

PREVENTING “THOSE TERRIBLE DISASTERS”: STEAMBOAT ACCIDENTS AND  
CONGRESSIONAL POLICY, 1824-1860

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## ABSTRACT

### PREVENTING “THOSE TERRIBLE DISASTERS”: STEAMBOAT ACCIDENTS AND CONGRESSIONAL POLICY, 1824-1860

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Responding to public outrage over the dangers of steamboat travel and entreaties by the press, inventors, and interest groups in the years before the Civil War, Congress investigated accidents, published data about the science of steam power, and suggested ways to improve vessel construction and operation. It also had the government test mechanisms, mandated certain safety devices, contemplated subsidizing inventors, and, in 1838 and 1852, passed laws requiring safety inspections and punishing steamboat operators for misconduct. These actions lend support to revisionist scholars of public policy who argue that the national government was more active and interventionist during this era than conventional historical depictions have portrayed.

Members of Congress believed that the government was responsible for the safety of passengers and had the authority to intervene. They often endorsed policies without contested votes and drew support from Whigs and Democrats, as well as all geographical sections. These circumstances are inconsistent with archetypes of nineteenth-century policymaking, such as the “party period” paradigm, sectional contests between North and South, or the Southern-Democratic alliance that sought to restrict government intervention. The idiosyncrasies of the legislative process were at least as important as outside forces in influencing the form, timing and disposition of steamboat legislation. Researchers should be alert to instances of energetic government, consensual policymaking, and the complex process of how Congress responded to persistent demands.

## BIOGRAPHICAL SKETCH

Peter Maust earned his A.B. degree in Political Science from Middlebury College in 1985. He worked in the development offices of Boston University and Brown University and received his M.A. in American history from Cornell University in 1996. He served as a visiting professor in the government department at the State University of New York at Old Westbury and as an adjunct professor of history at Stony Brook University. He is an assistant professor in the history department at St. Joseph's College in Brooklyn and Patchogue, New York.

For Carolyn and Thomas

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My wife, Carolyn, and father, Ralph B. Maust, helped with organization, provided constructive feedback and invaluable moral support. Kathleen Signorelli was a worthy research assistant who helped move the project forward during challenging times. Editors at Edit 911 made many suggestions to improve my prose and other aspects of the work.

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Special thanks are due to the members of my dissertation committee, both past and present. Professor Ron Kline guided my investigations into the history of technology during my early years at Cornell. Professor Edward Baptist generously agreed to serve on my committee when I restarted the project after an extended absence. Professor Richard Bensele helped inspire this inquiry and I am gratified by his ongoing interest and support. If there are virtues in this dissertation, a great deal of credit belongs to Professor Emeritus Joel H. Silbey, whose guidance, support, constructive criticism, and example as a scholar, leave me grateful to have been his student. I alone am responsible for any errors and oversights.

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## LIST OF ABBREVIATIONS

<i>ACG</i>	<i>Appendix to the Congressional Globe</i>
<i>ASP</i>	American State Papers, Naval Affairs
<i>CG</i>	<i>Congressional Globe</i>
H. Doc.	House Document
H. Exec. Doc.	House Executive Document
H. Rept.	House Report
H.J.R.	House Joint Resolution
H.R.	Bill introduced in the House of Representatives
<i>HJ</i>	<i>Journal of the House of Representatives</i>
<i>JFI</i>	<i>Journal of the Franklin Institute</i>
NA	National Archives and Records Administration
<i>NWR</i>	<i>Niles' Weekly Register &amp; Niles' National Register</i>
<i>NYDT</i>	<i>New York Daily Times</i>
<i>RD</i>	<i>Register of Debates in Congress</i>
RG	Record Group, National Archives and Records Administration
<i>SA</i>	<i>Scientific American</i>
S.	Bill introduced in the Senate (e.g., S. 128 represents Senate Bill 128)
S. Doc.	Senate Document
S. Exec. Doc.	Senate Executive Document
S. Misc. Doc.	Senate Miscellaneous Document
S. Rept.	Senate Report
S.J.R.	Senate Joint Resolution
<i>SJ</i>	<i>Journal of the Senate</i>
Stat. L.	Statute Law



## PREFACE

This work began as a paper for a graduate seminar on United States history during the Civil War era at Cornell University led by Professors Joel H. Silbey and Richard F. Bense. I had been interested in the growth of government power for some time, especially the rise of the national “state” in American life. My curiosity developed from early experiences on Long Island’s South Shore, where I could see a lookout tower from one of the Lifesaving Service stations that had once guarded the approaches to the Port of New York. I was fascinated by an old wreck near my grandparents’ house and my father and grandfather told me stories about stranded vessels and the surf men who rescued passengers and crews. When I grew older, I puzzled over the contradiction between depictions of the United States as a country of self-reliant individualists whose government had done little for them and the still visible foundations of the old Lifesaving stations among the dunes of Fire Island. Hadn’t we done something for each other?

In the seminar, I planned to investigate the government’s relationship to railroads in the second half of the nineteenth century, but Professor Bense noted that the federal government had intervened earlier to regulate steamboats. Intrigued, I shifted my attention from railways in the Gilded Age to waterways in the antebellum era, and learned that though steam vessels played a crucial role in the growth of the nation, they were subject to accidents that killed and wounded thousands of people and cost millions of dollars in property damage. A large percentage of the general public, many interest groups, and most members of Congress came to believe that the national government should act to address the problem. In 1852, Congress created the first federal agency responsible for regulating a private industry. Outside of wartime, national government intervention on this type did not become common until the twentieth century.

This is an account of the evolving process by which Congress responded to steam vessel accidents from the 1820s to 1860. The national government worked to prevent the disasters through four different types of policies which represented different degrees of intervention. The first approach, which I label the *Information Option*, began in the 1820s when Congress started to conduct investigations into the problem and publish information. A second approach, beginning in the 1830s, was a *Mechanical Option* where Congress evaluated, encouraged and, eventually, required steamboats to use safety devices while inventors asked Congress to subsidize their mechanisms. The third type of policy was a *Penalty Option*: in 1838, Congress passed a law that relied heavily on threatening steamboat operators with lawsuits and prosecution as a way to curb accidents caused by recklessness.

Federal intervention reached an important landmark in 1852 when Congress passed the Steamboat Act. The law integrated the earlier approaches with a *Regulatory Option*. This legislation included new provisions, such as examining and licensing steamboat personnel, testing boilers, and setting standards for steamboat construction and operation. In addition, the Act formed a permanent administrative body, the Supervising Inspectors of Steamboats, to enforce these requirements, oversee accident investigations, evaluate mechanical improvements, and recommend further changes in legislation.

These examples of government activism led me to question historical generalizations of the nineteenth-century government as “small” and “weak.” Many scholars subscribe to the notion that for a century or more after the ratification of the Constitution, the national government’s lack of influence made it “a midget institution in a giant land.”<sup>1</sup> By contrast,

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<sup>1</sup> Max M. Edling, *A Revolution in Favor of Government: Origins of the U.S. Constitution and the Making of the American State* (New York, NY: Oxford University Press, 2003), 228, quoted in Brian Balogh, *A Government Out of Sight: The Mystery of National Authority in Nineteenth-Century America* (New York, NY: Cambridge University Press, 2009), 9n. Ballard C. Campbell summarizes this view: “Government in the United States

steamboat policies flowed from a government that was more than willing to use its power over commerce. Another fact that piqued my interest was that the public broadly supported steamboat legislation, and divisions between congressmen did not break down along expected partisan or sectional lines. Both Whigs and Democrats sponsored bills and many of the measures were passed without recorded opposition.

The roll call votes in the House and Senate showed that a majority of the members of both parties and sections usually supported the proposals. It appeared that steamboat legislation engendered bipartisan support in what historians label “a partisan era.” Government intervention of this sort and the tendency by members of Congress to endorse it without deep-seated partisan or sectional conflicts were inconsistent with my understanding of the nineteenth-century political environment. This suggested that this subject provided an exception to historical frameworks that identify partisanship and sectional concerns as the most important forces that drove antebellum lawmaking.

Having been trained by Professor Silbey, a torchbearer of the “new political history,” to search for a “partisan imperative” that underlay many of the actions of politicians and voters of the era, I wondered why such a substantive increase in government power did not call forth more opposition from apostles of limited government among the legislators from the Democratic Party, why it did not stir resistance from Southerners sensitive to the federal government intruding on states’ rights, or why it did not antagonize Whigs and others who thought that the national government should promote business growth but not interfere by regulating it.

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underwent a major transformation in the years after 1887. Before the 1880s, government performed a limited range of functions and rarely intruded into everyday life. In our own time, the public sector manages an immense array of programs that affect all aspects of society.” Ballard C. Campbell, *The Growth of American Government: Governance from the Cleveland Era to the Present* (Bloomington & Indianapolis, IN: Indiana University Press, 1995), 1.

As I reviewed the literature on steamboat legislation, I concluded that the existing scholarship did not offer an adequate account of how the national government took responsibility for the safety of commerce and passengers, nor did it give a sufficiently detailed description of the process by which the government acted. Two of the most influential works, Louis Hunter's *Steamboats on the Western Rivers* and John G. Burke's article "Bursting Boilers and the Federal Power," mentioned these issues without exploring them in sufficient depth.<sup>2</sup> I set out to provide a more complete picture than is currently available of these policies as they illustrated the internal operations of the antebellum Congress.

Ultimately, I conclude that Congress acted as it did for several reasons. Underlying its decision was the commerce clause of the Constitution and the 1824 Supreme Court decision in *Gibbons v. Ogden*, which affirmed Congress's power to regulate interstate commerce. Perhaps an even greater influence was that, since the beginning of the republic, there was a widespread consensus that certain publicly funded efforts to protect commerce, such as constructing and maintaining lighthouses, were legitimate exercises of government power. Congressmen saw policies to protect steam vessel passengers through this lens. They were usually certain they had the authority and responsibility to act, and thus focused their attention on whether or not intervention was wise, and *how* they should undertake it.<sup>3</sup> Public fears of steamboat disasters translated into broad public support for legislative intervention, which provided an important proximate factor that drove bills to passage. This, along with backing from interest groups like

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<sup>2</sup> Louis C. Hunter, *Steamboats on the Western Rivers: An Economic and Technological History* (1949; reprint, New York, NY: Dover Publications, Inc, 1993), and John G. Burke, "Bursting Boilers and the Federal Power," *Technology and Culture* 7/1 (Winter 1966): 1-23.

<sup>3</sup> In the first report that Congress produced on the subject, the House Commerce Committee wrote that they were reluctant to interfere with private businesses and feared that intervening might discourage mechanical innovations and improvements. However, they did not express any doubt that Congress had the authority to act. See *Report of the Committee on Commerce, accompanied by a bill for regulating of Steam Boats, and for the security of passengers therein*, 18<sup>th</sup> Cong., 1<sup>st</sup> sess., May 22, 1824, H. Rept. 125, 1.

associations of steamboat engineers, boards of trade and marine insurance companies, exerted additional pressure on Congress to act.

However, beyond these reasons, most of this dissertation focuses on providing an account of *how* Congress acted. Over the years, there was a consensus on some aspects of government intervention. Most legislators agreed that the government should investigate and publish information about the hazards of steam and that steamboat operators who recklessly endangered the lives of passengers ought to be punished. They also thought it appropriate for the government to test safety devices. However, there was no clear model for the exact form that federal intervention should take, nor was there general agreement on what measures would be appropriate and effective. The complex technical nature of the *Mechanical* and *Regulatory* approaches meant that few members of Congress were willing or able to absorb the details of these plans. Then, when public concern was high and advocates within Congress were pressing the House and Senate to act, many legislators took their cues from sponsors who had specialized knowledge of the subject. As a result, when it came time to pass the bills, members acted on their belief that public opinion favored *some* sort of action and tended to defer to individual or groups of legislators responsible for drafting the legislation. The measures were passed, after substantial deliberation by a small number of congressmen—i.e., with little direct input from most senators and representatives—but usually enjoyed broad and often, near-consensual support.

In investigating Congress's actions, I am responding to challenges issued by historians of nineteenth-century politics and public policy to gain a better understanding of the origins and process by which policies were made, and where they fit into our current frameworks describing governance in the nineteenth century. Thirty years ago, Richard L. McCormick asked scholars

to make “the study of governmental policy as systematic as the study of elections,” and to “provide a satisfactory typology of governmental policies.”<sup>4</sup> By investigating the proposals and actions of Congress from 1824 to 1860, I have attempted to organize and categorize the different ways in which the government responded to the problems of steam vessel disasters, and to document “the process by which popular expressions of opinion are translated into specific recommendations for legislation, [and] the details by which such recommendations are worked into law.”<sup>5</sup> A senior historian of nineteenth-century America called for a similar agenda, one that would look closely at certain aspects of government policy, including “the origin and range of public responsibilities, the circumstances of normal policymaking, and the evolution of particular policies—the development of commitments to certain of them, and the way they moved from idea and/or demand into legislation and thereafter, and changes in the notion of appropriate regulative activities.” This includes the need to “trace how legislation was shaped, the institution’s power used, and pressures and ideas from outside dealt with.”<sup>6</sup>

It has been more than two decades since William Leuchtenburg suggested that “the history of the American state” constituted a “new frontier” for historical investigation and that future research should place particular emphasis on analyzing “the role of the state in our society.”<sup>7</sup> Though nineteenth-century United States government was not the leviathan that it became in the twentieth century, it was nonetheless capable of asserting its power in innovative ways. It has been easier for historians to minimize the U.S. government’s activities because they

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<sup>4</sup> Richard L. McCormick, *The Party Period and Public Policy: American Politics from the Age of Jackson to the Progressive Era* (New York, NY: Oxford University Press, 1986), 87.

<sup>5</sup> Allan G. Bogue, “Why Has the History of the U.S. Congress Been Unpopular?” *Congress and the Presidency* 13/1 (Spring 1986): 120.

<sup>6</sup> Joel H. Silbey, “The State and the Practice of American Political History,” *Journal of Policy History* 11/1 (1999): 16, 17.

<sup>7</sup> William E. Leuchtenburg, “The Pertinence of Political History: Reflections on the Significance of the State in America,” *Journal of American History* 73/3 (Dec. 1986): 585, 586, 590.

do not fit the model of the centralized, bureaucratic European state.<sup>8</sup> If my work helps to explain the reasons, form, and context of steamboat legislation, and adds to the expanding store of knowledge about aspects of nineteenth century governance, it will serve its purpose.

Early versions of chapters 2, 3 and 4 appeared in Peter Maust, " 'Congress Could Do Nothing Better': Promoting Steamboat Safety in Antebellum America," *Prologue* 32 (2000): 101-111.

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<sup>8</sup> Balogh, *Government Out of Sight*, 9.

## A NOTE ON PRIMARY SOURCES AND RESEARCH

While I have benefited a great deal from the scholarship listed in the bibliography, much of this dissertation is based on examination of primary sources. I first established a chronology of legislative activity by reviewing the official *Journals* of the House and Senate from 1820 to 1861 for material related to steam technology and passenger safety. From this, I created a record of the communications sent to Congress, committee referrals, and a list of relevant government documents published in the Congressional Serial Set. From 1824 to 1852, Congress published eighty documents on the topic of steam vessel accidents (Appendix B), and these provide information about steam power and offer an extensive sample of contemporary opinion about the causes and cures of the disasters. In the records of the National Archives and Library of Congress, I found copies of bills that address aspects of maritime safety as well as the related laws published in the Statutes-at-Large (Appendix A). From these I could track the development of dozens of legislative proposals regarding vessel safety. I documented the way bills were shaped, found the debates in the *Annals of Congress* and the *Congressional Globe*, noted that many proposals died before they could be considered, but that a small number passed, and were signed into law. In addition, I reviewed the National Archives' unpublished records in all instances where the subject of steam disasters and remedies was referred to a committee, as well as the files on individual bills. I have documented the geographical and partisan background of legislative sponsors, as well as the instances and outcomes where roll call votes were cast (Appendices A and C). I also reviewed the unpublished papers of members of Congress who played important roles in the legislation, such as Senators John Davis of Massachusetts and Hannibal Hamlin of Maine, as well as the edited papers and public addresses of prominent commentators and advisors on the use of science and technology, especially Princeton physicist



and later Secretary of the Smithsonian, Joseph Henry. These sources have been supplemented with information from popular non-technical publications, such as *Niles' Weekly Register and Niles' National Register*, and specialized periodicals concerned with technology and science, such as *The Journal of the Franklin Institute* and *Scientific American*. Additional primary sources are listed in the bibliography. From these documents and the written work of many scholars, I have worked to construct a story that adds to our understanding of the role of the state in ways that portended the latter's vast expansion in American life.

## INTRODUCTION

### STEAMBOAT DANGERS AND THE GOVERNMENT'S RESPONSE

On the evening of December 17, 1850, as it departed from New Orleans, the steamboat *Knoxville*'s boilers exploded. Nineteen people died, including sixteen passengers and three members of the crew. The blast wrecked the boat and damaged several nearby vessels.<sup>1</sup> The steamer *Yorktown* was docked two boats down from the *Knoxville* and its captain, Thomas J. Haldeman, described the disaster to a New Orleans newspaper:

There were two distinct reports following each other in rapid succession; the first I took to be a cannon, but with the second came a volume of steam, with an awful crashing sound, that convinced me that some boat had exploded. I received a severe shock and was considerably staggered by the concussion of the atmosphere. I immediately went out on the wharf to the bow of the *Knoxville*, and could see, though by moonlight, she was a perfect wreck; a broadside from a seventy-four, it seemed to me, could not have more completely torn her to pieces, and the two boats next to her on each side—the *Martha Washington*, which had steam up, and *Ne Plus Ultra*—were severely shattered; particularly the *Martha Washington*, as I discovered that some one of her pipes about the boilers was broken, and steam all blew out of her boilers . . . . The iron-safe of the *Knoxville* was blown over the *Ne Plus Ultra* and the *Yorktown*, and fell on the lower guard of the *Buckeye*, after passing through her boiler deck. This, sir, is the first time in my life I have been so near as to see and feel the effects of an explosion, and I hope most sincerely that it may be the last, for never can I erase from my memory the awful shrieks and cries for help, among those poor souls who were scalded and struggling in the river for their lives, but sunk to rise no more.<sup>2</sup>

The *Knoxville* explosion was one of the many accidents aboard steam vessels that killed thousands of individuals and caused millions of dollars of damage in the course of over four

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<sup>1</sup> James T. Lloyd, *Lloyd's Steamboat Directory and Disasters on the Western Waters* (Nashville, TN: Land Yacht Press, 2000), 158-59.

<sup>2</sup> Clipping of a Dec. 23, 1850 letter by Thomas J. Haldeman sent to the *New Orleans Bulletin* and reprinted in the *Cincinnati Daily Commercial*; Committee on Commerce, Committee Papers, S. 223, folder 1 of 2 (Sen32A-E2), 32<sup>nd</sup> Congress, Records of the U.S. Senate, RG 46, NA. Haldeman was an experienced steamboat captain who endorsed federal intervention and wrote to Congress a number of times on the topic of steamboat accidents. See Thos. J. Haldeman to Sen. John Davis, May 1, 1852, *Ibid*.

decades before the Civil War. There were no similar events in mid-nineteenth century America, and disasters like this tarnished the “golden age of the steamboat,” which ran roughly from the 1810s through the 1850s. As the United States spread across the continent during the first half of the nineteenth century, steamboats aided geographic and economic growth and became one of the nation’s most important modes of transportation.<sup>3</sup> Innovators improved the design and efficiency of the vessels, and they increased in number, size, and power in the years after Robert Fulton drove his *North River* steamboat up the Hudson River in 1807.<sup>4</sup> The vessels spread to the West following the voyage of Nicholas Roosevelt who, with the backing of Fulton and other investors, captained a steamer from Pittsburgh to New Orleans in 1811.<sup>5</sup> By the 1820s, steam vessels were common sights on the nation’s waterways. From 1820 to 1860, the total tonnage of steam-powered vessels in the United States increased from 22,000 to 868,000.<sup>6</sup> By the 1850s, steamers with auxiliary sails were making regular trans-Atlantic passages. By 1851, nearly 1400 steam vessels were transporting more than 32 million passengers yearly on trips in U.S. waters.<sup>7</sup>

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<sup>3</sup> George Rogers Taylor, *The Transportation Revolution* (New York, NY: Rinehart & Company, 1951), 58.

<sup>4</sup> Despite popular belief, Fulton was not the inventor of the steamboat; he did, however, build and run the first commercially successful vessel. For an extended account of the early efforts by inventors John Fitch and James Rumsey, see James Thomas Flexner, *Steamboats Come True: American Inventors in Action* (Bronx, New York: Fordham University Press, 1992).

<sup>5</sup> Louis C. Hunter, “The Invention of the Western Steamboat,” *Journal of Economic History* 3/2 (Nov. 1943): 201-202.

<sup>6</sup> *Historical Statistics of the United States: Colonial Times to 1970, Part 2* (Washington, DC: Bureau of the Census, 1975), 750. The Secretary of the Treasury estimated that in 1838 there were 3,010 steam engines operating in the United States, with about 800 in steamboats, approximately 350 in railroad locomotives and about 1,860 engaged in manufacturing. *Letter from the Secretary of the Treasury Transmitting ... Information in Relation to Steam Engines*, 25<sup>th</sup> Cong., 3<sup>rd</sup> sess., 1838, H. Doc. 21, 3.

<sup>7</sup> *Report of the Secretary of the Treasury on the Statistics of the Steam Marine of the United States*, 32<sup>nd</sup> Cong., 1<sup>st</sup> sess., Jan. 21, 1852, S. Exec. Doc. 42, 55. The use of steam engines in manufacturing expanded even more rapidly than their use on the water. There was only one recorded steam engine used in industry in 1776 and only 43 as of 1820. However, this number increased to 25,557 in 1860. See Jeremy Atack, Fred Bateman, and Thomas Weiss, “The Regional Diffusion and Adoption of the Steam Engine in American Manufacturing,” *Journal of Economic History* 40/2 (June 1980): 285.

The growth of maritime commerce inside the U.S. paralleled the expansion of the nation's foreign trade, and affected aspects of the legal system, as the growing number of craft called attention to the need for prudent management on crowded waterways. Judges and lawyers rethought legal concepts of negligence, and began to impose new standards to determine liability in accidents.<sup>8</sup>

While steam vessels were introduced in the East, and were used extensively along the coasts and Great Lakes, they were essential to developing the navigation of the Western rivers, helping to drive the economic and population expansion of the Mississippi Valley. Steamers had their biggest impact by lowering the cost of carrying goods and people and cutting the time spent doing so. They improved trade downriver, but notably created an upriver trade where little had existed before.<sup>9</sup>

Much of the increasing commerce took place on the Mississippi and Ohio rivers and their tributaries between rapidly growing cities like Cincinnati, Pittsburgh, Louisville, St. Louis, and New Orleans, where steam navigation "telescoped a half-century's development into a single generation."<sup>10</sup> Cincinnati, the "Queen City of the West," more than doubled its population, from 46,338 inhabitants in 1840 to 115,436 people in 1850, and became a great center of meat packing, the iron industry, and steamboat construction.<sup>11</sup> Between 1848 and 1850, more than 3,600 steamboats per year stopped in the city.<sup>12</sup>

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<sup>8</sup> Nan Goodman, *Shifting the Blame: Literature, Law, and the Theory of Accidents in Nineteenth-Century America* (New York, NY: Routledge, 2000), 38; John G. Burke, "Bursting Boilers and the Federal Power," in Marcel C. Lafollette and Jeffrey K. Stine, eds., *Technology and Choice: Readings from Technology and Culture* (Chicago, IL: University of Chicago Press, 1991), 59-60.

<sup>9</sup> James Mak and Gary M. Walton, "Steamboats and the Great Productivity Surge in Water Transportation," *Journal of Economic History* 32/3 (Sept. 1972): 625.

<sup>10</sup> Richard C. Wade, *The Urban Frontier: Pioneer Life in Early Pittsburgh, Cincinnati, Lexington, Louisville and St. Louis* (Chicago, IL: University of Chicago Press, 1959), 70.

<sup>11</sup> Jon C. Teaford, *Cities of the Heartland: The Rise and Fall of the Industrial Midwest* (Bloomington, IN: Indiana University Press, 1993), 3, 6-7. See also Daniel Aaron, *Cincinnati, Queen City of the West: 1819-1838*

Steam vessels played an important role in extending the market economy for American agriculture in areas touched by water transport, as farmers shipped grains, produce, and other commodities on the network of rivers, lakes, and canals.<sup>13</sup> They were also a crucial part of the slave economy, as they transported both slaves and the products of slave labor. As Thomas Buchanan notes, “Fifty-five percent of the South’s cotton crop, 1,915,852 bales in all, came down the Mississippi in 1860.”<sup>14</sup> Most Americans embraced the new technology, and observers commented that, with improvements in transportation and communication, the nation was engaged in annihilating space. Some praised the machines in extravagant language, as when Representative Edward Rumsey of Kentucky, whose uncle’s efforts to create a working steamboat predated Robert Fulton’s, spoke to the House of Representatives in the late 1830s:

How vast and incalculable are the results of this triumph of genius! How beneficial its influence upon the social intercourse, the agricultural industry, the commercial prosperity, the general improvement, the safety and permanence of the Union! The whole nation, in its magnificent onward march, has received new energy and animation from it. The great valley of the West, more especially, through the agency of steam in transporting a mighty commerce on its numerous rivers, has, in a few years, been accelerated to a point in population, in power, in wealth, in comfort, and happiness, which it would not otherwise have attained in ages.<sup>15</sup>

Despite being a pioneering technological innovation, steam vessels were vulnerable to new dangers as well as the hazards that watercraft had experienced for centuries. In the years from 1807 to 1853, more than 7,000 people died from accidents on board steamers.<sup>16</sup> Vessels

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(Columbus, OH: Ohio State University Press, 1992), 14-15 and 24-25.

<sup>12</sup> Carroll Pursell, *The Machine in America: A Social History of Technology* (Baltimore, MD: The Johns Hopkins University Press, 1995), 77.

<sup>13</sup> Walter A. McDougall, *Throes of Democracy: The American Civil War Era, 1829-1877* (New York, NY: Harper Perennial, 2009), 127-28.

<sup>14</sup> Thomas C. Buchanan, *Black Life on the Mississippi: Slaves, Free Blacks, and the Western Steamboat World* (Chapel Hill, NC: The University of North Carolina Press, 2004), 6.

<sup>15</sup> ACG, 25<sup>th</sup> Cong., 3<sup>rd</sup> sess. Feb. 9, 1839, 291.

<sup>16</sup> John K. Brown, *Limbs on the Levee: Steamboat Explosions and the Origins of Federal Public Welfare*

founded in the wind and waves, and though boats that ran in sheltered rivers and harbors largely avoided this danger, those that navigated the coasts, the Great Lakes, and the wider seas could not. Steamboats ran aground, too, and the shallows, shifting channels, and sand bars that were endemic to the Western rivers made such events quite common. Other hazards came from colliding with obstructions and with other vessels. There was no general system of markers or universally accepted manner of safely passing other craft; nor were there standardized navigational signals to guide vessels at night and in other circumstances of poor visibility.<sup>17</sup> Collisions often caused property damage and moderate injuries, but some had disastrous results. The greatest loss of life from a single accident in all the years before the Civil War occurred in October 1837, when the steamboat *Monmouth* was struck by another steamer during a rainy night on the lower Mississippi. The boat was closely packed with hundreds of Creek Indians being removed from their ancestral lands to the trans-Mississippi West. Between 200 and 400 people, mostly Native Americans, were killed as a result of the collision.<sup>18</sup> Another peril came from running into obstructions, including wrecks that littered dangerous stretches of the rivers and, even more commonly, the uprooted trees and logs that floated downstream and sometimes lodged in the bottom or banks to become “snags” or “sawyers.” Crashing into obstructions sank almost 350 vessels during the 1850s, which composed more than half the total number of steamboats sunk from all types of accidents during that decade.<sup>19</sup> The national government

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*Regulation, 1817-1852* (Middlebourne, WV: International Steamboat Society, 1989), 13.

<sup>17</sup>Charles F. Lehman, “The Unruly History of the Rules of the Road,” *Proceedings of the U.S. Naval Institute* 107/12 (Dec. 1981): 41-42; Louis C. Hunter, *Steamboats on the Western Rivers: An Economic and Technological History* (1949; reprint, New York, NY: Dover Publications, Inc, 1993), 247-50, 275-77; Priscilla M. Thompson, *Delaware History*, “Navigation of the Delaware Bay, 1790-1830,” 19/2 (1980): 82. Thompson states that in the early nineteenth century, there were no uniform standards for buoys; often the local customs collector decided the size, color, and type.

<sup>18</sup> Hunter, *Steamboats*, 276-77.

<sup>19</sup> Paul F. Paskoff, *Troubled Waters: Steamboat Disasters, River Improvements, and American Public Policy, 1821-1860* (Baton Rouge, LA: Louisiana State University Press, 2007), 1.

attempted to mitigate or eliminate hazards by financing improvements in the rivers, lakes, and harbors.<sup>20</sup> To address the problem of snags, the government funded the development and operation of specialized steamers designed to pull tree trunks out of the rivers called machine boats and snag boats.<sup>21</sup> Though Congress did not commit resources in a consistent fashion, between 1789 and 1861 it devoted a substantial sum, \$18,544,222, to build harbors, dredge channels, remove snags and undertake related actions.<sup>22</sup>

However, some dangers were inherent in steam vessels, and could not be addressed by upgrading the physical environment in which they operated. With fires burning continuously to generate steam, steamers faced greater chances of conflagrations than sailing vessels, canal barges and unpowered flat boats. Wooden structures were exposed to hot metal, embers fell from the fireboxes into the engine rooms, and sparks from chimneys settled onto decks and cargoes.<sup>23</sup> The largest steamboat fire on a Western river took place at St. Louis in 1849, where one burning vessel set others ablaze. The fire spread, eventually destroying a large portion of the city's waterfront. Twenty-two steamboats were destroyed, along with over 400 buildings. The city was fortunate that a calamity on this scale cost only twenty lives.<sup>24</sup>

The disasters became regular fodder for the press.<sup>25</sup> Though people feared fires, collisions, groundings, and foundering, testimony from the time suggests that explosions, like

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<sup>20</sup> Hunter, *Steamboats*, Chapter 4; Paskoff, *Troubled Waters*, Chapter 4.

<sup>21</sup> Edith McCall, *Conquering the Rivers: Henry Miller Shreve and the Navigation of America's Inland Waterways* (Baton Rouge, LA: Louisiana State University Press, 1984), esp. chapters 11 and 12; Hunter, *Steamboats*, 192-200, 235-36; Tim Spell, "Uncle Sam's Toothpullers," *Nautical Research Journal* 26/1 (1980): 38-42; and Robert F. Cairo, "Snag Boats on the Western Rivers, Part I," *Nautical Research Journal* 26/2 (1980): 83-93.

<sup>22</sup> Paskoff, *Troubled Waters*, 115.

<sup>23</sup> Hunter, *Steamboats*, 278.

<sup>24</sup> Paskoff, *Troubled Waters*, 16.

