Contents

The coming of flux pellets in the late 1980s led to limestone trains, moved by DM&IR from Duluth starting in 1988 to Minorca and Minntac, from a dock served by BN.

Some direct-shipping ore continued to move, but the amount was dwindling. Pellets were more than 60 percent of traffic in 1970 and topped 90 percent in 1980. The DM&IR's last movement of red ore came in September 2002, from Auburn Mine near Virginia (which had opened in 1994 to tap a small remaining pocket of high-grade ore).

The shift to pellets eliminated the need to classify ore cars, which meant much of the track in yards at Proctor and Two Harbors was pulled up. The more-efficient train operations also mean fewer cars are needed to haul the same amount of ore compared to direct-shipping ore. The small assembly yards across the range (along with spurs to various now-abandoned mines and loadouts) were abandoned. This did result in a new north-end yard, at Keenan, with 16 tracks and locomotive servicing area.

Other abandonments from the 1960s onward included the line to Coleraine (with trackage rights over Great Northern west of Hibbing as needed; the GN also abandoned track for rights over DM&IR in some areas), and the line to Ely north of Embarrass (in 1982). The line from Duluth to Two Harbors was embargoed in 1982 and sold to North Shore Scenic Railway in 1986.

A major change came in 1988, when U.S. Steel sold the DM&IR to Transtar, Inc. (which was controlled by Blackstone Capital Partners). In 2001 the DM&IR was spun off to Great Lakes Transportation, which was wholly owned by Blackstone. Finally, in 2004, Blackstone sold the railroad to Canadian National. The CN formally merged the DM&IR in 2011, and continues to operate its lines, **3**.

Great Northern

Ore is usually not the first thing that comes to mind in looking at the transcontinental Great Northern. However, the GN was the leading


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Soo Line Alco FA-1s roll their ore extra toward Superior, Wis., in September 1950. The Soo and Northern Pacific pooled Cuyuna ore traffic but operated their own road trains. *Henry J. McCord*


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An LTV Steel (former Erie Mining) taconite pellet train behind A-B-B-A F9s dumps its load at the Taconite Harbor dock in June 1991. After completing the loop, the train will head empty back to Hoyt Lakes. *John Leopard* ore carrier in Minnesota in terms of tons carried and ore cars owned until the 1938 merger that formed Duluth, Missabe & Iron Range. The GN remained solidly in second place behind DM&IR through the 1950s, and carried 36 million tons of ore in its peak year of 1953.

The GN began carrying ore from the Kelly Lake area of the Mesabi range to docks at Allouez, Wis. (on the east side of Superior) in 1892. In 1899 the GN acquired the Duluth & Winnipeg and Duluth, Mississippi River & Northern railroads, including the D&W dock at Allouez, which became GN Dock No. 1. After rebuilding with steel and concrete in the late 1920s, No. 1 remained in service into the 1990s. The railroad built three additional docks at Allouez through 1911 (one was retired in 1958).

From Allouez, a double-track line extended around Duluth to Brookston, Minn. (formerly Stony Brook). From there, the railroad's Mesabi Division comprised multiple routes northwest to mines in the Mesabi: GN's main line northwest to Minot through Swan River and Gunn (double-tracked to Swan River in 1911), and a single-track line northward to Olcott and Virginia. The line from Virginia to Gunn, **4**, completed in segments through 1909, ran along the Mesabi Range and had dozens of spurs and branches to the more than 100 mines in the area served by the GN. The line from Swan River to Kelly Lake was abandoned in 1958, with the railroad installing CTC on its other main lines in the area. Much of the double-track was also removed at that time.

Trains were operated as turns out of Allouez, carrying empties to Kelly Lake and returning with loads, which in the steam era could usually be done in under 16 hours (the limit for hours on duty at the time). Mainline trains operated out of several yards in the Kelly Lake area, with mine jobs (more than 20 at peak periods) pulling cars from individual mines to assembly yards at Kelly Lake, Canisteo, Calumet, and Nashwauk. Traffic was heavy, with up to 16 ore turns daily in


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Two Erie Mining RS-11s on an ore pocket run bring their loaded side-dump cars back to the pellet plant at Hoyt Lakes, Minn., in August 1984. *August West*

the 1940s (this dropped to five or six by the late 1960s), plus local freights and other mainline traffic on the Minot line.

