatively expensive, were made to the equipment and the routing, as well as to the overall operation itself, to further reduce the running time, all in an attempt to compete with the Pennsylvania Railroad's (PRR) paralleling route. The installation of track pans in the early 1890s by all three of the participating railroads worked to this end and would last until steam was completely replaced by diesels more than 60 years later.

There were four track pan locations on the Washington-Jersey City route, all fed by surface water, where steam locomotives scooped water on the fly, reducing the total running time by about 25 minutes. The national average distance between track pans was 30 to 45 miles, working best on tangents and requiring a roadbed that was absolutely level. The few track pans in the United States were all on eastern railroads.

There were only two track pans on the entire B&O system, both on the B&O's portion of the Washington-Jersey City route; one at Swan Creek, Maryland, 2.0 miles east of Aberdeen, and the other at Stanton, Delaware, 0.7 miles east of what would become Delaware Park Racetrack. Both were installed in 1893 and required some regrading of the roadbed to make the locations absolutely flat. The two other track pans on the route were at Roelofs, Pennsylvania, on the Reading and at Green Brook (Middlesex, New Jersey) on the CNJ.

Since B&O freight trains were not part of the through passenger agreement and did not scoop water, there were also penstocks, sometimes called "standpipes," "water columns" or "water plugs," installed beside the track at the track pan locations, as well as at several other intervening points. This enabled freight trains to stop and take water as needed, which was time-consuming. The penstocks also provided a backup for passenger trains in the event there was a track pan or scooping malfunction. (Incidentally, to everyone's recollection, only one B&O freight engine, Q-4b 4485, was fitted with a scoop. A few others did receive 13,000-gallon auxiliary tenders, which extended their range.)

The spring-loaded water scoop, 11¾ inches wide, scooped to within an inch of the bottom of the pan. It was carried in a horizontal position under the tender, only on the passenger engines assigned to the Jersey City route. Early configurations were mechanical in design.

In its last configuration, after 1926, the scoop was deployed in the trough by an

On the class P-5 Pacifics, the scoop control was located on the fireman's side. Westbound at Swan Creek in the early 1920s, the fireman of 5204 checks his work in this enlarged cropping of the photograph on page 3.

The class V-2 Lord Baltimore is in charge of the new *Royal Blue* lightweight consist at Swan Creek in June 1935. Two years later the engine and cars were transferred to the Alton Railroad. The cover for the steam heat connection can be seen every 45 feet between the inside rail and the track pan.

air-operated cylinder. A valve to send air to the cylinder was on the front, side of the tender of a P-7. Once over the pan, at the direction of the engineer, the fireman would open the valve. The greater the air pressure applied, the lower the scoop would extend.

The speed of the train forced the water collected by the scoop up a 12-inch pipe to the top of the tender's water tank. Cutting off the air pressure would cause the scoop to quickly spring back into its horizontal position. The engineer would also direct when to retrieve the scoop.

The demands on the water stations remained virtually unchanged until the mid-1920s. For example, a B&O passenger engine, which after 1919 usually was a P-5 Pacific (5200-5229), would leave Washington with a relatively light consist and a full tank of water and "top off" in Baltimore (36.8 miles) while at the lower-level Camden Station stop at a penstock fed by city water, then scoop water at Swan Creek, 34.3 miles east of Baltimore, and again 30.2 miles later at Stanton. That would enable

The track pans sat in a one-inch pocket milled out of the ties. Riveted to the side was a bracket that was spiked to the ties, allowing for expansion and contraction. Belgian block paving provided protection to the roadbed and better drainage of the spray kicked up by the water scoop. The block had once been used for the driveway of the freight shed in Pittsburgh.

the locomotive to reach Philadelphia (another 31.2 miles) with a low but relatively comfortable level of water.

The scooping did not necessarily completely refill the tank each time. So the "topping off" used in this context was the taking of water only while unloading/loading passengers. Once all were on board, the water process would end, so as not to delay the train. That also might or might not completely fill the tank each time. The only way to assure a full tank was to "take water," meaning stopping and filling the tank.

Early on, the Reading and CNJ pooled their power between Philadelphia and Jersey City. At Philadelphia there would be an engine and crew change to either a Reading or CNJ engine (usually a Reading engine) for the remainder of the trip to Jersey City. Only the passenger cars actually worked through at this time. They were nearly identical and pooled from all three railroads.

The B&O would participate in this power pool for through freight trains beginning in 1964.