<sup>25</sup> In *Niles' Weekly Register* in 1833, the editor noted that five steam vessels had recently met with disaster. One had been beached, and was then destroyed during a gale on Lake Erie. Another had sunk after hitting a snag on

the one that destroyed the *Knoxville*, generated the greatest anxiety among passengers, workers, and the general public. These sudden and violent events created, according to one informed witness who had traveled extensively on the Western river system, “an almost universal feeling of terror and apprehension.”<sup>26</sup> Of the many accidents that befell vessels on America’s rivers, lakes, and coasts, more than three hundred boiler explosions killed 3,187 people from 1816 to 1860, often in a gruesome manner, as they were scalded or had their bodies blown apart.<sup>27</sup>

The psychological impact was very substantial because these explosions were the most novel and stunning demonstrations of the destructive power of the steam age to affect the lives of a largely rural people. Boiler explosions attracted attention because they

killed indiscriminately, quickly, and in large numbers—at the time there weren’t any other cases of such large losses of life occurring as a result of human endeavors. Hurricanes and floods may have killed more, but, at this time in the early nineteenth century, nothing else created by humans could wreak such havoc outside of war.<sup>28</sup>

Louis C. Hunter, whose history of Western steamboats remains the most comprehensive examination of the development and operation of these machines, concluded that steamboat accidents, even at the peak of their destructiveness, were less common and less deadly than

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the Ohio River. A third had exploded a boiler on the way from St. Louis to New Orleans. Fragments of a fourth washed ashore on the coast of North Carolina, the cause of its demise unknown. And, finally, the steamer *New England’s* boilers had exploded on the Connecticut River. *NWR*, Oct. 19, 1833, 118-19.

<sup>26</sup> *Memorial of Alfred Guthrie, A Practical Engineer Submitting the results of an investigation made by him into the causes of the explosions of steam boilers*, 32<sup>nd</sup> Cong., 1<sup>st</sup> sess., Feb. 5, 1852, S. Misc. Doc. 32, 1.

<sup>27</sup> The casualty figures are taken from David John Denault, “An Economic Analysis of Steam Boiler Explosions in the Nineteenth-Century United States” (Ph.D. diss., University of Connecticut, 1993), 99. Among accidents, steamboat explosions had the highest rate of fatalities. In 1838, the Secretary of the Treasury reported that, of the 260 steam engine accidents that resulted in loss of life, injury or extensive property losses, approximately 230 were from steamboat explosions. *Letter from the Secretary of the Treasury Transmitting ... Information in Relation to Steam Engines*, 25<sup>th</sup> Cong., 3<sup>rd</sup> sess., 1838, H. Doc. 21, 4. The deadliest marine accident in all of U.S. history was caused by the boiler explosion, fire, and sinking of the steamer *Sultana* as the Civil War was ending in April 1865. More than 1,700 died on the overcrowded steamer. Gene Eric Salecker, *Disaster on the Mississippi: the Sultana Explosion, April 27, 1865* (Annapolis, MD: Naval Institute Press, 1996), xi.

<sup>28</sup> R. John Brockmann, *Exploding Steamboats, Senate Debates, and Technical Reports: The Convergence of Technology, Politics and Rhetoric in the Steamboat Bill of 1838* (Amityville, NY: Baywood Publishing Company, Inc., 2002), 55.



conventional shipwrecks that plagued water transport. However, Hunter also noted that an important reason that people were concerned about steam boiler explosions was that they repeatedly took place close to the growing population centers of the West, so that the disasters were “frequently at one’s very doorstep.”<sup>29</sup>

The *Washington*, which blew up on the Ohio River in 1816, was the first steamer to explode.<sup>30</sup> The popular press often recounted the catastrophes in dramatic language and these articles brought the danger home to Americans, even when there were no explosions in the vicinity.<sup>31</sup> Compared to newspaper accounts that included explicit descriptions of the gore and human suffering, Captain Haldeman’s account of the *Knoxville* disaster was on the milder end of the spectrum. A report of the destruction of the steamer *Moselle* serves as a graphic example of a typical story, replete with grisly images and pathos. Crowded with almost 300 passengers during a voyage in April 1838, the *Moselle* was a new boat and her young captain sought to build up her reputation as a fast vessel. After a brief stop, she started down the Ohio River from Cincinnati bound for Louisville. The captain kept the steam pressure up while passengers boarded, intending to use a full head of steam to show off his craft as she passed along the Cincinnati waterfront.<sup>32</sup> However, a local newspaper reported that, as the *Moselle* left the shore, instead of making a triumphant display of speed,

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<sup>29</sup> Hunter, *Steamboats*, 522.

<sup>30</sup> Lloyd, *Lloyd’s Steamboat Directory*, 55-57.

<sup>31</sup> Hunter, *Steamboats*, 284, 286, 288; William E. Lass, “The Fate of Steamboats: A Case Study of the 1848 St. Louis Fleet,” *Missouri Historical Review* 96 (Oct. 2001): 9-10; Stephen P. Rice, *Minding the Machine: Languages of Class in Early Industrial America* (Berkeley, CA: University of California Press, 2004), 119.

<sup>32</sup> Lloyd, *Lloyd’s Steamboat Directory*, 90. River captains liked to show that their craft were “crack” (fast) vessels. During an earlier passage from St. Louis to Pittsburgh, the *Moselle* had been overtaken by another boat. The other vessel outpaced the *Moselle* even though the *Moselle*’s captain took the dangerous step of having rosin thrown into the fires, so they would burn hotter and generate more steam. Passed by, the captain reportedly swore an oath “that the next time he encountered this rival, he would pass her, or blow his own boat out of the water.” “Steamboat Disasters.” *North American Review* 50/106 (January 1840): 30. Passing by the wreckage of the *Moselle*, a traveler reflected that he would have “execrated the memory” of the captain whose recklessness had

her boilers burst with a most awful and astounding noise ... heads, limbs, bodies and blood were seen flying through the air in every direction, attended by the most horrible shrieks and groans from the wounded and the dying. —The boat ... was rendered a perfect wreck. She seemed to be torn all to flinders [and] began to sink rapidly....

The Captain was thrown by the explosion entirely into the street, and was picked up dead and dreadfully mangled ... and limbs and fragments of bodies [were] scattered about the river and shore in heart-rending profusion. ...

We are told that one little boy on shore was seen wringing his hands in agony, imploring those present to save his father, mother and three sisters, all of whom were struggling in the water to gain the shore, but whom the poor little fellow had the awful misfortune to see perish, one by one almost within his reach.<sup>33</sup>

As many as 150 people were killed when the *Moselle* exploded and sank.<sup>34</sup>

Some critics believed that the explosions were a symptom of larger failings in U.S. society, including an inordinate love of speed. People wanted to “fly” down the rivers rather than merely move along them, and a vessel with a reputation as a fast boat was said to attract the most passengers and to be more profitable.<sup>35</sup> Crews engaged in dangerous practices to move more swiftly. Engineers, for instance, would tie down safety valves, which were designed to open and let off steam when pressure built up inside the boilers. Kept closed, the pressure rose quickly, producing more power and speed, but at greater risk of an explosion.<sup>36</sup>

Angry observers commented on the lack of regard for human life. After the steamboat *New England* blew up in 1833, Hezekiah Niles, editor of the widely read periodical, *Niles’*

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resulted in so many deaths if he “had not heard that his head was blown off his shoulders by the first columns of steam that shot from the exploding boiler.” H. D. D. Ruffner, “Notes of a Tour from Virginia to Tennessee, Ch. 2,” *Southern Literary Messenger*, 5/2 (Feb. 1839): 138.

<sup>33</sup> *Cincinnati Whig*, extra edition, Apr. 25, 1838. See also Hunter, *Steamboats*, 285-86.

<sup>34</sup> Hunter, *Steamboats*, 286.

<sup>35</sup> *Report of the Committee Appointed by the Citizens of Cincinnati, April 26, 1838, to Enquire into the Causes of the Explosion of the “Moselle”* (Cincinnati, OH: Alexander Flash, 1838), 28, 52. Hunter, *Steamboats*, 301.

<sup>36</sup> The earliest federal investigation into steamboat explosions noted that engineers would often increase the steam pressure to dangerous levels rather than allow other boats to beat them in a race, and would engage in other practices that put the vessels and passengers at risk by their “carelessness, inattention, or drunkenness.” *Report of the Committee on Commerce, accompanied by a bill for regulating of Steam Boats, and for the security of passengers therein*, 18<sup>th</sup> Cong., 1<sup>st</sup> sess., May 22, 1824, H. Rept. 125, 2.

*Weekly Register*, condemned the perpetrators of the disaster. Niles was especially exercised about reports that the *New England* had been racing another boat and the engineer raised the pressure beyond safe limits. He charged that the vessel master's reckless actions had "murdered" seventeen people and "crippled and tortured" many others. Niles argued that laws ought to make the malefactors think twice about their actions and, if necessary, punish them with penalties as severe as death or life-imprisonment. If the government declined to act, Niles wrote, the survivors would be justified in resorting to the "law of nature" by seizing and executing any reckless master who survived an explosion.<sup>37</sup>

Editorialists like Niles, other commentators, as well as members of the national government and the public, accused the steamboat operators of being reckless. Historian Arthur McEvoy has argued that in "technologically advanced societ[ies]" viewers tend to indemnify the technologies themselves from blame, while often attributing catastrophic failures to "poor equipment or, more typically, the carelessness of the injured worker."<sup>38</sup>

Beginning in 1826, some states passed laws to address the problem. These statutes prescribed "rules for passing, carrying gunpowder, keeping the vessel in safe trim, and making landings. They also forbade racing and required that the boat be kept in seaworthy condition and

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<sup>37</sup> *NWR*, Oct. 26, 1833, 130; Nov. 2, 1833, 145; Nov. 16, 1833, 180; and Dec. 21, 1833, 256. Emphasis in the original. This was not the only time that Niles resorted to such energetic language. He suggested inflicting "Lynch law" on the captain of the steamer *Ben Sherrod*, which was destroyed by fire on the Mississippi in 1837. Quoted in Brockmann, *Exploding Steamboats*, 95. The editor of the *New York Tribune* also wanted to charge owners with manslaughter when people were killed by recklessness. He argued that owners should know better than to overload the boat with flammable cargo or use paints that were liable to ignite. Undated excerpt from the *New York Tribune*, 28<sup>th</sup> Cong., 2<sup>nd</sup> sess., Feb. 7, 1845, H. Rept. 115, 5.

<sup>38</sup> Arthur F. McEvoy, "Working Environments: An Ecological Approach to Industrial Health and Safety," in Carroll Pursell, ed., *American Technology* (Malden, MA: Blackwell Publishers, Inc., 2001), 82. Rice, *Minding the Machine*, similarly contends that the people who contributed to the discourse regarding steam explosions blamed the operators of the machines, who supposedly "lacked either the knowledge or the care necessary to control such powerful agents" (117). Observers like Mark Twain, who had served as a pilot on Mississippi river steamers and whose brother was killed in a steamboat explosion, were concerned that the new technological systems tended to shift responsibility from individuals to machines. Goodman, *Shifting the Blame*, also notes that Karl Marx shared some of Twain's concerns and, in Goodman's words, thought that "machines not only diminished the quality of human labor, but seemingly replaced the element of human agency as a whole" (67; see also 86).

that the machinery be ‘substantial and sufficient.’” However, these laws proved ineffective because of defects in their design, inadequate modes of enforcement, and especially because state jurisdiction was limited to intrastate commerce while most of the well-trafficked rivers and lakes touched on multiple states or served as state boundaries.<sup>39</sup>

Congress considered responding to the dangers in 1824, even before the states had begun to pass their own measures. The first bill introduced into the House did not pass, but it inaugurated decades of federal attention to the problem. The bill’s sponsors wrote that they had a duty to protect individuals who did not have “the power to protect themselves” but “whose safety may be endangered by ignorance, avarice, or inattention.”<sup>40</sup> When it became clear that individuals could not assure their own safety, and that local and state governments could not effectively oversee interstate commerce, the U.S. government deemed “*federal control*” the only viable remedy.<sup>41</sup>

The national government’s policies to prevent accidents reached a plateau of regulatory sophistication with the Steamboat Act of 1852. During an era where federal interventions in the economy and oversight of business interests were more circumscribed than they are today, this law required the U.S. government to supervise private enterprise to a degree that would not be matched in peacetime until the Interstate Commerce Act of 1887.

Legislators tended to see activity on this subject as a broad spectrum of potential actions rather than as a stark choice between *laissez faire* and comprehensive government oversight. As

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<sup>39</sup> Hunter, *Steamboats*, 523-24; the quotation is from 523. When the Mississippi legislature in 1838 asked Congress to pass a law to regulate steamers, it noted that it was beyond the power of the states to address the problem, but within the authority of Congress. *Memorial of the Legislature of Mississippi praying the Passage of a Law to Regulate and Improve the Steamboat Navigation of the Rivers*, 25<sup>th</sup> Cong., 2<sup>nd</sup> sess., 1838, S. Doc. 199, 2.

<sup>40</sup> 18<sup>th</sup> Cong., 1<sup>st</sup> sess., May 22, 1824, H. Rept. 125, 1.

<sup>41</sup> Lawrence M. Friedman, *A History of American Law*, 3<sup>rd</sup> ed. (New York, NY: Simon & Schuster, 2005), 331. Emphasis in the original.

noted in the Preface, the Steamboat Act of 1852 integrated elements from four types of policies that Congress had experimented with since the 1820s.<sup>42</sup> Of the four, the Information Option was the most characteristic and pervasive, because it was already a common form of government activity. This policy of facilitating and providing information to the public had deep roots. A high proportion of the English colonists were literate, and during the Revolutionary era, they developed an additional interest in reading about, discussing, and attempting to address prominent areas of public concern.<sup>43</sup> Leaders advocated keeping the people informed of the government's actions. Many Americans came to value the free exchange of information, and encouraged discussion of public affairs, while legislators and administrators believed the government had a duty to facilitate this process. Newspapers and other periodicals supplied ever-increasing amounts of information. The U.S. postal system made it relatively easy to convey information throughout the country. This, along with improvements in transportation and printing technology, as well as the growing use of the telegraph as a new method to transmit information, wrought a communications revolution. Demand for information increased during the same period, as some intellectuals were seeking to foster a science of society to measure and assess social and economic facts and they pressed to have the government gather and publish more data. The market economy was expanding and businesspeople wanted greater access to economic facts and figures. On the social and cultural front, as an outgrowth of the Second Great Awakening, religious reform movements sought to use printed matter to advance their

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<sup>42</sup> My categories here differ from Theodore Lowi's. Lowi divides government intervention into three types: *promotional*, by which he means policies such as subsidies and tariffs to aid particular enterprises and enhance growth and development; *regulatory*, which allow the government substantial say over the use of private property; and *redistributive*, which means drawing from one economic class to give to another. It could be said, however, that my Information and Mechanical Options fit into Lowi's group of promotional policies, while my Penalty and Regulatory Options come under his definition of regulatory policies. See Theodore J. Lowi, "American Business, Public Policy, Case-Studies, and Political Theory," *World Politics* 16/4 (Jul. 1964): 689-91.

<sup>43</sup> Richard L. McCormick, *The Party Period and Public Policy: American Politics from the Age of Jackson to the Progressive Era* (New York, NY: Oxford University Press, 1986), 151.

causes.<sup>44</sup> Government printing of all sorts, including presidential messages and congressional reports, increased significantly after the War of 1812. One of the most important reasons for this increase, especially from the 1820s onward, was that politicians used government documents to communicate with their constituents and to support their campaigns. Some administrative units of the national government also sought to publicize their accomplishments via government printing. Thus, political elites had the incentive to publish large numbers of documents and to pay for them out of the public treasury.<sup>45</sup>

As part of this process, Congress published a great deal of information on the subject of technology. Constituents were interested in receiving data on agricultural advances and the development of new machines for industry and transportation. This grew out of the practice of “print statism,” which Oz Frankel describes as the federal policy of printing and disseminating documents on a wide variety of subjects, and this included the design of mechanical devices and use of technological systems. Frankel argues that printing was an important form of nineteenth-century state activism supporting territorial expansion and economic growth.<sup>46</sup> The government used this information to formulate policy and also distributed documents in order to encourage people to adopt and employ advances in technology. The best material in these publications added to the overall understanding of steam power, while reports of accidents stimulated public discussion about corrective measures, advanced the quality of technical inquiry, informed congressmen about potential responses, and helped them devise remedial proposals.<sup>47</sup>

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<sup>44</sup> Daniel Walker Howe, *What Hath God Wrought: The Transformation of America, 1815-1848* (New York, NY: Oxford University Press, 2007), 5, 222-31, 255, 626-27, 695-97.

<sup>45</sup> See Chapter 2.

<sup>46</sup> Oz Frankel, *States of Inquiry: Social Investigations and Print Culture in Nineteenth-Century Britain and the United States* (Baltimore, MD: The Johns Hopkins University Press, 2006), 1-2.

<sup>47</sup> State governments also tried to educate the public about the dangers of transportation. In Massachusetts, for example, Charles Francis Adams, Jr. published reports on railroad accidents in the 1870s encouraging railroad

After 1852, though Congress still conducted investigations and published reports, the Steamboat Act bureaucratized and regularized this process, creating a board of supervising inspectors to gather information on technical improvements and safe practices, transmit this information to the Secretary of the Treasury, and thence to Congress and the American public.<sup>48</sup>

Scholars have not systematically examined the government's repeated efforts to improve the safety of steam technology, but the way that the government pursued this approach is consistent with the "associative state" framework of nineteenth-century government intervention.<sup>49</sup> Brian Balogh argues that, rather than working through a large bureaucracy, people in the U.S. preferred a kind of state activism where the government aided individuals and private organizations to perform tasks that would benefit society.<sup>50</sup> Attempts to upgrade steam machinery and encourage safety measures were also consistent with the government's "strong interest in the improvement not only of steamboats, but also of the telegraph, railroads, agricultural science, and other technological advances of similar economic significance."<sup>51</sup> In the case of steamboat improvements, most legislators wanted the government to subsidize promising inventions when private investment was not available, and some of them wanted to endorse, purchase, or mandate the use of particular devices.

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operators to plan more carefully so that they could anticipate and prevent future dangers. See Steven W. Usselman, "The Lure of Technology and the Appeal of Order: Railroad Safety Regulation in Nineteenth-Century America," *Business and Economic History*, 2<sup>nd</sup> Series, 21 (1992): 292. For a broader discussion of state-level actions, see William R. Brock, *Investigation and Responsibility: Public Responsibility in the United States, 1865-1900* (New York, NY: Cambridge University Press, 1984).

<sup>48</sup> The supervising inspectors circulated intelligence about subjects such as boiler safety devices, flotation tanks (designed to keep boats afloat, even when the hulls filled with water), and fire extinguishers. See, for example, the Annual Report of the Supervising Inspectors contained in the *Report of the Secretary of the Treasury on the State of the Finances for the Year Ending June 30, 1855*, 34<sup>th</sup> Cong., 1<sup>st</sup> sess., 1855, S. Exec. Doc. 2, 456-58.

<sup>49</sup> The issue of government support for technological improvements is addressed briefly by Hunter, *Steamboats*, 584.

<sup>50</sup> Brian Balogh, *A Government Out of Sight: The Mystery of National Authority in Nineteenth-Century America* (New York, NY: Cambridge University Press, 2009).

<sup>51</sup> Forest G. Hill, "Formative Relations of American Enterprise, Government, and Science," *Political Science Quarterly* 75/3 (Sept. 1960): 416.

Congressmen and other officials believed that the Mechanical Option could be effective because they had everyday experience of the technological advances that were transforming the country. Most of them traveled on steamboats and, beginning in the 1820s, saw that their countrymen were receiving ever-greater numbers of patents.<sup>52</sup> They thought that mechanical advances were bringing deep social changes and moving the country toward “democratic objectives of political, social, and economic equality.”<sup>53</sup> With such positive views of the material and social benefits of technology, they were optimistic that technological improvements could ameliorate many evils. Historian Steven Usselman has described this as “the lure of technology—the faith that mechanical devices would solve problems of extraordinary complexity.”<sup>54</sup> Hoping that innovative devices could prevent accidents gave members of Congress an incentive to purchase inventions and encourage technological advances. Beginning in the early 1830s, the government investigated engine designs, safety valves, lifeboats, and other apparatus, and made recommendations about adopting equipment. Though they resisted mandating patented devices, eventually Congress passed laws requiring vessels to carry equipment like safety valves, lifejackets and water pumps.

In the 1830s and 1840s, the government employed experts to report on the virtues and shortcomings of steamboat mechanisms.<sup>55</sup> While not all of the tests met high standards for rigor and fairness, many of the investigations were innovative and thorough.<sup>56</sup> The government

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<sup>52</sup> B. Zorina Khan and Kenneth L. Sokoloff, “‘Schemes of Practical Utility’: Entrepreneurship and Innovation among ‘Great Inventors’ in the United States, 1790-1865,” *Journal of Economic History* 53/2 (Jun. 1993): 289-307.

<sup>53</sup> Hugo A. Meier, “Technology and Democracy, 1800-1860,” *Mississippi Valley Historical Review* 43/4 (Mar. 1957): 618.

<sup>54</sup> Usselman, “Lure of Technology:” 291.

<sup>55</sup> See Appendix A: 23<sup>rd</sup> Cong., 1<sup>st</sup> sess., Apr. 26, 1834, H.R. 452; 25<sup>th</sup> Cong., 2<sup>nd</sup> sess., Dec. 20, 1837, S. 73; 25<sup>th</sup> Cong., 2<sup>nd</sup> sess., July 4, 1838, S. 389; 27<sup>th</sup> Cong., 2<sup>nd</sup> sess., Sep. 11, 1841, H.J.R. 19; and 27<sup>th</sup> Cong., 3<sup>rd</sup> sess., H.R. 602.

<sup>56</sup> See Appendix B: 24<sup>th</sup> Cong., 1<sup>st</sup> sess. 1, March 1, 1836, H. Doc. 162; 25<sup>th</sup> Cong., 3<sup>rd</sup> sess., Feb. 7, 1839, H.



already had some experience in purchasing inventions and evaluating technologies to acquire armaments and other machines. Congress solicited advice from technical experts, and came to rely on a number of people for guidance. Some of these experts worked for the Navy Department, Patent Office, and Coast Survey, but the government also solicited advice from experts who held academic positions and/or were members of technologically savvy organizations like the Franklin Institute of Philadelphia.

Inventors naturally hoped to benefit from government evaluations, publicity, and endorsements, but they attested that their primary goals were to serve their country and the cause of humanity. Some of them devised valuable safety features, though they created many inventions that were mechanically flawed or commercially unsuccessful. However, even their failures could be useful, by reminding congressmen that they needed to be cautious in selecting which devices were worthy of government support.

By requiring devices such as boiler safety valves in 1838 and metallic lifeboats in 1852, Congress contributed to the standardization of a number of safety measures and helped to direct inventive activity along certain paths. It also unintentionally offered competitive advantages to inventors who sold versions of products mandated by legislation. Government investigations also showed that even the best mechanisms could not provide perfect security. Officials came to realize that statutory remedies could only be successful if they included a range of interventions.

Congress eventually designed a system of penalties and regulatory control over steam vessel construction and operation. Before 1838, steamboat owners had been subject to lawsuits under the common law, as well as state laws. Beginning with a steamboat law in 1838, Congress specified a Penalty Option that sought to discourage recklessness and negligence by threatening

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Doc. 170; 28<sup>th</sup> Cong., 1<sup>st</sup> sess., June 17, 1844, S. Doc. 405; and 30<sup>th</sup> Cong., 2<sup>nd</sup> sess., Jan. 8, 1849, S. Exec. Doc. 18.

steam vessel operators with punishment in the event of misbehavior. These legislative tactics, alluded to by Hezekiah Niles in the passage quoted earlier, “relied on enhanced civil and criminal liability to promote steamboat safety.”<sup>57</sup> The idea was to give steamboat owners as much freedom as possible to run their vessels, but also to discourage recklessness by threatening to punish them for any transgressions.<sup>58</sup>

The 1838 steamboat law made vessel owners and masters who failed to obey safety standards liable for damages; anyone operating a steamboat when life was lost in an explosion was liable to be charged with manslaughter, punishable by up to ten years of hard labor. It also placed the burden of proof on the defendants in civil liability suits by stating that any injuries or deaths caused by the uncontrolled release of steam would count as *prima facie* evidence of negligence.<sup>59</sup> Steamboat operators objected to the provision that they would have to prove their innocence to avoid liability for negligence, and Congress did away with this presumption of liability in the 1852 Steamboat Act. However, the 1852 law also increased the number of infractions with which steamboat operators could be charged, and imposed additional penalties if they were convicted.

Though members of both major political parties proposed legislation that included penalties for misbehavior, Jacksonian Democrats were more inclined than Whigs to believe that a Penalty Option would curtail accidents even without additional administrative oversight.

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<sup>57</sup> Jerry L. Mashaw, “Administration and ‘The Democracy’: Administrative Law from Jackson to Lincoln, 1829-1861,” *The Yale Law Journal* 117/18 (Jun. 2008): 1568.

<sup>58</sup> Hunter, *Steamboats*, 527.

<sup>59</sup> 5 *Stat. L.*, 304. This provision seems to run counter to a trend in American tort law to lessen the exposure of railroad operators to civil liability through legal theories like the “fellow servant rule, which held that an employer was not responsible for injuries to an employee engaged in common employment.” James W. Ely, Jr., *Railroads and American Law* (Lawrence, KS: University Press of Kansas, 2001), 214. Another doctrine that developed in the first part of the nineteenth century was that of contributory negligence, where an injured party could not sue for negligence if they were in some way negligent themselves, even if they were only slightly responsible. See Friedman, *History of American Law*, 225.

Proponents of the Penalty Option tended to attribute steamboat disasters to the flawed and reckless behavior of the human operators. Thus President Andrew Jackson, in his 1833 Annual Message to Congress, placed the blame for boiler explosions on the “criminal negligence” of the masters and crews of the vessels.<sup>60</sup> They thought that the threat of punishment would be sufficient to discourage steamboat operators from running their vessels in a hazardous fashion and preferred legislation that relied on the courts for enforcement rather than government administrators.

Beyond the Information, Mechanical and Penalty Options, the fourth and final element of federal intervention was a Regulatory Option, which was introduced in a limited fashion in 1838, but was embodied in a more comprehensive and sophisticated manner in the 1852 Steamboat Act. While individuals and interest groups proposed and pushed for legislation, a small number of legislators, most of whom have not received a great deal of historical attention, played indispensable roles gathering information, reviewing plans, and synthesizing data into coherent proposals. Congressmen who specialized in constructing complex legislation, such as Senator John Davis of Massachusetts, play a larger role in this story than some of their more famous colleagues.

The 1852 Steamboat Act established a regulatory body of sixty inspectors, who would be stationed at ports throughout the country under the direction of nine supervising inspectors appointed by the president and confirmed by the Senate.<sup>61</sup> This organization had all the characteristics of a twentieth-century regulatory body. As Bernard Schwartz writes:

The distinguishing feature of the modern regulatory agency is the possession by it of the power to determine, either by rule or decision, private rights and obligations. The typical regulatory agency has vested in it both legislative and

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<sup>60</sup> Quoted in Brockmann, *Exploding Steamboats*, 44.

<sup>61</sup> 10 *Stat. L.*, 61.

adjudicatory authority: the legislative power to promulgate rules and regulations having the force of law and the judicial power to decide individual cases.<sup>62</sup>

The Steamboat Act “pioneered ... scientific regulation,” which was to be based on the best available understanding of physical principles and mechanical operations. It also initiated “the ‘board’ or ‘commission’ form of administrative organization that would loom so large in Progressive and New Deal regulatory legislation; and ... the use of administrative rulemaking as a principal technique for articulating regulatory standards.”<sup>63</sup>

The law went into effect in 1853 and compelled owners to meet standards for vessel design and construction, to have boiler metal examined and approved before it was used, and to allow salaried government inspectors to scrutinize their boats, test the strength of their boilers, and issue licenses giving vessels the legal right to operate in U.S. waters. The inspectors would check to make sure the boats were equipped with required safety equipment, and could conduct inspections without prior notice. In addition, these inspectors would help to assess engineers and pilots for competence and, if applicants demonstrated acceptable qualifications and character, grant them licenses permitting them to ply their trades. The inspectors could suspend or revoke these licenses when the recipients did not follow the rules. The Steamboat Act provided that the Board of Supervising Inspectors would meet to oversee the law and to draw up regulations on operating steamboats, such as issuing “rules of the road” directing how they were to pass each other safely. The Board would forward reports on the efficacy of the law to Congress to help them formulate any future legislation.<sup>64</sup>

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<sup>62</sup> Bernard Schwartz, ed., *The Economic Regulation of Business and Industry: A Legislative History of U.S. Regulatory Agencies, Volume 1* (New York, NY: Chelsea House Publishers, 1973), 12.

<sup>63</sup> Mashaw, “Administration and ‘The Democracy:’” 1581.

<sup>64</sup> 10 *Stat. L.*, 61.

As they gained experience with the issues associated with steamboats, congressmen proposed, tried, and modified a variety of tactics in the effort to achieve their goal, and succeeded in building an increasingly complex framework intended to achieve greater safety for passengers. It was an important step in American development and a step in the evolution of a very different kind of national government.

## CHAPTER 1

### STEAMBOATS AND THE NATIONAL STATE

#### *1. Strong Action in a “Weak” National State*

It is a case of selective memory that scholars usually cite the Interstate Commerce Act of 1887 as the first independent national regulatory effort.<sup>1</sup> Drawn to the development and growth of massive industrial enterprises and their abuses, scholars of nineteenth-century government regulation have portrayed it as a response to the growth of large corporate enterprises after the Civil War. These have had “a well-established place in the American imagination as a sinister repository of private power.”<sup>2</sup> However, regulatory ideas and policies were neither new to the Gilded Age nor unique to railroads. By 1887, steamboats had been operating under national guidance for thirty-five years. Steamboat intervention suggests that the degree of concern an industry generated was not just a function of its size, but also that its failures had deleterious effects on the public.

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<sup>1</sup> See, for example, Charles A. Reich, “The Law of the Planned Society,” *The Yale Law Journal* 75/8 (Jul. 1966): 1233; Ari and Olive Hoogenboom, *A History of the ICC: From Panacea to Palliative* (New York, NY: W. W. Norton & Company, Inc., 1976), ix; Stephen Skowronek, “National Railroad Regulation and the Problem of State-Building: Interests and Institutions in Late Nineteenth-Century America,” *Politics and Society* 10/3 (1981): 225; James O. Freedman, “Legislative Delegation to Regulatory Agencies,” *Proceedings of the Academy of Political Science* 32/2 (1981): 81; Michael Nelson, “A Short, Ironic History of American National Bureaucracy,” *The Journal of Politics* 44/3 (Aug. 1982): 770-71; Thomas W. Gilligan, William J. Marshall, and Barry R. Weingast, “Regulation and the Theory of Legislative Choice: The Interstate Commerce Act of 1887,” *Journal of Law and Economics* 32 (Apr. 1989): 35; Morris P. Fiorina, “Legislator Uncertainty, Legislative Control, and the Delegation of Legislative Power,” *Journal of Law, Economics, and Organization* 2/1 (Spring 1986): 36; Edward L. Glaeser and Andrei Shleifer, “The Rise of the Regulatory State,” *Journal of Economic Literature* 41/2 (Jun. 2003): 401-25; Jerry L. Mashaw, “Recovering American Administrative Law: Federalist Foundations, 1787-1801,” *Yale Law Journal* 115/16 (Apr. 2006): 1258-59. Ballard Campbell also argues that the Agricultural Experiment Station Act (or “Hatch Act”) adopted in 1887 combined with the 1887 Interstate Commerce Act, to signal a turning point in the transition to greater national government intervention. See Ballard C. Campbell, *The Growth of American Government: Governance from the Cleveland Era to the Present*, (Bloomington & Indianapolis, IN: Indiana University Press, 1995), 4.