In general, empties traveled up the western line to Swan River, then to Kelly Lake. Loads returned either via the eastern line or through Gunn on the western main line.

In the steam era, GN mainline trains often featured class N 2-8-8-0 Mallets, with 2-8-2s handling mine runs and 0-8-0s working at the yards and docks. Once diesels appeared, SD7s and SD9s served at the docks and for mine transfers, with various four-axle power—mainly EMD F units and early GPs—on the mainline runs.

Even by the 1910s, ore trains ran up to 8,000 tons. Trains to 180 cars were typical in steam days, and with the coming of diesels the GN was known for operating some of the heaviest trains in the ore region, up to 220 cars and 20,000 tons.

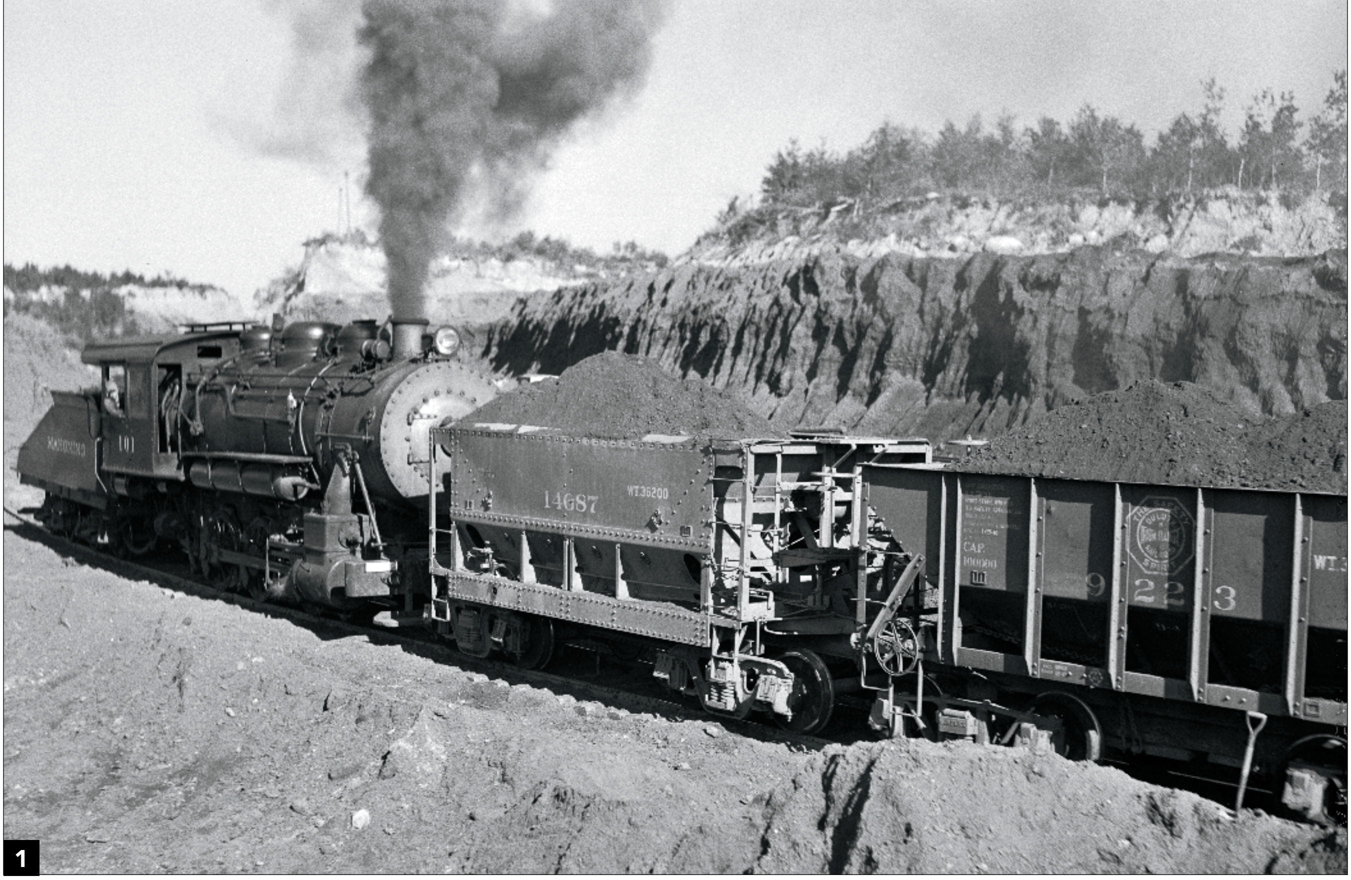
Inbound trains of loads arrived at Allouez Yard, **5**, which had an 8,000-car capacity with 19-track arrival yard, 9-track departure yard, and 89-track (hump) classification yard. It was the only hump yard for classifying ore in the Great Lakes ore region, and the largest yard/dock operation on the Great Lakes (DM&IR hauled more ore, but shipped it at two locations).

