Throughout: The height of hopper cars has been expressed as "from top of rails to eaves." It is more appropriate to discuss the height of open-top hopper cars as "from top of rails to top of sides."

Pages 66 and 67: Some additional information has been made available that makes this story more interesting and complete. Rewritten replacement pages containing this information with new photographs and diagrams are appended to this sheet.

Page 92, first paragraph, should read: "In 1932, the Aluminum Company of America had ten, 70-ton, aluminum cars built and placed in service hauling bauxite and coal. In that same year, the Pennsylvania Railroad had a 50-ton aluminum car built for evaluation. Two years later, the Baltimore & Ohio teamed with the Aluminum Company of America to build an aluminum hopper car, and several other railroads followed suit in the 1940s. Aluminum cars not only addressed the issue of corrosion but also of weight. In the B&O car, shown in Figure 4.48, there was a seven-ton reduction in light weight between an equivalently sized aluminum and steel car. Despite this difference and the fact that some of these early cars stayed in service for over twenty years,[51] it was another 50 years before this metal saw extensive use in coal cars."

Page 94, Figure 4.51: Photo courtesy of Bob's Photo.

Page 98, Figure 4.58: Photo courtesy of Jay Williams Collection.

Page 102, Figure 4.67, should read: The car is equipped with rubber draft gear. The "R" inside the circle on the side indicates the car is equipped with roller-bearing trucks.

Page 113, add: The lack of compatibility of links and pins among railroads is illustrated by this article from the *Rome Daily Sentinel*, December 30, 1885 regarding William Vanderbilt's death.

"So Vanderbilt is dead," said the freight brakeman. "I saw Billy once and at the time, I wished I hadn't. It was when I was a brakeman on the Central. One day we were shifting cars at a little station near Syracuse, when a special car, with locomotive attached, came in and stood on the main track near where we were at work. Special cars were not very uncommon, and we didn't pay much attention to this one. Pretty soon, I was making a coupling, but the infernal link wouldn't fit. I tried it two or three times, and the engineer got out of patience backing up for me so many times, and I began to get mad myself. Then I gave it another try, but still it wouldn't work, and then I took that link and gave it a sling into the creek and swore in the bargain. In about ten seconds I heard someone calling me and looking up, saw a plug-hatted and side-whiskered man standing on the platform of the special car. I knew him as soon as I laid eyes on him—it was Billy Vanderbilt. 'See here, young man,' says he, 'I've been watching you. Do you know whose property you have been throwing into the creek?' 'Yes, sir," says I, trembling and expecting to be bounced the next minute. 'Well, whose was it?' 'The Pennsylvania Railroad's sir,' says I. 'Oh,' replied Vanderbilt, and then he went into the car and shut the door. I wasn't bounced either." *Chicago Herald.*

Page 149, Figure 6.8, should read: "...In 189Z, the he Master Car Builders' Association developed a standard design for an arch bar truck for a 40-ton car, which was adopted as Recommended Practice in that year..."

Page 149, Table 6.1, should read: "...Although a standard was proposed in 1885, the M.C.B.A. did not establish standards for 40,000-pound or 60,000-pound trucks. In 189Z, it adopted the standard for 80,000-pound cars shown here. In 1909, it established a standard for 100,000-pound cars..." The dates in the table should be changed accordingly.

Page 153, Figure 6.17, should read: "This cutaway view shows a Barber lateral-motion, diamond arch bar truck."

Page 155, Table 6.2: Axle B should read 4 ¼" x 8". Axle F was initially adopted in 1920.

Page 157, Table 6.3: The total weight on rail for a 6-wheel truck with axle D should read 253,500 lbs.

Page 171, Figure 6.42, should read: ". . . from side to side. As the resultant load line moves from the center bearing to the side bearing as shown in the diagram above, 82.5% of the load is shifted onto one side frame. When that occurs, the side frame at point F is carrying a weight of 62,413 pounds while the side frame at point F1 is carrying a weight of only 13,587 pounds. As the rocking continues and the springs close, this shock is transmitted directly to the rails. Ironically, . . ."