<sup>2</sup> Morton Keller, “Law and the Corporation” in Austin Sarat, Bryant Garth, and Robert A. Kagan, eds., *Looking Back at Law’s Century* (Ithaca, NY: Cornell University Press, 2002), 232.

In the case of sailing vessels, the government began to intervene in the activities of individuals and businesses shortly after the Constitution was ratified. This set important precedents as officials and the public came to believe that the U.S. bore the responsibility to ensure public safety in interstate and international commerce, and protect lives on waterways. This was based on a “social vision” that emphasized the public good and “public happiness” “rather than private goods and interests.”<sup>3</sup>

Even with these early regulatory forays, scholarly portraits of the antebellum United States government often depict it as small and feeble—a polity which did not intervene in most people’s lives in a meaningful way.<sup>4</sup> As one historian has written, in “practice governance in Washington barely mattered in the lives of ordinary Americans,” and while there were “latent” powers in the Constitution, they lay largely unexploited. The election of 1800 brought Thomas Jefferson, with and his supporters, with their hostility to “consolidated national authority,” into power, and signaled the triumph of the “country” party, which in its Jeffersonian, Jacksonian, or Democratic versions, controlled the government more often than not from 1800 to 1861. The United States undertook energetic foreign policies, such as encouraging expansion, waging wars, and removing Indians, but these sought to enlarge the decentralized republic rather than to change its character.<sup>5</sup> By these accounts, the central government “in the antebellum years was a cipher, a mirage,” and power was concentrated in the individual states.<sup>6</sup>

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<sup>3</sup> William J. Novak, “Common Regulation: Legal Origins of State Power in America,” *Hastings Law Journal* 45 (Apr. 1994): 1082-83. See also Novak, *The People’s Welfare*, particularly Chapter 1.

<sup>4</sup> White, *The Jacksonians*, 437; Richard Franklin Bense, *Yankee Leviathan: The Origins of Central State Authority in America, 1859-1877* (New York, NY: Cambridge University Press), ix; John Lauritz Larson, *Internal Improvement: National Public Works and the Promise of Popular Government in the Early United States* (Chapel Hill, NC: University of North Carolina Press, 2001), 6; Balogh, *Government Out of Sight*, 1-2.

<sup>5</sup> Ira Katznelson, “Flexible Capacity: The Military and Early American Statebuilding” in Ira Katznelson and Martin Shefter, editors, *Shaped by War and Trade: International Influences on American Political Development* (Princeton, NJ: Princeton University Press, 2002), 82-110.

<sup>6</sup> John L. Brooke, “Cultures of Nationalism, Movements of Reform, and the Composite-Federal Polity: From

A number of scholars have contested this framework. They argue that, rather than being palsied by the will of their constituents, governments in the U.S. attempted to influence the economy through a wide variety of activities. States and localities promoted commerce and economic development.<sup>7</sup> Historians of American law argue that judges and the legal system encouraged the release of entrepreneurial energy to facilitate economic growth.<sup>8</sup> The courts helped to set priorities, and “even to effect significant redistributions of wealth and power in the economy,” while economic historians have shown how policy decisions had a substantive impact on “the rules and institutions that have shaped and constrained market processes.”<sup>9</sup>

The United States instituted protective tariffs to promote manufacturing, sold vast tracts of public land at low prices to encourage settlement, and subsidized internal improvements, such as railroad lines and river and harbor works.<sup>10</sup> While Henry Clay’s American System was never comprehensively enacted, the central government appropriated funds to assist commerce and improve public safety.<sup>11</sup> The programs for federal river improvements expanded after the 1820s,

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Revolutionary Settlement to Antebellum Crisis,” *Journal of the Early Republic* 29 (Spring 2009): 6-7; see also Richard R. John, *Spreading the News: The American Postal System from Franklin to Morse* (Cambridge, MA: Harvard University Press, 1995), 18-19.

<sup>7</sup> William J. Novak, “The Myth of the ‘Weak’ American State,” *American Historical Review* 113/3 (Jun. 2008): 766. Robert Lively, “The American System: A Review Article,” *Business History Review* 29/1 (Mar. 1955): 81-96. The description of an active government that promoted growth and practiced some forms of oversight is often known as the “commonwealth” theory of government. See Oscar and Mary Flug Handlin’s influential study of Massachusetts, *Commonwealth: A Study of the Role of Government in the American Economy: Massachusetts, 1774-1861* (Cambridge, MA: Harvard University Press, rev. ed., 1969).

<sup>8</sup> Novak, “Common Regulation,” 1073-74; Harry N. Scheiber, “Public Economic Policy and the American Legal System: Historical Perspectives,” *Wisconsin Law Review* (1980): 1159-89; James Willard Hurst, *Law and the Conditions of Freedom in the Nineteenth-Century United States* (Madison, WI: University of Wisconsin Press, 1956), 6.

<sup>9</sup> Harry N. Scheiber, “Regulation, Property Rights, and Definition of ‘The Market’: Law and the American Economy,” *Journal of Economic History* 41/1 (Mar. 1981): 104.

<sup>10</sup> Bernard Wishy, *Good-bye Machiavelli: Government and American Life* (Baton Rouge, LA: Louisiana State University Press, 1995), 103. States and localities also encouraged economic growth by issuing corporate charters, awarding subsidies, and funding infrastructure projects.

<sup>11</sup> Paul F. Paskoff, *Troubled Waters: Steamboat Disasters, River Improvements, and American Public Policy, 1821-1860* (Baton Rouge, LA: Louisiana State University Press, 2007). Others are more skeptical of the positive impact of national support for internal improvements and argue that the money the federal government appropriated



though not the result of a “grand design,” but pursuing the “prosaic and pragmatic goal of reducing the risk of movement on the Great Lakes and especially the western rivers.”<sup>12</sup>

In an influential framework to characterize types of activity, Theodore Lowi divides government intervention in the economy into three major categories: “distribution, regulation, and redistribution.”<sup>13</sup> Distributive policies involved the government giving away resources and privileges.<sup>14</sup> Lowi contends that these distributional or “promotional” policies were among the most frequently practiced forms of government activism during the nineteenth century.<sup>15</sup>

Richard L. McCormick agrees and enshrined the understanding of a nineteenth-century American government whose most “characteristic achievement” was “the distribution of economic benefits.”<sup>16</sup>

Lowi’s and McCormick’s concepts may be used to frame one of the basic questions of this investigation: *How and why did the national government undertake regulatory policies in a distributive era?* My answer has several parts. First, the characterization of nineteenth-century politics as “distributive” ignores significant exceptions—cases in which the antebellum state undertook regulatory interventions, which were not as alien to the period as many have argued. Legislators and other officials were not rigidly committed to a philosophy of laissez-faire and the

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was far less than the amount states and local governments spent and “likely had little impact on the ongoing process of economic integration.” Stephen Minicucci, “The ‘Cement of Interest’: Interest-Based Models of Nation-Building in the Early Republic,” *Social Science History* 25/2 (Summer 2001): 267.

<sup>12</sup> Paskoff, *Troubled Waters*, 3.

<sup>13</sup> Theodore J. Lowi, “American Business, Public Policy, Case-Studies, and Political Theory,” *World Politics* 16/4 (Jul. 1964): 689-91.

<sup>14</sup> Morton Keller writes that Lowi’s categorization scheme is especially useful in classifying public policy “from the creation of the Republic to the Great Depression and the New Deal.” Morton Keller, “Governance and Democracy: Public Policy in Modern America,” *The Journal of Policy History* 20/1 (2008): 177.

<sup>15</sup> Lowi, “American Business,” 690.

<sup>16</sup> Richard L. McCormick, *The Party Period and Public Policy: American Politics from the Age of Jackson to the Progressive Era* (New York, NY: Oxford University Press, 1986), 206-207; Morton Keller, “Social Policy in Nineteenth-Century America,” in Donald T. Critchlow and Ellis W. Hawley, eds., *Federal Social Policy: The Historical Dimension* (University Park, PA: The Pennsylvania State University Press, 1988), 104.

theory did not exercise a predominant influence on public policy until after the Civil War.<sup>17</sup>

While the national government usually left the responsibility of regulating economic interactions to states and municipalities, congressional representatives were willing to pass regulatory laws.

Second, the government distributed resources to ensure public safety as well as to promote economic growth. Advocates of distributing benefits argued that the public interest involved saving lives as well as encouraging commerce. They asked for federal appropriations claiming that building harbors of refuge, removing snags from rivers, and similar actions would save lives as well as protect property.<sup>18</sup> Members of Congress accepted that the United States had an obligation to secure the health and safety of its citizens engaged in interstate and international commerce, and that it was legitimate to appropriate money for these ends.<sup>19</sup>

Third, some types of intervention were made easier because the government was merely extending policies it was already undertaking in other areas. As we shall see in Chapter 2, the Information Option for steamboats was part of a larger set of government publications and investigations. The Mechanical Option relied on mobilizing private citizens, such as inventors, to act on behalf of the public good by pursuing their own interests. Today, with OSHA, the

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<sup>17</sup> Novak, *The People's Welfare*; Balogh, *Government Out of Sight*, 14.

<sup>18</sup> As examples of these requests for the Great Lakes and Western rivers, see *Memorial and Joint Resolution of the General Assembly of Indiana, Asking an appropriation for the public works at Michigan City, Ind.*, 24<sup>th</sup> Cong., 2<sup>nd</sup> sess., Jan. 26, 1837, H. Doc. 104; *Memorial of the Corporate Authorities of the City of Chicago, In the State of Illinois, Praying the completion of the harbor at that place*, 27<sup>th</sup> Cong., 2<sup>nd</sup> sess., Jan. 25, 1842, S. Doc. 65, 5; *Resolutions of the General Assembly of Indiana, to procure appropriations for the improvement of the western rivers, and for the purchase of the snag-boat invented by Henry M. Shreve*, 27<sup>th</sup> Cong., 2<sup>nd</sup> sess., S. Doc. 112; *Memorial of J.M. Peck of Illinois Praying the Employment of snag boats for the removal of obstructions in the Western rivers*, 28<sup>th</sup> Cong., 1<sup>st</sup> sess., Feb. 23, 1844, S. Doc. 141; and *Memorial of the Chicago Convention in Favor of the improvement of harbors and rivers by the general government*, 30<sup>th</sup> Cong., 1<sup>st</sup> sess., Jun. 19, 1848, S. Misc. Doc. 146, 2. See also Peter J. Parish, "Daniel Webster, New England, and the West," *Journal of American History* 54/3 (Dec. 1967): 538.

<sup>19</sup> See the remarks of Senators Andrew P. Butler, Thomas Ewing and Jefferson Davis on the Rivers and Harbors Bill of 1851. ACG, 31<sup>st</sup> Cong., 2<sup>nd</sup> sess., Mar. 1, 1851, 330, 338, 339. As members of the House debated the 1852 Rivers and Harbors bill, from July 23 to July 29 they frequently cited building harbors of refuge on the Great Lakes as a legitimate and desirable undertaking. CG, 32<sup>nd</sup> Cong., 1<sup>st</sup> sess., 1900, 1901, 1917, 1919, 1932, 1942, 1943, 1990, 1992, 1995, 1996.

FDA, the NTSB, the FAA, and a host of other federal agencies dedicated to public safety all setting standards and exercising some degree of control over products, businesses, and transportation, we may not perceive these earlier, more modest types of government influence as important forms of government activity, but they were common styles of intervention in the nineteenth-century.

Louis Hunter saw federal regulation of steam vessels as the logical endpoint of intervention, but to achieve it the government needed to surmount obstacles including “the dead weight of social inertia, the opposition of vested interests,” preference for limited government and “ignorance and inexperience.”<sup>20</sup> Hunter’s and John G. Burke’s classic accounts draw on a common understanding that national administrative institutions developed as responses to the failure of markets to control the negative effects of economic activities.<sup>21</sup> Thomas McCraw observes that scholars have generally argued that the government undertook regulation to benefit the “public interest” and responded when the “public good” was threatened by market failures.<sup>22</sup> American law designated that particular businesses operating in the public interest should be “subject to a strong application of the police power.”<sup>23</sup> Carrying millions of people and millions of dollars of cargo, steamboats were a vital branch of transportation and lawmakers believed that they should be subject to government oversight.

For Hunter, the key precipitant of government intervention was the shock that steamboat disasters delivered to both “public opinion” and “legislative bodies.” A number of explosions

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<sup>20</sup> Hunter, *Steamboats*, 524.

<sup>21</sup> David John Denault, “An Economic Analysis of Steam Boiler Explosions in the Nineteenth-Century United States” (Ph.D. Dissertation, University of Connecticut, 1993).

<sup>22</sup> Thomas K. McCraw, “Regulation in America: A Review Article,” *Business History Review* 49/2 (Summer 1975): 160. McCraw notes that common synonyms for “public interest” have included “public good,” “common good,” and “general welfare.”

<sup>23</sup> McCraw, “Regulation in America,” 160.

triggered the introduction of the steamboat acts of 1838 and 1852, while public anxiety and demands drove the bills to passage.<sup>24</sup> Congress also advanced along a learning curve as members discovered what needed to be done.<sup>25</sup> According to Hunter, it experimented with regulatory oversight by passing a law in 1838 that was insufficiently rigorous and administratively deficient, but corrected its errors when it passed the 1852 Steamboat Act.

But neither Hunter nor Burke developed the point that the national government began to oversee private businesses in the Federalist era and continued through the Civil War. The government regulated sailing vessels before steamboats were even in operation and there was a clear constitutional path for these actions because Article One, Section Eight of the Constitution gave Congress the power “to regulate commerce with foreign nations, and among the several states.” In 1789, the 1<sup>st</sup> Congress passed a law that organized U.S. commercial vessels, issuing certificates of registry to American owners for vessels trading abroad, “certificates of enrollment and license for coastal vessels over twenty tons, and licenses only for coastal shipping” for vessels from five to “twenty tons displacement.”<sup>26</sup>

Congress passed an act to regulate seamen the following year, prescribing the rights and duties of seamen and masters, and setting standards for vessel safety and the well-being of passengers and crews. The law provided that an officer and majority of the crew could force a vessel to head into port for inspection if they believed the vessel was unsafe. It also required that

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<sup>24</sup> Hunter, *Steamboats*, 532, 537. There were three destructive explosions, including that of the *Moselle*, in the months before the 1838 law was passed. In the eight months preceding the 1852 act, seven deadly disasters took place, killing almost 600 people. In an examination of steamboat technical reports and political rhetoric, R. John Brockmann showed that, in the 1830s, congressmen were more likely to introduce steamboat legislation soon after disasters had occurred. See R. John Brockmann, *Exploding Steamboats, Senate Debates, and Technical Reports: The Convergence of Technology, Politics and Rhetoric in the Steamboat Bill of 1838* (Amityville, NY: Baywood Publishing Company, Inc., 2002), 52-53.

<sup>25</sup> Hunter, *Steamboats*, 522.

<sup>26</sup> Brown, *Limbs on the Levee*, 26. These requirements were for record-keeping and tax purposes, and did not assert authority over vessel operations.

each vessel must carry a medicine chest and that all vessels undertaking trans-Atlantic voyages must carry adequate provisions.<sup>27</sup> In 1819, Congress limited the total number of passengers per ton that vessels could legally carry and expanded the prerequisite that vessels be stocked with sufficient provisions.<sup>28</sup> The government extended these requirements in the 1840s, directing that ships provide adequate ventilation as well as ample food and water. It also extended the laws to American vessels on the Pacific Ocean.<sup>29</sup> Congress passed a Passenger Act in 1855 that strengthened all of these requirements.<sup>30</sup> In 1860, it passed a law intended to protect female passengers from inappropriate treatment.<sup>31</sup> The laws tacitly or explicitly designated customs officials, already stationed at ports of entry, to oversee the acts, and offenders could be sued for damages in federal courts. Congressmen assumed that these were legitimate areas of federal concern and rarely questioned the constitutionality of such legislation, though they sometimes cited Article Three, Section Two which awarded the courts judicial power “in all cases of admiralty and maritime jurisdiction” as the source of their authority.<sup>32</sup>

Congress passed much of the maritime safety legislation with broad support, without roll call votes and without serious on-the-record opposition.<sup>33</sup> The passenger laws served as precedents for the use of Congress’s regulatory powers when it was considering steamboat

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<sup>27</sup> *An Act for the Government and Regulation of Seaman in the Merchant Service*, approved Jul. 20, 1790, 1 *Stat. L.* 131. The law provided that the vessel master and owners could be fined when they did not comply, but did not designate an administrative agency to enforce the rules. In 1798, Congress passed a law that taxed seaman’s wages to provide long-term care for sick and disabled seamen. See John Jensen, “Before the Surgeon General: Marine Hospitals in Mid-19<sup>th</sup>-Century America,” *Public Health Reports* 112/6 (Nov./Dec. 1997): 525.

<sup>28</sup> 3 *Stat. L.* 488.

<sup>29</sup> 9 *Stat. L.*, 127; 9 *Stat. L.* 149; 9 *Stat. L.* 220; 9 *Stat. L.* 399.

<sup>30</sup> 10 *Stat. L.*, 715. For the earlier acts, see *U.S. Statutes at Large*: 1 *Stat. L.* 131, 2 *Stat. L.* 330, 3 *Stat. L.* 488, 9 *Stat. L.* 127, 9 *Stat. L.*, 220, 9 *Stat. L.* 399.

<sup>31</sup> See Appendix A and *U.S. Statutes at Large*, 10 *Stat. L.* 715.

<sup>32</sup> David P. Currie, *The Constitution in Congress: Democrats and Whigs, 1829-1861* (Chicago, IL: University of Chicago Press, 2005), 123-25.

<sup>33</sup> See Appendices A and C.

legislation and lent a patina of legitimacy to its actions.<sup>34</sup> Rather than appearing alien and threatening when it considered intervening on steamboats, the government was acting in ways that were familiar and expected.

Congress assumed responsibility for the safety of passengers in other ways, as well. In the first law appropriating funds for public works, the 1<sup>st</sup> Congress had the U.S. assume control of all aids to navigation. Politically, both former Federalists and Antifederalists supported the law and it “sailed through both houses without recorded debate.”<sup>35</sup> The fact that lighthouses had been publicly financed during the colonial period and that the first three U.S. presidents oversaw the system and personally approved contracts for navigational aids probably reassured those who might question the program. Through the 1790s, few congressmen, either Federalists or Jeffersonians, objected to the lighthouse program and lighthouse appropriations “never met significant political opposition.”<sup>36</sup> Interest “groups concerned with safety at sea—such as merchants, ship-owners, captains, marine insurance companies, and naval officers” applied pressure to the government to improve navigational aids and gave Congress additional reasons to act.<sup>37</sup> From the 1820s through the 1850s, while battles over national funding for a general system of internal improvements became a major arena of conflict, funding aids to navigation stirred few questions about their constitutionality and propriety. Democratic legislators and

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<sup>34</sup> These earlier regulations have probably not appeared significant to historians because they were infrequently enforced. By the late 1860s, U.S. courts had limited application of the 1855 law primarily to sailing vessels. Investigations in the 1870s found that steamship operators on transatlantic routes generally ignored the requirements of the act. Customs inspectors assigned to enforce the law conducted only token searches for violations, and few owners were penalized. See Pamela S. Nadell, “United States Steerage Legislation: The Protection of Emigrants En Route to America,” *Immigrants and Minorities* 5/1 (Mar. 1986): 62-63.

<sup>35</sup> Larson, *Internal Improvement*, 45.

<sup>36</sup> *Ibid.*, 45-46. Stephen Minucucci, “Internal Improvements and the Union, 1790-1860,” *Studies in American Political Development* 18 (Fall 2004): 163. See also Dennis L. Noble, *Lighthouses & Keepers: The U. S. Lighthouse Service and Its Legacy* (Annapolis, MD: Naval Institute Press), 5-6.

<sup>37</sup> Michael Brian Schiffer, “The Electric Lighthouse in the Nineteenth Century: Aid to Navigation and Political Technology,” *Technology and Culture* 46/2 (2005): 277-78.

administrators set aside their inclinations toward strict construction and fears that excessive government intervention was a sign of corruption in the polity to support these programs.<sup>38</sup> They accepted that safeguarding the lives of mariners and passengers was the proper responsibility of the general government.<sup>39</sup> Democrats endorsed a positive role for the state to secure safety and promote commerce by funding “light-houses, beacons, buoys and public piers” because these undertakings had appeared, since the beginning of the republic to be “on their very face of so decided a national character, that Congress undertook them at once, as a matter of course, without a critical reference to the charter of its powers, and depending upon a unanimous popular approbation for its support.”<sup>40</sup> Every president from Jackson through Buchanan signed bills for navigational aids each worth more than one million dollars. Congress appropriated over \$3 million during Andrew Jackson’s two terms in office, but the largest expenditure during any presidential term, \$3.5 million, came when Democrat Franklin Pierce was in office.<sup>41</sup>

The editor of *Putnam’s Monthly Magazine* praised the United States along with the governments of France, Prussia and Russia because they saw “the system of aids to navigation as a national trust or duty” and therefore appropriated money out of general revenues to pay for them directly, unlike countries such as England, Holland and Sweden which financed their

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<sup>38</sup> “River and Harbor Improvements,” *The United States Magazine and Democratic Review* 22/120 (Jun. 1848): 496; Paskoff, *Troubled Waters*, Chapters 3 and 4. See the comments of South Carolina Democrat William De Saussure in *ACG*, 32<sup>nd</sup> Cong., 1<sup>st</sup> sess., Aug. 20, 1852, 1006.

<sup>39</sup> Stephen A. Douglas of Illinois argued that by passing the Steamboat Act of 1852 Congress affirmed its jurisdiction over all navigable waters inland, as well as along the coasts. See *Ibid.*, 1014.

<sup>40</sup> “River and Harbor Improvements,” 490. John Lauritz Larson has suggested an alternate explanation for the lack of opposition to appropriations for lighthouses and buoys: that they were inexpensive and therefore the money could be widely distributed in response to local demands for patronage. See John Lauritz Larson, “‘Bind the Republic Together’: The National Union and the Struggle for a System of Internal Improvements,” *Journal of American History* 74/2 (Sept. 1987): 369.

<sup>41</sup> Paskoff, *Troubled Waters*, 43.

lighthouses by taxing vessels.<sup>42</sup> According to *Putnam's*, the government should undertake this public trust in a spirit of generosity rather than demanding payment for services rendered.

Another reason why potential opponents may not have mobilized against these acts is that Congress avoided antagonizing defenders of states' rights and local privileges in other areas of maritime safety. The 1st Congress refrained from asserting the right to control aspects of navigation where local arrangements were already in place. Rather than setting up a national system to regulate coastal and harbor pilots, the 1789 lighthouse law directed that existing state laws would continue to apply to pilots guiding vessels in and out of harbors.<sup>43</sup> In 1837, Congress passed a law intended to destroy state piloting monopolies on ships using U.S. ports by allowing vessel masters to employ pilots from any state that touched the waters of any harbor. The action was consistent with the concept of dual federalism affirmed in *Gibbons v. Ogden*. Congress could have chosen to regulate pilots directly. Instead, relying on local and state governments when those bodies were in a position to "fulfill public purposes," it left the matter in their hands.<sup>44</sup>

Congress and the Executive promoted maritime safety in other ways. In 1837, Congress authorized public ships to cruise off the coasts during the winter season to aid vessels in distress.<sup>45</sup> Congress began to appropriate money for lifesaving stations in 1848 to help victims

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<sup>42</sup> "Our Light-House Establishment," *Putnam's Monthly Magazine of American Literature, Science, and Art* 7/42 (Jun. 1856): 644.

<sup>43</sup> 1 *Stat. L.*, 53. See Section 4.

<sup>44</sup> Balogh, *Government Out of Sight*, 3. See also White, *The Jacksonians*, 447-48. For an explanation of the reasoning behind leaving pilot regulations in state hands, see *Regulation of Pilots*, 24<sup>th</sup> Cong., 2<sup>nd</sup> sess., Feb. 22, 1837, H. Rept. 263.

<sup>45</sup> *SJ*, 25<sup>th</sup> Cong., 2<sup>nd</sup> sess., Dec. 26, 1837, 78. The Senate Commerce Committee drafted a bill the previous year and opined that using federal vessels in this manner would likely save lives and property during the winter season, while giving Navy personnel valuable experience in practical seamanship. See *Report of the Committee on Commerce on the Petition of the New York Chamber of Commerce for relief ships*, 24<sup>th</sup> Congress, 2<sup>nd</sup> sess., Feb. 11, 1837, S. Rept. 166. Senator John Davis referred to the proposed act in 1837 as "an important act of humanity as well as policy." See *NWR* 53, Dec. 16, 1837, 250; *1838 Report of the Secretary of the Navy*, ACG, 25<sup>th</sup> Congress,



of shipwrecks.<sup>46</sup> In 1851 and 1852, it organized and empowered a Lighthouse Board to oversee and advance the system of aids to navigation.<sup>47</sup> The government's other efforts to improve the environment for commerce, such as removing snags from rivers and subsidizing harbors of refuge also fulfilled the dual purposes of encouraging commerce and safeguarding lives and property.<sup>48</sup>

Congress's efforts to improve steamboat technology in the 1830s, 40s and 50s, mirrored its efforts to support mechanical improvements in other areas. It sought out information on technological advances used by the French in their lighthouse system.<sup>49</sup> The United States sent naval officers to Europe to examine lighthouses in 1840 and 1845.<sup>50</sup> Captain Mathew C. Perry purchased Fresnel lenses in Paris to install in U.S. lighthouses.<sup>51</sup> The members of the Lighthouse Board, particularly physicist and longtime Secretary of the Smithsonian Institution Joseph Henry, investigated lenses, bells, whistles, and other markers and warning devices for use along

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3<sup>rd</sup> session, 1837, 6. After the law was passed, some citizens on the Great Lakes wanted their own rescue vessels and asked the government to assign a steam revenue cutter to "save many valuable lives and [a] vast amount of property," in addition to other services. See *Petition of a Number of Citizens Upon the Northern and Western Frontiers* ..., 25<sup>th</sup> Cong., 3<sup>rd</sup> sess., Feb. 4, 1839, S. Doc. 181, 1.

<sup>46</sup> Dennis R. Means, "A Heavy Sea Running: The Formation of the U.S. Life-Saving Service, 1846-1878," *Prologue* (Winter 1987): 224; Dennis L. Noble and Truman Strobridge, "'You Have to Go Out,'" *Naval History* 3/4 (1989): 12-20. Merchant groups in major ports had been asking for federal aid for lifesaving for years. See *Report by the Committee of Commerce [with Senate Bill No. 213] on the memorial of the Chamber of Commerce of the City of New York*, 24<sup>th</sup> Cong., 2<sup>nd</sup> sess., Feb. 11, 1837, S. Rept. 166.

<sup>47</sup> *An Act making Appropriations for Light-houses, Light-Boats, Buoys, Etc.* ... approved Aug. 31, 1852, 10 *Stat. L.* 112; see Sections 8-17. See also Dennis L. Noble, *Lighthouses and Keepers: The U.S. Lighthouse Service and its Legacy* (Annapolis, MD: Naval Institute Press, 1997), 11-12. The Board was established in 1851 on a temporary basis; it was made permanent as part of the 1852 Lighthouse appropriations bill. The main sponsor of the provision in the House justified it as establishing "a board of scientific men who are acquainted with the requirements of the age" to improve the effectiveness and efficiency of the system. See *CG*, 32<sup>nd</sup> Cong., 1<sup>st</sup> sess., Aug. 24, 1852, 2321.

<sup>48</sup> Paskoff, *Troubled Waters*, 6.

<sup>49</sup> *Light-House Establishment in France*, 27<sup>th</sup> Cong., 2<sup>nd</sup> sess., Jul. 23, 1842, H. Doc. 274; Schiffer, "The Electric Lighthouse," 278.

<sup>50</sup> John O. Sands, "The U.S. Light-House Board: Progress through Process," *American Neptune* 46/3 (Summer 1997): 174-92. It was a common practice for governments in Europe to send naval officers to examine the lighthouse systems of other countries. See Schiffer, "The Electric Lighthouse," 278-79.

<sup>51</sup> "Our Light-House Establishment," 651.

the coasts.<sup>52</sup> Congress also provided funds for the early Lifesaving Service to test surfboats, mortars, rockets, and other equipment in the years from 1848 to 1871.<sup>53</sup>

These actions did not, except in the case of funding lighthouses, necessarily involve consistent and major expenditures by the national government. Nevertheless, they indicate that legislators and administrators were willing to ameliorate dangers relating to waterborne commerce, and to experiment with policies and technology intended to ensure public safety.<sup>54</sup>

## ***2. The Limits of Partisanship in a Partisan Era***

While the impetus to respond to steamboat disasters provides one explanation for *why* Congress was moved to act, it does not offer a sufficient account of *how* Congress acted, *what sort of* remedies it proposed, and *which* legislators supported them. The fact that congressmen introduced bills showed that they were willing to do *something*, but how they arrived at their ultimate prescriptions requires further examination. The explanation that Congress responded to an overwhelming sense of danger also does not adequately address the political context in which the steamboat laws of 1838 and 1852 were enacted. Despite the maritime regulations and other interventions discussed above, in these years the national government was not very active in

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<sup>52</sup> Sands, "The U.S. Light-House Board," 174-92; Schiffer, "The Electric Lighthouse," 279. Surfboats were buoyant small craft intended to rescue distressed mariners who were stranded near the coast.

<sup>53</sup> Robert F. Bennett, *Surfboats, Rockets, and Carronades* (Washington, DC: United States Government Printing Office, 1976), 41-57.

<sup>54</sup> The impulse by the national government to aid the health and material welfare of citizens was not limited to maritime safety. Congress passed a law in 1848 that provided for six new customs officers at major ports of entry to examine drugs being imported into the United States. See *An Act to prevent the Importation of adulterated and spurious Drugs and Medicines*, approved Jun. 26, 1848, 9 *Stat. L.* 237. Walter Trattner has argued that the U.S. aided needy citizens in nineteenth-century America by providing national public lands to states and localities to finance schools, as well as making grants to underwrite select private social welfare and disaster relief organizations. See Walter I. Trattner, "The Federal Government and Needy Citizens in Nineteenth-Century America," *Political Science Quarterly* 103/2 (Summer 1988): 347-56.

overseeing the economic actions of its citizens, nor were the national parties known for cooperating to enact major legislation.