The United States Railroad Administration was the name for the nationalized railroad system in the United States between 1917 and 1920, created during the war emergency of the First World War. Between 1918 and 1926, as a result of a USRA mandate to relieve an imbalance in the heavy wartime passenger traffic between Washington and New York (disproportionately more on the PRR), the B&O through passenger trains were routed over the PRR in New Jersey for the eastern leg of the trip, operating into Penn Station in New York City and not the CNJ terminal at Jersey City. The B&O was able to obtain an extension of the Penn Station agreement from the PRR lasting until 1926.

Not affected by the USRA's directive was the B&O's freight traffic, which continued to use car floats between New York City and the B&O's St. George Marine Terminal on Staten Island. The car float and express operations at Jersey City also were unaffected.

Even with the emergency USRA routing, B&O engines still did not work east of Philadelphia. The through passenger trains would leave the Reading at Manville, New Jersey, just short of the original CNJ connection at Bound Brook Junction, and run over the Lehigh Valley Railroad to the PRR just south of Newark,

A yellow warning sign with a light affixed on top, visible beside the train's fifth car, marked the beginning of the pans. A similar marking was at the end. Engine 5303, a P-7, is eastbound at Swan Creek. The fireman on a P-7 came to the engineer's side to operate the scoop. The pans were originally 19 inches wide, 7¾ inches deep and 1,200 feet long, made from 3⁄16-inch steel in 30-foot sections that were riveted together.

at a point called West Newark Junction, then east to Manhattan Transfer. There a PRR electric locomotive was attached to every train making the short trip under the Hudson River to Penn Station.

As mentioned, on the Reading, the locomotive would scoop at Roelofs, Pennsylvania, fed by Brock Creek, 31 miles east of Philadelphia (first located two miles farther east at Yardley, Pennsylvania and moved) and then 33 miles beyond that on the CNJ at Green Brook, 27 miles west of Jersey City.

Most of the Reading-CNJ portion of the route had three or four tracks from Neshaminy Falls, Pennsylvania to Jersey City and was relatively flat and straight. It was often called "the raceway." Track pans in four-track settings were on the two center tracks, with penstocks for freight trains on the outer tracks.

This was in stark contrast to the Washington-to-Philadelphia double-track portion on the B&O, with its rolling hills, curves and grades, not particularly harsh by B&O system-wide standards, but nevertheless the most challenging along this segment of the through route.

The scooping process was done in reverse for westbound trains from Jersey City to Washington.

On August 29, 1926, after the PRR refused to further extend the Penn Station agreement, B&O passenger trains could no longer operate directly into New York City and moved back to the CNJ terminal at Jersey City. As a result, a new agreement, called "The Blue Line Agreement of 1926," was reached between the three original participating railroads using the pre-1918 route, with one of the new main elements being that B&O power on passenger trains would work through to save time under a direct trackage rights arrangement. Power and crews on all other B&O trains, such as freights, mail and express, specials, etc., would still change at Philadelphia.

But the location of the four track pans on the through route had been based on an engine change in Philadelphia, not one engine working the entire route. With B&O passenger locomotives now working through, eastbound crews found water levels east of Philadelphia lower than desired before they could scoop at Roelofs. To stop and take water negated the time-saving justification for track pans in the first place, so several proposals, most to no avail, were introduced over

Looking east, beyond the storage tank, penstocks and warning sign, the shelter waiting station is visible. It was located east of Swan Creek, which fed the pans, and Robin Hood Road, both of which the railroad crossed on a trestle about 200 feet east of the end of the track pans. Engineers would have to reduce speed from the 80-mph speed limit in order to scoop. Scooping at 45 mph was considered by the railroad to be the optimum. Engine 5307 and its train are westbound.

the next twenty years or so, to address the problem.

Each of the 1,200-foot-long track pans on the B&O, made of 3⁄16" sheet steel in 30-foot sections riveted together, was 19 inches wide and 7¾ inches deep and held about 8,000 gallons of water. Small by industry standards, they were designed when the through route was at first assigned the B&O's relatively light 4-4-0 type locomotives, which were changed at Philadelphia.

As the engine size increased and operating procedures changed over the years, the pans would prove to be only marginally adequate. And as traffic demands changed and new technology became available over the years, the cost of the track pan operation would come under constant scrutiny.