Dock transfers pulled cuts of cars from classification tracks and shoved them to the proper dock pockets, then pulled empties back to departure-yard tracks.

The GN also interchanged ore with the Soo Line and Northern Pacific (which operated in a pool arrangement) at Allouez Yard, and with the DM&IR at nearby Saunders, using a yard job out of Allouez.

Ore traffic dropped significantly by the 1960s, but the coming of taconite plants brought loads back up. The first taconite pellet loads on GN came in 1967 as plants opened in Nashwauk (Butler Taconite/Hanna) and Keewatin (National Steel). At that time, the railroad converted the north side of Allouez dock No. 1 to a conveyor system, with a large pellet storage area (2.2 million ton capacity) near the dock and an automatic dumper that allowed trains to be emptied on a loop track without having to switch or uncouple cars.

Taconite trains operated as turns, with a 200-car unit train of empties brought from Allouez to one of the plants, loaded in motion (taking about six hours), and returned to dock No. 1 for dumping (which took about six hours, but without the need for an engine crew). Trains generally ran every day, alternating plants each day (with extra runs as needed). The GN equipped ore cars in this service with



1

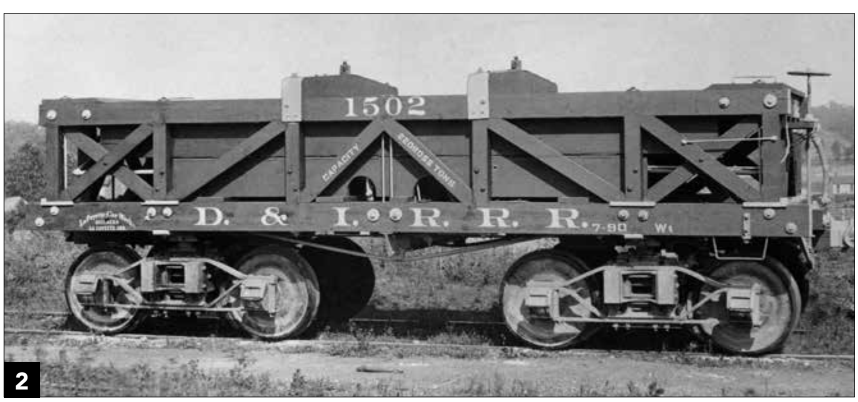
CHAPTER FOUR

Ore cars

Above: It's 1941, and a Mahoning Mine locomotive pulls loads in a pair of early 50-ton steel ore cars, including a former Duluth, Missabe & Northern class U6 car (left), built in 1910, and former Duluth & Iron Range 9223, a D4 car built in 1906 (and still riding on archbar trucks). *John Vachon, Library of Congress*

Right: Duluth & Iron Range 1502 is a 22-ton wood car built by LaFayette Car Works in 1890. It has archbar trucks and link-and-pin couplers. *Trains magazine collection*

Specialized hopper cars for iron ore began appearing in significant numbers by the 1880s. Early cars were wood, but steel became standard after 1900. The short length of ore cars, compared to standard coal hopper cars, gave them a unique appearance, and ore cars became widely known as "jennies," **1**.