One substantial hurdle that any steamboat law would have had to clear is that many members of the Democratic Party, which held majorities in both houses of Congress when these laws were passed, subscribed to a political ideology that was intensely suspicious of certain forms of government activity.<sup>55</sup> Partisanship played an important role in antebellum governance. As one scholar has put it, “party was the paramount force in the shaping of public policy in both Congress and the state legislatures, the main terrain of nineteenth-century American government.”<sup>56</sup> The parties gained their power because they were effective organizations which “reflected, organized, and articulated” social and cultural divisions in the larger society.<sup>57</sup>

Democrats wanted to avoid rewarding particular interests and were reluctant to endorse actions that went “beyond establishing general rules” and securing public “order.”<sup>58</sup> They thought that government intervention would favor one group over others and that the wealthy and powerful would make government “their tool.”<sup>59</sup> Idealizing a simple agrarian society and determined to clear away impediments so that individuals could achieve their goals, most Democrats resisted programs, like protective tariffs, that were intended to advance particular

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<sup>55</sup> Jacksonian Democrats adopted the outlook of Jeffersonian Republicans, and endorsed the idea that “that government is best which governs least. Its commands should be powerful, but seldom given, and for a long time obeyed. It should supervise all with a watchful care, and direct with such skill and harmony that its presence be barely seen. It should impress upon the governed, that they are responsible to themselves, and answerable to the laws only on condition of having betrayed this trust.” “The Duties of the State to its Citizens,” *The United States Democratic Review* 22/120 (Jun. 1848): 496.

<sup>56</sup> Joel H. Silbey, *The American Political Nation, 1838-1893* (Stanford, CA: Stanford University Press, 1991), 187.

<sup>57</sup> Margaret Susan Thompson and Joel H. Silbey, “Research on 19<sup>th</sup>-Century Legislatures: Present Contours and Future Directions,” *Legislative Studies Quarterly* 9/2 (May 1984): 327.

<sup>58</sup> Silbey, *American Political Nation*, 78.

<sup>59</sup> David M. Gold, “Democrats, Whigs, and the Antebellum Origins of Laissez-Faire Constitutionalism,” *New England Journal of History* 57/1 (2000): 46.

types of economic development.<sup>60</sup> In the year the Steamboat Act of 1838 was passed, President Martin Van Buren and his fellow Democrats insisted that the government should *not* intervene aggressively to address the economic crisis that afflicted the country.<sup>61</sup> Yet in his annual message to Congress the previous December, Van Buren had asked members to pass legislation to prevent steamboat accidents.<sup>62</sup> Why did Democrats not fight harder against laws that interfered with the steamboat operations—a vital and rapidly growing industry? Scholars who have examined steamboat legislation have not investigated this inconsistency in any detail.

If the Democratic majority should have been troubled by steamboat legislation, how then did steamboat legislation get passed? The Whigs, as champions of internal improvements, believed that the government should promote economic growth, but they were not known for advocating oversight of business, except in cases of regulating moral practices through policies like prohibition on the local and state levels. Perhaps, though, the situation with steamboats was similar to internal improvements where most Whigs favored appropriations to build roads, canals and improve waterways, while many Democrats opposed them. If Whigs provided the main support for steamboat legislation, it would have been consistent with some portions of their guiding philosophy. They tended to embrace economic and technological progress believing it would also “elevate the intellectual and moral level of society.”<sup>63</sup> With leaders such as Henry Clay and Daniel Webster who favored an energetic national government, and with party members who advocated government intervention on the state and local level, they appeared to

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<sup>60</sup> Silbey, *American Political Nation*, 177-78.

<sup>61</sup> Harry L. Watson, *Liberty and Power: The Politics of Jacksonian America*, rev. ed. (New York, NY: Hill and Wang, 2006), 207; David P. Currie, *The Constitution in Congress: Democrats and Whigs, 1829-1861* (Chicago, IL: University of Chicago Press, 2005), 127.

<sup>62</sup> Annual Message of President Martin Van Buren, *SJ*, 25<sup>th</sup> Cong., 2<sup>nd</sup> sess., Dec. 5, 1837, 24.

<sup>63</sup> Daniel Walker Howe, *The Political Culture of the American Whigs* (Chicago, IL: University of Chicago Press, 1979), 101.

be the group most likely to push for steamboat regulation. If this was the case, one might expect the voting outcomes for steamboat legislation to be similar to the voting coalitions that favored internal improvements, where the Whigs provided the core of support and enough Northern and Western Democrats joined them to secure majorities to pass the 1838 and 1852 steamboat acts. After all, as Michael Holt noted, there was a “growing congruence between the parties on almost all issues by the early 1850s,” and this would fit with the timing of passage of the 1852 act.<sup>64</sup>

Though members of Congress generally demanded roll call votes on contentious issues, they did not ask for one in the House or Senate when the 1838 bill was being considered for final passage and they passed it without substantial opposition. Unlike the contests over tariffs and internal improvements, partisan affiliation was not the best indicator of how congressmen would vote on steamboat legislation. The absence of a rancorous contest over the 1838 measure is puzzling; one might have expected more controversy, especially given the highly charged political environment of the 25<sup>th</sup> Congress, when the parties, in the wake of the Panic of 1837, fought over proposals like the independent treasury system.<sup>65</sup> Fourteen years later, the situation in Congress was calmer; the members of the 32<sup>nd</sup> Congress were not as preoccupied with the sectional issues that had engaged their recent predecessors.<sup>66</sup> Still, one might have anticipated energetic opposition from at least some Democrats and Southerners who opposed the 1852 act because they supported small government and states’ rights.

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<sup>64</sup> Michael F. Holt, *The Political Crisis of the 1850s* (New York, NY: W. W. Norton & Co., 1978), 13. Yonatan Eyal has argued that one of the reasons for this change was that by the late 1840s a new generation of Democratic leaders associated with “Young America” were embracing portions of the Whig program to promote commercial growth and economic development, including national government support for internal improvements. See Yonatan Eyal, “Trade and Improvements: Young America and the Transformation of the Democratic Party,” *Civil War History* 51/3 (2005): 245-68.

<sup>65</sup> Michael F. Holt, *The Rise and Fall of the American Whig Party: Jacksonian Politics and the Onset of the Civil War* (New York, NY: Oxford University Press, 1999), 67.

<sup>66</sup> The 31<sup>st</sup> Congress passed the Compromise of 1850 measures during its first session held from Dec. 3, 1849 to Sept. 30, 1850.

However, few opponents raised objections to the steamboat acts and those who did found little support. Members of Congress did not usually call for roll call votes on these types of legislation, preferring to pass them by general consent (Appendix A). The consensus support was similar to when other steamboat and passenger safety bills were passed. About 85% of members in the House and Senate supported the law in the final roll call votes on the 1852 legislation. Majorities of Whigs and Democrats, as well as congressmen from both the North and the South, voted in favor.<sup>67</sup> In this way steamboat intervention resembled legislation later in the century which did not provoke “partisan conflict,” such as the Interstate Commerce Act of 1887 and the Hatch Act to fund agricultural experiment stations.<sup>68</sup>

All of the approaches to steamboat safety enjoyed support from both sides of the aisle and I found no evidence that Whigs, Democrats, or Republicans used them for campaigning. Most Democrats “acknowledged that Congress could regulate what the Supreme Court would later call ‘the instrumentalities of commerce’ for reasons of public safety.”<sup>69</sup> The lack of partisan divisions was also reflected in the fact that there were no consistent differences between the proposals crafted in committee by legislators of different parties. Both Whig and Democratic members of Congress composed bills to subsidize inventors, require safety equipment, inspect vessels, test boilers, issue licenses to steamboat operators, and set standards for safe operation.<sup>70</sup>

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<sup>67</sup> Appendix C: S. 223, 32<sup>nd</sup> Cong., 1<sup>st</sup> sess. For example, the House passed the Steamboat Act with over 78% of Democrats in favor and almost 94% of Whigs. More than 92% of the free state representatives voted for the measure, along with over 71% of the members from slave states.

<sup>68</sup> Campbell, *Growth of American Government*, 47.

<sup>69</sup> Currie, *Constitution in Congress*, 124.

<sup>70</sup> For example, Jacksonians like Charles Wickliffe, and Democrats like John Ruggles and John W. Tibbatts, authored bills with regulatory features. Appendix A: H.R. 582, 22<sup>nd</sup> Cong., 1<sup>st</sup> sess.; S. 303, 25<sup>th</sup> Cong., 3<sup>rd</sup> sess.; S. 247, 26<sup>th</sup> Cong., 1<sup>st</sup> sess.; S. 148, 26<sup>th</sup> Cong., 2<sup>nd</sup> sess.; H.R. 71, 28<sup>th</sup> Cong., 1<sup>st</sup> sess. These were similar to bills drafted by Anti-Jacksonians like Samuel Southard and Whigs like Joseph Rogers Underwood. Appendix A: S. 201, 23<sup>rd</sup> Cong., 1<sup>st</sup> sess.; S. 20, 3<sup>rd</sup> Cong., 2<sup>nd</sup> sess.; H.R. 486, 26<sup>th</sup> Cong., 1<sup>st</sup> sess.

How could there have been such widespread support for policies that ought to have been controversial?

Since there were relatively few roll call votes to provide systematic evidence of congressional preferences on these issues and because there is no clear evidence of candidates who raised the steamboat issue in election campaigns, I have charted Congress's actions in this area from the 1820s to the 1850s by examining the type of information it gathered, the recommendations it made, the characteristics of the legislation it introduced and passed, and the affiliations and comments of the congressmen and other government officials who sponsored and shaped it. Much of this data is outlined in the Appendices.

Given that the government had regulated sailing vessels for decades, steamboat legislation represented more aggressive versions of *existing* types of federal oversight, rather than entirely new types of activity. As we shall see, while the steamboat acts of 1838 and 1852 intervened more substantively in the operation of vessels than acts regulating sailing vessels, all were similar in that Congress asserted its authority in the name of public safety. What was distinctive about the 1852 Steamboat Act was the way that Congress combined Informational, Mechanical, Penalty, and Regulatory policies, and how a small number of congressmen devised a complex set of administrative requirements to oversee and enforce these policies.

Steamboat legislation was thus in tune with the goals and practices of related policies, while it broke new ground in other ways. Legal scholar Jerry Mashaw contends that steamboat legislation contradicts the notion that the nineteenth-century polity was feeble and incompetent. The legislation, he argues, particularly the 1852 Act, provided a series of breakthroughs in American governance.<sup>71</sup> Overseeing steam vessels was “the national government’s first major

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<sup>71</sup> Jerry L. Mashaw, “Administration and ‘The Democracy’: Administrative Law from Jackson to Lincoln, 1829-1861,” *Yale Law Journal* 117/8 (Jun. 2008): 1568-1693.

health and safety regulatory program,” which pioneered “scientific regulation”—i.e., regulation based on expertise and knowledge gained through verifiable evidence. It initiated the “‘board’ or ‘commission’” form of administration staffed by independent experts who were not directly answerable to the Executive branch, as well as the process of “administrative rulemaking,” where the board propagated rules to dictate practices in areas under its authority.<sup>72</sup> If steamboat intervention was such an important development, its design and the ways it was carried out deserve a closer examination.

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<sup>72</sup> Mashaw, “Administration and ‘The Democracy’,” 1581.



## CHAPTER 2

### “THE GREAT SCHOOLMASTER OF THE PEOPLE”

#### *1. Introduction*

In an effort to prevent steamboat accidents, members of Congress and the Executive branch gathered and disseminated information to people who designed, operated and traveled on the vessels. Of the four policy approaches we are examining, discovering and disseminating information was the one the government practiced most persistently for the longest period and was consistent with government efforts to gather information and publish documents on other subjects of public concern.<sup>1</sup> As part of this Information Option, from 1824 to 1852 Congress published eighty documents on the subject.<sup>2</sup> These included assessments of the reasons for steam vessel accidents, advice on how to build and operate them, news on safety equipment, and

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<sup>1</sup> The documents created by the government relating to steam vessel accidents served five of the six functions of public documents identified by Leroy Charles Merritt in his classification scheme for government publishing. Most served a *legislative function* by providing information helpful to shaping bills and resolutions. Other documents served the *reportorial function* of communicating government activities to the people, such as providing copies of the laws or of proposed bills. Petitioners frequently responded to proposed bills that had been printed and circulated, indicating their support or disapproval, or making suggestions; the government printed some of these responses. Still other documents were part of a *service function* designed to convey “certain useful information to individuals or specific groups,” such as information about managing steam engines for vessel engineers and captains, who could then adopt safer practices. Closely related were documents that served a *research function*, such as the report on the investigations undertaken by the Franklin Institute in the 1830s and the Navy Department in the 1840s, which contained information intended to provide a better understanding of the problems of steamboat accidents and to evaluate inventions designed to prevent them. Service and research documents were also used to disseminate information to inventors and scientists to improve the technology, and to gain greater insight into the natural laws governing steam power. Finally, the documents also served an *informational function*, by informing the country and trying to influence public opinion about government activities, and spelling out the advantages that policies offered to certain groups. Merritt, *The United States Government as Publisher* (Chicago, IL: University of Chicago Press, 1943), 5-9. In this chapter and chapter three, we will mostly be concerned with the *reportorial*, *service*, and *research* aspects of the documents. Merritt also identifies the category of *administrative function*; documents in this category helped with administering and enforcing the laws. Regarding steamboats, these included Treasury Department circulars and the Annual Report of the Board of Supervising Inspectors that began publication after the 1852 Steamboat Act.

<sup>2</sup> While these documents contained only a small percentage of the total information that the government received on the topic, they provide a good sample of the knowledge, beliefs and concerns in the United States at the time. The published government documents ranged from massive reports hundreds of pages long which reflected years of investigation, to brief letters and resolutions drafted by individuals and organizations from all parts of the country (Appendix B).

discussions of existing and potential government policies (see Appendix B). The documents were intended to facilitate the use and improvement of steam power and Congress distributed them, along with hundreds of thousands of copies of other documents dealing with the economic life of the nation, such as Coast Survey reports, census materials, reports on Commerce and Navigation, and the annual report of the Patent Office.<sup>3</sup>

In the case of steam power, the government tried to guide steamboat operators toward safer use of their vessels, rather than to dictate their day-to-day operations. Readers could educate themselves and make informed decisions. One Senate committee constructed an appendix of information they believed would be “most useful to builders of steam vessels and steam-engines, or to the owners who have the care of them” and ordered 1,000 extra copies to be printed.<sup>4</sup> This was a way of promoting the public interest with a light touch, without requiring that vessels be inspected or engineers licensed, and without the preferential treatment that came with awarding subsidies to particular inventors.

Historian Oz Frankel has coined the phrase “print statism” to describe the way that the nineteenth-century governments of the U.S. and Britain gathered and disseminated information. In the United States, government personnel conducted investigations and wrote reports on an array of topics.<sup>5</sup> The documents covered subjects as exotic as exploration of the South Seas and provided accounts of the lives of native peoples in the West, and were sometimes as technical

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<sup>3</sup> Harry N. Scheiber, “The Impact of Technology on American Legal Development, 1790–1985,” in Joel Colton and Stuart Bruchey, eds., *Technology, the Economy, and Society: The American Experience* (New York, NY: Columbia University Press, 1987), 109. See also David John Denault, “An Economic Analysis of Steam Boiler Explosions in the Nineteenth-Century United States” (Ph.D. Dissertation, University of Connecticut, 1993), 9, 101.

<sup>4</sup> See 26<sup>th</sup> Cong., 1<sup>st</sup> sess., Mar. 2, 1840, S. Rept. 241, 2.

<sup>5</sup> Oz Frankel, *States of Inquiry: Social Investigations and Print Culture in Nineteenth-Century Britain and the United States* (Baltimore, MD: Johns Hopkins University Press, 2006), 1-2.

and specialized as analyses of the qualities of anthracite and bituminous coal.<sup>6</sup> The government produced these reports at the public expense and distributed them free of charge. The United States created a Post Office, extending its services to remote areas of the country, and used the mail to transmit newspapers and other periodicals to create a market for news about national affairs.<sup>7</sup> Taking on the responsibility to keep citizens informed about federal activities, the national government became what one congressman labeled as the “great schoolmaster of the people.”<sup>8</sup>

Congress first inquired into the causes of steam vessel disasters in 1824, when the House of Representatives asked the Treasury Department to investigate the problem. With this, the national government joined state, local, and private entities that were inquiring into steamboat accidents.<sup>9</sup> Secretary of the Treasury William Crawford thought that congressional action would do more harm than good and recommended against legislation.<sup>10</sup> But by publishing information about steamboat accidents and operation, Congress had already begun to intervene in a way that, though modest, was typical for the period. Committees in both houses scrutinized the issue,

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<sup>6</sup> For a brief discussion of the government publications related to the U.S. Exploring Expedition of 1838-42, commanded by Lt. Charles Wilkes, and the work of ethnographer Henry Rose Schoolcraft, see Frankel, *States of Inquiry*, 112-18 and Chapter 7. Prof. Walter R. Johnson wrote the report on coal for the U.S. Navy; it was printed as 28<sup>th</sup> Cong., 1<sup>st</sup> sess., 1844, S. Doc. 386.

<sup>7</sup> Richard R. John, *Spreading the News: The American Postal System from Franklin to Morse* (Cambridge, MA: Harvard University Press, 1995), 112; and Oz Frankel, “Potholes on the Information Superhighway: Congress as Publisher in Nineteenth-Century America,” in David Thorburn and Henry Jenkins, eds., *Rethinking Media Change: The Aesthetics of Transition* (Cambridge, MA: The MIT Press, 2003), 139.

<sup>8</sup> *CG*, 31<sup>st</sup> Cong., 1<sup>st</sup> sess., Mar. 12, 1850, 503. North Carolina Democratic representative Abraham Venable condemned this practice while trying, and failing, to block an attempt to print extra copies of two sections of the Patent Office annual report on agriculture and the mechanical arts. “Information is of value, it is true,” said Venable, “but this Government was never intended to be the great schoolmaster of the people.”

<sup>9</sup> See *HJ*, 18<sup>th</sup> Cong., 1<sup>st</sup> sess., May 26, 1824, 599, and *HJ*, 18<sup>th</sup> Cong., 2<sup>nd</sup> sess., Jan. 31, 1825, 188.

<sup>10</sup> *Report of the Secretary of the Treasury on Accidents in Steamboats*, 18<sup>th</sup> Cong., 2<sup>nd</sup> sess., Jan. 31, 1825, H. Exec. Doc. 69. One congressional committee in 1830 thought that it was best to keep Congressional intervention to a minimum and to rely on technical advances, “the improvements of the age” to solve the problem. See John K. Brown, *Limbs on the Levee: Steamboat Explosions and the Origins of Federal Public Welfare Regulation, 1817-1852* (Middlebourn, WV: International Steamboat Society, 1989), 30.

asked for information from the executive departments, and Congress subsequently appropriated funds for additional inquiries.

Using Leroy Merritt's typology of government printing, the data the government accumulated under its *research function* was probably the most significant in expanding knowledge of the causes of accidents and preventative measures. The federal government sought out experts to investigate the problem of explosions and distributed reports that pointed the way toward safer operating practices. Ideally, in the government's *service function*, people who operated steamboats could refer to this data and come to understand the safest ways to use machinery.<sup>11</sup> Government officials knew that their documents did not need to reach everyone. Private publications could be counted on to reprint relevant material.<sup>12</sup> This practice worked both ways as the government also reprinted reports and documents that were produced by private individuals.<sup>13</sup> In the case of steamboats, it was reasonable for congressmen to assume that many of the documents it printed would be reprinted, summarized or discussed in periodicals such as

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<sup>11</sup> An experienced steamboat agent wrote that one of the best things that Congress could do would be to provide for a swift and thorough investigation after each accident, then publish both the facts and the conclusions to make them available to both steamboat operators and the public. *Letter from the Secretary of the Treasury Transmitting ... Information in Relation to Steam Engines*, 25<sup>th</sup> Cong., 3<sup>rd</sup> sess., 1838, H. Doc. 21, 433.

<sup>12</sup> For example, one article "Monthly Record: Politics and Statistics: Steam Boat Explosions," *The New-England Magazine* 3/1 [July 1832], 66-67), summarized the findings and recommendations of a House Select Committee on Steam (22<sup>nd</sup> Cong., 1<sup>st</sup> sess., 1832, H. Rept. 478 - See Appendix B). The *Journal of the Franklin Institute*, the *Boston Mechanics Magazine*, the *New York City Mechanics' Magazine*, and the *Journal of the American Institute* in New York carried copies of an 1833 report investigating the explosion of the steamer *New England* on the Connecticut River. See R. John Brockmann, *Twisted Rails, Sunken Ships: The Rhetoric of Nineteenth-Century Steamboat and Railroad Accident Investigation Reports, 1833-1879* (Amityville, NY: Baywood Publishing Company, Inc., 2005), 26. Editors of periodicals were willing to publish excerpts, summaries, and extended commentary about government documents on the topic of steamboats. In 1840, *The North American Review* published a twenty-three-page essay on steamboats prompted by two reports: one on the causes of explosions, prepared at the request of the citizens of Cincinnati after the 1838 *Moselle* disaster ("Steamboat Disasters," *The North American Review* 50/106 [Jan. 1840], 19-43), the other was the massive document prepared by the Secretary of the Treasury and issued in Dec. 1838 (25<sup>th</sup> Cong., 3<sup>rd</sup> sess., 1838, H. Doc. 21 - See Appendix B). J. B. D. Debow regularly published material taken from government documents, including statistics taken from S. Exec. Doc. 18 in 1849 (Appendix B) on the causes of steamboat accidents. "Miscellaneous: Steam Boiler Explosions," *Debow's Review* 8/1 (Jan. 1850), 91-92.

<sup>13</sup> The House of Representatives appended the report on the *New England* explosion to a massive collection of steamboat-related material gathered by the Secretary of the Treasury and published as 25<sup>th</sup> Cong., 3<sup>rd</sup> sess., 1838, H. Doc. 21, and printed 10,000 extra copies in 1838 (see Appendix B).

*Scientific American* and the *Journal of the Franklin Institute*, which covered issues relating to technology, including steam power.<sup>14</sup>

Documents concerning technology were among the largest and most popular ones that the government published. Legislators and administrators believed that printing and diffusing technical information about steam power would help inventors and practical mechanics make improvements in engine design and vessel construction.<sup>15</sup> If the minds of inventors could be seeded with ideas about how to improve steam engines, they could come up with ways to protect people's lives and limbs. To this end, many of the documents on boiler explosions in the 1830s, 1840s, and 1850s included technical information on safety mechanisms. The sponsors of these investigations thought that they could foster the process of invention by providing learned critiques, descriptions, diagrams and models to serve as sources of ideas to make further improvements. This belief reflected their understanding of how people learned to build and use machinery and how improvements were made in the arts and crafts. Mechanics, artisans, and skilled laborers learned their vocations through a process of "emulation." They worked with an experienced practitioner of their craft, often as an apprentice to a master. When they fully understood current techniques, tools, and the relevant technology well enough to work independently, their apprenticeship was complete and they could strike out on their own.<sup>16</sup>

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<sup>14</sup> *Scientific American* trumpeted the fact that it contained engravings illustrating "new inventions," "scientific principles" as well as notices of "mechanical and other scientific improvements," "essays on the principles of the sciences" and "instruction in various arts and trades." *SA* 2/5, Oct. 24, 1846, 40. The magazine was intended for non-specialists and, according to its publishers, was directed toward "mechanics and manufacturers," as well as "farmers."

<sup>15</sup> In the 1920s the government also printed technical information on agricultural subjects and published guides on the safe use of automobiles to facilitate "safety education" and promote "uniform traffic control laws." See Ellis W. Hawley, "Herbert Hoover, the Commerce Secretariat, and the Vision of an 'Associative State,' 1921-1928," *The Journal of American History* 61/1 (Jun. 1974): 131.

<sup>16</sup> Brooke Hindle, *Emulation and Invention* (New York, NY: New York University Press, 1981), 13. Many of the government documents on steamboat accidents listed in Appendix B included diagrams and descriptions of safety mechanisms and apparatus. Alexander Dallas Bache, for example, head of the Franklin Institute Committee

By providing inventors and mechanics with descriptions and visual representations of machinery, legislators hoped that interested Americans would reconceptualize and tinker with the existing machinery and devise further improvements. In 1855, James C. Booth, chief metallurgist at the U.S. Mint, investigated steam safety devices on behalf of the Treasury Department and Board of Supervising Steamboat Inspectors. He recommended soliciting the advice of interested Americans: Booth would make a formal report to the department “on the methods of employing the [inventions], accompanied by illustrative drawings,” which would then be distributed to machinists throughout the country. “It appears to me,” Booth wrote, “that such a course would call into the field a large amount of ingenuity and skill, which will lead to the construction of more perfect apparatus than has been hitherto devised.”<sup>17</sup>

Public officials expressed a great deal of confidence in the mechanical capabilities of their fellow citizens. These attitudes, along with the rapid increase in the “mechanical capabilities of craftsman” from 1800 to 1850, convinced many Americans that they were living in an age of progress, one in which the dangers of steam could be minimized or avoided while it still served great national and commercial purposes.<sup>18</sup> Confidence in the United States’ technological future was consistent with “the spirit of political and intellectual optimism” that prevailed during the period.<sup>19</sup> President Andrew Jackson wrote in 1831 that “science is steadily

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investigating boiler explosions, devised an improved safety device and included an illustration and description with the Institute’s report. 24<sup>th</sup> Cong., 1<sup>st</sup> sess., March 1, 1836, H. Doc. 162, 38-39.

<sup>17</sup> James C. Booth, U.S. Mint, to James Guthrie, Secretary of the Treasury, Philadelphia, Jul. 14, 1855, *Miscellaneous Correspondence Received by the Secretary of the Treasury, 1852-1862* (Bound Volume), Bureau of Marine Inspection and Navigation (BMIN), Steamboat Inspection Service (SIS), RG 41, NA. The Treasury Secretary had asked Booth to examine and refine a metal alloy safety device that had been invented by Cadwallader Evans.

<sup>18</sup> Eugene S. Ferguson, “On the Origin and Development of American Mechanical ‘Know-How,’ ” *Midcontinent American Studies Journal* 3/2 (1962): 3.

<sup>19</sup> Donald Zochert, “Science and the Common Man in Antebellum America,” *Isis* 65/4 (Dec. 1974): 470. Experience should have tempered the confidence that elected officials expressed in their fellow citizens. Americans conceived passionate enthusiasms for improbable and impossible (for the time and sometimes for all time)

penetrating the recesses of nature and disclosing her secrets, while the ingenuity of free minds is subjecting the elements to the power of man and making each new conquest auxiliary to his comfort.”<sup>20</sup> Improvements were visible for everyone to witness and steamboats themselves provided evidence of the continuous advancement in human affairs, “the sublime progress of the race.” Americans were sure theirs was a land of opportunity and that their democratic system provided incentives for people to advance their “own comfort and status.”<sup>21</sup>

While the government published a lot of high quality material, its system of disseminating information had significant imperfections in both supply and demand. The government documents on steam, like many of its publications, were often poorly organized and this probably limited their usefulness to those who read them.<sup>22</sup> Most importantly, the government was much better at gathering evidence and testimony than it was at differentiating which claims had a solid evidentiary basis. While some of the documents reflected the best scientific and practical knowledge of the day, portions were flawed and misleading, endorsed errant or questionable theories, and failed to unequivocally condemn dangerous practices. The fact that there was inadequate quality control likely indicated that lawmakers assigned a higher

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inventions that ranged from flying machines to mesmerism and perpetual motion. But despite these misconceived manias, the rapid material progress taking place in the country seemed to justify their faith in themselves and their fellows.

<sup>20</sup> Andrew Jackson, Third Annual Message (Dec. 6, 1831) in James D. Richardson, ed., *A Compilation of the Messages and Papers of the Presidents*, Volume II, Part 3: Andrew Jackson, March 4, 1829, to March 4, 1833 (Washington, DC: U.S. Bureau of National Literature and Art, 1910), 1108.

<sup>21</sup> Leo Marx, *The Machine in the Garden: Technology and the Pastoral Ideal in America* (New York, NY: Oxford University Press, 1964), 88, 105, 129, 197, 204.

<sup>22</sup> For example, the editor of the *New York Review* noted that 25<sup>th</sup> Cong., 3<sup>rd</sup> sess., 1838, H. Doc. 21, printed in Dec. 1838, and at 472 pages the lengthiest of the steam-related documents published by the national government during this period, was “wanting in any regular and lucid order” while lacking a classification scheme or an index. The commentator went on to say that the subject was an important one and lamented that any person who wanted the information simply had to “wade through” all of it. See *The New York Review* 6/9 (Apr. 1839): 462. A writer in the *North American Review* echoed these criticisms the following year when he characterized the “mass of documents” in H. Doc. 21 as “ill-arranged and undigested.” He acknowledged that the publication presented a wide range of opinions about the causes of steamboat accidents, but he disapproved of the fact that it did not provide definitive answers or map out a persuasive case for an effective governmental response, which would require, he thought, more study. See “Steamboat Disasters.” *North American Review* 50/106 (January 1840): 37.

priority to pleasing their constituents by sending them printed books and reports, than in assuring that the contents of the reports were accurate.<sup>23</sup>

Beyond this problem of supply, there were also difficulties with demand. Despite the fact that steam engines had been in use for over a century, most nineteenth-century Americans had only a rudimentary understanding of the physical processes that governed steam power. The science of thermodynamics was still in its infancy and many people, often those who operated steam engines, fervently believed in myths about the causes of steam engine accidents. Publications were more effective in expanding the state of knowledge than in getting all steamboat operators and builders to believe and use it. Vessel owners and engineers were often reluctant to adopt new equipment and follow safer practices.

Despite these limitations, over time the investigations and publications probably enlightened at least some of their intended audiences, and pointed the way for steamboatmen to adopt better practices and use improved safety devices, which had a positive impact on vessel safety.

## ***2. Environment and Infrastructure: Print Culture, Government Printing and Technological Knowledge***

Disseminating documents on steam was part of a vital print culture that accompanied a commitment to government printing and an effort to publish information on public affairs and technology. The public printing, that is printing that was ordered by the government and done at public expense, served as an instrument of the national government's efforts to disseminate information about steam power, but was only a small

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<sup>23</sup> This should not be surprising in a democratic republic where lawmakers were influenced by their desire to serve particular popular constituencies.



part of a larger project where Congress regularly printed many copies of documents on a wide variety of subjects.<sup>24</sup> Congressmen used some of these documents in Washington, but they also mailed many to their constituents using the franking privilege, the legal right every congressman and select members of the executive branch had to send out mail for free.<sup>25</sup>

The government printed huge numbers of documents every year and the numbers increased over time. Testifying before a committee of the House of Commons in 1853, an agent of the Smithsonian noted that

the federal government issued each of its papers in 1,500 copies, but in every session ... about ten to twenty documents received publicity unmatched by any parliamentary literature. Printed in large editions of between 5,000 to 100,000 copies, they were allocated through congressional representatives and senators to hundreds of libraries, learned associations, and athenaeums. As a matter of law, Washington sent some of its most lavish print productions to state governments, colleges, and incorporated literary institutions, mostly historical societies.<sup>26</sup>

The Parliamentary committee praised the fact that by gathering information and distributing documents without charge, the U.S. (and state governments) served as part of an educational system of schools, libraries and other institutions to diffuse knowledge throughout the country.<sup>27</sup> While

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<sup>24</sup> The best brief overview of this topic can be found in Frankel, *States of Inquiry*, Chapter 2. See also Sarah Jordan Miller, "The Depository Library System: A History of the Distribution of Federal Government Publications to Libraries of the United States from the Early Years of the Nation to 1895" (Ph.D. dissertation, Columbia University, 1980).

