

Sail tonnage was roughly twice that of steam in 1868 and maintained some part of that advantage until 1881/82 when the steam fleet began to grow decisively, exceeding sail tonnage for the first time in 1884. It continued to grow dramatically to the end of the century and well beyond. What is less often noted is that sail tonnage in 1900 was at roughly the same level that it had reached in 1874. Clearly rigged vessels had a continuing value to operators. The curve for barge tonnage (as distinct from the canal boats) runs significantly below steam and sail and almost bottoms out at the end of the 1880s. A revival began in 1888 that can largely be attributed to Alexander McDougall's American Steel Barge Company's whalebacks, most of which were designed to be towed.

The dramatic upward curves for growth in both sail and steam tends to mask the ratios from the 1830s and 1840s. Figure 3 attempts to adjust for that by measuring each class of tonnage as a percentage of the whole for a given year. Clearly the enrollment of canal boats in the various customs districts at the end of the Oswego, Erie, Ohio and Illinois canals distorts the ratios before the non-steam canal boats were finally exempted from enrollment by legislation in 1873.<sup>18</sup> That said, there is other evidence that on the American side of the Lakes, the ratio of steam to non-steam powered vessels was rising into the 1840s, declining through the decade of the 1850s and the major shift to steam began at the end of the Civil War. We will return to this later in the paper.

That broad conclusion is supported by the statistics for new American construction, numbers which are significantly more reliable for the period after 1868. As figure 4 demonstrates, the majority of new tonnage coming off the ways between 1868 and 1900 was steam. Only for three years early in the period was the tonnage of sail larger than that of steam. From it one can conclude that the sail tonnage on the Great Lakes from at least 1874 onwards was an aging stock of vessels that were finding ways of remaining viable, but that vessel owners had reduced significantly their investments in that technology a decade or more before the new steel behemoths started arriving. However, as the US Commissioner of Navigation noted in 1900, much, if not most, of the new "sail" tonnage was never intended to be more than a "rigged barge" whose sails were deployed in emergencies or when the reduced crews could reduce the strain on the steam vessel undertaking the tow.<sup>19</sup>

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<sup>18</sup> United States, *Statutes* (43 Cong. Sess. 1) 1874, chap. 110 "An act to amend the act entitled 'An act for enrolling and licensing ships or vessels to be employed in the coasting trade and fisheries, and for regulating the same,' passed February eighteen, seventeen hundred and ninety three." Approved 18 April 1874. This exempted from federal documentation any canal boats operating solely within the waters of a single state. The exceptions were those with sails or an engine. Some parties had tried without success for a number of years to have canal boats exempted, starting with H. R. 256 in 18th Congress, 2d Session (7 January 1825).

<sup>19</sup> The US Commissioner of Navigation in his annual report for 1900 noted "The proportion of vessels ordinarily towed is larger than is indicated by the figures of the tables as the acts of Congress create distinctions between vessels with and without motive power of their own. A large tonnage of barges on the seaboard and on the lakes is schooner rigged, and these vessels are equipped with sails, though ordinarily towed ... The rig, however, of such vessels is designed rather to meet emergencies than as an ordinary commercial means of propulsion." *Annual Report of the Commissioner of Navigation For the Fiscal Year ended June 30, 1900* (Washington, 1900), 10.