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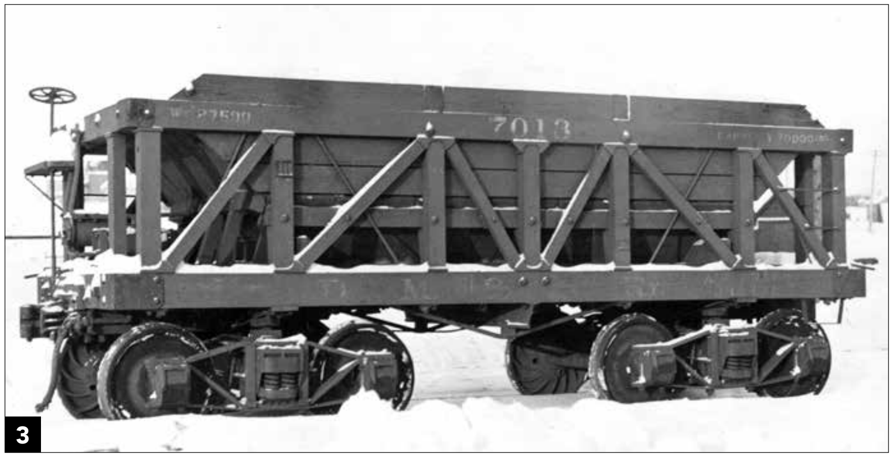

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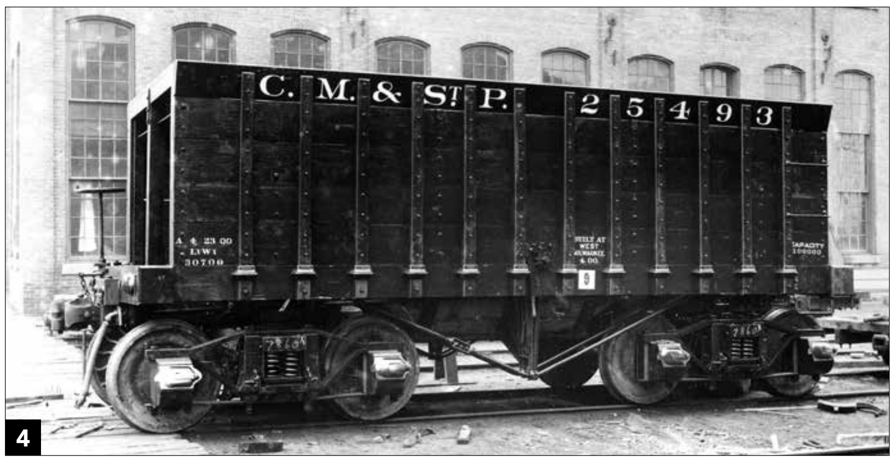
Number 7013, a 35-ton car built by Pullman in 1900, is from the last series of wood cars on the Duluth, Missabe & Northern. *Trains magazine collection*



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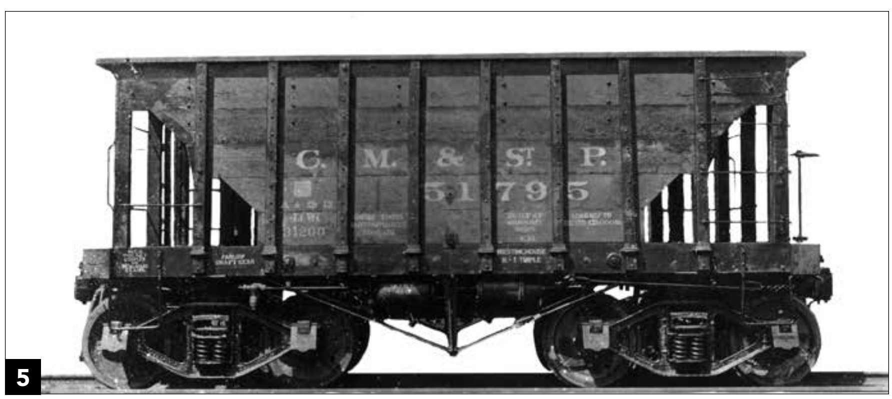
Chicago, Milwaukee & St. Paul 25493 was built at the railroad's West Milwaukee shops in 1900. The 50-ton car has wood sides, steel posts and underframe, and archbar trucks. *Milwaukee Road*



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This 60-ton Milwaukee Road wood car, built by the railroad in 1913, has the ends of the sides angled to match the slope sheets. It has Bettendorf T-section trucks. *Milwaukee Road*

Iron ore is an extremely dense, heavy material, weighing up to 155 pounds per cubic foot (coal weighs about 80 pounds/cf). Thus a typical hopper car being loaded with iron ore will reach its weight limit long before the car is completely full. Cars designed specifically for ore, therefore, are smaller, with about half to two-thirds the cubic capacity of a standard hopper car of the same weight capacity.