Since an engine was only able to scoop about 65 percent, or in this case a maximum of around 5,000 gallons at best, having a relatively low water level at Philadelphia left most of the eastbound engine crews working through feeling somewhat uneasy, since the next chance to scoop was Roelofs, about 60 miles east of Stanton, the previous scoop. It is the same feeling one has when the automobile gas gauge is near or on "empty."

On the average, a steam locomotive when "working" consumed about 6,000 gallons of water and 3.5 tons of coal per hour. Some engineers, as a result, would not work the engine as hard, or "favor the engine," east of Stanton until they reached Roelofs, in order to conserve water. This often resulted in not keeping the schedule.

The same situation existed for westbound trains between those points, but to a lesser degree since the tender water level was generally a little higher upon reaching Philadelphia because of the previous flat and straight running.

In 1926, it was proposed to increase the size of the fill pipes from the water station holding tank to the track pans in order to allow a quicker replenishment of water once a train had scooped. Problems had been encountered where a second section or a close-following train found little or no water left in the track pan. This became evident after the engines began working through.

Under the original design, refilling the pans took about 15 minutes, so the pipe size was increased first at Swan Creek and then at Stanton, cutting refill time almost in half.

Surface water, also known as "raw water," was pumped from a creek at each

The scoop, attached just forward of the rear tender truck, was deployed and held down by air pressure, scooping within an inch of the bottom of the track pan. A spring would help snap the scoop back into the position seen here. All passenger engines assigned to the *Royal Blue* route had scoops.

location to an elevated holding tank and released by gravity through the fill pipes to the track pan's floor at connections 200 feet from each end and one midway.

Water for use in a boiler often requires treatment, or "dosing," whether it comes from a pan or a penstock. That is the adding of chemicals to adjust, among other things, the pH level and to neutralize any impurities that could adversely affect or impede the process of making steam or cause damage to the boiler. The term "dosing" is derived from the act of adding a dose of chemicals to the water.

At some locations, raw water is suitable as is, but at other locations, sometimes within the same region, dosing is required, and is usually done by the engine crew as they take on water.

At a few of the larger water facilities there was often a treatment plant for this process. Regardless, water samples from all locations were taken and analyzed frequently.

The water source for the pumping station at Swan Creek was its namesake and required dosing. At times of prolonged drought when the creek level would decline there was cause for considerable concern, but rarely did any action have to be taken, such as excluding some passenger trains with non-time-sensitive schedules from scooping or freights from taking water from the penstocks at the affected water station.

A 6-foot-high timber dam made of used telephone poles was constructed in Swan Creek, creating a collecting pool that made the creek deeper and wider there and helped to offset most water fluctuations. Water entered a filtering well and was drawn 600 feet through a cast-iron pipe to the pump house and pumped into a 40,000-gallon elevated holding tank.

