Before a Failing Breeze: Sailing Labor in the Final Years of Sail on the Great Lakes

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Sailing commerce on the Great Lakes underwent a protracted decline between the mid-1870s and its ultimate disappearance in 1931. In its final half-century, the pressures of economic marginalization, falling profit margins, novel marine technologies, and the emergence of distinct steam and sail maritime labor sectors all resulted in a radical redefinition and changes to nearly all aspects of the sailor's experience. This paper will explain how the experience and occupation of the seaman changed in response to these pressures.

Le commerce de la voile sur les Grands Lacs a connu un ralentissement prolongé du milieu des années 1870 à sa disparition définitive en 1931. Au cours de son dernier demi-siècle, les pressions exercées par la marginalisation économique, la baisse des marges bénéficiaires, les nouvelles technologies marines et l'apparition de secteurs distincts de la main-d'œuvre maritime à vapeur et à voile ont provoqué une redéfinition fondamentale et des changements dans presque tous les aspects de l'expérience des marins. Cet article explique comment l'expérience et la profession des marins ont évolué en réaction à ces pressions.

Before the mid-nineteenth century, sailing vessels possessed a practical monopoly on the transport of bulk commodities in the Great Lakes region. Sailing commerce operating under sail on the Great Lakes experienced a protracted end beginning in the mid-1870s. By the early 1880s, the momentum of shipping on the Lakes had decidedly shifted in favor of steamships.[1] Though

[1] Walter Lewis, "Transition from Sail to Steam on the Great Lakes in the Nineteenth Century," *The Northern Mariner* 25, no. 4 (2015): 352; and Jay Martin, "Sailing the Freshwater Seas" (PhD diss., Bowling Green State University, 1995), 170.

the decline of sail and the ascendency of steamships was certainly apparent by the 1880s, not least by those employed on sailing ships, sailing vessels persisted, albeit in diminishing numbers for another half-century.

The revolution in steamship bulk freight transportation in the latter half of the nineteenth century brought fundamental and far-reaching changes to nearly all aspects of maritime life, labor, management, and the conduct of commercial transportation on the Great Lakes. Among these changes was an increase in the influence of onshore management to the detriment of the master's traditional independence and authority aboard, the scheduling of nearly all aspects of operation, a shift towards seasonal contracts set at previously negotiated rates, and improved mechanized methods of handling bulk freights.[2] The latter half of the nineteenth century witnessed the establishment of steam's dominance in the bulk freighting economy and the foundations of the modern Great Lakes transport system.

These developments in bulk freight handling, modern management practices, and innovations in iron and steel shipbuilding revolutionized the operation of steamships and transformed the Great Lakes transport economy, particularly from the 1880s and 1890s. Meanwhile, sailing vessels continued to operate for nearly another half-century, albeit increasingly confined to shrinking economic niches that either remained advantageous to sail commerce due to its lower costs or lower tonnage requirements.

While sail was seen as traditional, not least by those who worked aboard a sailing vessel, in truth, the seaman's occupation was radically altered by the acute pressures of competition and economic marginalization, transforming nearly every aspect of the sailor's experience and work aboard, of their relationship to organized labor, the social organization within their trade, as well as to the skills of seamanship. In short, as sail was marginalized, both as a mainstay of transportation as well as a category of skilled labor, the traditional experience of sailing laborers was radically altered into a trade that bore only passing similarity to that practiced by sailors on the lakes less than fifty years prior.

Within the historiography of Great Lakes maritime labor these transitions and the final years of sailing and commerce have received comparatively little attention, despite sailing labor's immense importance within the region throughout the nineteenth century. Historians addressing maritime labor

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[2] Matthew Daley, "An Unequal Clash: The Lake Seamen's Union, the Lake Carriers' Association, and the Great Lakes Strike of 1909," *The Northern Mariner* 18, no. 2 (2018): 122-123; Martin, "Sailing the Freshwater Seas," 198-199; and Bradley Rodgers, *Bones of a Bulk Carrier: The History and Archaeology of the Wooden Bulk Carrier/Stone Barge* City of Glasgow (Greenville, NC: East Carolina University, 2003), 27.

The schooners (left to tight) *Henry Witbeck*, *Isaac Stephenson* of Ogdensburg, *D. Freeman* of Port Hope, Ontario and *M. & H. Lyon* of Ogdensburg awaiting loading alongside the Delaware & Hudson and New York, Ontario and Western coal trestles at Oswego, New York in 1910. (Richard Palmer Collection, Maritime History of the Great Lakes)

and the development of the modern Great Lakes transportation system have primarily focused on the emergence of organized steam labor and its struggles with operators between the 1880s and early 1900s, with the dwindling number of sailing laborers in the background becoming increasingly invisible as their place of prominence in bulk freight transport diminished and ultimately disappeared.[3] As a result, sailing laborers are largely absent from the historiography of the Great Lakes after the 1890s.

While excellent social histories of Great Lakes sailors such as Jay Martin's *Sailing the Freshwater Seas* and Theodor Karamanski's *Schooner Passage* have addressed many aspects of the experience of sailing seamen on the lakes, both focus principally on the mid-nineteenth century, the heyday of sailing commerce.[4] In the historiography of the struggles of seafaring labor throughout the nineteenth century, the Great Lakes are an anomaly. Both

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[3] For example Emil Frankel, "Labor Turnover of Seamen on the Great Lakes," *Monthly Review of the U.S. Bureau of Labor Statistics* 6, no.6 (1918); Henry Hoaglund, *Wage Bargaining on the Vessels of the Great Lakes* (Urbana, IL: University of Illinois, 1917); and Charles Larrowe, *Maritime Labor Relations on the Great Lakes* (Lansing, MI: Labor and Industrial Relations Institute, 1959).

[4] Theodore Karamanski, *Schooner Passage: Sailing Ships and the Lake Michigan Frontier* (Detroit, MI: Wayne State University Press, 2001); and Martin, "Sailing the Freshwater Seas."

Martin and Karamanski note that inland shipping lacked many of the abuses and social disconnection that have characterized the historiography exploring the struggles of maritime labor on saltwater throughout the nineteenth century by historians such as Leon Fink and Marcus Rediker.[5] Martin in particular notes that, while such abuse occurred on the lakes, the conditions of inland navigation, including closer social connections to communities ashore and high labor turnover rates, altered the traditional structure of maritime labor towards a more egalitarian and restrained shipboard hierarchy.[6] In the early twentieth century, as sailing commerce neared its end, social distinctions aboard and between those operating and owning the vessels had further diminished as opportunities for economic and social advancement through sailing commerce declined. For sailing labor on the Great Lakes, the principal struggle was not against the master or ship owners, but against economic marginalization from increasing steamship competition and the emerging steam labor sector.

This paper will show how sail as an occupation and the experience of sail laborers on the Great Lakes changed over sail's last fifty years, first examining the profitability of sailing vessels in the latter half of the nineteenth century and the effects of declining revenues that coincided with increasing industrialization within the Great Lakes bulk freight transport system. It will then examine how the increasingly tenuous financial situation of sailing vessel operators affected crewing, wages, and shipboard conditions. Finally, this article will examine how economic marginalization was paralleled by shifts in the enfranchisement of sailing labor within organized labor movements and how the emergence of steam labor as a distinct labor category affected the traditional social structure of the seaman's trade.