Because most ore cars were used to carry ore from mines in northern Minnesota and Michigan to lakefront ore docks for transloading into ships, car length (coupled) by the end of the 1800s had became standardized at 24 feet to match the length of individual pockets on the ore docks. Dock pockets are on 12-foot centers (which in turn match the spacing of hatches on lake bulk freighters), so coupled ore cars actually align on every other dock pocket.

This means that even as car weight limits and cubic capacity increased from 50 to 70 and finally 100 tons, the length remained the same for most cars, with changes coming in taller sides, deeper hoppers, and increased width.

Cars developed to a few common designs, largely driven by the railroads owning the most cars: the Duluth, Missabe & Iron Range (and its predecessors) and the Great Northern, but there was a great variety in features.

Ore railroads owned thousands of these cars (see the chart on page 65) based on the amount of traffic they carried. Let's take a look at how car design evolved, from wood cars to steel and then with increasing weight limits, with some specific examples of common designs.

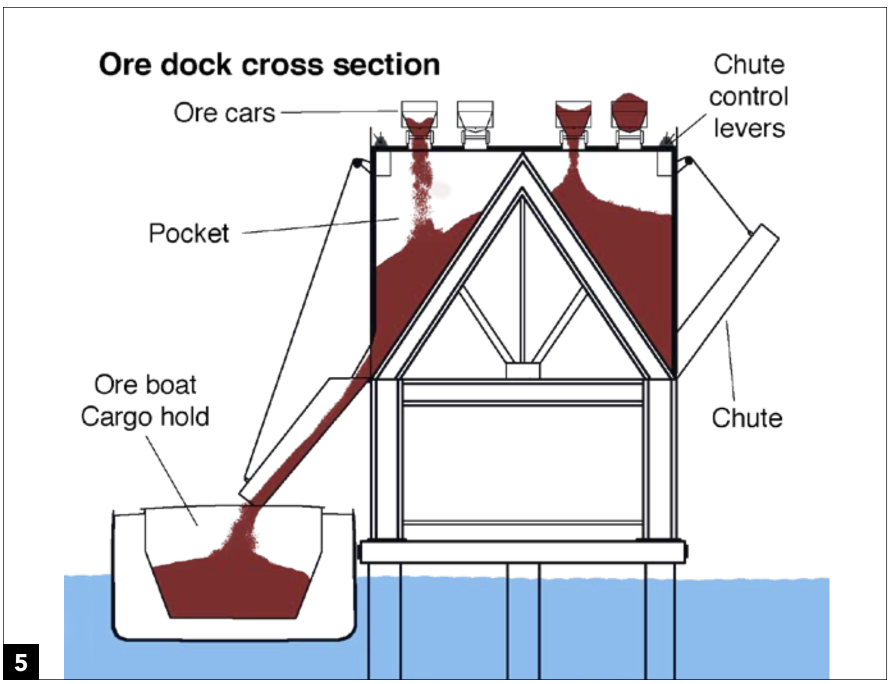
Wood cars

The first specialized iron ore cars featured all-wood construction. In Michigan in the 1860s and 1870s, these were short four-wheel cars with capacities of 10 tons or less. By the 1880s and 1890s, cars were getting larger—they were still smaller than standard hopper cars, but rode on pairs of four-wheel trucks, **2**, with capacities of 20 to 25 tons. Cars had heavy beams for frames and vertical exterior posts (with interior plank sheathing) and various types of bottom outlet gates. Most of these early cars rode on archbar trucks, with a transition from link-and-pin couplers to knuckle couplers by the 1890s.

Some early cars were built with a coupled length of 28 feet, but most of these were either retired or rebuilt to 24-foot length by the turn of the century. Car capacities of 20 to 25 tons were common for early two-truck cars,

4

Wooden ore docks are impressive structures, as shown by Lake Superior & Ishpeming dock no. 1 at Presque Isle (Marquette), Mich., in 1905. Note the wood ore cars on the approach track. The structure would be replaced by a new steel and concrete dock in 1912. *Library of Congress*



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Pocket size varied by dock, usually holding from 3 to 5 carloads of ore each. Each pair of tracks served pockets on one side of the dock.