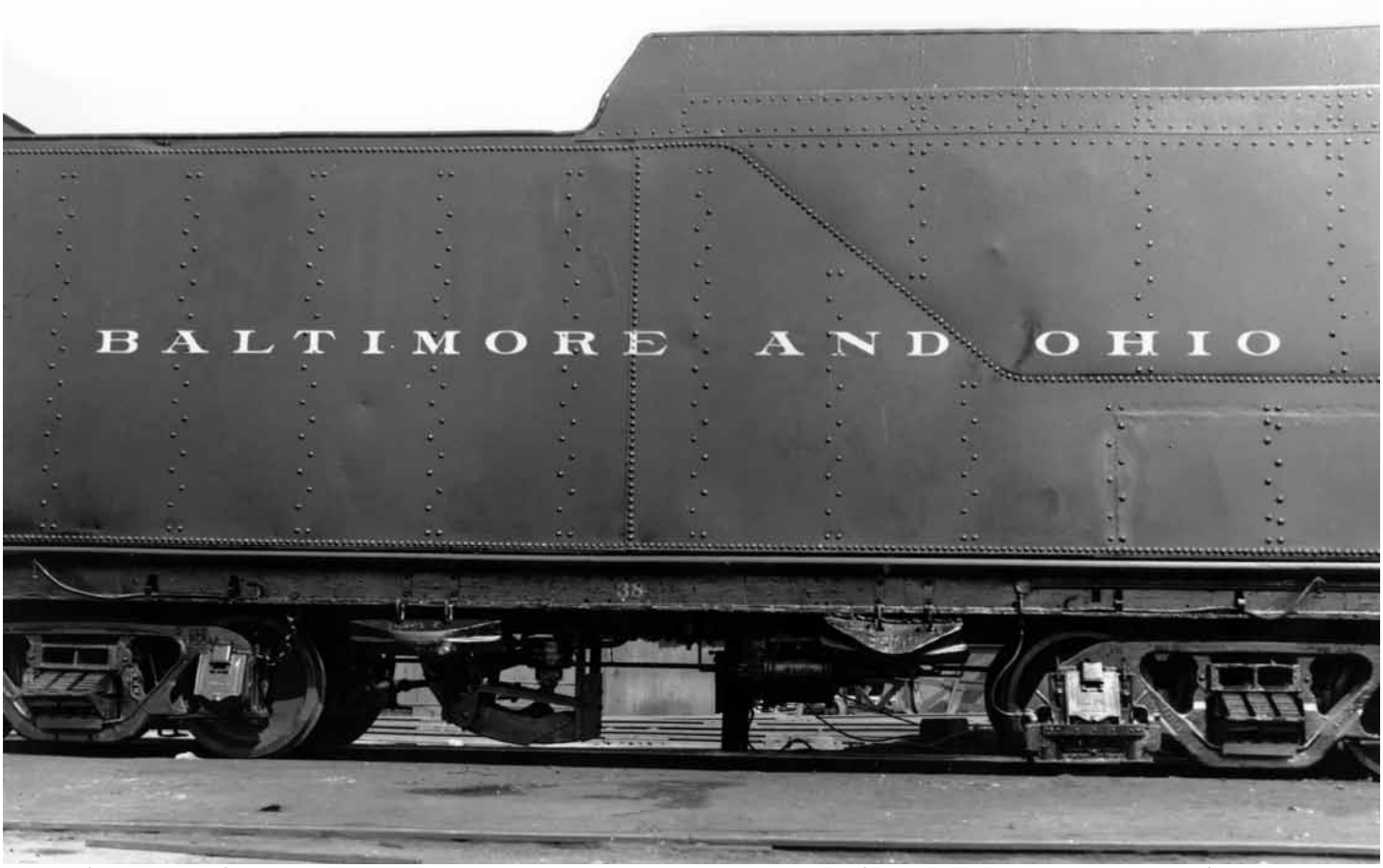
At Stanton, initially, water was taken from a long mill race that ran adjacent to the right-of-way on the north (westbound) side, fed by Calf Run, east of the facility. Flowing by gravity for about 600 feet through two cast-iron pipes to a sump at the pump house, it required no dosing and was pumped into an elevated 30,000-gallon holding tank. Since the flow in the pipe to the pump station was constant, any overflow was released into a drainage ditch and discharged downgrade into nearby Mill Creek, west of the facility.

But the mill race was prone to icing in the winter, which dramatically reduced the flow, so a dam was constructed at Mill Creek along with an automatic electric pumping station connected directly to the holding tank. The electric pump at Mill Creek was activated by a fill valve when the water level in the tank was below the normal operating level.

The water line from the mill race was retained to feed an auxiliary boiler that provided steam to the track pans in winter and also served as a backup to the electric pump system.

The tanks at both locations were 28 feet above track level to permit a gravity feed to the pans and penstocks and were later changed to a 50,000-gallon capacity, a system-wide standard. The track pans at Swan Creek were west of the tributary with the pump facilities and the small timber dam on the south (eastbound) side of the railroad. At Stanton the layout was in reverse as noted. Both sites had passenger platforms and small shelters nearby that were served by local trains.

The area around the pans at both locations was eventually paved with Belgian blocks to permit better runoff and



Some of the P-5 Pacifics used in *Royal Blue* service had their tenders extended 10 feet so they could hold 16 tons of coal and 10,800 gallons of water. But the longer range brought with it a need for bigger turntables. The tenders of P-7s could carry 19½ tons of coal and 11,000 gallons of water.

prevent the undermining and disruption of the roadbed. Better drainage also helped to prevent heavy ice buildup as a result of standing water on the roadbed in the winter.

Even so, freight trains taking water at the penstocks during icy conditions were required to stop short of the track pan area so the locomotive could cut off from the train and move, light, to the penstock to take water. This avoided having a trainman on the ground slip in the icy paved area caused by the frozen spray, had the cut been made at the penstock. Theoretically, to handle the penstock spout, the fireman would also move to and from the engine to the top of the tender where the cut was made. The paved area extended 100 feet beyond each end of the pans.