The Profitability of Sailing Vessels in the Late-Nineteenth Century

For vessel owners and operators, the ship was fundamentally a profit-making enterprise. Profitability required the alignment of numerous factors such as the appointment of a competent master, who was entrusted with the operations and financial management of the vessel, sufficiently high freight rates, the costs of the vessel, its operation, and crew wages, and its insurability.[7] As revenues began to consistently decline beginning in the latter half of the

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[5] Leon Fink, *Sweatshops at Sea: Merchant Seamen in the World's First Globalized Industry from 1812 to Present* (Chapel Hill, NC: University of North Carolina Press, 2011); Martin, "Sailing the Freshwater Seas," 118-121; and Marcus Rediker, *Between the Devil and the Deep Blue Sea: Merchant Seamen, Pirates, and the Anglo-American Maritime World, 1700-1750* (New York: Cambridge University Press, 1987).

[6] Martin, "Sailing the Freshwater Seas," 74-75.

[7] Karamanski, *Schooner Passage*, 115.

1870s, financial uncertainty and lessening prospects for future profits began to motivate sweeping changes to ship management and ultimately began the decline of the sailing fleet.

For the first owners, the building and outfitting of a vessel represented a substantial investment and acceptance of financial risk. Receiving a return on this investment required that a vessel pay for itself and generate a profit before time and use necessitated the rebuilding of its wooden hull. On the Great Lakes, this lifespan was approximately fifteen years, though a vessel might be used for up to twenty to twenty-five years, albeit requiring rebuilding and constant repair. The local availability of timber throughout much of the nineteenth century enabled the comparatively inexpensive replacement of these vessels and most owners seem to have preferred replacement rather than maintaining their aging vessels.[8]

The annual rate of return for investment in new vessels varied widely with fluctuating freight rates, demand for shipping tonnage, and the details of the vessel's operation. In the 1860s, high tonnage demand and freight rates contributed to the expansion of shipbuilding into the early 1870s, with the potential for schooners to produce substantial profits.[9]

Though in the early 1870s a new vessel might be paid off within two to three shipping seasons if managed by a competent master, the initial costs of construction were often too high for wage-earning individuals who aspired to ownership and the social mobility that accompanied it, such as employed masters seeking independent ownership.[10] However, the limited service life of wooden vessels meant that their values depreciated as they aged. The availability of low-cost used vessels provided ambitious lake men the opportunities to become vessel owners and obtain upward social mobility and status as entrepreneurs.[11]

The value of used sailing vessels did not depreciate linearly with a vessel's age. Vessel values varied based on numerous factors including the current demand and availability of tonnage, outlooks on freight rates, the vessel's insurance rating, its upkeep, and its reputation as a profitable carrier.

Among the most important factors affecting a vessel's valuation was the insurance rating assigned by insurance underwriters. Beginning in 1856,

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[8] James Barry, *Ships of the Great Lakes* (Holt, MI: Thunder Bay Press, 1996): 149; Ben Ford, *The Shore is a Bridge* (College Station, TX: Texas A&M University Press, 2018), 92; and H. Inches, The *Great Lakes Wooden Shipbuilding Era* (Port Huron, MI: H.C. Inches, 1962), 2.

[9] David Cooper and John Jensen, *Davidson's Goliaths: Underwater Archaeological Investigations of the Steamer* Pretoria (Madison, WI: State Historical Society of Wisconsin, 1995): 12.

[10] Karamanski, *Schooner Passage*, 119.

[11] Karamanski, *Schooner Passage*, 115-119.

the Association of Lake Underwriters established rules for the classification of vessels to more reliable standards for the inspection, characterization, and construction of lake vessels to reduce incidences of losses by ensuring and improving the quality of lake shipbuilding.[12] In the 1866 *Rules,* eight classification ratings were listed. The ratings characterized both the quality of the materials and the vessel's construction and form. All vessels were subject to random inspections permitted at any time or following repairs and refits, and ratings were routinely reduced after a set number of years, the span being determined by the initial rating.[13] In 1876, revised rules were published incorporating the recommendations of shipwrights and improvements in shipbuilding techniques that had been employed over the intervening years to increasingly standardize and improve the construction of new vessels and establish rules mandating intermittent inspection and maintenance if a vessel's insurance rating were to be maintained. While insurance ratings were downgraded according to a schedule as the vessel aged, a rating could be restored, for a limited time, if refits and prescribed repairs were undertaken by the owners. Adherence to the requirements of inspection and maintenance prolonged the period that a vessel retained its initial insurance rating and therefore lowered insurance premiums for both the vessel and its cargo.[14]

The influence of insurance on the value of a vessel is seen in the recorded values for the two-masted trading schooner *Katie Eccles*. Though the initial construction cost of *Eccles* in 1877 is unknown, the vessel retained an A1 rating and an assessed value of $7,500 in 1879.[15] The following year it was sold for $8,000.[16] In 1886, with its rating reduced to A 2 ½, the *Eccles* was valued at $4,000. Its value increased to $5,500 following restoration to an A 1 ½ rating.[17] At the time of its last known survey in 1901, *Eccles,* once again

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[12] William Bates, "Marine Insurance and Its Influence Upon Ship-Building," *U.S. Nautical Magazine and Naval Journal* 5, no.1 (1856): 1-8.

[13] Walter Lewis, "Rules Relative to the Construction of Lake Sail and Steam Vessels. A Transcription for the Maritime History of the Great Lakes," *Maritime History of the Great Lakes*, 2000, https://www.maritimehistoryofthegreatlakes.ca// Documents/Rules1866/ default.asp.

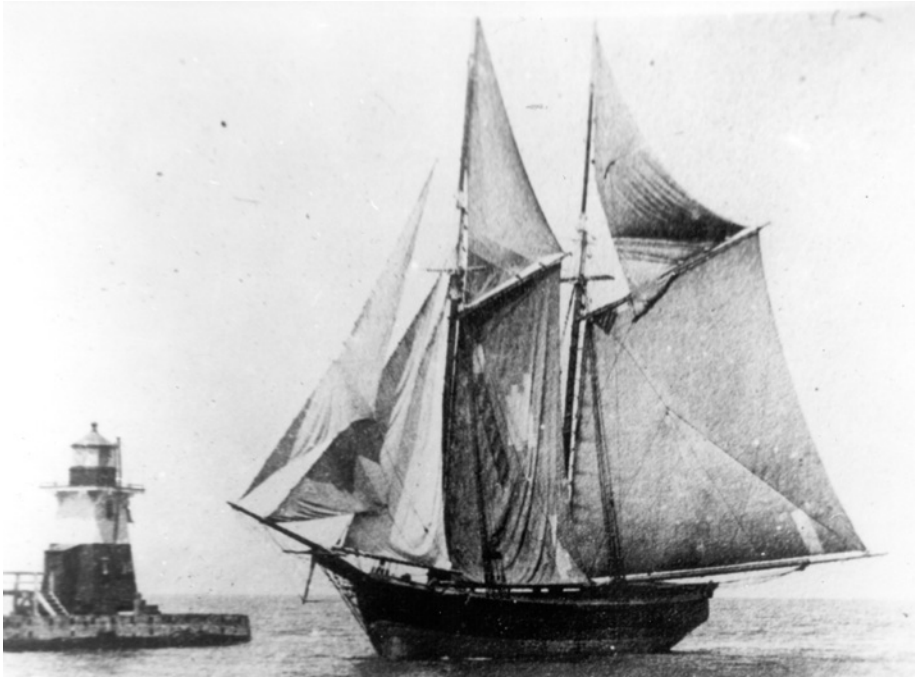
[14] Ebenezer Dorr, *Rules for the Construction, Inspection, and Characterization of Sail and Steam Vessels* (Buffalo: C.J. Burroughs & Co., 1876), 75, 97-118; Lewis, "Rules Relative to the Construction of Lake Sail and Steam Vessels."