To gain the elevation required for this dock height, long approach trestles and bridges were needed, as the surrounding ground sloped to the level of the lake. These approaches could extend several thousand feet inland from the dock itself. Dock approach tracks led to a neighboring yard where ore cars were classified. Approach track arrangements varied, but it was typical to have a pair of approach tracks, with crossovers allowing access to the four tracks on the dock, **7**.

Lighting was provided on decks for nighttime operation. On most early docks, a series of lamps with reflectors were strung on cables across the deck at regular intervals. These were gradually replaced by higher-intensity fixtures, similar to streetlights, along the sides of the deck. Modern docks may have banks of lights that resemble stadium fixtures.

Wood or other fenders are attached to the dock along the waterline to protect the dock from mooring ships. Mooring posts are located along the fender for cables coming from the boat.

Ore docks for each railroad at each harbor were typically numbered in the order that they were built. Older wooden docks were often dismantled and removed when taken out of service, while steel and concrete docks were typically left in place when taken out of service, but with their track and approaches removed.

Dumping ore in pockets

For direct-shipping ore, the ore was classified by its characteristics: the type of ore; its iron content, phosphorus content, and other chemical composition; and its flow rate (fine or coarse). Loading the ore into a dock and ship are based on blending the ore to match a customer's needs, and doing it in a method to ensure that it will flow as freely as possible from the dock pocket down the chutes and into the ship's holds. See Blending Ore in Chapter 6 (page 100) for a good explanation of this.

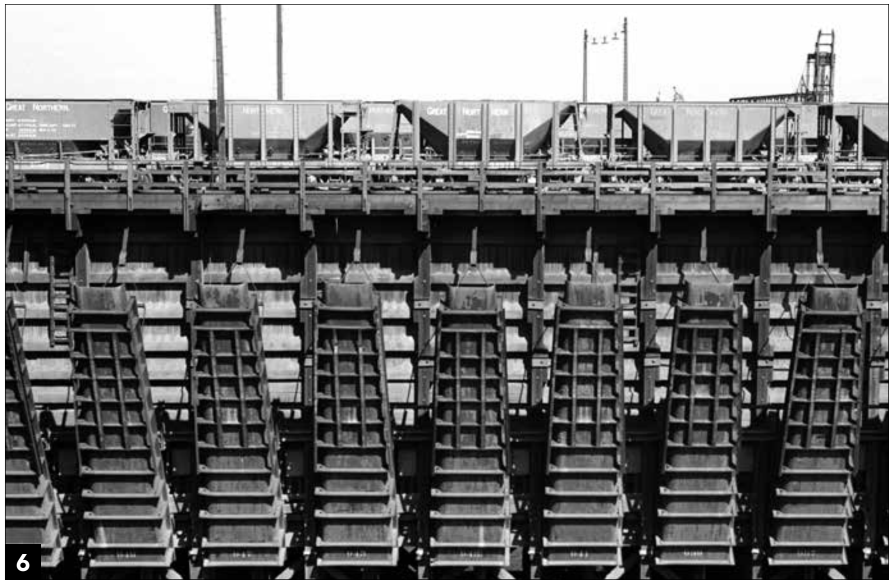
Author Patrick Dorin provided an excellent description of the dumping process in his book, *The Lake Superior*

Iron Ore Railroads. To load each pocket, the first two or three carloads would ideally be dumped on the inboard track, with the last load or two dumped on the outboard track.

Because fine ore tends to clump (and plug openings) more readily, a carload of coarse ore (high silica content) is usually dumped into the pocket first. Because coarse ore will flow readily when the chute opens, the fines atop it will drop rapidly and thus also flow freely without clumping.

This also aided in loading boats, as the coarse ore flowed more quickly, and was easier to direct by chute to the far side of the boat being loaded. This helped to load boats evenly.

Operations became much simpler with the move to pellet operations, as we'll see in a bit. During the period



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The 12-foot pocket length allowed coupled placement of 24-foot ore cars over every other dock pocket, simplifying switching and ore blending operations. *John Vachon, Library of Congress*

7

A taconite pellet train has just arrived for unloading at the Canadian National (former DM&IR) Duluth dock no. 6 in April 2015. A double crossover allows access to all four dock tracks. *Craig Williams*