

The Hulett Ore Unloader

Necessity has always been the mother of invention, and in the late 19th century steel industry, necessity was nowhere more evident than in the crude methods of unloading cargoes of iron ore at the Lake Erie iron ports. As late as the 1890s, Great Lakes bulk freighters frequently laid alongside a wharf in Cleveland, Sandusky or Ashtabula for a week or more while gangs of workers wielded shovels to unload the holds.



The Hulett Unloader, invented in 1899, revolutionized the discharge of iron ore at Lake Erie ports. In this photo, the John G. Munson is unloaded at Lorain, Ohio. (Lake Superior Marine Museum Association Archives, Lake Superior Maritime Collection at University of Wisconsin-Superior, USX Great Lakes Fleet photo)

Already by the 1860s, iron mining engineers had devised an elegant system for loading vessels at the Upper Lakes ports. Wooden ore docks jutted into the Marquette harbor and discharged their loads of rich, red ore into the holds of the waiting bulk freighters.¹ Built of wood and iron, the docks were trestle-like affairs. Railroad tracks ran across the top of the ore docks, and railcars full of iron ore were positioned on the docks. Crews then shoveled or pushed the ore into the pockets.² When a vessel pulled up to load, iron chutes, or spouts, swung out from the dock and positioned themselves above the vessel's hatches.³ Gravity did the rest. Ore cascaded down the spouts with a great roar, and ore trimmers monitored the flow to keep the receiving vessel trim and stable in the water.⁴ A competent ore dock crew in the late 19th century could load and trim a vessel in a matter of hours. Escanaba's Ore Dock No. 3, built in 1880, had 200 pockets of 90 tons capacity apiece. Bulk freighters at the time had capacity of anywhere from 600 to 3,000 tons of iron ore, so multiple vessels could be loaded simultaneously. At a half-mile in length, the Escanaba dock alone was able to accommodate three vessels at a time.⁵



A massive Hulett Unloader discharges iron ore from the William A. Irvin at a Lake Erie port. (SS William A. Irvin Museum Collection, Duluth Entertainment & Convention Center)

The ore docks were by no means a perfect system. Much of the natural ore that came off the Michigan and Minnesota ranges went through washing plants at the mines to remove dirt and sand. In the late season rush in November and December, and the early season rush in March, carloads of iron often arrived at the docks frozen solid. Crews of immigrant laborers used steam hoses in an attempt to thaw the frozen ore. Other crews wielded 20-foot-long iron poles to try to break the ore apart in the pockets so that it would roll down the chutes into the holds.⁶ The system introduced at Marquette in the late 1850s, however, remained essentially unchanged for more than 140 years except for mechanical and structural improvements. Every time a new iron range opened up in the late 19th Century, new ore docks were built in the loading ports. Ashland, Two Harbors, Duluth and Superior all boasted new ore docks jutting into their harbors following soon after the openings of the Gogebic, Vermilion and Mesabi Ranges.

A quick and efficient method of unloading the bulk freighters at Lower Lakes ports eluded the industry until a Clevelander by the name of George Hulett invented a piece of machinery that would revolutionize the iron and steel industry. Whereas gravity was a help in loading bulk freighters, it was a hindrance in the unloading process. Numerous methods were tried in the late 19th century to speed up the unloading process, which was labor-intensive, to say the least. A crew of 50 workers with shovels could unload 3,000 tons of iron ore from a vessel in 24 hours, given ideal conditions. But frozen ore in the holds could add days to the process.

Engineers used small steam donkey engines to hoist ore out of the holds in tubs, which were then emptied into wheelbarrows on the docks. In 1880, Alexander E. Brown introduced his "Tom Collins" rig to the ore docks at Cleveland. Essentially a cable tramway with movable legs, the Tom Collins

vertically lifted hand-filled tubs of ore out of the holds of bulk freighters.⁷ The rig was an improvement over the primitive steam hoists then in use, but all too often, the weight of the tub caused the cable to sag, thus fouling the machinery. Brown went back to the drawing board and came up with the "Brown Hoist." Instead of a cable, Brown's invention used an iron bridge structure to carry the iron ore out of the hold. The rear legs of the bridge hoist were movable and capable of traveling down the dock face. To eliminate manually filling the tubs in the hoist, Brown designed a clamshell bucket that could be lowered into the hold to take a bite out of the cargo.⁸

Brown later refined his hoist with the "Brown Electric Fastplant," which included a man-carrying trolley to control the descent of the bucket into the hold. Brown Hoists and Brown Electric Fastplants dominated the docks at the Lower Lakes for more than 20 years. They were far more efficient than manual labor, and they complemented the traveling bridge cranes that were coming into common use at ports all over the Great Lakes. But the increased flow of ore to the Lower Lakes in the 1890s, fueled by the opening of the Mesabi Range in 1892, called for a faster way to unload the bulk freighters of the Great Lakes fleet. In 1899, George H. Hulett introduced a bulk unloader that would withstand the test of time.