[15] C.P. Morey et al., *1879 Lake Hull Register of the Association of Lake Underwriters* (Detroit, MI: Free Press Book and Job Printing House, 1879), 38.

[16] "Marine News," *Daily British Whig*, 7 April 1880.

[17] R.L. Polk, *Directory of Marine Interests of the Great Lakes* (Detroit, MI: R.L. Polk, 1884), 89; Thomas Taylor, *Vessel Classification of the Inland Lloyd's- Canadian Hulls* (Toronto, ON: Budget Printing and Publishing Company, 1886), 16.

rated A2 ½, was valued at $2,100.[18] The value of one contemporary Oswego-built scow-schooner, *Rockaway*, depreciated at an average rate of three percent annually between 1866 and 1891.[19] This meant that, so long as construction of new sailing vessels continued, there were affordable used vessels available for purchase, allowing opportunities for advancement for the ambitious master or the replacement of existing vessels which had become too costly to insure or



Katie Eccles entering port at Fair Haven, NY under sail (Historical Collections of the Great Lakes, Bowling Green State University)

maintain.

The decreased value of used vessels also reflected a decrease in the future potential for profits, as cargoes eligible for insurance were reduced. Grain, typically the most profitable cargo, required a high rating to affordably insure due to its high cost and susceptibility to water damage should leaks allow water into the hold. Vessels carrying cargos less susceptible to water damage, such as coal, iron ore, or lumber, did not require as high of a rating. However, underinsuring or operating uninsured seems to have been common, particularly

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[18] George McMurrich, *Vessel Classification of the Inland Lloyd's-Canadian Hulls* (Toronto, ON: Dudgeon and Thorton, 1902), 26.

[19] Kenneth Pott, "The Wreck of the *Rockaway*: The Archaeology of a Great Lakes Scow Schooner" (MA thesis, Western Michigan University, 2001), 53.

as sailing vessels aged out of insurability or sailed late in the season when premiums were highest.[20]

In the absence of significant governmental regulations restricting sailing vessel operations, insurability formed one of the principal regulatory oversights for standards of vessel maintenance and serviceability. Owners applying for a specific rating were required to contractually agree to abide by the underwriter's regulations on loading and reporting along with the inspector's report, establishing a financial incentive for vessel owners to comply. As vessels aged out of insurability, or as operators chose to save on high premiums by sailing uninsured, little regulatory constraint existed.[21]

As the profitability of smaller sailing vessels declined with age, routine maintenance was commonly deferred by many operators lacking the available funds and who were unwilling to accept debt with dwindling future prospects. Though vessels idling while in winter layup could be refitted and repaired without incurring a loss of revenues, routine investments in vessel maintenance were increasingly limited to the repairs necessary to keep the vessel in service, a trend that contributed to the growing attrition of vessels through loss or abandonment.[22]

The potential profitability of sailing vessels was inseparably tied to freight rates. Until the early 1880s freight rates remained sufficiently high in most trades to permit a reasonable assurance that a vessel could pay itself off and bring profits if spared from significant mishaps and operated by a competent and financially astute master.[23] Freight prices and rates on shipping were set by contemporary market conditions and therefore varied considerably throughout the shipping season, typically being highest at its beginning and end.[24]

Historian Jerome Laurent estimated that in 1873, 4.13 cents per bushel was the minimum rate at which a schooner might profitably carry grain from Chicago to Buffalo. While grain freight rates varied widely in the 1860s, even in slow years, rates remained well above the threshold of profitability. By the end of the 1860s, rates began a steady downward trend. The recession of 1873 brought a rate reduction of 52.8% between 1873 and 1874, and for the remainder of the 1870s rates averaged only 3.64 cents. The economy recovered by 1880, but rates on grain never reached their former prices, relegating sailing vessels to less-profitable peripheral trading.[25]

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[20] Ford, *The Shore is a Bridge*, 120.

[21] Martin, "Sailing the Freshwater Seas," 201.

[22] Richard Palmer, "Fitting Out on the Great Lakes," *Inland Seas* 55, nol. 1 (1999): 51-53; Pott, "The Wreck of the *Rockaway*," 53.

[23] John Mansfield, *History of the Great Lakes Vol.1* (Chicago: J.H. Beers, 1899), 437.

[24] Karamanski, *Schooner Passage*, 115; Martin, "Sailing the Freshwater Seas," 146.

[25] Cooper and Jensen, *Davidson's Goliaths*, 14; Jerome Laurent, "Trade, Transport and

The lumber schooner *Josephine Dresden*, built in 1853 at Michigan City, Indiana, heavily overloaded with lumber. Note the lack of freeboard beneath the unpainted line on the hull denoting the height of the deck (Richard, J. Wright, Historical Collections of the Great Lakes, Bowling Green State University)

Amidst immense pressure to maximize revenues, overloading became endemic aboard sailing vessels on the Great Lakes. By the 1870s, vessels in the inter-lake trade were being loaded to the limit of clearance of the canals as a financial necessity, regardless of the associated risks. These circumstances were compounded for canal sailing vessels, particularly from 1873 when the Welland Canal's depth was increased from ten feet (3.04 meters) to twelve feet (3.65 meters) to allow clearance by larger vessels.[26] Sailing canal vessels constructed to the former canal dimensions, whose owners lacked the finances to construct new vessels to the dimensions of the enlarged locks, were placed at a disadvantage and their vessels were commonly loaded beyond their intended capacities to maximize their earnings.[27] Particularly from the 1870s,

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Technology: The American Great Lakes 1866-1910," *Journal of Transportation History* 4, no. 1 (1983): 1-24; Mansfield, *History of the Great Lakes*, 1:535; Keith Meverden and Tamara Thomsen, *Wisconsin Coal Haulers: Underwater Archaeological Investigations form the 2012 Field Season* (Madison, WI: Wisconsin Historical Society, 2013), 6.

[26] "Safety on the Lakes," *Daily British Whig,* 19 February 1890; Mansfield, *History of the Great Lakes,* 1:235.

[27] "A Plimsoll Wanted," *Daily British Whig*, 15 August 1882.

overloading contributed to high losses among canal sailing vessels and their crews.[28]

No regulation on either side of the border prevented masters from overloading their ships.[29] Despite the recommendations of multiple Canadian and American commissions, no government regulations, such as the load line requirements of the British *Merchant Shipping Act of 1876*, existed for inland waterways of either nation until well into the twentieth century after commercial sailing vessels had disappeared.[30] Underwriter's rules and inspections formed the only effective restraint on overloading for insured vessels.[31] Yet, these rules were irrelevant to an ever-increasing number of uninsured or uninsurable vessels as the sailing fleet aged, offering sailors few protections from these risks.

Another means of increasing the freight volume carried by vessels was the use of towing. Towing by steamship became common for sailing vessels on the Great Lakes from the 1840s, and within a decade they were reliant on towing for daily operations in confined waters, particularly within ports.[32] Towing added reliability to sailing schedules, for vessels formerly might have been windbound for days or weeks. By towing for portions of their voyage, sailing vessels were able to complete more trips every season, albeit while incurring added expenses. Towing bills often comprised 20-34 percent of a vessel's expenses, an amount exceeded only by the wages of the crew.[33]

The realization that aging schooner hulls could make a profit in this manner was recognized in the late 1850s, and many vessels ended their careers sailing at the end of a towline, owned by steamship interests. While sailors saw this

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[28] "Gone to the Bottom," *Buffalo Commercial Advertiser*, 23 November 1874; "In Commenting a Few Days Ago on the Probable Loss iof the Schooner *Atlanta,*" *Buffalo Commercial Advertiser*, 1 December 1874; "With all Hands," *Chicago Inter-Ocean*, 10 November 1877; Mansfield, *History of the Great Lakes*, 1:393; Monk, "A Great Lakes Vessel Type," 62-65; and "The Loss of Vessels," *Oswego Palladium*, 7 December 1874.