Pages 184 and 185, add: Donald S. Barrows received patent number 1,652,808 on December 13, 1927 for his Double-Truss Car Truck. The Symington Company was among the first to produce a double-truss truck. The design was widely licensed and was produced by a number of manufacturers.

Page 185, Figure 6.84, add: "The tension member extended into the spring seat, which increased spring capacity and allowed the use of spring combinations such as the coil-elliptic combination seen in Figure 6.44. Alternately, the design could accommodate another coil spring or snubbing device."

Page 190, Figure 6.104: should read: "A drawing of the Type S-2 is shown in Figure 6.90. The Type S-2 was equipped with four coil sets; Type S-2A had five."

Page 191, Figure 6.110, should read: "...These trucks were designed by the Standard Steel Car Company and manufacutered by the Verona Steel Castings Co. of Verona, Pennsylvania from which they got their name. This set was photographed under a New York Central 70-ton hopper car in 1951."

Page 193, first paragraph, add at end: "In 1955, the A.A.R. required that all cars built new or rebuilt after January 1, 1956 have 'trucks equipped with springs having not less than 2 ½" travel and with snubbing devices or built-in snubbing features. . .'"

Page 193, add after last sentence in box: "[The *'-B'* or *'-C'* refers to the grade of steel used.]"

Page 202, third paragraph, should read: ...Prior to 1927, the rule stated that journals "should be repacked when necessary, using properly prepared packing (new or renovated) in accordance with Recommended Practice, at which time all packing should be removed from the boxes and boxes cleaned; dust guards to be renewed (if necessary) or replaced when wheels are changed."[29] From 1927 [extended to March 1, 1929] through 1931, Rule 66 stated journal boxes should be repacked "after the expiration of twelve months,"[30] and from 1932 through 1954, the interval was fifteen months, except for the years 1951 and 1952 when the interval was reduced to twelve months.[31] In 1955, the interval was extended to eighteen months...

Page 209: Some excellent builders photos of 20th century coal cars built by Ralston can be viewed at: http://www.columbusrailroads.com/index.htm

Page 210, Figure 8.3: This photograph was taken in West Virginia in July 1966 by John C. La Rue Jr.

Page 216, Figure 8.17, should read: August 1909.

Page 232, Figure 8.50, should read: "C&O 22535 was produced by the Pressed Steel Car Company in 1901 as part of the railroad's 22000 to 22999 series. These cars had the same dimensions as the Standard Steel car shown in Figure 8.51. Between 1921 and 1923, the cars in this series were rebuilt into cars that shared the dimensions of the C&O's 64000 to 65508 series cars, which were being built new at that time. The two series each had an inside length of 30' 0", inside width of 9' 5", height above rails of 11' 0" and capacity of 2,015 cubic feet."

Page 257, Figure 8.101, should read: An example of one is shown in Figure 8.176.

Page 261, Figure 8.111, should read: "VGN 50002 was one of four experimental gondolas built for the Virginian in 1917 numbered 50000 to 50003. Based upon its evaluation, the railroad purchased 1,000 120-ton cars from Pressed Steel in 1920 numbered 19000 to 19999. Each had an inside length of 49' 6", inside width of 10' 3", inside height of 7' 4 ¾", and capacity of 3,840 cubic feet. It subsequently purchased an additional 1,025 cars numbered 20000 to 21024."