Hulett was a native of Conneaut, Ohio, but had grown up and gone to school in Cleveland. He spent 15 years as a merchant in nearby Unionville, Ohio, before liquidating his inventory and returning to Cleveland in 1880. For most of the next 10 years, Hulett sold produce in Cleveland.⁹ In 1890, Hulett went into business in Cleveland manufacturing iron ore- and coal-handling machinery. In 1898, he was hired as an engineer with the Variety Iron Works in Cleveland, and the next year joined the staff of the McMyler Manufacturing Company, one of the major producers of ore-handling machinery at Lower Lakes iron ports.¹⁰

In 1899, Hulett and McMyler approached Carnegie Steel Company about installing a new unloader at the company's docks in Conneaut, Ohio. The Hulett Unloader was a revolutionary design. Historian John A. Burke called it "a massive gantry crane, traveling the dockside on rails spanning four rail trackways."¹¹ A contemporary observer described the unwieldy contraption as a machine consisting of "two heavy parallel girders at right angles to the face of the dock and mounted on moving trucks which span four or more railroad tracks. On the two girders, a carriage travels back and forth, carrying a long-pivot walking beam. On the front, or the water end, of this walking beam is a vertical dependent leg, to which is attached the 'grab' bucket."¹²

The vertical leg remained vertical during the unloading process. On the lower end of the vertical leg, directly above the bucket, was a glassed-in cab occupied by the operator. "In operation," a 1907 observer noted, "the walking beam oscillates up and down, carrying the bucket down into the hold of the boat and up above the dock. The travel of the carriage back and forth on the heavy girders carries the walking beam out over the boat and back

over the dock." ¹³ With its 10-ton grab bucket, the Hulett Unloader could unload up to 600 tons of ore in an hour. Multiple Huletts spaced along the dock face were capable of relieving a bulk freighter of 10,000 tons of iron ore in five hours or less. Best of all from the steel companies' vantage was that the Hulett Unloader only required a crew of three men. ¹⁴

The Hulett Unloaders were such a success that within a decade they replaced most of what had come before them on the Lake Erie docks. By 1907, Huletts dominated the docks at Conneaut, Lorain, Buffalo, Ashtabula and Cleveland. U.S. Steel, which had just broken ground for a new mill at Gary, Indiana, on Lake Michigan's south shore, had a half-dozen Huletts under order for the docks at the new greenfield mill in the dunes east of Chicago. ¹⁵ Hulett Unloaders also made possible the construction of bigger bulk freighters with hatches spaced closer together.

Until the rapid conversion of much of the Great Lakes fleet to self-unloading equipment in the 1980s, Huletts were a fixture at Lower Lakes ports. The last Hulett at Cleveland unloaded its final cargo in 1992. ¹⁶ By the time the *LeMoyne* pulled away from Cleveland's C&P Dock on the afternoon of December 18, 1992, relieved of its cargo of Mesabi taconite pellets, Hulett Unloaders had handled several billion tons of iron ore.

¹ Boyum, "The Saga of Iron Mining in Michigan's Upper Peninsula," p.13. The first dock built specifically for iron ore was erected by the Lake Superior Iron Company at Marquette in 1857.

² John A. Burke, "Barrels to Barrows, Buckets to Belts: 120 Years of Iron Ore Handling On the Great Lakes," *Inland Seas*, Winter 1975, p.268. Bottom-dump rail cars weren't introduced to the Lake Superior mining industry until the early 20th century.

³ *Ibid.*, p.268. The chutes are still known as spouts.

⁴ John P. Beck, "They Fought for Their Work: Upper Peninsula Iron Ore Trimmer Wars," *Michigan History*, January-February 1989, pp.24-31. Iron ore trimmers were skilled workers who jealously guarded the prerogatives of their craft. Mostly immigrant Irish, the ore trimmers were the first group in the Upper Lakes to band together in labor organizations. Ore trimmers started to disappear after the turn of the 20th Century when mechanization became more commonplace on the ore docks. See Also, Holbrook, *Iron Brew*, pp.71-78

⁵ Boyum, "The Saga of Iron Mining in Michigan's Upper Peninsula," p.19. When it was built, Escanaba's Ore Dock No. 3 was reputed to be the longest timber structure in the United States.

⁶ Mechanical car-shakers weren't introduced on the ore docks until the late 1950s. See *Skillings Mining Review*, February 13, 1960

⁷ John A. Burke, "Barrels to Barrows, Buckets to Belts," p.271

⁸ *Ibid.*, p.271

⁹ "George H. Hulett," Elroy McKendree Avery, *A History of Cleveland and its Environs: The Heart of New Connecticut* (Chicago: The Lewis Publishing Company, 1918). v.3, Biography, pp.130-131

¹⁰ Ibid., pp.130-131. McMyler made a railroad crane that was in wide use on the Lake Erie iron port docks in the 1890s. See John A. Burke, "Barrels to Barrows, Buckets to Belts," p.273

¹¹ Ibid., p.274

¹² W.M. Gregory, "Ore-Boat Unloaders," *National Geographic*, May 1907, p.345

¹³ Ibid., p.345. "The maximum spread of the bucket is 18 feet," a reporter for *Engineering News* wrote in 1905, "and by telescopic motion it can be made to reach from the center of one hatch to that of the next hatch, the suspended leg being mounted in rotating trunnions in the walking beam, so that it can be revolved on its vertical axis and enable the bucket to reach out in any direction." See *Engineering News*, v.54, no.5, August 3, 1905, pp.125-126

¹⁴ Gregory, "Ore-Boat Unloaders," p.345

¹⁵ Ibid., p.345

¹⁶ Carol Poh Miller, "Cleveland's Hulets Still Standing Tall," *Society for Industrial Archaeology Newsletter*, v.26, no.4, Winter 1997, pp.1,3. Hulett Unloaders still have their passionate defenders. A minor flap erupted in 1998 when the Cleveland-Cuyahoga Port Commission announced plans to scrap the last four Hulets at the Cleveland harbor. Preservationists, who maintain an Internet Web site devoted to the Hulets, fought to retain at least one of the massive machines for a Great Lake museum. See "11-Most Update," *Preservation*, November-December 1999, p.82. See Also

<http://web.ulib.csuohio.edu/SpecColl/glihc/articles/sia.html>