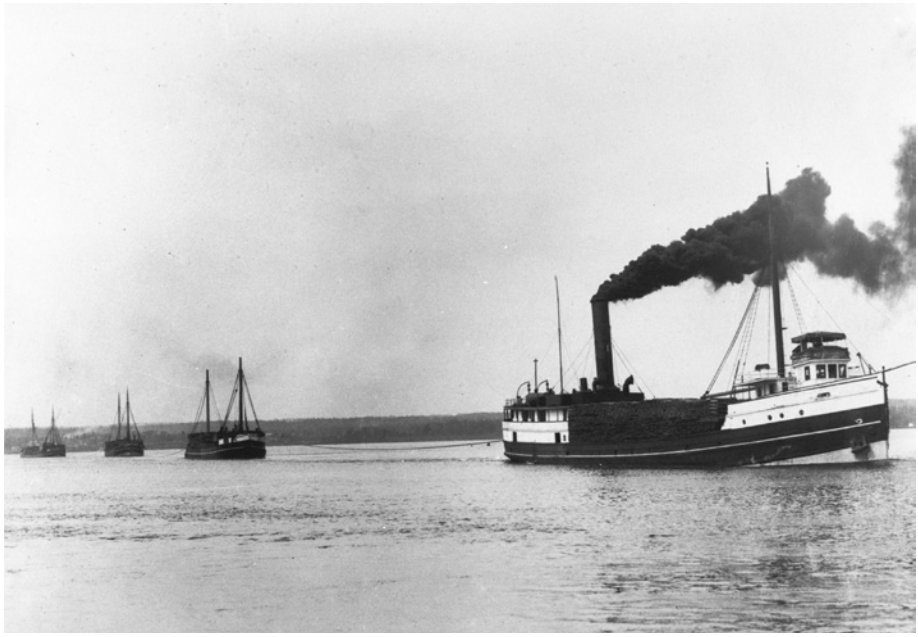
[29] Martin, "Sailing the Freshwater Seas," 23, 167.

[30] Royal Labor Commission, *Report of the Royal Commission on the Relation of Labor and Capital in Canada* (Ottawa, ON: S. Senecal, 1889): 9; US Congress, House of Representatives, "A Bill to Amend the Act of March 2, 1929 (45. State 1492), entitled "An Act to Establish Load Lines for American Vessels and for Other Purposes" H.R.4220, 76th Cong., 1st sess, 1879; US Congress, House of Representatives, "Overloading Vessels on the Great Lakes," US House of Representatives Exec. Doc. No.324, 50th Cong., 1st sess., 1888, 1-2; US Congress, Senate, "An Act to Establish Load Lines of American Vessels and for Other Purposes," S.1781, 50th Cong., 2nd sess, 1929, Chp. 508, 1492-1495.

[31] Dorr, *Rules*, 81, 93-96.

[32] Edward Warner, "Towing with Steam Tugs: An Aspect of the Great Lakes Commercial Trade Under Sail," in *A Fully Accredited Ocean: Essays on the Great Lakes,* ed. Victoria Brehm (Ann Arbor, MI: University of Michigan Press, 1998): 45-49.

[33] Warner, "Towing with Steam Tugs," 50, 52.



The steam barge *Charles H. Bradley* with schooner barges in tow. Date unknown (Great Lakes Maritime Collection, Alpena County George N. Fletcher Public Library)

as an ignominious end for their vessels, towing effectively maximized freight revenues by supplementing the carrying capacity of the towing steamship without imposing a significant increase in operating costs, all with the reliability of steam navigation.[34] As employment prospects diminished in sail and with sailors excluded from employment in steam due to licensing requirements, acceptance of work aboard schooner barges brought with it loss of status and some of the lowest-paid marine labor on the lakes.[35]

Sailing Labor on the Great Lakes

Thin financial margins and falling revenues demanded a reduction of expenditures for sail to remain financially viable and brought sweeping changes to the sailor's occupation and shipboard labor. Crew wages, which were consistently the largest expense in operating a vessel, represented the most reliable means of reducing fixed operating costs.[36] Edward Warner's analysis

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[34] Toni Carrell, *Submerged Cultural Resources Site Report:* Noquebay. *Apostle Islands National Seashore.* (Santa Fe, NM: National Parks Service, 1985): 14-15.

[35] Martin, "Sailing the Freshwater Seas," 197.

[36] Martin, "Sailing the Freshwater Seas," 144.

of the schooner *Exile*'s financial accounts for 1879 shows the importance of wages to the finances of a schooner. *Exile*'s annual expenses totaled $8,015.70. Of these expenses, $2,719.14 was spent on the crew's wages, or 33.9% of the vessel's costs, while "extra labor" accounted for an additional $1,493.36, or 18.6%.[37] Reducing the crew size meant further savings on associated expenses such as provisioning and accommodation.[38]

As a result, under-manning was ubiquitous aboard small sailing vessels in the waning years of sail. Investments by owners in new marine technologies allowed improved efficiency of shipboard labor and were concentrated in labor-intensive tasks or tasks which occupied much of the crew's time, thus allowing fewer crew to operate the vessel under normal conditions.

In a 1914 article, the *Toronto Globe* noted that "Undermanned schooners have sailed and will continue without accident when weather is favorable." As a case in point, they observed that the two-masted schooner *William Jamieson* was then crewed by three men and a boy (with two women also aboard), which meant only three crewmembers were available to handle the sails. The article further remarked that its auxiliary steam hoisting engine or donkey engine "that displaces men for trimming and setting canvas is a fair-weather contrivance. With a wheel-chain parted or jammed, two men would be needed at the tiller. It is almost always in stress of weather that lines part, seams open, or pumps break down."[39] The two-masted schooner *Katie Eccles,* a sister ship of the *William Jamieson,* is a glaring example of the extremity that under crewing might reach. In 1906, the *Eccles* was reported to have been crewed by five men and a cook. In

William Jamieson on the Long Reach of the Bay of Quinte (Naval and Marine Archive. Metcalfe fonds)

[37] Warner, "Towing with Steam Tugs," 52.
[38] Donna Souza, *The Persistence of Sail in the Age of Steam* (New York: Springer, 1998): 107.
[39] "The Chances Sailors Take," *Toronto Globe*, 14 May 1914.

November 1922, at the time of its loss, it sailed very late in the season with a crew of only three.[40]

Sail labor on the Great Lakes was characterized by short-term employment with rapid turnover of crews, with forecastle hands often signing on for a single trip, sometimes for as short as a single trip of two days.[41] As demand for labor aboard steam vessels increased, experienced seamen were increasingly drawn to steam, with its higher pay and more consistent employment. This was particularly the case from the 1890s onwards, as steamship lines shifted towards hiring from shipping offices and promoting long-term employment.