Page 330, Figure 8.258, first two sentences should read: "GTW 107150 began life in 1909 as a 50-ton twin-hopper car in the Grand Trunk Western's 74500 to 75499 series. That series shared most of the features of the 1905 Common Design, but the hoppers were spaced 8' 2" apart rather than the Common Design's 7' 2"." *With thanks to David Thompson*

Page 332, Figure 8.263, should read: "Norfolk & Western car number 81657 began its service life in April 1937 as one of the fish-belly hoppers in that railroad's HL class. Those cars had the same size and appearance as the Norfolk Southern car shown in Figure 8.265. The railroad produced 8,500 of these fish-belly cars from 1936 through 1939 numbered 22000 to 25999, 67500 to 69999, and 38000 to 39999. Beginning in 1939, the railroad extended the first and last side post below the side sill so that the lower edge of the side was horizontal from bolster to bolster as seen in this photo. The railroad produced 4,000 cars in the HL class in this new configuration numbered 56500 to 59999 and 67000 to 674999 in 1939 and 1940. In 1949, the N&W began heavy repairs to these cars converting them into its H9 class. By 1957, all of the remaining HL class cars had been converted into the H9 configuration shown here. The cars in the H9 series were numbered 80000 to 83999, 72500 to 73999, 79500 to 79999, 87500 to 87907, and 60000 to 65814. The H9 series had a nominal inside length of 31' 0", inside width of 9' 9", and height of 11' 0". Although some of the H9 series had internal dimensions that deviated from these numbers, all were rated at a capacity of 2,054 cubic feet."

Page 341, Figure 8.281, add: "These cars were based upon the railroad's all-steel H-8 series, which it had begun purchasing in 1939. Between 1954 and 1957, the remaining cars in this series were rebuilt into all-steel cars with an inside length of 33' 0", inside width of 9' 5", height of 10' 9", and capacity of 2,048 cubic feet."

Page 346, Figure 8.290, should read: "The Virginian began a major expansion of its coal-car fleet after World War II with the addition of its H-12 and H-13 series of 50-ton twin-hopper cars. Both series had an inside length of 33' 0", inside width of 9' 9", height to top of sides of 10' 9", and capacity of 2,041 cubic feet. The railroad purchased a total of 5,500 cars in these two series. The cars in the H-12 series were numbered 23000 to 23999 and 24000 to 24499, and those in the H-13 series were numbered 25000 to 25999, 26000 to 26999, 27000 to 27499, 28000 to 28499, and 29000 to 29999. These cars also shared the internal dimensions of the H-8 series produced from 1939 to 1943, although the cars in the H-8 series, numbered 8000 to 10399, were rated at a capacity of 2,051 cubic feet. VGN 28205 was built in November 1948. This photograph was taken in 1959."

Page 359, Figure 8.316, should read: The car is equipped with rubber draft gear. The "R" inside the circle on the side indicates the car is equipped with roller-bearing trucks.

If you have any questions or comments, please feel free to contact me at: Bob Karig; 2635 Harrisburg Pike; Lancaster, PA 17601; or at karig@sprintmail.com

In 1906, the Pressed Steel Car Company produced an alternate design for a side-discharge drop-bottom gondola. That design yielded a car with an inside length of 34′ 0″, volume of 1,530 cubic feet, and nominal capacity of 50 tons. The doors over the trucks dropped to allow a 23″ opening, while the doors in the center of the car dropped to permit a 26″ opening. They were operated by a winding chain attached to a "creeping shaft" that ran the length of the car. Two railroads belonging to the Frisco System, the Chicago & Eastern Illinois and the Kansas City, Fort Scott & Memphis, each received 100 of these cars.[9]

These side-discharge, drop-bottom designs proved extremely popular among the railroads, and in particular among the western and midwestern railroads. Indeed, many other car manufacturers followed these manufacturer's lead and produced similarly designed cars, some of which were entirely self-clearing and some of which were mostly self-clearing, as in the design shown below.