<sup>25</sup> John, *Spreading the News*, 58, 251. Congressmen claimed that the franking privilege provided a reasonable means to distribute documents. On franking out copies of annual reports of the Patent Office, see *CG*, 31<sup>st</sup> Cong., 1<sup>st</sup> sess. Mar. 7, 1850, 473-75. For an impassioned defense of the franking privilege, where one congressman claimed that the "Government is a great educational apparatus, and its most beneficent operation is that in which it diffuses knowledge in reference to all matters that relate to [the] public interests among the people," see the remarks of Representative Charles Wentworth Upham in favor of extending the franking privilege to the superintendent of the Coast Survey. Upham pointed out the benefits to commerce and to the security of life that Americans enjoyed as a result of the Survey's work and that his proposal would make it much easier to send out documents that were both useful and popular. *CG*, 33<sup>rd</sup> Cong., 1<sup>st</sup> sess., Jan. 24, 1854, 245. Act of February 2, 1854, Ch. 8, "An Act Granting the Franking Privilege to the Superintendent of the Coast Survey, and the Assistant in Charge of the Office of Said Coast Survey."

<sup>26</sup> Frankel, *States of Inquiry*, 72.

<sup>27</sup> *Ibid.*, 73-74.

fostering this system, the national government “paid incessant tributes to the informative value of [its] publications, whether the knowledge released was expected to guide the decision-making process in the national legislature or the choices individual citizens had to make in the marketplace.”<sup>28</sup>

Within the federal establishment, Congress played the most important role in the growth of government publishing. Most government documents were issued in the “Congressional Series” and published or purchased by order of either house of Congress.<sup>29</sup> Congress usually initiated the inquiries that led to the documents and, with the constitutional power of the purse, appropriated the money to pay for them. It determined most of what would be printed and hired private firms to print the documents until the Government Printing Office began operating in 1861.<sup>30</sup>

An important reason for the growth of government printing was that there were fewer procedural barriers to publish a document than to pass a law. All it took was for the House or Senate to pass a nonbinding resolution, which did not require the approval of the other house or

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<sup>28</sup> Ibid., 32.

<sup>29</sup> Merritt, *The United States Government as Publisher*, 3.

<sup>30</sup> Jerrold Zwirn, “Federal Printing Policies, 1789-1861,” *Government Publications Review*, 7A/3 (1980): 179. Congress produced only a modest number of documents up until Thomas Jefferson’s presidency, and until the late 1810s, the format and quality of materials varied greatly, and editorial oversight of the content left much to be desired. See August. A. Imholtz, Jr., “The Printing and Distribution of the Serial Set: A Preliminary Contribution to 19<sup>th</sup>-Century Printing,” *DTTP: Documents to the People* 31/1 (2003): 8. Some of this was due to the undeveloped condition of the new national capital after the government relocated there in 1800. Large printers had been available when the capital was in New York and Philadelphia, but when the seat of government was moved to the District of Columbia, it was difficult for several years to find print shops capable of doing the work. See Culver Smith, *The Press, Politics and Patronage: The American Government’s Use of Newspapers, 1789-1875* (Athens, GA: The University of Georgia Press, 1977), 3. There was no uniform classification system or method to ensure that government documents were distributed to everyone who was supposed to get them, and this created problems until the mid-1810s. Members of Congress often complained about the high cost and poor quality of the printing. See Robert E. Kling, Jr., *The Government Printing Office* (New York, NY: Praeger Publishers, 1970), 10. The Printing Act of 1819 addressed some of these problems, but it also meant that government printing contracts became very profitable in subsequent decades. The cost of printing declined as technology improved while government reimbursement stayed the same. This may have increased the support among congressmen for publishing documents, since legislative spoilsmen could endorse government printing as a way to reward printers who supported a particular party or faction within the party. See Imholtz, “Printing and Distribution,” 13; Frankel, *States of Inquiry*, 74; and Smith, *Press, Politics, and Patronage*, especially chapters 6–9 and 12–15.

of the president. Most printed material was authorized by resolutions in either house of Congress and paid for out of their contingency funds or money that Congress had appropriated for the public printing.<sup>31</sup> A majority in either house could send a document to the printer and print extra copies. Most questions of printing never even came to a roll call vote and proposals to print documents were generally approved by unanimous consent and without debate, though often on the recommendation of a designated committee. As a result, the House and the Senate quickly authorized most resolutions for printing the usual number of documents and extra copies. Of the eighty documents produced from 1824 to 1852 concerning steam vessel accidents, only one of them was contested in a roll call vote in Congress.<sup>32</sup>

Congress increased the number and quality of documents it printed after the War of 1812 as individuals and interest groups solicited the government to disseminate information more widely.<sup>33</sup> For example, settlers, speculators, and politicians who favored western expansion called for additional copies and wide distribution of the reports composed by government exploring expeditions.<sup>34</sup> The government responded to these requests, sponsored investigations and printed documents. Members of Congress franked out thousands of them.<sup>35</sup>

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<sup>31</sup> Frankel, *States of Inquiry*, 316 n. 2.

<sup>32</sup> See Appendix B: 32<sup>nd</sup> Cong., 1<sup>st</sup> sess., Feb. 6, 1852, S. Misc. Doc. 32. Among the eighty steamboat-related documents, there were four other times when the Congress did not print what a member had requested. In one case, the Senate approved printing only 10,000 out of the requested 30,000 extra copies of a document. See 30<sup>th</sup> Cong., 2<sup>nd</sup> sess., Jan. 8, 1849, S. Exec. Doc. 18. In two other cases, the House of Representatives declined to print extra copies of a document: 24<sup>th</sup> Cong., 1<sup>st</sup> sess., March 1, 1836, H. Doc. 162, and 26<sup>th</sup> Cong., 1<sup>st</sup> sess., Jul. 10, 1840, H. Rept. 651. In both of these instances, the motion to print was not defeated, but the session ended before the issue was addressed; see *HJ*, 24<sup>th</sup> Cong., 1<sup>st</sup> sess. Mar. 2, 1836, 444 and *HJ* 26<sup>th</sup> Cong., 1<sup>st</sup> sess., Jul. 10, 1840, 1255. In one other case, a report was referred to a committee, but was never ordered printed; see *HJ*, 24<sup>th</sup> Cong., 2<sup>nd</sup> sess. Dec. 20, 1836, 76.

<sup>33</sup> For instance, as professional librarians organized themselves in mid-century, they lobbied Congress to distribute more copies of public documents and U.S. statutes. See Susan Lee Grabler, "Government Information of, by and for the People: The Changing Mission of the American Library Association's Public Documents Committee, 1876-1956," *Journal of Government Information* 22/1 (1995): 46.

<sup>34</sup> Frankel, *States of Inquiry*, 26.

<sup>35</sup> When a document was ordered printed, both the Senate and the House of Representatives printed a standard quantity referred to as the "usual number" of documents. Many of these documents were kept by congressmen for

The growth of government bureaucracy also increased the number and demand for government documents.<sup>36</sup> Some administrators advocated printing and distributing copies of the reports they were producing. Alexander Dallas Bache, Superintendent of the Coast Survey, realized that one method to cultivate support from members of Congress was to make sure that they received copies of the Survey's reports where they could read about the good work accomplished by the bureau.<sup>37</sup> The Coast Survey reports provided positive publicity that supporters could use to justify further appropriations. It became standard procedure for Congress to order thousands of extra copies of the Survey's annual report.<sup>38</sup>

Commercial groups clamored both for the Coast Survey reports and for more extensive information about the subject of trade. By 1836 the House of Representatives was ordering 10,000 extra copies of the annual report on commerce and navigation. Representative Gideon Lee stated that not only was the report

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their own use, though some were routinely sent out to states, newspapers, designated individuals, libraries and other outside organizations. Congress increased the usual number of printed documents as the country grew, though not in direct proportion to the expanding number of states and congressmen. By the mid 1840s, during the second session of the twenty-eighth Congress, the Senate's "usual number" of documents was 1214 copies of documents, 770 copies of public bills, and 554 copies of private bills. For the House, the usual number was 1380 copies of documents and reports and 600 copies of bills by 1847. Many documents were printed in much larger numbers as the Senate and House ordered thousands of extra copies of certain documents, such as the President's Annual Message. See Imholtz, "Printing and Distribution," 10-11.

<sup>36</sup> Frankel, *States of Inquiry*, 8.

<sup>37</sup> Hugh Richard Slotten, "The Dilemmas of Science in the United States: Alexander Dallas Bache and the U.S. Coast Survey," *Isis*, 84 (1993): 31. Bache was one of the most prominent scientists in the country, he was an excellent administrator, and his own reputation and that of the survey was likely helped by the positive press coverage they received. In an 1852 article portraying life in Washington City, *Harper's New Monthly Magazine* praised the Survey and commended Bache for his "able superintendence." *Harper's New Monthly Magazine* 6/31 (Dec. 1852): 11.

<sup>38</sup> *CG*, 34<sup>th</sup> Cong., 1<sup>st</sup> sess. Feb. 14, 1856, 413. By the mid-1850s, Bache had run the Survey for over a decade and he could count on supporters in Congress to help him get documents printed and make the case for funding the Survey. Bache's lobbying and adept use of the Survey's reports helped garner enough congressional support to keep it under civilian control when in the 1840s and 1850s some members of Congress attempted to transfer it to the Navy Department. In 1856, the Senate and House ordered 10,000 extra copies each of the Survey report. See *CG*, 34<sup>th</sup> Cong., 1<sup>st</sup> sess., Feb. 18, 1856, 441. Six thousand of the extra copies were reserved for the use of House members, while four thousand were designated for distribution by Bache as the Superintendent of the Survey. Democratic Senator and Chairman of the Commerce Committee Hannibal Hamlin attested in 1856 that many men of commerce asked for the report and he was confident that the Coast Survey office could distribute them efficiently.

required by every merchant and trader ... but was no less required by every farmer, planter and manufacturer. This paper recorded truly and faithfully the commercial transactions of this great nation, detailing, item by item, the quantity and value of our annual imports and exports. ... Every man, of every trade and profession should have it. Ten thousand copies were usually printed, and he was informed ... that this number had fallen far short of the pressing demands.<sup>39</sup>

Boards of trade in port cities also lobbied the government to publish commercial information. In 1856, the Boston Board of Trade wrote Congress that it intended to create a library. The best way to promote commerce, they said, was to collect and make available statistics on products, manufactures, imports, and exports, as well as information on “navigation laws, treaties, and commercial regulations and usages of the United States and of the world.” The Board asked Congress to send them documents on these subjects and to also send them to every other board of trade and chamber of commerce that requested them.<sup>40</sup> Requests like this were in tune with the demands to have the government gather and provide access to facts that would more accurately describe society.<sup>41</sup> Political theorist Francis Lieber wanted the national government to gather information systematically and disseminate it widely.<sup>42</sup>

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<sup>39</sup> *RD*, 12, pt. 4, 24<sup>th</sup> Cong., 1<sup>st</sup> sess., May 28, 1836, 4068. In the 31<sup>st</sup> Congress, Senator John Davis sponsored a law that mandated that 20,000 copies of the Commerce & Navigation report for the use of Congress and the Treasury Department would be printed annually. See *An Act to Provide for the Printing of the Annual Report of Commerce and Navigation*, 31<sup>st</sup> Cong., 1<sup>st</sup> sess., Sept. 16, 1850, 9 Stat. L. 459. Ch. 55. See also the discussion in the Senate: *CG*, 31<sup>st</sup> Cong., 1<sup>st</sup> sess., Jun. 27, 1850, 1304-1305.

<sup>40</sup> *Memorial of the Boston Board of Trade to the U.S. Senate referred to the Joint Committee on the Library*, 34<sup>th</sup> Congress, Feb. 18, 1856, Records of the Joint Committees of Congress, RG 128, NA. See also the following petitions to the Senate on the same topic referred to the Joint Committee on the Library in the same folder: *Petition of the Board of Trade of Pittsburgh* (Feb. 29, 1856), *Memorial of the Board of Trade of Baltimore* (undated - c. Mar. 1856), *Memorial of the Board of Trade of Philadelphia* (Mar. 3, 1856), *Memorial of the Cleveland Board of Trade* (Mar. 17, 1856), *Memorial of the New Orleans Chamber of Commerce* (undated - c. Mar. 1856), and *Memorial of the Portland Board of Trade* (May 31, 1856).

<sup>41</sup> Others believed that there was, in a parallel to the laws of physical science, a science of humanity and “that these laws, part at least, [were] discoverable.” Joseph Henry to [Thomas Sparrow?], Aug. 15, 1846, in Marc Rothenberg, ed., *The Papers of Joseph Henry, Volume 6, Jan. 1844-Dec. 1846: The Princeton Years* (Washington, DC: Smithsonian Institution Press, 1992), 497f. The word “statisticks” came into use to describe the type of information that measured various forms of human activity and enterprise. Patricia Cline Cohen, “Statistics and the State: Changing Social Thought and the Emergence of a Quantitative Mentality in America, 1790-1820,” *The William and Mary Quarterly*, 3<sup>rd</sup> Series, 38/1 (Jan. 1981): 36-37.

<sup>42</sup> *Memorial of Francis Lieber ... Relative to Proposals for a Work on the Statistics of the United States*, 24<sup>th</sup> Cong., 1<sup>st</sup> sess., Apr. 18, 1836, S. Doc. 314. See John, *Spreading the News*, 8-9.

As time went on, Congress created more documents and printed more copies of popular ones. Despite the fact that technological advances were making printing less expensive, the portion of the national budget dedicated to the public printing increased faster than the overall budget as additional documents were printed and distributed. During a ten-year period from 1846-1856, for example, the amount the government spent on printing rose from about \$86,000 to over \$500,000, increasing almost 6½ times, while overall outlays by the federal government rose about 2½ times in the same period. The actual amount spent on printing was likely much larger—these figures greatly underestimate the costs since they do not include the expenditures for specialized printing services like engraving and lithography, and do not consider the amount of money it took for the Post Office to deliver government documents sent via the franking privilege.<sup>43</sup>

The United States also sent documents to institutions that would make them available to the public. After 1813, as a precursor to the depository library system, Congress increased the usual number of copies of documents it printed and sent them to governors and legislatures, universities and colleges in each state, with an additional copy to go to state historical societies.<sup>44</sup> It also passed

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<sup>43</sup> Smith, *The Press, Politics, and Patronage*, 253. The exact cost of the government documents was \$86,269.35 in 1845-46 and \$552,189.86 in 1855-56, though, as noted, this does not include the many thousands of dollars spent on additional services like engraving, lithographs, and electrotypes. Total outlays for the federal government in 1845-46 were \$27,767,000 and for 1855-56 were \$69,571,000. See *Historical Statistics of the United States: Colonial Times to 1970, Part 2* (Washington, DC: Bureau of the Census, 1975), 1114. By 1860, opponents estimated that the franked documents cost the Post Office Department \$1.8 million dollars and introduced a bill to abolish the franking privilege. A majority of the House Committee examining the bill, led by Ohio's Clement Vallandigham, defended the practice. They argued that the franking privilege was used by other nations, and that it had been in place in North America since colonial times and had been sanctioned by the framers of the Constitution. The main purpose of the Post Office was to allow public officers to communicate public business, and these duties should be paid for out of the "common treasury, because the expenditure is for the common good." The committee members conceded that there were abuses in the system, but also contended that the speeches and other documents sent from Washington served to instruct the public and that the practice of transmitting newspapers for free through the mails underlay the practical application of press freedom. See *Franking Privilege [To accompany S. 35]*, 36<sup>th</sup> Cong., 2<sup>nd</sup> sess., Dec. 6, 1860, H. Rept. 1, 5, 9.

<sup>44</sup> Imholtz, "Printing and Distribution," 9-10.

a law to send copies of the House and Senate *Journals* and other Congressional documents to libraries.<sup>45</sup>

Citizens were interested in receiving the information and, with the development of an extensive public sphere, were prepared to use it.<sup>46</sup> Both the demand and the supply of printed information increased rapidly in the first half of the 1800s. A mass consumer culture developed where readers sought inexpensive amusement and writers sought to attract popular audiences.<sup>47</sup>

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<sup>45</sup> Miller, "Depository Library System," 13. Some observers wanted to also make additional documents more accessible to the public, such as reports by the cabinet departments, treaties with foreign governments, presidential messages, congressional committee reports, laws and resolutions, Supreme Court opinions, as well as documents produced by the states. One concerned citizen petitioned Congress to propose that these and other documents should be deposited and stored at every county seat in the nation. See *Petition of William Brent, Jr., of Virginia for a More General Distribution of the Printed Documents and Laws of the United States*, 25<sup>th</sup> Cong., 1<sup>st</sup> sess., Sept. 14, 1837, S. Doc. 30.

<sup>46</sup> By the time of the Revolution, the vast majority of adult New Englanders, 95%, were literate. Both New England women and men were almost universally literate by 1850. While literacy was not as extensive in other parts of the country, many groups in the Middle and Southern colonies and states also valued learning and great numbers of them could read. See Edward E. Gordon and Elaine H. Gordon, *Literacy in America: Historic Journey and Contemporary Solutions* (Westport, CT: Praeger Publishers, 2003), 7 and 21 and chapters 2 and 3. The demand for written material and the ability to decipher it increased as people needed to know more about what was going on in distant areas in order to conduct business. The generation of Americans born during and after the Revolution became even more literate, in part because of the advance of the market economy. See Joyce Appleby, *Inheriting the Revolution: The First Generation of Americans* (Cambridge, MA: Harvard University Press, Belknap Press, 2000), 91. See also Kenneth L. Sokoloff and Stanley L. Engerman, "History Lessons: Institutions, Factors Endowments, and Paths of Development in the New World," *Journal of Economic Perspectives* 14/3 (Sum. 2000), 229. The "public sphere" refers to the fact that the country had popular forums to communicate ideas and exchange information, large numbers of people participated in these exchanges, there was an "infrastructure" of printers, presses and publications and a "market" for material. See Alfred D. Chandler, Jr., "The Information Age in Historical Perspective" in Alfred D. Chandler, Jr. and James W. Cortada, eds., *A Nation Transformed by Information: How Information Has Shaped the United States from Colonial Times to the Present* (New York, NY: Oxford University Press, 2000), 5, and Richard D. Brown, "Early American Origins of the Information Age" in Chandler and Cortada, eds., *A Nation Transformed*, 41. Increased interest and participation in public affairs accompanied the greater availability of printed material. See Ronald P. Formisano, "State Development in the Early Republic: Substance and Structure, 1780-1840," in Byron E. Shafer and Anthony J. Badger, eds., *Contesting Democracy: Substance and Structure in American Political History, 1775-2000* (Lawrence, KS: University Press of Kansas, 2001), 8; and Gordon S. Wood, *The Radicalism of the American Revolution* (New York, NY: Alfred A. Knopf, 1992). A mass audience developed for news. American leaders argued that it was necessary for the people to be well informed, so that they could defend their rights and select public officials who would serve as effective guardians of their liberties and interests. See Brown, "Early American Origins," in Chandler and Cortada, eds., *A Nation Transformed*, 44-47. For a more detailed discussion, see Richard D. Brown, *The Strength of a People: The Idea of an Informed Citizenry in America, 1650-1870* (Chapel Hill, NC: University of North Carolina Press, 1996), chapter 3.

<sup>47</sup> David Chapin, *Exploring Other Worlds: Margaret Fox, Elisha Kent Kane, and the Antebellum Culture of Curiosity* (Amherst, MA: University of Massachusetts Press, 2004), 5. Increasing numbers of professional authors who made their livings from their writing also expanded the amount of printed material. See Frankel, *States of Inquiry*, 8, 77.

The reform efforts associated with the Second Great Awakening also helped to expand print culture.<sup>48</sup> By the 1830s and 1840s advances in technology made it cheaper to produce newspapers and other periodicals, making them more accessible to wider audiences.<sup>49</sup> Americans were stimulated by “patriotism, religion, recreation and trade” to establish and seek out “newspapers, printed sermons, organizational tracts and specialized journals that entertained and edified.”<sup>50</sup> The 1850 census reported that there were 2,800 newspapers and periodicals in the country with a circulation of about 5 million and aggregate copies of approximately 422 million.<sup>51</sup>

Political contests in the early national and antebellum periods contributed to the expansion of print culture and increased the amount of printed material by and about the government.<sup>52</sup> The rivalry between Jacksonians and National Republicans in the 1820s boosted people’s attention to the government and debates about public policy led to production of more written material. The U.S. developed an expanded electorate of “voter-readers” and partisan

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<sup>48</sup> Frankel, *States of Inquiry*, 7. Evangelical groups regularly printed huge amounts of material, made mass mailings, and also supported improvements in papermaking and printing technology. David Paul Nord, “The Evangelical Origins of Mass Media in America,” *Journalism Monographs*/88 (May, 1984), 6-39. For some, the steam printing press seemed more than just an object of increased mechanical efficiency, but an instrument of God’s will as it facilitated spreading His word, supported the democratic tendency toward equality, and brought social and moral progress. See Ronald J. Zboray, “Antebellum Reading and the Ironies of Technological Innovation,” *American Quarterly* 40/1 (Mar. 1988): 68.

<sup>49</sup> Newspapers that previously sold for 6 cents now cost a penny and cheap novels could be had for a little as a dime. See Starr, *Creation of the Media*, 124, and Frank Luther Mott, *American Journalism: A History of Newspapers in the United States through 250 Years, 1690 to 1940* (New York, NY: The Macmillan Co., 1941), 215, 314-16. The use of the stereotyping process and the steam press speeded up production as machines replaced people in many skilled tasks and New York became the “print capital of the United States” by 1845. See Sean Wilentz, *Chants Democratic: New York City and the Rise of the American Working Class, 1788-1850* (New York, NY: Oxford University Press, 1984), 129.

<sup>50</sup> Appleby, *Inheriting the Revolution*, 91.

<sup>51</sup> 1851 Report of the Superintendent of the Census, *ACG*, 25, 32<sup>nd</sup> Cong., 1<sup>st</sup> sess., 1852, 78.

<sup>52</sup> Smith, *Press, Politics and Patronage*, Chapter 2. Paul Starr, *The Creation of the Media: Political Origins of Modern Communications* (New York, NY: Basic Books, 2004), 79-80. Newspapers and pamphlets became weapons in the contests between the Federalists and Antifederalists and the Jeffersonian Republicans as they opposed the Washington and Adams administrations in the 1790s.



papers worked hard to publicize the party line, cement voter loyalties, and get them to the polls.<sup>53</sup>

By 1840, both the Democratic and Whig parties had developed a national system of elected officials, newspaper editors, and activists disseminating speeches, newspapers, and pamphlets.<sup>54</sup>

Americans drew ideological sustenance for their commitment to distribute information about the government from eighteenth-century ideals “that demanded government accountability, open debate, and public scrutiny of the affairs of state.”<sup>55</sup> Some national leaders wanted to distribute news about governmental affairs because they believed that the people required as much information as possible to oversee their representatives and hold elected officials accountable for their actions.<sup>56</sup> By the late eighteenth century, it was becoming conventional wisdom among American leaders that a democratic republic needed to keep its citizens well informed about their government.<sup>57</sup> This attitude continued well into the nineteenth century. One representative, writing in 1848 on behalf of the House Committee on the Post Office and Post Roads, stated that the government should continue to aid the circulation of newspapers and periodicals. According to him, it was consistent

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<sup>53</sup> Frankel, *States of Inquiry*, 8, and Joel H. Silbey, *The American Political Nation, 1838-1893* (Stanford, CA: Stanford University Press, 1991), 54-55.

<sup>54</sup> Joel H. Silbey, ed., *The American Party Battle: Election Campaign Pamphlets, 1828-1876*, vol. 1: 1828-1854 (Cambridge, MA: Harvard University Press, 1999), x-xiv. See also Frankel, *States of Inquiry*, 77. The parties produced and distributed thousands of documents attempting to reach the widest possible electorate. See Michael F. Holt, *The Rise and Fall of the American Whig Party: Jacksonian Politics and the Onset of the Civil War* (New York, NY: Oxford University Press, 1999), 237. Select items, such as floor speeches on platform issues, were printed as pamphlets and distributed as campaign documents via the congressional franking privilege. For example, in the 1840 election, the Whig Party reportedly printed over a million copies of John Davis’s Senate speech against the subtreasury plan supported by President Martin Van Buren and the Democrats. See the entry for “John Davis” in James Grant Wilson, John Fiske and Stanley L. Klos, eds. *Appleton’s Cyclopaedia of American Biography*, Bk. 1 (New York, NY: D. Appleton and Company, 1887-1889).

<sup>55</sup> Frankel, *States of Inquiry*, 9.

<sup>56</sup> Walters, “Whose Vision,” 356. Members of the House of Representatives sent circular letters to the constituents to keep them informed about their activities. See Noble E. Cunningham, Jr., ed., *Circular Letters of Congressmen to their Constituents, 1789-1829* (Chapel Hill, NC: University of North Carolina Press, 1978).

<sup>57</sup> John, *Spreading the News*, chapter 2. See also Ridley R. Kessler, Jr., “A Brief History of the Federal Depository Library Program: A Personal Perspective,” *Journal of Government Information*, 23/4 (1996): 370.

with the principles of our republican institutions, which can be best sustained by the diffusion of knowledge and the due encouragement of a universal national spirit of inquiry and discussion of public events through the medium of the public press.<sup>58</sup>

Public-private partnerships developed to facilitate this process.<sup>59</sup> Most readers probably experienced government proceedings and documents through the numerous passages reprinted as “long excerpts in the daily press and reviews in journals.”<sup>60</sup>

Americans did not rely entirely on the medium of print to disseminate information about technology and founded organizations such as mechanics institutes. The institutes, which were most active from the 1820s through the 1850s, were among the many educational institutions “including lyceums, mercantile libraries, apprentice libraries, and young men’s institutes,” designed “to provide educational opportunities to what many viewed as a woefully undereducated populace.”<sup>61</sup>

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<sup>58</sup> *Newspaper Subscriptions*, 30<sup>th</sup> Cong., 1<sup>st</sup> sess., Mar. 9, 1848, H. Rept. 325, 1. It became a standard sentiment among politicians and editors that knowledge should be diffused widely throughout the population to help citizens advance their interests, serve as watchdogs over the government, and keep the nation together. See *The United States Democratic Review* 22/120 (Jun. 1848): 495. Government policies helped create the conditions that made this consensus possible as the widespread distribution of national news through the mails helped create a greater sense of nationalism. See John, *Spreading the News*, 56.

<sup>59</sup> Smith, *The Press, Politics and Patronage*, Chapter 3. After Jefferson was elected president, Samuel Harrison Smith pioneered the practice of recording floor speeches in the House and Senate, and printing them in his paper, the *National Intelligencer*. He also received government printing contracts. Smith’s successors expanded his project.

<sup>60</sup> Frankel, “Potholes,” 141. Periodicals, such as *Niles’s Weekly Register* published detailed accounts and selected excerpts of congressional activities. See Mott, *A History of American Magazines, Volume 1: 1741-1850* (Cambridge, MA: Harvard University Press, 1939), 269. Newspapers used a goodly portion of their available space to write about Congress and the President and played a large role in circulating “information emanating from Washington.” See Frankel, *States of Inquiry*, 77. Americans paid attention to national issues, and the Congress responded by producing more documents to inform and influence the people. See John, *Spreading the News*, 198-99. Which branch of government got the most coverage in newspapers depended on the electoral season. A study of Cleveland newspapers from 1820 to 1876 shows that the press tended to focus on Congressional floor proceedings and other legislative actions while Congress was in session; the presidency received proportionally more attention during presidential election years. Samuel Kernell and Gary C. Jacobson, “Congress and the Presidency as News in the Nineteenth Century,” *The Journal of Politics* 49/4 (1987): 1016-35.

<sup>61</sup> Stephen P. Rice, *Minding the Machine: Languages of Class in Early Industrial America* (Berkeley, CA: University of California Press, 2004), 43-44. The institutes were dedicated to providing opportunities for self-improvement to members of the working class. The most famous example was the Franklin Institute of Philadelphia, which was founded in 1824. The Institute’s founders took their cues from an international movement that began in Scotland and England. The Institute attempted to diffuse knowledge and encourage improvements in

### 3. “*The Power of Acting Intelligently*”

As time went on, the government expanded the range and depth of its inquiries and, as Margo Anderson has written, “Americans called for new institutions to support a more complex and integrated economy. In the 1830s and 1840s, the infant statistical community had begun to press for the creation of a more professional national statistical system.”<sup>62</sup> Proponents of government reports on technology argued that printing them was a comparatively modest way to promote the interests of mechanics and farmers. Besides, people wrote to their congressmen asking for copies of reports and appreciated receiving them. The prevailing sentiment was that the people needed and wanted to know more, not less, and printing and distributing documents was a means to achieve this goal.

As one example, members of Congress expanded the information that was gathered and published in the census. Senator John Davis served on a committee for the 1850 census and received a letter suggesting that it ought to include information on domestic conditions, occupations, manufacturing, physical condition, education, crime, agriculture, mining, machinery, internal improvements, commerce, and insurance.<sup>63</sup> The census, argued Davis’s correspondent, “is essentially the true friend of the people ... the government extends a knowledge of all, and all alike have access to its developments which cannot prove otherwise than a fruitful source of practical suggestions, leading to new sources and objects of enterprise

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the mechanic arts through popular lectures, displays of models, a library and awarding prizes for useful improvements. See Bruce Sinclair, *Philadelphia’s Philosopher Mechanics: A History of the Franklin Institute, 1824-1865* (Baltimore, MD: Johns Hopkins University Press, 1974), chapter 1. The Institute also published a journal which was, its subtitle proclaimed, “devoted to mechanical and physical science, civil engineering, the arts and manufactures, and the recording of American and other patented inventions.” See *JFI* 22/4 (Oct. 1836): 217.

<sup>62</sup> Margo J. Anderson, *The American Census: A Social History* (New Haven, CT: Yale University Press, 1990), 32.