While wages were typically higher on the lakes than for labor ashore, wages aboard schooners varied considerably throughout the shipping season and from year to year, connected to the availability or scarcity of labor, fluctuating freight rates, and the influence of collective actions by both labor and vessel operator associations.[42] During periods where the potential for profits was good, particularly late in the shipping season when freight rates reached high premiums, wages increased substantially.[43]

In 1818, monthly wages averaged $10 for seamen, $25 for cooks, $25-$30 for mates, and $40-$50 for masters. By 1836, monthly wages for seamen had increased to $15, to $36-$60 for first mates, and to $600-$1000 for masters annually.[44] In the prosperous years of the 1860s and 1870s, rates of $1.25 and up to $2.50 per day late in the season were typical.[45]

The accounts of the schooner *Russel Dart* from 1860 and 1861 show the extent to which wages changed throughout the shipping season. In April 1860 and 1861, seamen received average monthly wages of $24.14. As freight rates decreased into the summer, seamen's wages decreased to $21.19, $17.77, and $22.00 in May, June, and July respectively. In August, wages began to increase, and seamen received $24.33, $24.28, and $36.88 in August, September, and October. In November and December, very late in the season, wages increased to $65.02 and $243.75 per month, though it should be noted that seamen typically signed on by the day, and work for more than a few days in December was atypical.[46]

Steamer crews received higher pay than their sailing counterparts, with some notable exceptions. An 1890 census report accounting for 1072 steam

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[40] "Marine News," *Daily British Whig*, 8 November 1906; C.H.J. Snider, "Rudderless Ride Through Snow of Bygone December. Schooner Days 591," *Toronto Telegram*, 29 May 1943.

[41] Martin, "Sailing the Freshwater Seas," 84.

[42] Larrowe, *Maritime Labor Relations on the Great Lakes*, 12.

[43] Martin, "Sailing the Freshwater Seas," 131, 144.

[44] Martin, "Sailing the Freshwater Seas," 145.

[45] Karamanski, *Schooner Passage*, 107-108.

[46] Martin, "Sailing the Freshwater Seas," 145-146.

and 758 sailing vessels, recorded average monthly wages for sailing masters at $77.18, while their counterparts on steam vessels received $109.15 monthly. First mates on sailing vessels received just $52.14 monthly in contrast to $71.56 for those on steamships. While such disparity in wages was consistent across nearly all positions, seamen received $38.39 in sail and $35.96 in steam. This higher pay in sail for seamen likely resulted from the increased responsibilities and lack of consistent watch schedules as well as the need to go aloft.[47] A schedule of standard wages published at Cleveland on 21 March 1902, established monthly rates of $70.00 and $55.00 for first mates in sailing vessels of the first and second classes, $50.00 for second mates, and $45.00 for cooks and seamen. Meanwhile, wages among first mates aboard steel steamers ranged from $78.00 to $96.00 and from $78.00 to $84.00 on wooden steamers with second mates earning between $54.00 and $66.00. Seamen on all vessels were paid $45.00 per month.[48]

For independently operated sailing vessels, hiring and setting wage rates was typically the master's responsibility. At the end of the nineteenth century, wage rates were increasingly influenced by the unionization of seamen and the establishment of associations of vessel owners, both of which intermittently published standardized wage scales. While the influence of the unions peaked in the 1880s and 1890s, the shrinking sector of labor in sail and the shift of the unions towards the representation of steamship labor meant that sailing vessels operated largely outside these restrictions, with wages negotiated by the master and potential hires.[49]

Wages aboard Canadian vessels were consistently lower than those on American vessels. In the 1870s and 1880s, Canadian seamen's wages averaged $1.00 per day at Kingston when signed on with a vessel. Those working aboard barges were paid considerably lower wages, earning from as much as $1.00 per day to as little as $10.00 per month.[50]

While masters resorted to reducing their crew to cut costs and increase the dividends of the owners and often themselves, the reduction of employment within sail had adverse effects on the sail labor force, not least of which was an increasing scarcity of experienced seamen. Between 1889 and 1906, the number of individuals employed on the lakes on sailing vessels decreased from 5758 to 2258. Of those remaining in sail, 768 were employed on schooner barges

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47 Mansfield, *History of the Great Lakes*, 485-486; Martin, "Sailing the Freshwater Seas," 149-149.

48 Bureau of Navigation, *Annual report of the Commissioner of Navigation for the Fiscal Year Ended June 30, 1902* (Washington, D.C.: Bureau of Navigation, 1902), 149.

49 Martin, "Sailing the Freshwater Seas," 83.

50 "Labour Commission Through with Its Work Here," *Daily British Whig,* 2 February 1888.

and 1490 individuals were working aboard independent sailing vessels.[51] As the availability of experienced seamen decreased, vessel operators were increasingly confronted with an inability to obtain sufficient crews to operate their vessels.[52]

The system of apprenticeship, whereby unskilled hands acquired the skills of the sailor's trade, was a slow process. As opportunities for shipboard employment diminished, so too did opportunities for new hands to acquire the skills of the trade by apprenticing with experienced seamen. As a result, the labor force under sail suffered a deskilling of the trade, which increased competition for employment between unskilled laborers who could be paid lower wages and higher-paid experienced seamen.[53]

The issues of availability of labor were aggravated by the high turnover of labor aboard lake vessels. Emil Frankel's analysis of labor turnover in lake shipping for the year 1917 found that, despite significantly higher pay, sixty-six percent of the unrated crew aboard bulk carriers were employed for less than one month aboard the same vessel, with an additional 18.9% serving between one to three months. Aboard steam vessels employed in the lumber trade, forty-nine percent were employed longer than one month, with 29.5% employed between one and three months, nine percent between three and six months, and only twelve percent remaining longer than six months.[54]

No comparable information is available for sailing vessels in 1917. The account books of the schooner *Russel Dart* from 1860 to 1861 show that mates remained aboard for an average of just over four months. Stewards and cooks remained for two and one-half months. Seamen typically stayed on between one and a half months and two months.[55] Masters often discharged the crew while idling in port to avoid incurring additional labor costs while awaiting improvement of freight rates or dock space, though this might result in delays in obtaining a new crew when departing.[56]

Shipboard machinery was the subject of intensive experimentation and innovation in the nineteenth century, particularly as the pace of industrialization accelerated in the latter half of the century. This period brought the introduction of more efficient marine machinery, including steam-assisted machinery

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[51] O.S. Straus, *Transportation by Water 1906* (Washington, D.C.: Bureau of Census, 1908): 145.

[52] Robert Foulke, "Life in the Dying World of Sail, 1870-1910," *Journal of British Studies* 3, no.1 (1963): 122.

[53] Martin, "Sailing the Freshwater Seas," 171.

[54] Emil Frankel, "Labor Turnover of Seamen on the Great Lakes," 49-51.

[55] Martin, "Sailing the Freshwater Seas," 94.

[56] Hoaglund, *Wage Bargaining on the Vessels of the Great Lakes*, 26; Karamanski, *Schooner Passage*, 205.

Lyman M. Davis, built 1873 at Muskegon, Michigan and retired 1931, was the last commercial schooner in operation on the Great Lakes. On 29 June 1934, *Davis* was burned as a public spectacle at Toronto. (Great Lakes Maritime Collection, Alpena County George N. Fletcher Public Library)

such as steam windlasses and hoisting engines powered by donkey boilers. Innovations and improvements in shipboard machinery alleviated, at least in part, many of the most labor-intensive tasks and increased labor efficiency.

The improvement of labor efficiency aboard brought with it the compelling and cost-saving temptation to reduce the crew to an absolute minimum to save on wages and other associated expenses that accompanied the crew. Increasing financial pressures made under-manning endemic on sailing vessels by the end of the nineteenth century, whether for financial reasons or as a result of the dwindling availability of experienced sail laborers. This contributed to worsening labor conditions aboard, as the work of the now-absent crew was taken on by those few who remained.