The success of these designs is measured in their use by the railroads. Drop-bottom gondolas were the primary means of transporting coal for many of the western and midwestern railroads. For example, of over 19,000 open-top cars that the Burlington Route used for hauling coal in 1929, only 1,750 were hopper cars. Similarly, in that same year, the Illinois Central had over 18,280 drop-bottom gondolas compared to only 3,480 hopper cars.[10]

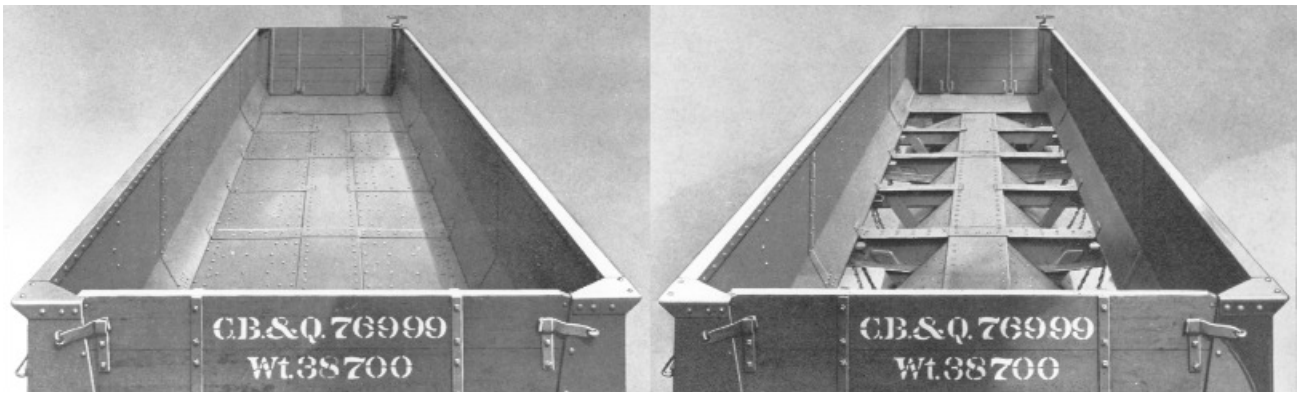

FIGURE 4.9

This high end view shows the operation of the drop doors on the side-discharge, drop-end, drop-bottom gondola built for the Chicago, Burlington & Quincy by the Pressed Steel Car Company in 1910 as a lot of 500 numbered 76500 to 76999. This car compensated for the fact that it was not entirely self-clearing with its versatility. Note the ends, which can be unlatched and dropped to accommodate mill-type loads. ***[Pressed Steel Car Company Photo; Courtesy: D.K. Retterer Collection]***