<sup>63</sup> “Letters addressed to the Hon. John Davis Concerning the Census of 1849, by Nahum Capen and Jesse Chickering,” 30<sup>th</sup> Cong., 2<sup>nd</sup> sess., 1849, S. Misc. Doc. 64, 7-19.

and industry.”<sup>64</sup> Representative William Strong contended that census information also served the same purpose as having a Library of Congress; that is, it existed “to inform members of Congress – to aid them in the discharge of their duties as legislators, to give the power of acting intelligently.”<sup>65</sup> Strong thought that citizens should have similar opportunities to use government information and the 1850 census included more data than any previous census.<sup>66</sup>

Small government, cost-conscious, and strict-constructionist opponents sometimes objected to the growth of government printing, but won, at most, only temporary victories, and enough members supported the public printing that it continued to expand. The overall sentiment among most members of Congress was that it was appropriate to print large numbers of documents and send them out at the public expense. Senator John P. Hale remarked in 1850 that he had “opposed propositions [to print extra copies of documents] so often and so unsuccessfully that really I feel disheartened.” Hale went on to say that

although we daily hear lectures from all sides of the house about our extravagance in printing, yet there are continually presented wise propositions for extra

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<sup>64</sup> 30<sup>th</sup> Cong., 2<sup>nd</sup> sess., 1849, S. Misc. Doc. 64, 2. Expanding the census was part of an international movement to find more precise ways to describe society. Joseph Kennedy, the superintendent of the 1850 Census, was sent to Europe to study their methods of gathering and presenting information. He attended meetings of statistical societies in England and the Statistical Council of Belgium, and supported organizing an international conference to work toward more uniform statistical measurements among nations. See the 1851 Report of the Superintendent of the Census, *ACG*, 25, 32<sup>nd</sup> Cong., 1<sup>st</sup> sess., 1852, 79-81. Davis’s Senate committee eventually reported a bill designed to see that the census takers would gather and report more data. See *Report of the Select Committee, Raised Upon the Subject of the 7<sup>th</sup> Census*, 30<sup>th</sup> Cong., 2<sup>nd</sup> sess., 1849, S. Rept. 323.

<sup>65</sup> *ACG*, 31<sup>st</sup> Cong., 1<sup>st</sup> sess. Apr. 25, 1850, 1298. Strong was a Democrat from Pennsylvania.

<sup>66</sup> *CG*, 30<sup>th</sup> Cong., 2<sup>nd</sup> sess. Mar. 1, 1849, 627; *ACG*, 31<sup>st</sup> Cong., 1<sup>st</sup> sess. May 1, 1850, 1245; *CG*, 31<sup>st</sup> Cong., 1<sup>st</sup> sess., Feb. 4, 1850, 286, 287, 288. The 1850 census created more categories and included more information than any other census before it. Despite opposition in both the House and Senate, Congress approved the expanded census. In Mar. 1850, by a vote of 29 to 16, the Senate defeated an amendment that would have confined the census purely to enumerating the inhabitants of the U.S. Eight Democrats, mostly from the north and west, joined with twenty Whigs and a Free Soiler to sustain the broader census, while fourteen Democrats, a Whig and a Free Soiler voted for enumeration alone. See *SJ*, 31<sup>st</sup> Cong., 1<sup>st</sup> sess., Mar. 15, 1850, 216-17 and *CG*, 31<sup>st</sup> Cong., 1<sup>st</sup> sess. Mar. 15, 1850, 540. The party affiliations are taken from the *Biographical Directory of the United States Congress, 1774-2005* (Washington, DC: Government Printing Office, 2006). Nine senators—six Democrats and three Whigs—did not vote in this roll call.

printing, which find somebody to claim an exception for them from the charge of extravagance, and despite all of the lectures on economy, they are adopted.<sup>67</sup>

The House and Senate required printing committees to review documents before they were printed. While these committees sometimes limited the numbers of copies, they did not stem the tide running in favor of producing more documents. Senator Solon Borland of Arkansas, chairman of the Committee on Printing, explained that the members of the committee wanted to see expenditures “curtailed.” He noted, however, when the committee members recommended printing extra copies, they were merely conforming “to what appeared to be the evident sense of the Senate ... in favor” of additional printing.<sup>68</sup>

The government printed many documents concerning steamboats and steam power, sometimes with thousands of extra copies (Appendix B). In the first large publication, the House printed 6,000 extra copies of an 1832 document which included the results of French experiments that charted how quickly pressure rose in heated boilers. The committee that assembled the report wrote that these facts were “matters of interest, and are worthy to be communicated to the public, from which much scientific and practical information can be derived by those engaged in constructing and navigating steamboats.”<sup>69</sup> In 1836 the House published the results of a five-year investigation into the causes of steam boiler explosions. In 1838, the House printed 10,000 additional copies of a document that included hundreds of pages of testimony on the causes of steamboat accidents. In 1849, the Senate printed 10,000 extra copies of an evaluation by the

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<sup>67</sup> *CG*, 31<sup>st</sup> Cong., 1<sup>st</sup> sess., Jul. 20, 1850, 21, pt. 2: 1423. Despite his protests, Hale himself was not above franking out materials to his friend, abolitionist Theodore Parker, when Parker requested copies of bills, Western surveys, the Patent Office Annual Report and a report on Commodore Perry’s voyage to Japan. See George E. Carter, “Theodore Parker and John P. Hale,” *Dartmouth College Library Bulletin* 13 (Nov. 1972): 18, 19, 20, 25.

<sup>68</sup> *ACG*, 32<sup>nd</sup> Cong., Special sess., Mar. 11, 1851, 422. Borland said that if the committee had recommended printing a small number of popular documents like the Patent Office report, he was sure that the Senate would soon increase the number because of “the great demand for it and the general desire on the part of the Senators to have it for distribution.”

<sup>69</sup> 22<sup>nd</sup> Cong., 1<sup>st</sup> sess., May 18, 1832, H. Rept. 478, 2.

Commissioner of Patents on the reasons for boiler explosions and the efficacy of devices designed to prevent or mitigate them.<sup>70</sup> One senator proposed that this report be disseminated throughout the country and a copy be placed on board “every steamboat in the United States.”<sup>71</sup> The Senate in 1852 published a lengthy study by a steam engineer who had investigated the practices and machinery of steamers on the western river system and ordered 5,000 extra copies for distribution. The document included technical specifications of the author’s inventions and contained information that Senator John Davis used to compose the 1852 Steamboat Act.<sup>72</sup>

Government publications on steamboats were part of the huge number of documents that Congress ordered printed on the subjects of agriculture and the mechanical arts.<sup>73</sup> It distributed information about cultivating and processing crops,<sup>74</sup> and in 1832 the House and Senate published 7,000 extra copies of a report by the British House of Commons regarding designs for steam carriages.<sup>75</sup> Technology was developing all the time and Congress hoped that the report and others like it would encourage the creativity of U.S. inventors.<sup>76</sup>

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<sup>70</sup> 24<sup>th</sup> Cong., 1<sup>st</sup> sess., Mar. 1, 1836, H. Doc. 162; 25<sup>th</sup> Cong., 3<sup>rd</sup> sess. Dec. 13, 1838, H. Doc. 21; 30<sup>th</sup> Cong., 2<sup>nd</sup> sess. Jan. 8, 1849, S. Exec. Doc. 18.

<sup>71</sup> *CG*, 30<sup>th</sup> Cong., 2<sup>nd</sup> sess., Jan. 8, 1849, 187.

<sup>72</sup> 32<sup>nd</sup> Cong., 1<sup>st</sup> sess., Feb. 6, 1852, S. Misc. Doc. 32.

<sup>73</sup> In the early nineteenth century, the phrases “the mechanical arts” and the “agricultural arts” were the closest equivalents for the modern term “technology.”

<sup>74</sup> For agricultural enthusiasms and distribution of information on farming by the government during this period, see Paul W. Gates, *The Farmer’s Age: Agriculture, 1815-1860* (New York, NY: Holt, Rinehart and Winston, 1960), chapters 14 and 15, and John Alfred Hietmann, *The Modernization of the Louisiana Sugar Industry, 1830-1910* (Baton Rouge, LA: Louisiana State University Press, 1987). These documents complemented the many periodicals that dealt with mechanical innovations. See Peter D. McClelland, *Sowing Modernity: America’s First Agricultural Revolution* (Ithaca: Cornell University Press, 1997), 207; Walter A. McDougall, *Throes of Democracy: The American Civil War Era, 1829-1877* (New York, NY: Harper Collins, 2009), 131; and Rice, *Minding the Machine*, 16.

<sup>75</sup> *HJ*, 22<sup>nd</sup> Cong., 1<sup>st</sup> sess., Feb. 16, 1832, 362. *SJ*, 22<sup>nd</sup> Cong., 1<sup>st</sup> sess., Feb. 17, 1832, 142. For more on the House of Commons report, see Francis T. Evans, “Roads, Railways and Canals: Technical Choices in 19th-Century Britain,” in Terry S. Reynolds and Stephen H. Cutcliffe, eds., *Technology in the West: A Historical Anthology From Technology and Culture* (Chicago, IL: University of Chicago Press, 1997), 225.

<sup>76</sup> Observers often commented on the remarkable progress of the age, that once questionable visions were nearing reality after short periods of time. Hezekiah Niles noted that in the late 1780s Oliver Evans had advocated

The Patent Office also worked to “stimulate invention” and to diffuse “technological knowledge.”<sup>77</sup> Legislators believed that the national government could encourage technical advances by making information more widely available to inventors and the general public. A 1793 law required that patent applicants submit working models with their applications. Inventors realized that they could review Patent Office records to learn from the work of others. To construct the first reliable and commercially successful steamboat, Robert Fulton studied existing knowledge on the subject.<sup>78</sup> Fulton had a draftsman copy “all the specifications and drawings of mechanical boats on file at the Patent Office” to help him design his own vessel.<sup>79</sup> The Patent Law of 1836 expanded the right to review the materials in the Patent Office, giving access to all of the office’s drawings and specifications to anyone who paid a copying fee.<sup>80</sup>

After a fire destroyed the Patent Office building in 1836, Senator John Ruggles argued that the destroyed models should be replaced and their replacements exhibited. Ruggles believed that “specifications, models, and drawings” served as sources of ideas and inspiration “so that anyone can apply [their] principles to practical use, or make them the foundation of further improvements.”<sup>81</sup>

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using steam to propel land vehicles, but was “pretty nearly voted down as a madman” when he applied to the Pennsylvania legislature for aid. *NWR*, Aug. 31, 1833, 5.

<sup>77</sup> Naomi Lamoreaux and Kenneth L. Sokoloff, “Long-Term Change in the Organization of Inventive Activity,” *Proceedings of the National Academy of Science USA*, 93 (Nov. 1996): 12687. It was relatively inexpensive to get a patent in the U.S. in comparison to other countries, and this encouraged inventors to apply for patents. Because they could profit from it, inventors had incentives to disseminate their plans “as widely as possible” by selling their own products and trading with others. Networks of patent solicitors and inventors grew up around the Patent Office to facilitate trading technical knowledge.

<sup>78</sup> James Thomas Flexner, *Steamboats Come True: American Inventors in Action* (reprint, Bronx, NY: Fordham University Press, 1992), 281-82.

<sup>79</sup> Daniel Preston, “The Administration and Reform of the U.S. Patent Office, 1790-1836,” *Journal of the Early Republic* 5 (1985): 337, 339, 340f, 342.

<sup>80</sup> Preston, “Administration and Reform:” 337.

<sup>81</sup> 24<sup>th</sup> Cong., 2<sup>nd</sup> sess., S. Doc. 58, 3. The Office also intended to display manufactured articles in order to demonstrate the quality of America’s industrial products, both to increase their commercial appeal and as a measure

Despite the fact that public officials wanted to provide and disseminate technical information, their ambitions frequently brushed up against limits on expenditures imposed by Congress's rule of parsimony, the goal to operate the government as frugally as possible.<sup>82</sup> The number of models supposed to be housed in the Patent Office increased, for example, as Americans applied for greater numbers of patents and despite the fact that many Americans were interested in its activities, Congress did not provide adequate funds to allow the Patent Office to fulfill its statutory mandate to display models of the patented devices.<sup>83</sup>

Despite the budgetary and space constraints, the Patent Office came to serve as an important nexus to disseminate information about technology.<sup>84</sup> Congress printed the Annual Report of the Commissioner of Patents and distributed it to encourage use of innovations and to give inventors ideas for further improvements. The report trumpeted the achievements of American ingenuity and declared that they were the happy result of the "equal rights and

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of national pride in technological accomplishment. See *Report of the Commissioner of Patents ... during the Year 1843*, 28<sup>th</sup> Cong., 1<sup>st</sup> sess., 1843, S. Doc. 150, 2-3.

<sup>82</sup> Leonard White, *The Jacksonians: A Study in Administrative History, 1829-1861* (New York, NY: Macmillan Co., 1954), 154-56.

<sup>83</sup> The model room had insufficient space to display the models within a few years after the new Patent Office building was completed, *Report of the Commissioner of Patents Showing the Operations of the Patent Office during the year 1843*, 28<sup>th</sup> Cong., 1<sup>st</sup> sess., 1844, S. Doc. 150, 2.

The building quickly became so crowded that in the 1840s the Commissioner of Patents had to leave boxes of specimens from the South Seas exploring edition commanded by Charles Wilkes unopened and untouched. Because of the lack of space the Commissioner also declined to accept many samples of American products, even those of high quality that the office would have otherwise been proud to display. In 1844 Commissioner Henry Ellsworth asked Congress to enlarge the building to accommodate the proliferation of models. See *Report of the Commissioner of Patents showing the operations of the Patent Office during the year 1844*, 28<sup>th</sup> Cong., 2<sup>nd</sup> sess., Jan. 28, 1845, S. Doc. 75, 2.

Some members of Congress spoke passionately on behalf of extending the building so that both the patented and rejected models could be displayed in a manner required by law. See *CG*, 31<sup>st</sup> Cong., 1<sup>st</sup> sess., Sept. 23, 1850, 1941. So many models were crammed into the building by the early 1850s that they could not be exhibited to good effect. 32<sup>nd</sup> Cong., 1<sup>st</sup> sess., 1852, S. Exec. Doc. 118, 12. According to the Commissioner, it reached such a state of congestion that it was difficult to keep many models "from serious injury" or protect the delicate ones from "positive destruction."

<sup>84</sup> Steven W. Usselman and Richard R. John, "Patent Politics: Intellectual Property, the Railroad Industry, and the Problem of Monopoly," *The Journal of Policy History*, 18/1 (2006): 103.



privileges” extended to everyone under the laws and the Constitution.<sup>85</sup> In addition to listing the patents issued every year, beginning in the late 1830s the office compiled and published information on innovations in agriculture and the mechanical arts.<sup>86</sup> The annual report included sections on metallurgy, steam and gas engines, navigation and marine implements, and other fields.<sup>87</sup> Many inventors sought patents for safety equipment for steamboats and steam engines, such as safety valves, spark arrestors, life preservers, and devices to fend off snags.<sup>88</sup>

In 1843, Senator John C. Calhoun protested that the Commissioner of Patents was assuming responsibilities beyond his powers. Calhoun thought that the growth and dissemination of the Patent Office Annual Report was a sign of creeping centralization and evidence that the Patent Office was assuming the extra-legal responsibilities of a home department. He could not sanction, he said, government patronage “of agriculture, or any other interest.”<sup>89</sup> Lawmakers also complained about the expense of printing the documents and objected that the public did not really desire them and could not possibly find them useful. Despite these protests, majorities of the members supported printing the documents.<sup>90</sup> By 1852, the Patent Office annual report was an enormous publication. That year it ran over 1,000 pages

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<sup>85</sup> *Report of the Commissioner of Patents ... 1844*, 28<sup>th</sup> Cong., 2<sup>nd</sup> sess., S. Doc. 75, 5.

<sup>86</sup> 28<sup>th</sup> Cong., 2<sup>nd</sup> sess., 1844, S. Doc. 150, 3.

<sup>87</sup> 28<sup>th</sup> Cong., 1<sup>st</sup> sess., 1844, S. Doc. 150, 5-6, 248-333.

<sup>88</sup> *Ibid.*, 348-50.

<sup>89</sup> *CG*, 27<sup>th</sup> Cong., 3<sup>rd</sup> sess. 1843, 252. Despite Calhoun’s objections, the Senate ordered 1,000 additional copies of the report to be printed in addition to the usual number. In the House, Democrat William Smith of Virginia also objected that the report was too expensive and that its subject matter of the report was “extra-official and out of the sphere of this government.” The House ordered 10,000 extra copies of the report over Smith’s objections. See *Ibid.*, 266.

<sup>90</sup> *CG*, 21, 31<sup>st</sup> Cong., 1<sup>st</sup> sess. Mar. 7, 1850, pt. 1: 475. See also similar comments by Albert G. Brown of Mississippi in *CG*, 33<sup>rd</sup> Cong., 1<sup>st</sup> sess., May 10, 1854, 1145. For a detailed debate in the House of Representatives on the propriety and usefulness of printing the Patent Office report, see *CG*, 31<sup>st</sup> Cong., 1<sup>st</sup> sess. Mar. 12, 1850, 503-506. The House voted 113 to 63 to increase to 50,000 the extra number of copies printed of the mechanical section of the report and 100,000 extra copies of the agricultural section of the report. See *HJ*, 31<sup>st</sup> Cong., 1<sup>st</sup> sess. Mar. 12, 1850, 657.

and the House and Senate combined to order over 200,000 extra copies of the report, making it one of the largest imprints in the United States.<sup>91</sup>

Beyond disseminating information so that Americans could take advantage of improvements in technology, the government contemplated taking additional steps to educate steam engineers. In 1838, an army officer, Major Charles Mapes, proposed establishing a government-funded national school for engineers.<sup>92</sup> A few years later, Congress introduced a bill to appropriate \$20,000 to set up schools in Cincinnati and St. Louis, but the measure died in the House.<sup>93</sup>

Other groups advocated founding a national school for steam engineers and suggested a system where the only ones who would be permitted to manage vessels would have at least three years of experience or a diploma from the school.<sup>94</sup> In his investigation into the problem of steamboat disasters in 1848, Commissioner of Patents Edmund Burke recommended similar

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<sup>91</sup> 32<sup>nd</sup> Cong., 1<sup>st</sup> sess., 1852, S. Exec. Doc. 118, Part 1: Arts and Manufactures and Part 2: Agriculture; the Senate ordered 17,000 extra copies of the Arts and Manufactures report and 32,500 extra copies of the Agriculture report. 32<sup>nd</sup> Cong., 1<sup>st</sup> sess., 1852, H. Exec. Doc. 102, Part 1: Arts and Manufactures, Part 2: Agriculture; the House ordered 60,000 extra copies of the Arts and Manufactures report and 110,000 extra copies of the Agriculture report.

<sup>92</sup> Given that it was difficult to get people to change their practices simply by reading about best practices, establishing a school might have offered an effective method to raise the standards for steamboat engineers and secure greater safety on the waters. Mapes's plan to train engineers appears to have been modeled on the U.S. Military Academy. He wanted to draw students of at least 16 years of age from every congressional district who would then undertake a 5-year program. The institution would have a well-equipped machine shop, salaried instructors, and its program would include lectures on topics in science related to the engineering profession. After graduation, the students would be commissioned as "assistant steam-engineers" with the opportunity to move up to become "steam-engineers" after they had gained two years of experience and could demonstrate professional competence before a board of examination. Only commissioned engineers would be permitted to oversee steam engines on passenger steamers, mail steamers or locomotives. See 25<sup>th</sup> Cong., 3<sup>rd</sup> sess. 1838, H. Doc. 21, 246, 250-52.

Cincinnati steam engineer Lewis Warden suggested that individual states could charter institutions to educate engineers "in a more thorough knowledge of [their] business." *Documents Relating to the Protection and Preservation of Passengers ... from Steamboat Accidents*, 31<sup>st</sup> Cong., Special sess., Mar. 15, 1849, S. Doc. 4, 15.

<sup>93</sup> Appendix A: H.R. 71, 28<sup>th</sup> Cong., 1<sup>st</sup> sess. H.R. 71. See *HJ*, 28<sup>th</sup> Cong., 1<sup>st</sup> sess., Jan. 18 and Mar. 7, 1844, 256 & 534. Kentucky Democratic Congressman John Tibbatts was the author of the measure.

<sup>94</sup> *Report and Memorial of the Board of Trade of the City of Wheeling on the Subject of Steam Boat explosions on the Western Waters*, Feb. 11, 1848 (referred Feb. 14, 1848), Committee on Commerce, Petitions and Memorials Referred to Committees, Various Subjects, Folder 1 of 3 (HR 30A-G4.7), 30<sup>th</sup> Cong., Records of the House of Representatives, RG 233, NA.

prerequisites, apparently modeled on the requirements for physicians in the army and navy, where the engineers would train and then be licensed by the government after they had been tested for competence.<sup>95</sup>

The proposal to create a national school for steam engineers resembled similar types of intervention where government-educated and trained experts were employed on public works projects. The government had been providing army engineers to work on internal improvements since the 1820s, though they worked in areas that required expertise in topographical and civil engineering, mostly to survey lands and supervise transportation projects.<sup>96</sup>

The government also struggled with how to train steam engineers for the naval service.<sup>97</sup> As early as 1826, the Secretary of the Navy noted that steam-driven ships would become an increasingly important part of national defense and that the United States should make them a part of the fleet.<sup>98</sup> In 1841, Navy Secretary Abel P. Upshur wanted to convert the navy from sail

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<sup>95</sup> Jerry L. Mashaw, "Administration and 'The Democracy': Administrative Law from Jackson to Lincoln, 1829-1861," *Yale Law Journal* 117/8 (Jun. 2008): 1636. Some members of Congress thought that engineers did not require more knowledge, but instead needed "judgment, and precaution ... with a moderate degree of skill, [which] are the grand requisites in good engineers; and any greater knowledge of the sciences than they now possess ... would prove of no greater practical utility to them than the knowledge of the expansive force of gasses to the soldier in safely loading his musket." *Report of the Committee on Commerce ... relative to the safety of passengers on board of vessels propelled in whole or in part by steam*, 30<sup>th</sup> Cong., 1<sup>st</sup> Sess., Feb. 29, 1848, H. Rept. 260, 2 (Appendix B).

<sup>96</sup> Robert G. Angevine, "Individuals, Organizations, and Engineering: U.S. Army Officers and American Railroads, 1827-1838," *Technology and Culture* 42/2 (Apr. 2001): 298. The Military Academy trained more engineers than the army needed and legislation passed in 1824 authorized the President to direct engineers to work on "civilian projects of national importance."

<sup>97</sup> Secretaries of the Navy commented that an ideal education for naval midshipmen would combine both "scientific" and "practical" aspects. By this, they meant that officers needed knowledge of academic subjects including mathematics, navigation, astronomy, geography, languages and international law, but also hands-on knowledge of seamanship. Annual Report of the Secretary of the Navy, Dec. 7, 1830, *ASP*, 3: 758. See also *ASP*, 3: 54; *ASP* 4: 352, and *ACG*, 25<sup>th</sup> Cong., 3<sup>rd</sup> sess., Nov. 30, 1838, 6. The idea of instituting a naval academy to match the military academy at West Point had been discussed for some time when President John Quincy Adams proposed establishing a naval school, but the Senate defeated the effort in 1827. However, beginning in the 1830s, secretaries of the navy began to regularly ask Congress to authorize an academy.

<sup>98</sup> An armed steamship was ordered for the Navy during the war of 1812, but it never saw service. See Annual Report of the Secretary of the Navy, showing the condition of the navy in the year 1826, *ASP*, 2/319: 727.

to steam, experiment with the screw propeller, and develop explosive shells for naval guns.<sup>99</sup> While a political conservative, Upshur was forward-looking in his views on modernizing the navy. He pushed to adopt technical improvements and to train personnel to use them.<sup>100</sup> Upshur noted that using steam war vessels would require officers to have greater “scientific knowledge” and urged that naval schools be established on the model of the Military Academy to give officers exposure to both scientific theory and mechanical practice.<sup>101</sup> As the Navy Department added steam vessels it also undertook a long-term program to cultivate mechanical expertise within the service. By 1854, it was establishing a machine shop at the naval academy and making sure that a steam vessel would be available to train midshipmen in practical engineering.<sup>102</sup>

But even with these precedents, the chances were slim that the government would have founded a school for civilian steamboat engineers. The Pittsburgh Board of Trade pointed out that, though they were concerned about steamboat accidents and wanted to promote practical and

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<sup>99</sup> Norma Lois Peterson, *The Presidencies of William Henry Harrison and John Tyler* (Lawrence, KS: University Press of Kansas, 1989), 151-52.

<sup>100</sup> “Report of the Senate Committee on Naval Affairs on the Establishment of a Naval School, May 14, 1836,” *NASP, 8: Social History & The Navy and Science*, Wilmington, Delaware: Scholarly Resources, Inc., 1981, 234-35. The naval academy was eventually established by order of Naval Secretary George Bancroft in 1845, though Congress tacitly accepted its creation. See Secretary of the Navy George Bancroft to Commander Franklin Buchanan, Aug. 7, 1845, *Ibid.*, 246. Before this, even without a regular educational institution for the navy, the service moved forward in fits and starts to adopt and integrate steam technology into the fleet and the navy yards. It also moved to train its personnel to support this mission, as when Navy Secretary David Henshaw asked for appropriations to establish a laboratory at the Washington navy yard and to employ a pyrotechnist and a chemist to test and develop materials. See “Report of the Secretary of the Navy,” Nov. 25, 1843, in *Message From the President of the United States to the Two Houses of Congress, at the Commencement of the First sess. of the Twenty-Eighth Congress*, 28<sup>th</sup> Cong., 1<sup>st</sup> sess., Dec. 5, 1843, S. Doc. 1, 481.

<sup>101</sup> 1841 Report of the Secretary of the Navy, *ACG*, 27<sup>th</sup> Cong., 2nd sess., 1841, 22. The navy had fallen behind European nations during the 1830s. Britain and France were motivated to update their navies by their longstanding rivalry and the United States lacked a military opponent in its hemisphere that might have spurred it to greater efforts. See Kurt H. Hackemer, *The U.S. Navy and the Origins of the Military-Industrial Complex, 1847-1883* (Annapolis, MD: Naval Institute Press, 2001), 5.

<sup>102</sup> 1854 Report of the Secretary of the Navy, in *ACG*, 33<sup>rd</sup> Cong., 2nd sess., 24. By the late 1850s, one observer noted with approval, the Navy was broadening its capacities beyond purely military duties, so that it could foster technological innovation in times of peace, as well as defend the nation in time of war. Navy vessels, he wrote, could “be made the means of promoting science and fostering improvements, without a departure from its legitimate purposes” *The United States Democratic Review* 41/2 (Feb. 1858): 103, 107.

theoretical knowledge of steam engineering, they feared that opponents would raise constitutional objections to establishing a government school, and this made founding one unlikely. The Board also thought that “local jealousies” would arise that would compromise the school’s usefulness. The Board advised that a more practical measure would be for mechanics and engineers in western cities to form their own organizations and educate themselves.<sup>103</sup>

Some steamboat engineers formed associations, such as the Pittsburgh Mutual Aid Society of Steam Boat Engineers, which was founded in 1848. Members thought that employing incompetent engineers was a major cause of steamboat accidents and they intended to “elevate the character and standing of engineers.” The group planned to evaluate and classify engineers according to their knowledge and experience, and would form a board to investigate the causes of accidents.<sup>104</sup>

Endorsing these engineering associations, one commentator thought that engineers would become more professional and competent if they met regularly to discuss “the principles of the engine and the causes of explosions.” Congress might, he suggested, aid these groups by supplying them with experimental apparatus and appointing boards of examiners to help judge

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<sup>103</sup> *Documents Relating to the Protection and Preservation of Passengers ... from Steamboat Accidents*, 31<sup>st</sup> Cong., Special sess., Mar. 15, 1849, S. Doc. 4, 4.

<sup>104</sup> Constitution of the Pittsburgh Mutual Aid Society of Steam Boat Engineers (Johnson and Stockton: Pittsburgh, 1848) in Papers of the Senate Committee on Commerce, Various Subjects, 31<sup>st</sup> Cong., (Sen31A-E2), Records of the Senate, RG 46, NA. The quotation is from page 12. The Cincinnati Association of Steamboat Engineers recommended forming a board of qualified engineers in every port of entry in the United States and that they should be able to make rules to govern their own qualifications and practices as long as they did not conflict with the laws of the states or the U.S. See *Document Relative to Steamboat Explosions*, 27<sup>th</sup> Cong., 3<sup>rd</sup> sess., 1843, H. Doc. 145, 14. The engineers also related their views of the circumstances that led to explosions and gave an overview of safe practices for operating a high-pressure steam engine.

Depending on private associations and other “cooperative institutions” to provide certain types of public services—in this case to ensure the proliferation of competent personnel and the safety of the traveling public—resembles Herbert Hoover’s intent in the 1920s for “a type of private government” to serve national needs. See Hawley, “Herbert Hoover, the Commerce Secretariat,” 117. See also William J. Novak, “The Legal Transformation of Citizenship in Nineteenth-Century America” in Meg Jacobs, William J. Novak and Julian E. Zelizer, eds. *The Democratic Experiment: New Directions in American Political History* (Princeton, NJ: Princeton University Press, 2003), 102-3.

the competence of engineers. Over time, engineers would be able to blend science with practical knowledge and elevate the profession, gaining greater mastery over their mechanical charges and prevent boiler explosions.<sup>105</sup> By 1848, *Scientific American* noted that associations of steam engineers were proliferating in cities along the Ohio and Mississippi Rivers and that though the intentions of these organizations were good, they were “inefficient” and needed reorganization.<sup>106</sup>

#### ***4. Government Investigations and Publications about Steam Accidents***

Steamboat accidents, particularly boiler explosions, raised a number of questions related to science and technology. Why did they happen? Could they be prevented by improving vessel designs and machinery? Could better knowledge of the causes of explosions alter how vessels were operated, and lead to greater safety? Government investigations into accidents provided testimony, data, and suggestions for how to reduce the dangers.<sup>107</sup>

There were two main types of steam engines used in the United States during this period, low-pressure engines on the Boulton and Watt model and high-pressure engines of the type invented by Oliver Evans. High-pressure engines, because of their lighter weight and proportionally greater power, were commonly used on the shallow rivers of the West. They also made greater economic sense in that region where higher credit rates made it difficult to finance the capital costs of the larger and more expensive low pressure engines, while inexpensive fuel

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<sup>105</sup> Cadwallader Evans, *A Treatise on the Causes of Explosions of Steam Boilers with Practical Suggestions for their Prevention* (Pittsburgh, PA: William H. Whitney, Printer, 1850), 17-18.

<sup>106</sup> “Explosions of Steam Boilers,” *SA* 3/20, Feb. 5, 1848, 157.

<sup>107</sup> The best overview of the causes of steam boiler explosions and the theories extant at the time can be found in Hunter, *Steamboats*, 289-304. See also John G. Burke, “Bursting Boilers and the Federal Power,” *Technology and Culture* 7/1 (Winter 1966): 1-23.

made it less important that the engine be energy efficient.<sup>108</sup> But because the high pressure engines confined a huge amount of energy into a small space, the boilers could burst with remarkable violence.