This was further exacerbated by the decline in the use of watch-and-watch schedules in which crewmembers were divided into multiple watches and alternated on and off duty, allowing them time to rest. This lack of alternating watches was common practice aboard trading vessels engaged in short trips, such as those common among schooners on Lake Ontario. Douglas Bennet notes a near-universal lack of watch-and-watch schedules aboard trading vessels – the comparatively short passages and minimal crew prioritized the

completion of the trip over the fatigue of crewmembers.[57] To avoid delays in awaiting docking, sailing masters often sought to arrive early in the morning to load and return the same day. This often meant overnight runs, which in turn required that the crew work without adequate rest.[58]

The labor of the crew did not necessarily cease once mooring lines were made fast, as masters and mates oversaw the lading and trimming of the vessel, and longshoremen loaded and unloaded the vessel.[59] The crew might assist the stevedores by shifting the ship and handling lines or, more rarely, by loading and unloading the vessel themselves, particularly in ports where longshore labor was unorganized or unavailable, or where loading occurred outside of established dock facilities, such as in the lumber trade.[60] These strenuous schedules with long and inconsistent hours imposed immense strains on crews throughout routine operations and, when combined with under crewing, had the potential for catastrophic consequences in emergencies.

The Divergence of Sail and Steam Labor

The emergence of steam labor as the dominant maritime labor sector on the Great Lakes in the late-nineteenth century brought fundamental changes to the organization and enfranchisement of sailing labor within the labor movements of the late-nineteenth century. The resulting shifts within both the scale and structure of maritime labor would result in widespread changes to the structure of sail labor, a declining labor pool, and the broader degradation of skills among the sailing labor force.

The emerging dominance of steam vessels in Great Lakes freight transport and the transition of the majority of those employed in lake shipping to steam brought substantial shifts in the status and traditional occupational structure of labor on the Great Lakes. By the end of the century, the divergent systems of management, increasing segregation of sail and steam labor forces, and vast differences in shipboard life and labor structures resulted in the emergence of separate maritime cultures. Sail was characterized by independently operated vessels and an apprenticeship system, while steam was characterized by industrial organization, corporate management, and technical specialization.

This divergence of competing maritime cultures was evident in the inability of maritime labor on the lakes to effectively organize as interests

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[57] Douglas Bennet, *Schooner Sunset: The Last British Sailing Coasters* (Annapolis, MD: Naval Institute Press, 2001), 15.

[58] "In Marine Circles," *Daily British Whig*, 2 June 1897; Snider, "Rudderless Ride"; C.H.J. Snider, "White Oak Shavings. Schooner Days 70," *Toronto Telegram*, 14 January 1932.

[59] C.H.J. Snider, "Dusty Diamonds, Schooner Days 19," *Toronto Telegram*, 6 June 1931.

[60] Martin, "Sailing the Freshwater Seas," 58.

diverged and antipathy increased between sail and steam laborers. Early efforts towards unionization by Great Lakes' seamen had begun with the establishment of the Seaman's Benevolent Union of Chicago in 1863. A professional society of sailing lake men, it was intended to aid the mutual improvement of its members and by extension their trade. There was little talk of class or collective bargaining. While this organization proved short-lived, it was revived as the Lake Seaman's Benevolent Association in 1878, this time with the stated intention of organizing sailors and influencing wages.[61]

Membership in early labor unions was restricted to those possessing traditional skills in sailing seamanship. In other words, the aim was to deliberately exclude steam laborers, who were seen as unskilled and an affront to the profession.[62] This enmity was in no small part founded on fundamental differences in the means of acquiring the skills of their respective occupations. Among sailors, the skills of seamanship were traditionally earned through an apprenticeship, with individual advancement determined by experience. While requirements for certificates of competency set formalized requisites for officers on applicable vessels, few barriers prevented a sailor's advancement from deckhand through the ranks of seaman, able seaman, and mate. During the nineteenth century, an ambitious sailor might reasonably expect to become a master and to attain ownership or part ownership of the vessel they sailed. Accordingly, the system of apprenticeship allowed the prospect of substantial upward social mobility among sailors.[63]

Apprenticeship had important implications for the specialization of labor on sailing vessels. As a result of this apprenticing, the sailing master knew all of the skills performed by those under his command. Conversely, while the master remained the ultimate authority in the operation of the vessel, those aboard shared a common professional skillset acquired through experience and a high level of competency in operating their vessels.[64]

In contrast, the increasing technical complexity of steam vessels throughout the nineteenth century resulted in a high degree of specialization among steamer crews. This separation was reinforced by regulations requiring certificates of competency. The certificates themselves, meanwhile, necessitated formalized education. This, in turn, established a more rigid division of labor aboard ships, as each task came to require highly specialized training. The result was that the steamboat master was primarily concerned with the effective management of the vessel on behalf of the owners but lacked extensive knowledge of the

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61 Hoaglund, *Wage Bargaining*, 10.
62 Hoaglund, *Wage Bargaining*, 13.
63 Martin, "Sailing the Freshwater Seas," 182.
64 Daley, "An Unequal Clash," 120; Hoaglund, *Wage Bargaining,* 160-162, 166.

vessel's machinery. The latter was the responsibility of the chief engineer who also received orders from management independent of the master. As a result, each position aboard steamships possessed a narrower skillset that was not necessarily shared by others within the crew and had duties not shared by others.[65]

Historian Matthew Daley, who has written extensively on Great Lakes shipping and labor relations, notes that in contrast to the relative social mobility afforded sailors, steam labor was characterized by credentialed specialization, in which individual ratings fulfilled a limited role.[66] In British Canada, licensure requirements for engineers were established with the Inland Navigation Acts of 1845, which was amended in 1859, and reaffirmed by the new Dominion government in 1868 and 1882. Canadian lake masters and mates were not licensed until 1883.[67]

In the United States, the Steamboat Act of 30 August 1852 established the Steamboat Inspection Service under the Department of the Treasury, which instituted licensing requirements for steam masters and engineers with no corresponding regulation of sailing vessels. Certificates of competency in sail were not required in the United States until 1898 and even then this requirement applied only to officers of vessels exceeding 700 gross tons. The Seamans Act of 4 March 1915 instituted licensure requirements for able-bodied seamen, by which time American sailing vessels had largely disappeared from Lake Ontario.[68]

For sailors, professionalism within their trade was defined as broad competency in seamanship, including a knowledge of all skills of operating the vessels required of their ratings. Among steamship labor licensure and formal education in navigational schools came to define professionalism, a definition which deliberately excluded apprenticed sailors.[69] In contrast, the limited scope for practicing the skills of seamanship on steamers represented a debasement of professional seamanship to sailors. This perceived affront was amplified by the higher pay and increasing enfranchisement of steam in organized labor at sail's expense.[70] The result was continual conflict both within the union and with competing labor organizations representing certain sectors of steam labor, all of which detracted from the Seamen's Union's ability to effectively control marine labor on the lakes.