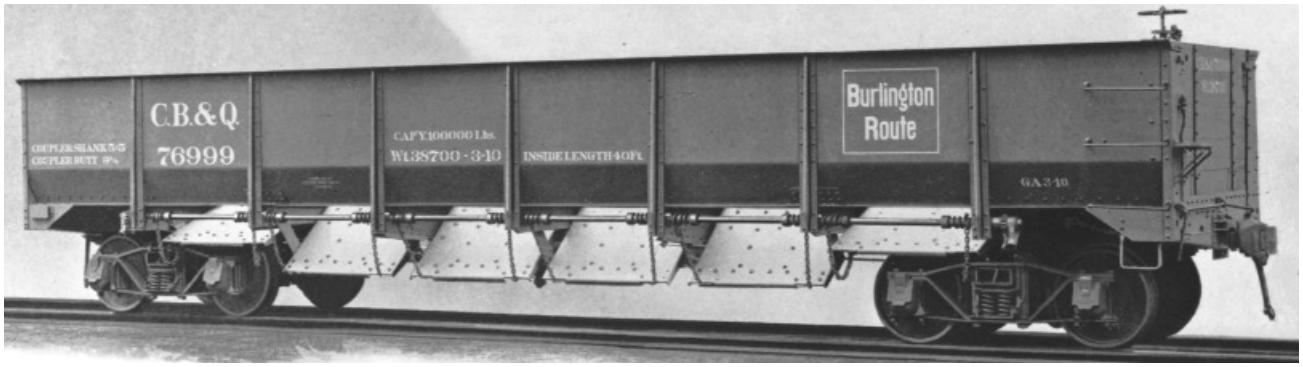

FIGURE 4.10

This side view of the CB&Q car shown in Figure 4.9 shows the Caswell door actuating mechanism used to open and close the drop doors. William A. Caswell received patent number 806,394 for his car design on December 5, 1905, and he subsequently assigned that patent to the National Coal Dump Car Company, which licensed it to other manufacturers to produce. Although the Caswell patent was awarded after the Becker patents discussed on page 66, the Caswell claim was filed first. This, plus the fact that Ralston and Becker were former employees of Caswell, became grounds for a patent infringement suit filed by National against Ralston, which National ultimately lost in 1909. The CB&Q class GE-1 car shown here had an inside length of 40′ 0″, inside width of 9′ 4½″, inside height of 4′ 4″, and capacity of 1,595 cubic feet. ***[Pressed Steel Car Company Photo; Courtesy: D.K. Retterer Collection]***

Beyond the large-sized models, the gondola continued to be a popular way to haul coal through the first half of the 20th century. The advantage of the drop-bottom gondola was that it was a multi-purpose car, that is, it could haul coal one day and other materials the next. The disadvantage was the fact that early drop-bottom gondolas and hopper-bottom gondolas were not self-clearing—they required physical effort to discharge the load.

The introduction of the side-discharge gondola at the turn of the twentieth century addressed this disadvantage. In 1904, Anton Becker was awarded patent number 763,947 for his "Metallic Flush Floor Dump Car," a self-clearing, side-discharge gondola. That patent, along with accompanying patents for a door operating mechanism, became the basis for the formation of the Ralston Steel Car Company in 1905. In the Ralston design, the car's drop doors were hinged in the center, and, in effect, the entire bottom dropped out of the car, permitting the car's contents to be dropped to the side as shown in Figure 4.8. When the doors were closed, the car could perform as an ordinary flat-bottom gondola without hoppers or other obstructions to interfere with the load.

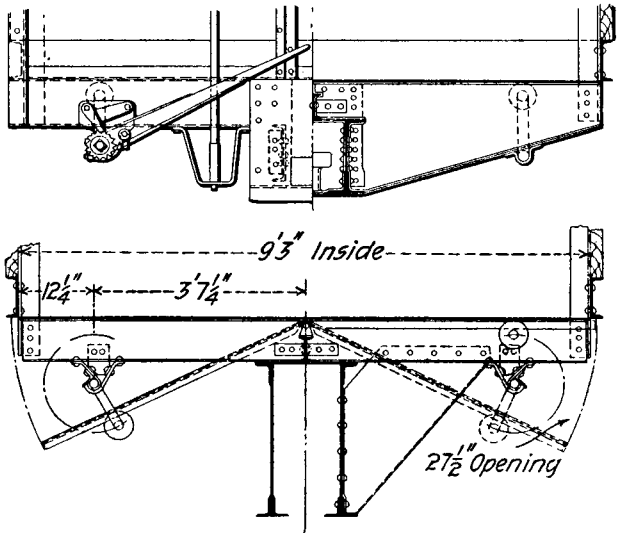

FIGURE 4.7
Anton Becker was awarded patent number 763,841 for this "dumping mechanism for metallic cars" on June 28, 1904. He assigned this and subsequent patents that improved the mechanism to the Ralston Steel Car Company. ***[Car Builders' Dictionary, 1906; Courtesy: Simmons-Boardman Publishing Corporation]***

FIGURE 4.8
Zanesville & Western car number 20690 was built by the Ralston Steel Car Company in December 1907. The car had an inside length of 40′ 0″, inside width of 9′ 3″, inside height of 4′ 6¼″, and height to top of sides of 9′ 0″. It had a capacity of 1,665 cubic feet and was rated for a load of 100,000 pounds. The self-clearing, side-discharge design was based upon a 1904 patent by Anton Becker, who partnered with Joseph Ralston to form the company in Columbus, Ohio. This design was popular with a number of railroads. Note the instructions for the door operating mechanism posted at the end of the car. ***[Ralston Steel Car Company Photo; Courtesy: Alexander J. Campbell Collection]***