Congress began to look into the matter of steam vessel disasters when the high-pressure steamboat *Aetna* exploded in New York harbor in May 1824.<sup>109</sup> Though some members of Congress rushed to blame the incompetence and recklessness of the steamboat operators, others saw it as a mechanical problem and proposed a technical fix. Representative Samuel Vinton of Ohio introduced a resolution that would have forbidden the use of high-pressure engines by denying a license to any steam vessel that used one.<sup>110</sup> It was late in the session and the House eventually postponed the bill and never took it up again.<sup>111</sup> However, the House also asked the Secretary of the Treasury to investigate and report on the causes of the disasters and what measures would provide greater safety.<sup>112</sup> Congress subsequently sponsored dozens more inquiries.

Congress paid less attention to the issue from 1825 through 1829 as reduced numbers of deadly accidents made the problem less urgent. This changed in 1830 when a House select committee, with Charles Wickliffe of Kentucky as chairman, began to look for ways to protect the lives of passengers from bursting boilers.<sup>113</sup> The members became interested after the explosion of the steamboat *Helen McGregor* at Memphis, Tennessee in February 1830. The

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<sup>108</sup> Harlan I. Halsey, "The Choice between High-Pressure and Low-Pressure Steam Power in America in the Early Nineteenth Century," *Journal of Economic History* 41/4 (Dec. 1981): 725.

<sup>109</sup> Sinclair, *Philosopher Mechanics*, 173.

<sup>110</sup> Hunter, *Steamboats*, 290.

<sup>111</sup> *HJ*, 18<sup>th</sup> Cong., 1<sup>st</sup> sess., May 19, 1824, 544, and May 24, 1824, 576.

<sup>112</sup> *Ibid.*, May 26, 1824, 599.

<sup>113</sup> *HJ*, 21<sup>st</sup> Cong., 1<sup>st</sup> sess. 1830, 473, 509. Wickliffe had earlier advocated river improvements and also wanted to use steamboats to deliver the mail.

blast killed between thirty and sixty people, which was the greatest loss of life due to a boiler explosion up to that time. This was only one of many deadly accidents that year, as 14 explosions killed 189 people.<sup>114</sup>

Wickliffe's select committee reported a bill, but also asked the Secretary of the Treasury to gather data about steam navigation and report any information useful to enacting regulations to prevent boiler explosions.<sup>115</sup> The bill made no progress, but the Treasury Department formulated a set of questions, sent them out to people who had a working knowledge of steam, and reported back to the House. Treasury Secretary Samuel Ingham also discovered that the Franklin Institute had independently begun its own investigation. The Secretary and the Institute agreed to cooperate and Ingham made \$1,500 available to fund experiments by the Institute.<sup>116</sup>

The arrangement between the national government and the Franklin Institute was a nice marriage of the government's desire for knowledge with the expertise provided by an independent organization that could conduct technical research.<sup>117</sup> This was the first time that the government cooperated with a private research institution to carry out this sort of investigation. Beginning in the twentieth century the government would, of course, commonly finance this sort of work. When the Franklin Institute began its inquiry, their members did not have a budget to perform experiments and were undertaking a modest effort to collect facts and

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<sup>114</sup> James T. Lloyd, *Lloyd's Steamboat Directory*, 71; Brown, *Limbs on the Levee*, 29.

<sup>115</sup> *HJ*, 21<sup>st</sup> Cong., 1<sup>st</sup> sess., May 4, 1830, 604-605. Appendix A: H.R. 458, 21<sup>st</sup> Cong., 1<sup>st</sup> sess.

<sup>116</sup> Ingham noted that it had been difficult to gather information about steamboat accidents, in large part because few steamboat owners were reluctant to respond to the department's inquiries. *Letter of the Secretary of the Treasury Transmitting a Report on the Subject of Steam Boilers*, 21<sup>st</sup> Cong., 2<sup>nd</sup> sess., Mar. 3, 1831, H. Doc. 131, 1. See also Bruce Sinclair, *Early Research at the Franklin Institute: The Investigation into the Causes of Steam Boiler Explosions: 1830-1837* (Philadelphia, PA: Franklin Institute, 1966).

<sup>117</sup> In 1830, the Institute was already engaged in an investigation of water power, and this gave key members experience in designing experiments, performing tests, and quantifying the results. See Sinclair, *Philosopher Mechanics*, 149.



testimony about the problem.<sup>118</sup> With the promise of Treasury Department funding, the Institute's committee on the explosion of steam boilers broadened its inquiry to execute a set of experiments on how boilers worked, why they failed, and the strength of materials involved.<sup>119</sup>

The Institute was well suited to embark on the boiler investigation, and the committee that oversaw the experiments boasted skilled mechanics, such as foundry owner and locomotive builder Matthias Baldwin, as well as Frederick Graff, superintendent of the Philadelphia Water Works. Knowledgeable men of science with academic credentials like Alexander Dallas Bache and Dr. Robert Hare were also members of the committee.<sup>120</sup> Bache began as a member of the Institute's boiler investigation committee and soon became chairman.<sup>121</sup> In the early 1830s he was starting a career that would lead him to become a leader in the American scientific community and head of the Coast Survey.<sup>122</sup> With his friend physicist Joseph Henry, he became one of the most prominent and important voices on scientific issues in the country who also held

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<sup>118</sup> Sinclair, *Philosopher Mechanics*, 175. As had the Treasury Department, the Institute had distributed a circular to gather information from people with experience with steam engines.

<sup>119</sup> *Ibid.*, 177. In Chapter 7 Sinclair provides a detailed examination of the Franklin Institute investigation and report. See also, Rice, *Minding the Machine*, 131-32.

<sup>120</sup> Sinclair, *Philosopher Mechanics*, 175, and John K. Ward, "The Future of an Explosion," *American Heritage of Invention and Technology*, 5/1 (1989): 61.

<sup>121</sup> Bache ended up performing a large portion of the labor, devising and conducting experiments and drafting two of the three sections of the final report. He was a rising star in the Philadelphia and national scientific community and had an impressive academic and family pedigree. He had graduated first in his class at the U.S. Military Academy at West Point, which was then the only college in the country with an engineering program. See Sinclair, *Philosopher Mechanics*, 149, 181. The best students at West Point were directed toward the army engineers and Bache served as an army topographical engineer, and then left the service to become a professor and chair of natural philosophy and chemistry at the University of Pennsylvania. By leaving the army, Bache was like many other West-Point educated army engineers who subsequently left the service for jobs in the private sector. See Forest G. Hill, "Formative Relations of American Enterprise, Government and Science," *Political Science Quarterly* 75/3 (Sept. 1960): 410. Bache also, as a great grandson of Benjamin Franklin, was the descendent of the country's most legendary scientist and technological innovator. As the nephew of two senators and the brother-in-law of a Secretary of the Treasury, he also had an entrée into the national political leadership.

<sup>122</sup> As the Superintendent of the Coast Survey, where he served from 1843 through his death in 1867, Bache turned the Survey into the foremost scientific institution in the country. In 1848 he helped found, and subsequently led the American Association for the Advancement of Science. He intended that the professional scientists in its ranks would advise the government on a host of issues related to their areas of expertise. See Sinclair, *Philosopher Mechanics*, 149-50, 175, and Dupree, *Science*, chapter 6, esp. 116.

a position in the national government. Along with some of the other members of the Franklin Institute Committee, he also became part of a group of experts to whom the government turned for advice on issues relating to science and technology.<sup>123</sup> The results of the steam boiler experiments earned Bache an international reputation.

Though President John Quincy Adams's failed to get the government to commit to a national program of scientific investigation and education, Congress enacted piecemeal programs dealing with technical issues in response to particular needs and demands by various constituencies.<sup>124</sup> In the 1830s, 1840s and 1850s, Congress and certain executive departments built relationships with academic experts and private associations, such as the Franklin Institute, from which they procured the services of academics like Bache and Walter R. Johnson.

The Institute's investigation took five years, but their committee, especially Professors Bache and Johnson, the latter of whom did the lion's share of labor on a subcommittee investigating the strength of boiler materials, produced an exceptional amount of data on the reasons for boiler explosions, the characteristics of steam and the strength of metals.<sup>125</sup>

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<sup>123</sup> Others on the Franklin Institute Committee who served the government on different projects included Professor Walter R. Johnson and meteorologist James P. Espy.

<sup>124</sup> A. Hunter Dupree, *Science in the Federal Government: A History of Policies and Activities* (Baltimore, MD: Johns Hopkins University Press, 1986), 39-42. Adams's plans were too ambitious for the time, which was demonstrated when Congress defeated the proposals in his 1825 annual message to build national institutions to support science and the arts. Opponents ridiculed his visionary notions, his supposed anti-democratic sentiments and reserved especial scorn for his plans to build an astronomical observatory. But though the U.S. did not found a school for civil engineering, the engineering education available at the Military Academy provided the country with skilled personnel who conducted surveys of Western lands and oversaw internal improvements. Other military and naval officers received extensive on-the-job training as they worked on the massive project to survey the U.S. coastline. The Coast Survey drew on members of the Army and Navy and helped them develop useful skills in mathematics, physics and surveying. See Dupree, *Science*, 54. See Dupree, Chapter 3 for a full discussion of how the government responded to specific needs rather than a comprehensive plan. Also see A. Hunter Dupree, "Science Policy in the United States: The Legacy of John Quincy Adams," *Minerva*, 28/3 (Autumn 1990): 260-64.

<sup>125</sup> Sinclair, *Philosopher Mechanics*, Chapter 7, and Edwin Layton, "Mirror-Image Twins: The Communities of Science and Technology in 19<sup>th</sup>-Century America," *Technology and Culture* 12/4 (Oct. 1971): 569.

Steam vessel accidents persisted during the early 1830s while the Franklin Institute investigation was underway, and Congress produced its own reports about the problem.<sup>126</sup> A Select Committee of the House of Representatives generated the first large congressional report on steamboat accidents in 1832. In nearly 200 pages, the Committee published a wealth of information, including technical data from experiments on the characteristics of steam by Walter R. Johnson, Dr. John D. Craig of the Patent Office, and a translation of a paper from the French Academy of Sciences, concerning that body's investigation into the characteristics of steam, including its elasticity at high temperatures.<sup>127</sup> The report included theories about the causes of explosions and descriptions of engine designs and safety devices. Together the House and Senate printed 9,000 additional copies for distribution.<sup>128</sup>

The report's insights, strengths, and flaws were characteristic of ones that Congress repeated in subsequent publications. The committee conveyed information, printed testimony from interested parties, and made a number of perceptive observations. However, they also passed along myths and misconceptions about the causes of boiler explosions. Congressmen and administrators, in this case members of the House Select Committee and the Treasury Department, were better at gathering information than they were at sorting through it and determining what was reliable. They repeated popular myths without forcefully debunking them and passed along inaccurate or misleading assessments even when the weight of experimental evidence or scientific principles discredited them.

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<sup>126</sup> The documents that Congress published from 1831-1835 regarding steam vessel accidents included requests by inventors to have Congress test their inventions, a petition by members of a community asking Congress to act to prevent steam vessel disasters and two reports by House committees. See Appendix B.

<sup>127</sup> *Steamboats: Report by the Select Committee*, 22<sup>nd</sup> Cong., 1<sup>st</sup> sess., May 18, 1832, H. Rept. 478.

<sup>128</sup> *HJ*, 22<sup>nd</sup> Cong., 1<sup>st</sup> sess., May 18, 1832, 757; *SJ*, 22<sup>nd</sup> Cong., 2<sup>nd</sup> sess., Mar. 1, 1833, 224. The House ordered 6,000 extra copies, the Senate ordered 3,000.

Congressmen sometimes conceived enthusiasms for particular ideas and projects without making the effort to inform themselves as to whether they were possible or practical. Critics noted that Congress did not always sufficiently distinguish between diffusing useful knowledge and *misinformation*. To be fair, they were making decisions based on an incomplete understanding of how steam engines operated and the relevant physical laws. Steam engines had developed “from the empirical observations of practical men, most of them ignorant of contemporary science.”<sup>129</sup> Even though practitioners of natural philosophy were making strides in understanding thermodynamics and engineers were obtaining a better grasp of the forces they were harnessing, the average user of steam, much less the average legislator, understood it in a limited way, seeing it as a profoundly useful, sometimes dangerous and potentially revolutionary force, but also one that was a bit mysterious. The country lacked effective gatekeepers to vet technical information and, as Donald Scott has noted, “With the partial exception of science and theology, there were few if any clearly bounded ‘communities of the competent’ to which one directed intellectual production and which certified its standing as knowledge and meted out position and prestige.”<sup>130</sup>

The situation of Joseph Henry, one of the country’s leading scientists and later Secretary of the Smithsonian Institution, illustrates some of these issues. Henry used his influence to help scientific institutions in the government and aid his friend and fellow scientist Alexander Dallas Bache. While a professor at Princeton Henry wrote an article in the *Princeton Review* praising the work of the Coast Survey, which was later republished as a separate pamphlet. Henry and

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<sup>129</sup> Dupree, *Science*, 46.

<sup>130</sup> Donald M. Scott, “The Popular Lecture and the Creation of a Public in Mid-Nineteenth-Century America,” *Journal of American History* 66/4 (Mar. 1980): 796.

other leaders of the scientific community strongly desired the Survey to be successful lobbied to have Bache named as Superintendent in the early 1840s.<sup>131</sup>

In 1838 Henry protested against Congress's publishing 5,000 copies of a document about the theories of Henry Hall Sherwood. Sherwood, a physician, described a "new" theory of magnetism and asked for government aid to develop a navigational device based on his theory. Henry objected that not only were Sherwood's theories incorrect, but that by printing many copies of the document the government was implying that it endorsed Sherwood's erroneous conclusions. As a leading member of the growing class of professional scientists, Henry was concerned that too many people used scientific-sounding concepts that were either wrongheaded or deliberately deceitful. To prevent the government from disseminating errant data and make sure that fakirs were not offered government subsidies, he thought that scientific and technical innovations should be reviewed by experts before Congress published documents about them.<sup>132</sup> Some years later he confessed to his friend Bache that he was almost driven to despair when he contemplated the "avalanch[e] of pseudo-science" that fell upon those who were trying to sort through and uphold high standards for scientific knowledge.<sup>133</sup>

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<sup>131</sup> See Joseph Henry to Alexander Dallas Bache, Mar. 15, 1845, in Rothenberg, ed., *The Papers of Joseph Henry*, 6, 250-51 and fn. 2.

<sup>132</sup> Arthur P. Molella and Nathan Reingold, "Theorists and Ingenious Mechanics: Joseph Henry Defines Science," *Science Studies* 3 (1973): 334. See also Joseph Henry to Alexander Dallas Bache, Aug. 9, 1838, in Nathan Reingold, ed., *The Papers of Joseph Henry*, 4, Jan. 1838-Dec. 1840: *The Princeton Years* (Washington, DC: Smithsonian Institution Press, 1981), 98-99; and A. Hunter Dupree, *Science in the Federal Government: A History of Policies and Activities* (Baltimore, MD: Johns Hopkins University Press, 1986), 89-90.

<sup>133</sup> Joseph Henry to Alexander Dallas Bache, Apr. 16, 1844 in Rothenberg, ed., *The Papers of Joseph Henry*, 6, 76. In addition to the fact that Americans inside and outside of government were easily seduced by the claims of scientific charlatans, Henry was also frustrated by the fact that many of his countrymen were skeptical of "the practical utility of basic science." He thought that this situation existed throughout the world, but was particularly true in the United States where mechanics, so he believed, tended to puff themselves up over their own accomplishments, and dismiss theoretical understanding of principles as lacking in practical benefits. As Henry became better known in the country, many inventors wrote to him for his advice and endorsement. Some solicited the impossible, such as help to build devices that employed perpetual motion. To Henry's mind, many of such men were willfully ignorant of scientific principles because they were overconfident from their ability to master nature through technological applications and believed they had no need to understand the underlying truths that governed the operation of mechanical devices.

A great flaw in some of the congressional documents on steam was the tendency to print opinions for which there was little scientific evidence. Like inventors carried away by their theories, or steamboat operators who doggedly stuck with their own beliefs in the face of contrary evidence, government officials sometimes had limited interest and ability to separate truth from fiction. They privileged the testimony of eyewitnesses and the opinions of experienced individuals over experimental evidence and scientific understanding of physical principles.<sup>134</sup> One difficulty with relying on first hand accounts of steamboat disasters was that members of the crew made poor witnesses—they were not disinterested and sometimes, through “mismanagement or want of vigilance,” were responsible for the disasters. They certainly did not have incentive to be forthright when it might reflect badly upon them. Accounts by passengers and observers, on the other hand, were often biased by the fact that they were in a state of shock due to the sudden violence they had experienced or simply had imperfect knowledge of the circumstances that led to the accident. Accounts in the press were frequently not helpful, especially since they tended to focus on the horrors of death and destruction rather than inquire closely as to the causes.<sup>135</sup>

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Henry was proud of the advances in knowledge that were being made by the growing generation of professional scientists and he wanted to make sure that they received their proper due from society. However, his critique of the limitations of practical men was not merely a matter of pride of place, but also borne of fear that, without knowledge of principles, even ingenious mechanics would run out of new ideas and be limited to endlessly repeat existing practices. While Henry had substantial regard for the technical innovations birthed by practical men and thought they played a major role in expanding economic growth and fostering social improvement, he was concerned that without greater scientific understanding such progress could not continue indefinitely. See Molella and Reingold, “Theorists,” 334-35, 337.

<sup>134</sup> Oz Frankel has noted that the standards of proof in most 19<sup>th</sup>-century government investigations reflected “common law methods of determining facts” and included “courtlike” testimony and presentation of evidence rather than employing exacting standards using empirical data and expert opinion. The latter are more characteristic of modern science and the social sciences. See Frankel, *States of Inquiry*, 13.

<sup>135</sup> *JFI*, 22/4 (Oct. 1836): 219. See also *Memorial of Alfred Guthrie, A Practical Engineer*, 32<sup>nd</sup> Cong., 1<sup>st</sup> sess., 1852, S. Misc. Doc. 32, 26.

When Congress or an executive department prepared a report, they usually began with a summary overview where the author(s) set out their understanding and opinions. They then attached selected evidence and testimony that was representative of what had they received or discovered about the topic. The 1832 House select committee report set the pattern for subsequent steam-related documents. The committee provided its views in the introduction, then attached additional information it thought was relevant and interesting, mostly letters from onlookers or participants in steam navigation. Even though they did not vouch for this testimony, they still integrated it into the publication and left it to the “judgment” and “experience” of readers to determine its value.<sup>136</sup> This meant that the investigators sometimes gave a greater priority to gathering testimony than determining if it was accurate and did not base their conclusions on the best available understanding of physical principles. By contrast, making careful experiments, combining them with cutting edge physical knowledge and attempting to make a definitive examination of the issue to separate fact from myth was a primary goal of the Franklin Institute investigation. Even though the investigations such as the Franklin Institute report provided extensive evidence for their conclusions, legislators did not always use this to guide them and substantiate the content of subsequent documents.

The documents Congress printed on steam accidents from 1824-1852 were intended to serve a number of purposes. First, to educate people as to the causes of boiler explosions; second, to provide a set of guidelines to design, build and operate steam engines safely and third, to give examples and ideas for mechanisms that American inventors could use to improve steam engines. They had a mixed record for the first category and better results for the second and third. It is worthwhile to look more closely at these publications and especially at one of the

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<sup>136</sup> *Steamboats: Report by the Select Committee, 22<sup>nd</sup> Cong., 1<sup>st</sup> sess., 1832, H. Rept. 478, 2.*

documents, the Franklin Institute Report of 1836-37, in order to get a clearer idea of the strengths and weaknesses of the print statist campaign to prevent steamboat accidents.

The Franklin Institute took five years to complete the investigation and published its report in three parts in 1836 and 1837. Part One of the report was completed in the summer of 1835. It was a technical report on the experiments that Alexander Dallas Bache and his subcommittee had done to test the causes of boiler explosions. Difficult for the layman to understand because of its specialized bent, it included descriptions of the experiments, diagrams of the testing apparatus and charts and graphs of the data. The investigating committee conducted an exhaustive series of experiments to test popular theories of the causes of explosions. They examined common safety equipment and other inventions. Further, they overloaded and exploded some test boilers to gather additional data. By trying to find definitive reasons why boilers exploded, the Franklin Institute committee hoped to lead “ingenious men” toward useful plans and “away from false suppositions, which can only waste their time and talent.”<sup>137</sup>

Part Two of the Institute’s report was a general report of the committee on the causes of boiler explosions. By far the easiest to read of the three parts, it was written in a clear and accessible style, referred to and interpreted the data in the two other parts of the report and linked the experimental evidence to testimony the committee received from steamboat operators, builders, and special correspondents. Part Three of the report concerned the strength of steam boiler materials.<sup>138</sup> Like the first part of the report, Part Three was highly technical and included diagrams of the apparatus used to test the metals along with tables and graphs containing the

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<sup>137</sup> 24<sup>th</sup> Cong., 1<sup>st</sup> sess., H. Doc. 162, 5. See also *JFI*, 22/4 (Oct. 1836): 218.

<sup>138</sup> Sinclair, *Philosopher Mechanics*, 183. Part Three was not ready until the beginning of 1837, though in Part Two, the general report, Professor Bache sometimes drew upon data that had already been gathered by the tests for Part Three.



experimental data. All three reports were published in installments in the Institute's periodical, *The Journal of the Franklin Institute*.<sup>139</sup>

At the time, there was no definitive answer explaining the causes of steam boiler explosions, but observers had a number of well-founded notions, as well as some misplaced beliefs. The Franklin Institute committee had to contend with some pervasive and potentially deadly myths, the *explosive element myth*, the *low water alone myth* and the *water flashing into steam myth*. As one steamboat engineer later wrote, "absurd opinions sometimes gain circulation, and many persons, without examination, repeat and adopt them" and errant commentators often combined portions or all of these into their accounts and explanations for steam boiler explosions.<sup>140</sup> The *explosive element myth* was the belief that processes in the steam boiler caused an explosive element or compound to form. The most common version of this myth was that when the water interacted with the metal the water decomposed into oxygen and explosive hydrogen.<sup>141</sup> The belief in an explosive element was often combined with the *low water alone myth* to theorize that hydrogen gas formed when water was added to a heated boiler and the water came into contact with the hot metal.<sup>142</sup> The Institute's findings contradicted these beliefs.<sup>143</sup> Dr. Thomas P. Jones, the editor of *the Journal of the Franklin Institute*, wrote in 1837

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<sup>139</sup> Part One, the technical report, was published in the *JFI* 17 (Apr. & May 1836); Part Two, the general report, was published in 18 (new series), Issues 4, 5 and 6 (Oct., Nov. and Dec. 1836). The third part, on the strength of materials, was published in 19 (new series), Issues 2, 3, 4, 5 and 6 (Feb., Mar., Apr., May and Jun., 1837).

<sup>140</sup> Evans, *A Treatise on the Causes of Explosions of Steam Boilers*, 12.

<sup>141</sup> Others hypothesized that an unknown element was present and reasoned by analogy that since steam boiler explosions closely resembled the explosions from gunpowder, "lightning, gas and other explosive matter," that they must have similar causes. See John Clowes, C.E., "On the Causes of Explosions of Steamboat Boilers and the Accidents to the Working Gear of Steam Engines" (New York, NY: W.E. Dean, Printer, 1848), 5-6. See also, Rice, *Minding the Machine*, 131.

<sup>142</sup> See for example, *Report of a Joint Committee of the Legislature of the State of Louisiana on the Petition of J.O. Blair*, 22<sup>nd</sup> Cong., 1<sup>st</sup> sess., 1832, H. Doc. 226.

<sup>143</sup> *JFI* 18/4 (Oct 1836): 230-31. Even in the most extreme circumstances only minute traces of hydrogen separated from oxygen in boilers because, while hydrogen might be formed when the metal of a boiler oxidized,

that, although there continued to be intelligent people who asserted that the explosion of a dangerous gas in steam boilers accounted for the force of some explosions, he had never known any person with knowledge of chemistry who believed this was the case.<sup>144</sup>

Another widespread belief, the *low water alone myth* was especially common in the West and it stated that low water in the boiler was the most important (or only) cause of explosions. One version of the myth was related to the *explosive element myth*, that metal uncovered by water somehow interacted with other elements to produce an explosion. The other version of the myth held that parts of the boiler and flues were uncovered and became overheated when water became low; when the supply was renewed the water contacted the hot metal which caused it to flash into highly expansive steam (the *water flashing into steam* or “*hot metal*” myth) and cause an explosion.<sup>145</sup> Calling this a myth is somewhat of a misnomer, since low water could and did contribute to explosions, though it was not the only, nor the most important, cause.<sup>146</sup>

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these amounts would also be very small, hardly enough to make an impressive explosion. The explosive element theory had, in fact, already been debunked numerous times, including by a panel of experts who investigated the 1833 explosion of the steamer *New England* on the Connecticut River. The panel, which included both academic scientists and steamboatmen, pointed out that formation of hydrogen in such quantities had never been proven and “steam has never been decomposed by heat alone.” They stated that while electricity can separate the hydrogen and oxygen comprising water, merely heating the water would not do it. They wrote that only a small amount of hydrogen could be produced, and it would need a lot of air in order to make it flammable—air that was not available within the boiler. Even if they had been heated to white heat, the *New England’s* copper boilers would never have produced explosive hydrogen gas. The investigators also noted that any hydrogen, even if it had been formed, would have escaped into the atmosphere through the air pump. See *Letter from the Secretary of the Treasury Transmitting ... Information in Relation to Steam Engines*, 25<sup>th</sup> Cong., 3<sup>rd</sup> sess., 1838, H. Doc. 21, 466-67.

<sup>144</sup> To support his point, Jones went on to cite scientific testimony from England and note that explanations had been printed for years in the Franklin Institute *Journal*, in addition to the Franklin Institute report. See Thomas P. Jones to A.B. Quinby, Dec. 10, 1837 in *Petition of A. B. Quinby, praying for an appropriation to test his inventions for preventing the explosions of steam-boilers*, 25<sup>th</sup> Cong., 2<sup>nd</sup> sess., Dec. 14, 1837, S. Doc. 17, 8.

<sup>145</sup> Marion A. Brown, “Mid-Nineteenth-Century Mechanics and Scientists: A Reluctant Alliance,” *Queen City Heritage* 50/2 (Summer 1992): 29. This was widely mentioned as the major reason for explosions, and commentators cited some high authorities to support this belief, including Richard Trevithick, who had designed a high-pressure steam engine in England and testified before the British House of Commons that this was a major reason for disasters. See Petition of James D. Woodside, Dec. 10, 1833, Petitions and Memorials received by Committees, Committee on Naval Affairs (HR23A-G12.2), Records of the House of Representatives, RG 233, NA. Woodside was quoting Trevithick from an account in the Dec. 11, 1833 *National Intelligencer*.

<sup>146</sup> *JFI* 18/5 (Nov. 1836): 290. One problem was that overheated metal, without a supply of water to moderate the heat, lost tensile strength and became more vulnerable to catastrophic failure, even at ordinary working pressures

The third common misunderstanding about the causes of boiler explosions was the *water flashing into steam myth*. One version of this was pushed especially by engineer Jacob Perkins, author of a well-known work on steam, who claimed that overheated boilers could produce steam so saturated with heat that when water was added it was instantly converted to expansive steam that burst the boiler.<sup>147</sup> The Franklin Institute's experiments showed that this was simply wrong—adding water to hot steam reduced the pressure of steam inside a boiler rather than increasing it.<sup>148</sup> Another version was more of a case of misdirection than a myth, and diverted attention from other causes of explosions. While water *could* turn rapidly into steam if exposed to very hot metal from careening or foaming, more explosions were probably caused by a *gradual* increase of pressure, and that was the danger that most needed to be guarded against.

In addition to debunking myths and providing solid evidence for the reasons that boilers exploded, the Franklin Institute report made important observations and set forth guidelines about designing, maintaining, and operating boilers. The committee tested and critiqued various safety devices, and made suggestions for improving them. Boilers needed to be thicker and

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of steam. Another problem was that boiler parts that were unevenly heated expanded and contracted over time, fatiguing the metal, loosening rivets and weakening the integrity of the system. Vessels that had parallel boilers with a common water supply could become endangered when they heeled over as they were being loaded or unloaded, or simply when the vessel was poorly trimmed. Called “careening,” the water would run to the lowest boiler and would rush back to the other boilers when the boat returned to an even keel or heeled in the opposite direction; if it contacted overheated metal it would form highly elastic steam that could expand rapidly and might explode the boiler. See *JFI* 18/4 (Oct. 1836): 228.

Another problem arose when the engine was started and the water was low, the remaining water would tend to foam up inside the boiler bringing it into contact with the hot metal and suddenly convert into steam. Also, an engineer who found that the water in his boilers was low might try to quickly add more water, thereby creating too much pressure as the new water changed rapidly into steam. The belief that low water *alone* caused explosions could also create substantial dangers of its own. When steamboat operators concentrated on keeping the water level high and were less concerned with keeping boiler pressure within safe limits they could, and did, easily explode boilers that had plenty of water in them. Hunter, *Steamboats*, 293-94. While low water in boilers was a danger, but adding water to a hot boiler that had low water probably led to fewer explosions than was commonly believed. See 25<sup>th</sup> Cong., 3<sup>rd</sup> sess., 1838, H. Doc. 21, 103. Steam engineer Elihu Bunker pointed out that since water feed pipes generally came into the bottom of boilers that injecting cold water into hot water would simply cool the water and diminish the expansive power in the boiler rather than increase it.

<sup>147</sup> Sinclair, *Philosopher Mechanics*, 179.

<sup>148</sup> 24<sup>th</sup> Cong., 1<sup>st</sup> sess., March 1, 1836, H. Doc. 162, 25. *JFI* 18/4 (Oct. 1836): 292-93. As designed and built, especially on the Western waters, steam engine boilers were often too thin and made with metal of inferior quality.

made of better quality metal, and made of wrought iron.<sup>149</sup> Safety valves were often poorly maintained, and as a result would not open to release excessive pressure.<sup>150</sup> Valves were regularly too small and could not relieve pressure quickly enough when steam was being generated rapidly.<sup>151</sup> The report recommended that there be two safety valves on every boat, and that one be secured so that it could not be tied down or tampered with in any way.<sup>152</sup> Boilers needed to be cleaned regularly, especially to keep them free of deposits that accumulated from the dirty and unfiltered water that was used in the engine.<sup>153</sup>

Two-thirds of the major explosions on Western rivers took place, as in the case of the *Moselle* in 1838, when vessels were just leaving a landing or were stopped to take on or discharge passengers and cargo.<sup>154</sup> The committee recommended preventing the steam from building up during times when the engine was idling and urged steamboat operators to better maintain their equipment.<sup>155</sup> The committee concluded that racing between steamboats should

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<sup>149</sup> Burke, "Bursting Boilers," 4. In terms of design, the committee recommended that, to strengthen them, boilers should be made of wrought iron, not cast iron or copper, and boiler heads should be from the same material as the rest of the boiler to prevent uneven expansion when heated. See *JFI*, 18/6 (Dec. 1836): 364.