In 1863, ninety-three percent of all tonnage on the lakes was still in sailing

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65 Martin, "Sailing the Freshwater Seas," 183.
66 Daley, "An Unequal Clash," 120-121.
67 Martin, "Sailing the Freshwater Seas," 191-192.
68 Martin, "Sailing the Freshwater Seas," 191.
69 Martin, "Sailing the Freshwater Seas," 181.
70 Hoaglund, *Wage Bargaining*, 13, 25; Martin, "Sailing the Freshwater Seas," 181.

vessels.[71] As a result, when the first efforts to organize labor on the lakes began, sail labor controlled unionization efforts. When the Lake Seamen's Union was founded in 1878, its rolls were restricted to those with sail training. High demand for labor and the prosperity of lake shipping in the late 1870s and 1880s favored unionization efforts. Throughout the 1880s, the Lake Seamen's Union pursued wage setting and closed-shop agreements with operators who were left without recourse but to agree.[72] In response, the Cleveland Vessel Owner's Association was established in 1880, followed by the rival Lake Carriers Association of Buffalo in 1892 to oppose the unchecked control of the unions in setting wages.[73]

J. V. Taylor, buillt in 1867, was abandoned in Racine, WI in 1928. (Great Lakes Maritime Collection, Alpena County George N. Fletcher Public Library)

Early efforts to organize marine labor on the lakes were impaired, however, by the unwillingness of traditional sailors to unify with rival sectors of labor on the lakes, particularly with steamship crews. Steam-trained seamen were initially excluded from the Lake Seamen's Union. Their exclusion not only limited the ability to organize workers within what was a unified labor market, but also resulted in the emergence of competing marine labor movements including the National Marine Engineers Association, the International Longshoremen's Association, and the Marine Firemen, Oilers, and Watertender's Benevolent

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71 "Launch of the *Wolvin,*" *Marine Review*, 14 April 1904, 30.

72 Larrowe, *Maritime Labor Relations on the Great Lakes*, 12.

73 Martin, "Sailing the Freshwater Seas," 72.

Associations, all of which competed to organize steam labor. Shipowners and freight companies benefitted from this disorganization among Great Lakes maritime workers.[74]

With sailors representing an ever-diminishing sector of marine labor, the Lake Seamen's Union and affiliates on the coasts formed the National Seamen's Union of America in 1892 and opened its rolls to some steam positions. In 1899, the union was extended to Canadian locals and was renamed the International Seamen's Union in 1899.[75] By the mid-1890s, the numbers of seamen employed in sailing vessels had begun to decline, while steam labor growth meant that steam labor soon constituted the majority of the Seamen's Union rolls. By 1902, membership was extended to deckhands on steamers.[76]

As steam labor increasingly came to control the nominally unified marine labor movement on the lakes, the Seamen's Union came to represent the interests of increasingly corporatized labor in steam. With diminishing influence, sail enrollment declined throughout the 1890s. As steam labor came to control the Seamen's Union, its leaders adopted an increasingly adversarial approach towards independent sailing operators characterizing sail as lacking standards of professionalism.[77] By the end of the first decade of the twentieth century, seamen aboard sailing vessels had largely withdrawn from the labor organizations they had established and which had ceased to advance their interests.

With sail-trained labor largely withdrawing from organized labor, the Seamen's Union found itself increasingly in opposition to other unions and associations of vessel owners. In 1892, the Lake Carrier's Association of Buffalo and the Cleveland Vessel Owners Association merged to form the Lake Carriers Association. At the same time, the Longshoremen's Union, established in that same year, increasingly competed for representation of labor, seeking to establish representation of all marine labor on the lakes.[78]

In 1908, after several years of cooperation and closed-shop agreements between the Seamen's Union and the Lake Carriers Association, the carriers ended relations with the unions. The Lake Carrier's Association now adopted a union-breaking stance, using stockpiles of commodities and anticipation of a slow shipping season to weaken the position of the unions. The Lake Carriers Association also enacted an open shop policy, establishing hiring offices, an owners' union, and standard wage scales of their own.[79] By the 1910s, the Lake

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74 Hoaglund, *Wage Bargaining*, 31, 46-49.
75 Hoaglund, *Wage Bargaining*, 21-22.
76 Larrowe, *Maritime Labor Relations on the Great Lakes*, 15.
77 Martin, "Sailing the Freshwater Seas," 153-154.
78 Larrowe, *Maritime Labor Relations on the Great Lakes*, 14-15, 19-27.
79 Hoaglund, *Wage Bargaining*, 78; Larrowe, *Maritime Labor Relations on the Great Lakes*,

Carriers Association had gained unilateral control of steam labor on the lakes. While some sailing vessels were operated by members of the Lake Carriers Association, these seem to have been primarily towed vessels. Independent sailing vessels run by largely unorganized labor operated on the periphery, while unions shifted towards advancing the interests of steam.[80]

The 1890s laid the foundations of what Matthew Daley characterizes as a "fully-integrated industrial system," forming the basis of the modern Great Lakes transportation system and economy. This system was characterized by the consolidation of steam tonnage in vertically-integrated corporate shipping fleets within their respective industries, detailed schedules, and sailing times, all of which were controlled by shore management and carried out by the master, who possessed little autonomy.[81]

First implemented within John Rockefeller's Bessemer Steamship Company in 1895, shipping lines began operating based on annually-negotiated contracts for high-volume low-profit freight, rather than negotiating individual charters at fluctuating rates.[82] With set amounts to be delivered at pre-determined rates, operators obtained consistent employment for their fleets and sought to improve the efficiency of each vessel and thereby maximize the profitability of the fleet. This combined with the improved economies of scale that could be realized by increasing the overall tonnage of individual vessels was the central motivating influence behind the seemingly exponential increase in the length and tonnage of bulk carriers in the 1890s and 1900s.[83] These developments were accompanied by the increasing imposition of onshore management in the day-to-day operations of vessels, with the masters and chief engineer being issued orders and operating instructions including schedules for sailing times, fuel-consumption schedules, and set speeds along their routes.[84]

The shift brought further divergence in the structure of labor aboard sail and steam vessels. In independent sailing operations, the master was appointed by the owners of the vessel and possessed broad authority in nearly all aspects of the ship's operation throughout the shipping season. While the appointment of a knowledgeable master did much to ensure the profitable operation of the vessel, the position was usually insecure if the master was not himself a part-

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20-33, 36.

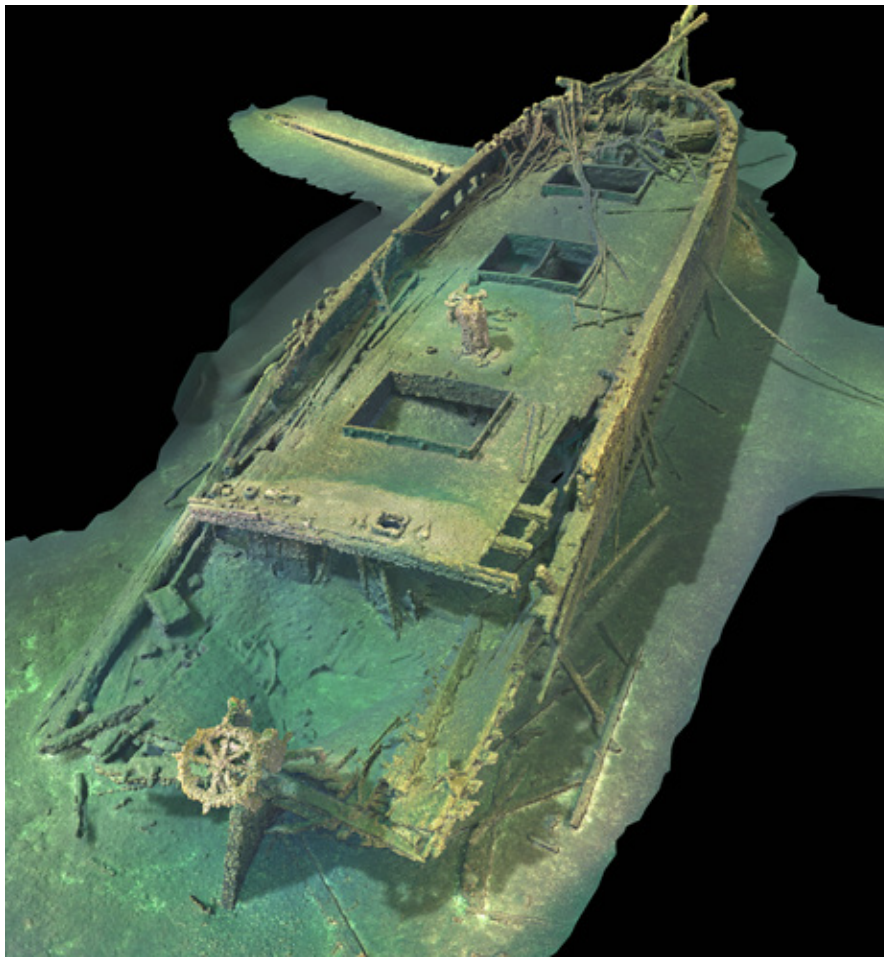
80 Larrowe, *Maritime Labor Relations on the Great Lakes*, 14; Martin, "Sailing the Freshwater Seas," 154.