Engines scooping water would do so at a speed not exceeding 50 mph since above that, too much water would be sprayed to the trackside and wasted. Excessive speed could conceivably cause damage to the scoop mechanism. Higher speed while scooping would also generate a higher volume of water with a greater force, resulting in excessive pressure in the tank and possibly blowing off the hatch cover. In the event two opposing trains passed at the pans, with either or both scooping water, the speed was reduced to 30 mph to prevent the spray from injuring crews or damaging the windows or contents of the train on the adjoining track, since there could be loose coal and other debris in the spray.

Below 30 mph, the scoop proved to be less effective, providing less force to push the water up the fill pipe in the tender. So the optimum speed on the B&O for scooping was 40-45 mph.

At each end of the pans was a yellow warning marker and light on a pole, not only for night operations but for days with reduced visibility.

To increase their operating range, in 1926 some of the P-5 Pacifics' tenders were extended 10 feet, increasing the "as delivered" coal capacity from 14 to 16 tons and the water capacity from 10,000 gallons to 10,800, somewhat resolving the low-water concern. As always, there was a trade-off—the affected engines required a 90-foot turntable. All were hand-fired and did not receive stokers until 1940.

Often, if a passenger train was near the 10-car limit, the train would be doubleheaded. This was not so much to keep the schedule, but with two engines, they would not have to work as hard and individually would consume less water and coal. With this easy fix the four scheduled scoops were adequate but costly because of the expense of the second engine and crew.

But one must also consider that the second locomotive on a doubleheader would get next to nothing on a scoop, so agreements had to be worked out between the crews as to which engine would scoop, one at the first pan location and the other at the second, if possible.

The Columbian is westbound at Green Brook (Middlesex, New Jersey) on the Central of New Jersey. Penstocks were provided on the two outer tracks for freights. The pipe between the tracks, held off the cold ground by metal supports, is for steam heating in winter. The Belgian block used for drainage is apparent between the two eastbound tracks.

Another plan, in theory, and I repeat *in theory,* was that if the first engine lowered its scoop only halfway, then the second engine would have water to scoop. But in reality, what the first engine didn't scoop was for the most part dissipated over the pavement.

Another approach was for the rear engine only to scoop first until halfway down the pan, and then the front engine would lower its scoop for the second half. Even at 30 mph, 1,200 feet went by fairly quickly.

In 1927, with the arrival of the P-7 Pacifics (5300-5319), which were specifically designed for the Washington-Jersey City through route, the low-water concern was reduced even further since the engines proved more efficient and had a slightly greater operating range even with the now-heaver consists. As delivered, they had a capacity of 19.5 tons of coal and 11,000 gallons of water.

It was proposed in 1931 to extend the length of the track pans at both B&O locations, from 1,200 feet to 1,800 feet. This would give them an increased capacity of about 12,000 gallons and with the engine having a 65 percent scooping rate, that would translate to a maximum of about 7,000 gallons taken on each scoop. It was felt that this would result in a nearly, if not a totally, full tank each time, which was not necessarily the case with the shorter pans. Also, with the extension, the second engine on a doubleheader could conceivably take in more water, as little as that might be.

But it was during the Great Depression, when money was scarce, ridership was down and no doubt, there were higher priorities elsewhere. Nevertheless, the B&O saw several innovations during this bleak time, including the world's first fully air-conditioned train *(The Columbian,* between Washington and Jersey City), with more trains to follow.

Other innovations such as diesel power, one-of-a-kind steam locomotive designs and lightweight trains were also were tried on the route. One of those engines, 5304, a P-7a Pacific, was streamlined and had an increased capacity of 13,000 gallons of water and 18.5 tons of coal, foreshadowing things to come.

If problems were encountered, the crews always seemed to find a way to "make things work" somehow, which was all a part of good railroading. In effect, the Washington-Jersey City route had become a test track.

Since the 223-mile through run Washington to Jersey City was lucrative for crews (2¼ days' pay for engine crews and 1½ days' pay for train crews, one way), it tended to attract men with a lot of seniority and experience. Thus, the engineers, for the most part, knew just how to best handle the locomotive in order to conserve both coal and water. This also helped to temporarily resolve any low-water and coal concerns.

Crews often called jobs such as these, and there were several on the railroad, "money jobs" for indeed they were. This particular job was also referred to as "Working the Blue Line," with crews taking a great deal of pride in being assigned the prestigious run.

Under the agreement, the through crews, using men from all three railroads,