81 Daley, "An Unequal Clash," 11.

82 Hoaglund, *Wage Bargaining*, 25.

83 C. Patrick Labadie, *Submerged Cultural Resources Study: Pictured Rocks National Lakeshore* (Santa Fe, NM: National Parks Service, 1989): 28.

84 Daley, "An Unequal Clash," 122; Hoaglund, *Wage Bargaining*, 25.



Wrecked in 1922, *Katie Eccles* lies on the bottom of Lake Ontario off Prince Edward County. This photogrammetric model of the wreck 100 years later was captured by Kayla Martin and Ken Merryman, June 2022 (https://3dshipwrecks.org/shipwreck-katie-eccles/)

owner.[85] Even if the master were a part-owner, laws preventing the removal of a master that owned a minority share in a vessel were removed in 1872, making the position more tenuous.[86] While the sailing master's independence was diminished by the increased involvement of owners in scheduling charters – facilitated by the use of the telegraph – masters retained much of their traditional independence to the end of sail.

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[85] Martin, "Sailing the Freshwater Seas," 73.

[86] Bureau of Navigation, "Laws of the United States Relating to Navigation and the Merchant Marine," in *Report of the Commissioner of Navigation 1895, Part II* (Washington, D.C.: Bureau of Navigation, 1895), 50; Martin, "Sailing the Freshwater Seas," 72.

In the new steamship system, the master relinquished much of the autonomy and authority that they formerly held. Masters were reduced to middle management within the corporate structure without owning an interest in the vessels they operated.[87] In addition, the sailor's opportunity for upward social mobility by obtaining the rank of master and seizing an opportunity for ownership of a vessel effectively closed in the new steamship system.

The shifts in the management of steam were not all deleterious though. Despite the collapse of labor's organization in the first decade of the 1900s, the structure of steam labor moved to a pattern of more secure and consistent employment. Under this system, crew members were incentivized to remain aboard for the entire season. Furthermore, the Lake Carrier's Association published standardized and intermittently adjusted wage scales and established beneficial programs for workers. For workers, these programs possessed many of the benefits of unions and further undermined remaining efforts to organize labor. Though the programs offered by operators were self-serving in undermining unionization efforts, they nevertheless provided benefits to the average seaman working aboard their steam fleets.[88]

All of these changes conspired to solidify the divide between sail and steam labor, almost exclusively at the expense of the less-efficient sailing vessels and the dwindling number of workers employed in sail. By the mid-1890s, it had become apparent that there were few future career prospects in sail. Historian Jay C. Martin notes that by 1884 and 1909, most new officers standing for competency examinations sought steam certifications. Sail, nevertheless, would persist into the fourth decade of the twentieth century.

Those who remained in sail did so for many reasons, including devotion to traditional seamanship and resentment of steamships and the seamen serving on them. Others refused to stand for competency examination for steam, which would have meant starting over for many aging masters approaching retirement. Some retired from the lakes entirely, seeking business opportunities ashore. Others, particularly those who maintained certificates in both sail and steam succeeded in transitioning into steam roles.[89] The shift from sail to steam was not solely a shift in technology, but entry into a separate and unfamiliar maritime culture, one in which sailors saw their experience in sail count for little. For those who remained in sail, it was an ongoing struggle to secure themselves financially or to find alternate means of income as the end of their sailing careers approached.

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87 Hoaglund, *Wage Bargaining*, 24-26, 40; Martin, "Sailing the Freshwater Seas," 171.

88 Martin, "Sailing the Freshwater Seas," 178.

89 Martin, "Sailing the Freshwater Seas," 170.

Conclusions

Sailing commerce maintained a dominant position in bulk freight transportation on the Great Lakes into the 1870s. By the mid-1870s, however, declining prospects for profitability resulted in the decline in the construction of new sailing vessels – moving forward, as the sailing fleet on the Great Lakes aged and went out of service, new vessels were not constructued to replace them.[90] With freight rates falling to prices at which profitable operation was tenuous to impossible, sail owners and masters went to great lengths to keep their vessels in service and to make what profits could be made while their aging vessels remained serviceable.

As the largest single cost of operating a sailing vessel, reducing expenditures on crew wages was imperative for operators in lowering their overall operating costs and improving the profitability of their vessels. This was achieved primarily through investment in improved and novel marine machinery intended to increase the efficiency of particularly laborious tasks which required multiple crew members to accomplish, or which required frequent relief. These innovations brought fundamental changes to shipboard routines and work and often had negative implications for the sailors and sailing labor in general, including worsening watch schedules and increasing under-crewing of vessels. While sailors prided themselves on their "traditional" skills in marlinspike seamanship, the introduction of this new machinery brought widespread changes to these skills, often for the worse.

As sailing commerce continued under increasingly adverse financial conditions, operators accepted increasing risks. Deferral or neglect of routine maintenance of these aging vessels was commonplace. This was particularly true in scarce seasons. When repairs, refits, or maintenance were done, it was often delayed until winter layup when repairs would not infringe on the sailing season. These worsening working conditions were accompanied by pervasive overloading of nearly all vessels and the aforementioned under-crewing. While all of these risks had been present in sailing vessel operations throughout the nineteenth century, these practices were aggravated by the adverse financial conditions that accompanied the end of sail.

All the while, the sailor was largely without regulatory protection or recourse through labor unions by which to seek redress for their grievances and the dangers they faced, the unions having been co-opted by the steam labor as the importance of sailing labor diminished.[91] These differences resulted in

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[90] Lewis, "Transition from Sail to Steam," 352.

[91] Larrowe, *Maritime Labor Relations*, 14; Martin, "Sailing the Freshwater Seas," 154; Souza, *The Persistence of Sail*, 114-121.

the emergence of separate maritime cultures among those working aboard sail and steam vessels. One was traditionally characterized by apprenticeship-based labor, a shared skill set, high social mobility, and independent ownership and operations under sail, the other by increasing corporate consolidation of ownership, limited social mobility, skills specialization, and operations under the oversight of corporate shore management.[92] While sailors prided themselves on these "traditional" characteristics of their trade, few aspects of this trade survived the adversity of sail's final years unaltered.

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[92] Hoaglund, *Wage Bargaining*, 25; Martin, "Sailing the Freshwater Seas," 177-202.