<sup>150</sup> *JFI* 18/4 (Oct. 1836): 223, 227. To help obviate this difficulty, the committee recommended that valves should be designed in a disk form and the disk could not be too much bigger than the valve seat. The valves needed to be repaired when they corroded and also tested frequently to make sure they were in working order. Boilers should also be designed with individual water supplies to prevent the danger of steam being rapidly generated in parallel boilers during careening. See *JFI*, 18/5 (Nov. 1836): 303.

<sup>151</sup> *JFI* 18/4 (Oct. 1836): 224, 229 and *JFI* 18/5 (Nov. 1836): 291.

<sup>152</sup> *JFI* 18/4 (Oct. 1836): 224-25, 227. Gauge cocks, commonly used to check the level of water in boilers, were found to be unreliable indicators of water height and the committee recommended using a glass tube instead. The Institute committee provided a description and diagram to design and build it in a way that would minimize breakage. See *JFI* 18/5 (Nov. 1836): 295-96.

<sup>153</sup> *JFI* 18/5 (Nov. 1836): 299-302; see also 24<sup>th</sup> Cong., 1<sup>st</sup> sess., March 1, 1836, H. Doc. 162, 82-87. Silt and other particles suspended in the water could, over time, form large solid masses baked onto the inside of boilers and interior flues. These would pit the inside of the metal and also cause uneven heating which contributed to metal fatigue.

<sup>154</sup> Hunter, *Steamboats*, 295-96.

<sup>155</sup> See also Evans, *A Treatise on the Causes of Explosions of Steam Boilers*, 37. When boats were stopped the steam was no longer being expended through the engine. Boilers could quickly build up an excess of steam or boil off water so that the water level would get too low; therefore boilers should be kept constantly supplied with water whenever the fire was active, even when the vessel was stopped at a landing. At that time the safety valve should also be left open to release excess pressure. If the water did become low, the engine should not be put in motion and

be forbidden, because in the heat of competition some engineers built up unsafe levels of pressure in the boilers in order to generate more power and gain more speed.<sup>156</sup>

The Franklin Institute committee examined safety devices and recommended that some, such as safety valves, should be required by law.<sup>157</sup> They tested some patented devices, published critiques and made substantive suggestions for ways to improve them.<sup>158</sup> Of the inventions they examined, they found that some were promising, but none were completely reliable.<sup>159</sup> No automatic apparatus could replace the skill and attention of the engineer on watch.

All in all, the Institute's committee reached some important conclusions and provided excellent guidelines for safe operation.<sup>160</sup> They showed that a boiler could burst from gradually increasing the pressure, this could produce extremely violent explosions, and was the most typical reason for boilers to fail.<sup>161</sup> This contradicted the widely held belief that boilers burst solely from the *sudden* generation of steam caused by low water. It also contradicted the

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the boiler should be allowed to cool, sometimes by banking the fires, before adding more water to the boilers. During normal operations, the crew needed to maintain temperature gauges and to allow safety valves to function freely.

<sup>156</sup> *JFI* 22/4 (Oct. 1836): 227.

<sup>157</sup> *JFI* 22/4 (Oct. 1836): 222, 227. An effective pressure gauge was not available for high-pressure engines as of 1836. For low-pressure engines, the committee recommended a mercury gauge. However, the committee noted that its place could be served in a high-pressure engine by a graduated safety valve which would be calibrated to open at predetermined pressures to let the engineer know the force within the engine. High-pressure engines should also have a thermometer to check the temperature inside the boiler.

<sup>158</sup> *JFI* 22/5 (Nov. 1836): 306. The committee tested various fusible plugs, discs of metallic alloy designed to melt at predetermined temperatures and release excess pressure, sound an alarm, or both. The committee also scrutinized two inventions by Pittsburgh inventor Cadwallader Evans. Bache found one of them to be very useful, suggested a way to improve it and provided a detailed description and diagram to help engine builders and inventors to do so. The metals within the plugs tended to separate into their constituent elements when exposed to pressure and thus to melt irregularly. The committee suggested that they be placed within a tube to guard them against exposure to pressure while continuing to transmit the heat. To help do this, they provided a table to indicate the proportions of metals to be used. See *JFI* 18/5 (Nov. 1836): 297-98.

<sup>159</sup> *JFI* 18/5 (Nov. 1836): 294. They looked at various designs for interior floats to measure the height of water within the boiler and could not identify a self-regulating apparatus that would reliably maintain water in the boiler.

<sup>160</sup> Burke, "Bursting Boilers," 13; see Hunter, *Steamboats*, 292-95 for a more general discussion.

<sup>161</sup> See 24<sup>th</sup> Cong., 1<sup>st</sup> sess., March 1, 1836, H. Doc. 162, 75-78.

corollary, also widely held on the western waters that no boiler would explode if it was supplied with enough water.<sup>162</sup>

The Franklin Institute report provided extraordinarily detailed overview of the subject. Many who read it or heard about it, however, did not find it persuasive. Part of the reason lay with the report itself, part lay with how it was disseminated and part lay with the steamboat operators to whom it was directed. First, the national government did not do its utmost to circulate the report. Congress did not print the results of the report quickly or publish many extra copies. This was probably due to the fact that the report was completed and published in portions, rather than as a whole, and because the system of public printing depended on members of the House and Senate to take the initiative to print extra copies of documents.

The investigation had taken more than five years when in 1835 and 1836 Secretary of the Treasury Levi Woodbury pressed the Franklin Institute's committee to complete it. The first part, the technical report, was finished in June 1835 and Woodbury had 500 copies printed for the House and Senate.<sup>163</sup> However, the House of Representatives did not formally receive the first part until nine months later on March 1, 1836. Representative Harmar Denny of Pennsylvania moved to print 5,000 extra copies of the report and managed to get a vote of 88 to 44 in order to suspend the rules of the House to consider the motion. The subject was postponed and the House agreed to print only the "usual number" of 1035 copies.<sup>164</sup> In addition to the

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<sup>162</sup> *JFI* 18/4 (Oct. 1836): 221; also see 24<sup>th</sup> Cong., 1<sup>st</sup> sess., March 1, 1836, H. Doc. 162, 75-78.

<sup>163</sup> Sinclair, *Philosopher Mechanics*, 181.

<sup>164</sup> *HJ*, 24<sup>th</sup> Cong., 1<sup>st</sup> sess. Mar. 1 & 2, 1836, 444-45; *CG*, 24<sup>th</sup> Cong., 1<sup>st</sup> sess. Mar. 2, 1836, 219. Gorham Parks of Maine objected because he wanted to read the report before voting to print extra copies. When Denny tried to have it taken up again on Mar. 22, an objection was raised to considering the matter as the House launched into a lengthy and heated debate on another subject, the value of bank notes issued by the Bank of the United States. The resolution to print the extra copies was not taken up again during that session and no extra copies were ordered printed. See *CG*, 24<sup>th</sup> Cong., 1<sup>st</sup> sess., Mar. 22, 1836, 276.

It is not clear why Representative Denny's attempt to have extra copies printed did not succeed, though it is possible that if he had persevered and continued to raise the subject during the session that he might have gotten

copies printed of the first part of the report, the Treasury Department also asked the Institute to print 350 copies of Part Two, the general report. However, aside from this, neither the second nor the third parts of the report were printed as Congressional documents.<sup>165</sup>

Except for items that were mandated to be printed by law, in order for a house of Congress to print something, a legislator or committee had to advocate for it and the body had to give its consent. Getting government documents printed depended on the attention of at least one advocate within Congress and the good will or acquiescence of the other members. This was usually a routine matter and when a Senator or Representative asked to print a document, the house would often, though not inevitably, grant permission. Both the House and Senate routinely printed committee reports and communications from executive departments.

Considering the number of copies that Congress printed of other steam-related documents, as well as the quality of the work that went into the Franklin Institute Report, it is puzzling and unfortunate that Congress did not order more copies. Without direct evidence, one

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more copies printed at some point. There did not appear to be significant resistance in the House; no legislator made a substantive objection to printing the report and the Mar. 2 vote on the subject, though preliminary, indicates that the House was open to printing extra copies. The Senate also ordered the usual number printed for its chamber. See *Letter from the Secretary of the Treasury Transmitting A Report of the Franklin Institute*, 24<sup>th</sup> Cong., 1<sup>st</sup> sess., Feb. 26, 1836, H. Doc. 162; *SJ*, 24<sup>th</sup> Cong., 1<sup>st</sup> sess., Mar. 1, 1836, 193; and Imholtz, "Printing and Distribution," 10-11.

<sup>165</sup> Sinclair, *Philosopher Mechanics*, 183. The general report arrived in the House in December 1836, near the beginning of the second session of the 24<sup>th</sup> Congress. It was immediately referred to a select committee on steamboat navigation where it stayed for the rest of the session. The committee did not report any bills on the topic. See *HJ*, 24<sup>th</sup> Cong., 2<sup>nd</sup> sess., Dec. 20, 1836, 76. The select committee was chaired by Edward Allen Hannegen of Indiana. The general report was also received by the Senate and referred to the Commerce Committee where, as in the House, the committee did not introduce any related legislation during the session or ask for the report to be printed. See *SJ*, 24<sup>th</sup> Cong., 2<sup>nd</sup> sess. Dec. 19, 1836, 42. Even though the Senate did not take action on the issue during the session, we shall see in Chapter 5, that the Senate used some of the information in it to draft bill S.1 in the 25<sup>th</sup> Congress. For example, when Felix Grundy of Tennessee introduced S.1 on Dec. 6, 1837, it included a provision in Section 7 that would have required steam vessels to continue to supply water to the boilers whenever they stopped, to keep the steam down and to open the safety valve. These were provisions recommended by the Franklin Institute. For the first version of S.1, see *Library of Congress, American Memory, A Century of Lawmaking for a New Nation, Senate Bills and Resolutions*, 25<sup>th</sup> Cong., 2<sup>nd</sup> sess., <http://memory.loc.gov/ammem/amlaw/lwsblink.html>.

The House of Representatives received Part Three of the Institute report, on boiler materials, on Dec. 7, 1837. The report was tabled and not printed by the House. See *SJ*, 25<sup>th</sup> Cong., 2<sup>nd</sup> sess. Dec. 7, 1837, 31. Despite the fact that Congress did not disseminate the final two parts of the report, they remained in the House and Senate where they served the *legislative function* of providing information to shape bills on the subject. See Rice, *Minding the Machine*, 132.

can guess that, after the publication of the first part of the report containing the technical data on boiler explosions, Congressmen believed that they had already printed the most important information from the investigation. Perhaps they therefore felt no sense of urgency to print the subsequent parts. It may have also been that no legislator felt the proprietary interest in the report necessary to motivate them to seek to print more copies. Of the ten Congressional documents on steam from 1824 to 1852 where a legislator requested to have extra copies printed, the request was generally made by a member of the responsible committee. In only two cases after a congressman had proposed printing extra copies did the body decline to do so. These two were the first part of the Franklin Institute report in 1836 and the report by the Senate Select Committee on Steam in 1840. In both instances the requests lapsed rather than were defeated by vote (see Appendix B).<sup>166</sup>

In the case of the Franklin Institute report, it was finally received in the House six years after the report had been requested. The select committees that had originally been concerned with the topic had expired. Charles Wickliffe, who had headed the select committee in the twenty-first and twenty-second Congresses, was no longer a member of the House of Representatives. Representative Denny, the Pennsylvania Anti-Masonic representative who asked to print extra copies of Part One of the report, was not on any of the committees, such as Commerce or Naval Affairs that might be interested in the report, so he did not have an institutional responsibility bearing on the topic. The members were also occupied with other

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<sup>166</sup> For 26<sup>th</sup> Cong., 1<sup>st</sup> sess., Jul. 10, 1840, H. Rept. 651, see *HJ*, 26<sup>th</sup> Cong., 1<sup>st</sup> sess., July 10, 1840, 1255. Joseph Rogers Underwood, the chairman of the House Select Committee on Steam, proposed printing the extra copies with two weeks left in the session. The subject was laid over for a day under the rule that requests for printing extra copies of documents would be delayed for a day before being considered. The subject never came up again during the session. A review of the *House Journal* shows that this was a very busy and contentious end of the session where the House had frequent roll call votes on procedural matters, calls of the House and spent extensive time considering bills as a Committee of the Whole, particularly the army appropriations bill.



matters during the 1836 session, including Andrew Jackson's specie circular and the upcoming presidential election.

Despite the fact that Congress did not publish all of the Franklin Institute report, its conclusions, recommendations, and some of the data were made available via other sources. Subsequent government and private reports cited it frequently and portions were reprinted in other government documents.<sup>167</sup> The report was referenced in a massive 1838 report on steam engines that was printed with 10,000 extra copies.<sup>168</sup> In 1849, the Commissioner of Patents conducted an examination of the topic where he praised, cited and excerpted portions of Institute's report.<sup>169</sup>

An important limitation on using print statism as a government policy to diffuse information and modify behavior was that even when knowledge was *gained* it did not mean that everyone would believe it or that they would apply the lessons from that knowledge. It is often difficult to change both the "behavior and expectations of workers" as well as "the outlook and orientation of managers" in any complex technical system and business operation.<sup>170</sup> The Franklin Institute's investigation demonstrated that steam boilers exploded for two reasons, either the pressure was too high or there was a weakness in the boiler, but many people did not accept these facts as the definitive word on the topic. This was especially tricky because steam engineering was entering an awkward adolescence and some steam vessel operators and

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<sup>167</sup> Sinclair, *Philosopher Mechanics*, 190-92. All three portions of the report were, as noted earlier, printed serially in the *JFI*. They were also printed as separate pamphlets and reprinted in the London *Mechanics Magazine*. Physicist Joseph Henry, who had done major work in the study of electricity and magnetism, wrote an admiring summary of the material that was published in a supplementary volume of the *Encyclopaedia Americana* in 1847. See Rothenberg, ed., *The Papers of Joseph Henry*, 6, 300n.

<sup>168</sup> 25<sup>th</sup> Cong., 3<sup>rd</sup> sess., 1838, H. Doc. 21; *HJ*, 25<sup>th</sup> Cong., 3<sup>rd</sup> sess., Jan. 16, 1839, 303.

<sup>169</sup> Report of the Commissioner of Patents on the Subject of Steam Boiler Explosions, 30<sup>th</sup> Cong., 2<sup>nd</sup> sess., Jan. 8, 1849, S. Exec. Doc. 18, 31, 81-91. See also Denault, "An Economic Analysis," 160.

<sup>170</sup> Kenneth Lipartito, "When Women Were Switches: Technology, Work, and Gender in the Telephone Industry, 1890-1920," *American Historical Review* 99/4 (Oct. 1994): 1080.

observers believed they understood much more about steam power than they really did. Many engineers, with relatively little training, experience or scientific knowledge, still conceived of themselves as being highly qualified for their jobs.<sup>171</sup>

The Franklin Institute report was probably less effective than it might have been because the first and third parts of it were presented in a highly technical format not easily comprehensible to most steamboatmen. Thomas P. Jones, editor of the *Journal of the Franklin Institute*, thought that the boiler explosion report had to be shorter and less technical if it was going to be of interest to the average mechanic.<sup>172</sup> It probably did not help that Part One, the highly specialized portion that focused on the boiler experiments, was also the part where the government printed the most copies. The abstruse document was, for some steamboatmen, the face of government advice on the issue, presented in a way that they could not easily comprehend or respect.

Steam engineers and inventors who wanted others to pay attention to them learned to flatter their audiences and make it clear that they respected the native wisdom of common workers. Cadwallader Evans, an inventor who authored a treatise on steam boiler explosions, was careful to disassociate his pamphlet from “elaborate scientific works” filled with “algebraic signs” and “mathematical problems.” He wrote that he would “explain himself in the language of a practical engineer.” Evans wanted, he asserted, to “elevate rather than to depreciate”

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<sup>171</sup> *Memorial of Alfred Guthrie, A Practical Engineer*, 32<sup>nd</sup> Cong., 1<sup>st</sup> sess., 1852, S. Misc. Doc. 32, 22, 23.

<sup>172</sup> Bruce Sinclair, “Science, Technology, and the Franklin Institute,” in Alexandra Oleson and Sanborn C. Brown, eds., *The Pursuit of Knowledge in the Early American Republic: American Scientific and Learned Societies from Colonial Times to the Civil War* (Baltimore, MD: Johns Hopkins University Press, 1976), 201. It was apparently not of sufficient simplicity to interest Jones himself, because it is not clear that he understood the report or even examined it closely in either his role as a member of the Franklin Institute committee or as the editor of the *Journal*. Shortly after the report came out, he wrote in 1837 that he was convinced that the only reason that strong and well-constructed steam boilers exploded was “when the water is too low, or the temperature too high.” If he was being quoted accurately and if a member of the committee could still make an errant statement like this about a central finding from the Institute’s investigation which showed that he did not understand the issue, how much more difficult must it have been for the average engineer to understand the matter? See *Petition of A. B. Quinby Praying an Appropriation to Test his Inventions*, 25<sup>th</sup> Cong., 2<sup>nd</sup> sess. 1837, S. Doc. 17, 2.

engineers and hoped that they would listen to his analysis and also keep his “Safety Guard” invention, which he described and advertised in his pamphlet, in mind for use and purchase.<sup>173</sup>

In addition to government publications, many private citizens published their opinions about the causes of steam accidents and Congress reprinted some of them. Chicago steam engineer Alfred Guthrie sent a pamphlet to the Senate in early 1852; Guthrie had privately conducted a fourteen-month long investigation of steamboats operating on the Mississippi River and its tributaries and claimed to have examined nearly 300 vessels. He analyzed the reasons for boiler explosions and recommended particular standards for boiler design, operation, and maintenance. In the vein of the Franklin Institute committee, he contested some of the stubborn myths about the causes of explosions. Guthrie also critiqued safety equipment and recommended features for a new steamboat law. He believed that his study would enable steamboatmen and legislators “to form a correct judgment, and to take the proper measures for preventing the further occurrence of these dreadful calamities.”<sup>174</sup> The fact that he used his memorial to publicize his own designs for steam and water safety gauges and a new safety valve suggests that he was motivated by commerce as well as by his concern for the public weal.<sup>175</sup>

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<sup>173</sup> Evans, *A Treatise on the Causes of Explosions of Steam Boilers*, 3. Cadwallader Evans may have had a family experience in mind when he composed his pamphlet. His father, Oliver Evans, the inventor of the high-pressure steam engine, published a guide to constructing and operating steam engines in 1805. However, the elder Evans was disappointed that builders and engineers did not follow his guidelines. See Oliver Evans, *The Abortion of the Young Steam Engineers’ Guide: Containing an Investigation of the Principles, Construction and Power of Steam Engines* (Philadelphia: Fry and Kammerer, 1805), and Burke, “Bursting Boilers,” 4.

Cadwallader Evans was less respectful towards steamboat engineers in his private comments than his public ones. In a letter to Joseph Henry, Evans noted that many engineers were incompetent and, given their poor practices, that it was a wonder that more steamboats did not explode. In designing his Safety Guard Evans he assumed that the engineer might not be skilled and devised it so that it did not depend solely on the attention of the engineer. If the pressure rose too high in the boiler or water level fell too low, the safety guard would trigger an alarm that would let everyone on the vessel know that there was danger. See Cadwallader Evans to Joseph Henry, Jul. 12, 1841 in Nathan Reingold, ed., *The Papers of Joseph Henry, Volume 5: Jan. 1841-Dec. 1843, The Princeton Years* (Washington, DC: Smithsonian Institution Press, 1985), 63-65, 63n. and 65-66n.

<sup>174</sup> *Memorial of Alfred Guthrie, A Practical Engineer*, 32<sup>nd</sup> Cong., 1<sup>st</sup> sess., Feb. 6, 1852, S. Misc. Doc. 32, 2.

<sup>175</sup> *Ibid.*, 36-37. Senator John P. Hale of New Hampshire protested against publishing Guthrie’s memorial. “We have explosions enough,” he said, “without disseminating essays upon them; and I hope the Senate will interpose and not sanction this expenditure.” See *CG*, 32<sup>nd</sup> Cong., 1<sup>st</sup> sess., 1852, 24: 487. Notwithstanding Hale’s

Yet despite government documents like the Franklin Institute report and the efforts by individuals like Cadwallader Evans and Alfred Guthrie, years after the Franklin Institute's careful experiments had demonstrated the causes of steam explosions, many vessel engineers, captains, and quasi-scientific observers still believed the old myths. Steamboat engineers of the time were much closer to what we might think of today as mechanics, rather than highly educated and trained professionals. Mechanics of the time relied on experience and intuition and rarely observed underlying scientific principles.<sup>176</sup> Their experience and perspective often left them unprepared to question and revise their beliefs, since most learned their trade through brief apprenticeships that did not expose them to the growing body of knowledge about steam power. Even if they made an effort to keep up with the literature, reading reports, and perusing diagrams, no matter how clearly illustrated or how well supported by evidence, often could not persuade steamboat operators to revise their day-to-day habits, since technical knowledge about how to use machines was disseminated more effectively through training, hands-on experience, and the migration of skilled personnel than through the printed word.<sup>177</sup> Long after the Franklin Institute report came out, the Pittsburgh Board of Trade, whose members, as representatives of a major river port and builders of steamboats were in a position to know better, asserted that the causes of explosions were still in dispute, as were the means of preventing them.<sup>178</sup>

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expostulation, the Senate rewarded Guthrie by ordering the printing of 5,500 extra copies of his memorial, 500 of them for Guthrie's own use. See *SJ*, 32<sup>nd</sup> Cong., 1<sup>st</sup> sess., 1852, 186 and *CG*, 32<sup>nd</sup> Cong., 1<sup>st</sup> sess. 24, part 1, 487, Feb. 6, 1852. Senator John Davis also introduced a resolution, which the Senate passed, asking the Navy Department to test Guthrie's safety valve, hydrostatic gauge and indicator. See *SJ*, 32<sup>nd</sup> Cong., 1<sup>st</sup> sess. Mar. 22 and 24, 1852, 295, 304.

<sup>176</sup> David Freeman Hawke, *Nuts and Bolts of the Past: A History of American Technology* (New York, NY, Harper and Row, 1988), 27-34.

<sup>177</sup> Nathan Rosenberg, "Economic Development and the Transfer of Technology: Some Historical Perspectives," in Reynolds and Cutcliffe, eds., *Technology and the West*, 254-56.

<sup>178</sup> *Memorial of the Board of Trade of the City of Pittsburgh*, Received Apr. 18, 1848," Petitions and Memorials received by the Committee on Commerce, Various Subjects (HR 30A-G4.7), Records of the House of Representatives, RG 233, NA.

Bache and the Franklin Institute committee were aware of and showed some sympathy for this situation. They noted that the causes of explosions had not previously been systematically investigated, that even men “well-versed in general science” could easily be ignorant of the wider circumstances of steam engineering, and it was not surprising if engineers, firemen and builders did not have a good understanding of the matter. The committee members commented that these men were unlikely to become acquainted with scientific principles, but that they needed to “have a thorough practical acquaintance with the steam engine” and know the rules necessary to avoid common dangers.<sup>179</sup>

However, even individuals who read the technical literature could find the flood of information confusing and doubt that it was authoritative. A group of experienced engineers from Cincinnati complained that there were too many inconsistent sources among the published materials.<sup>180</sup> They wanted more experiments on the causes of explosions, but asked that they be conducted by “practical men” whose judgment they trusted. One of the doctrines about the causes of explosions, wrote the group, “is based upon philosophical theory [what we would now call ‘scientific theory’], another upon actual experiments, another upon visionary conjectures—all opposite and contradictory in their conclusions. The writers make this subject appear most vague, unaccountable, and mysterious to us; in fact nothing systematic can be comprehended by which we can be directed....” The engineers had much greater faith in their own “sure system of management, acquired by long practical experience and attentive observation.”<sup>181</sup>

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<sup>179</sup> *JFI* 18/6 (new series): 367.

<sup>180</sup> The Cincinnati Association of Steamboat Engineers wrote to Congress and detailed the contradictions between “different American, English and French writers” on steam power that had a tendency “rather to confuse than enlighten the practical engineer,” and attributed this to the fact that too much of the information that came into Congress was provided by men they could not trust: “theoretical, and not practical engineers.” See 27<sup>th</sup> Cong., 3<sup>rd</sup> sess., Feb. 13, 1843, H. Doc. 145, 1, 2-5 (Appendix B).

<sup>181</sup> *Ibid.*, 5. It is also quoted in Hunter, *Steamboats*, 297. See also Brown, *Limbs on the Levee*, 55.

There was no universally accepted source of authoritative information about steam engineering and so far, at least in the opinion of the Cincinnati engineers, the government had not stepped forward to fill this need. As a result, even well-informed mechanics and engineers continued to debate the causes of boiler explosions into the 1850s and after. The Cincinnati engineers saw themselves as responsible practitioners of their craft, sifting through the information to find truths to guide their actions. As with many professional associations, they also wanted to set standards in order to raise the prestige and compensation for their profession.<sup>182</sup> But with so many different theories and resources, and none of them definitive in their eyes, even conscientious steamboat men could cling to dangerous myths and misconceptions about how to manage their engines.<sup>183</sup>

Poorly vetted government documents sometimes repeated myths and conveyed inaccurate information.<sup>184</sup> On occasion Congress's investigating committees also represented myths as truth. A report by the House Committee on Naval Affairs in 1845 stated that low water in the

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<sup>182</sup> Brown, *Limbs on the Levee*, 56.

<sup>183</sup> J. P. Van Tyne to J. R. Underwood, Chairman of the Committee, Washington, Apr. 25, 1842; *Reports and Papers of the House Select Committee on Steam and Samuel Raub's Safety Valve* (folder 3), Records of the House of Representatives, RG 233, NA. When the Ohio Mechanics Institute in Cincinnati held a debate on the causes of steam boiler explosions in 1852, many of the participants and members of the audience were aware of the Franklin Institute's report and other scientific studies. However, they still did not consider the evidence conclusive enough to come to a consensus on the causes. Several of the participants adamantly held to the myths. See Brown, "Mid-Nineteenth-Century Mechanics and Scientists," 28-31.

<sup>184</sup> See Appendix B. In 1838, the House printed a document from Jonathan Morgan who insisted that the Franklin Institute was wrong and that explosive gas was the reason that boilers exploded. He spun his own theory that "electrical gases" caused explosions and the explosion bore no relation to the amount of pressure in the boiler. His solution was to draw off the supposed explosive gases via valves placed in the middle and at each end of the boiler. See *Memorial of Jonathan Morgan, Esq. on the Explosion of Steam Boilers*, 25<sup>th</sup> Cong., 2<sup>nd</sup> sess., 1838, H. Doc. 100, 6-7. Joseph Henry was outraged that Congress was disseminating such material. See Joseph Henry to Alexander Dallas Bache, Aug. 9, 1838 in Reingold, ed., *The Papers of Joseph Henry*, 4, 99. In another instance, the Senate printed a memorial from Samuel Raub, Jr., the inventor of a steam safety valve. Raub wrote that the ordinary and gradual build up of steam until it exploded a boiler was a rare occurrence and, when it did occur, did the least damage of several different causes of explosions. He went on to cite the *explosive element* and *water flashing into steam myths* as the problems that posed the greatest danger and stated that they only occurred when the water in a boiler was low. See *Report on the Petition of Samuel Raub, Jr.*, 24<sup>th</sup> Cong., 2<sup>nd</sup> sess., 1837, S. Rept. 159, 2-3.

boiler “and incrustation from sediment and salt” were the *only* causes of explosions.<sup>185</sup> A concerned observer, Charles T. James of Rhode Island, a steam engine designer, manufacturer, mill owner and engineer, wrote to criticize the House for publishing this erroneous and incomplete information, but the offending document was already printed and in circulation.<sup>186</sup>

Steamboat operators were also likely skeptical of the report by the Franklin Institute and other government publications because of anti-intellectualism that was common during the period. The people who ran the vessels were not always interested in the latest knowledge and techniques. Working men with calluses on their hands lauded information gained through “practical knowledge” over mere “theory.”<sup>187</sup> These attitudes and skepticism were reinforced by popular publications such as *Scientific American* that advanced the notion that scientific men were lacking in common sense and practical mechanical skill.<sup>188</sup> Opinions like this were especially unfortunate because the Franklin Institute committee, along with many of the other government-sponsored inquiries, had gone out of the way to seek the advice of experienced steamboat operators when undertaking their investigations.<sup>189</sup>

These anti-scientific prejudices were not limited to steam engineering and paralleled the response some farmers made to proposals by agricultural reformers. While innovators promoted the use of scientific knowledge and experiments to advance new techniques in cultivation, tillers

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<sup>185</sup> *Report of the Committee on Naval Affairs on Safety Valves [To accompany H.R. 594]*, 28<sup>th</sup> Cong., 2<sup>nd</sup> sess., 1844, H. Rept. 115, 3; emphasis added (see Appendix B).

<sup>186</sup> *Memorial of Charles T. James*, 26<sup>th</sup> Cong., 2<sup>nd</sup> sess., 1841, H. Doc. 79 (Appendix B). On James, see Carroll W. Pursell, Jr., *Early Stationary Steam Engines in America: A Study in the Migration of a Technology* (Washington, DC: Smithsonian Institution Press, 1969), 76-77.

<sup>187</sup> 25<sup>th</sup> Cong., 3<sup>rd</sup> sess. 1838, H. Doc. 21, 76.

<sup>188</sup> Robert C. Post, “Science, Public Policy, and Popular Precepts: Alexander Dallas Bache and Alfred Beach as Symbolic Adversaries” in Nathan Reingold, ed., *The Sciences in the American Context: New Perspectives* (Washington, DC: Smithsonian Institution Press, 1979), 91.

<sup>189</sup> 24<sup>th</sup> Cong., 1<sup>st</sup> sess., 24<sup>th</sup> Cong., 1<sup>st</sup> sess., March 1, 1836, H. Doc. 162, 3.

of the soil often denounced the “new fine-spun theories” as useless to the practical man.<sup>190</sup> One congressman, in remarks about agricultural practices that he might have applied equally well to steam power, lamented the

numerous class who are not anxious for information, who might and ought to be enlightened, but are, nevertheless, perfectly at ease in their ignorance. Among them are to be found those who rail out indiscriminately against science ... and appear to have come to the conclusion, that any fact upon this subject becomes a falsehood when printed.<sup>191</sup>

In 1838, steamboat agent William C. Redfield wrote that he was saddened that too few people had reviewed and adopted the conclusions of the report by the commission that investigated the 1833 explosion of the steamer *New England*. Even though the investigation was led by one of the most famous scientists in America, Yale Professor Benjamin Silliman, and was a careful attempt to analyze an explosion and use the findings to benefit the public, many people simply would not accept that the reason the accident had occurred was because steam pressure had been raised too high and overwhelmed the boiler. Accurate analysis, mused Redfield, was not sufficient to open up closed minds and even an insightful “examination, supported by the best evidence, would [not] convince those who had long cherished some favorite theory concerning explosions.”<sup>192</sup>

Another reason that many working people sometimes regarded scientists like Alexander Dallas Bache with suspicion was that he and others like him were often from high social strata. Deference to established elites was giving way during the era to the celebration of the common man and politics shifted “from a notable-oriented and deferential politics on the one hand to a

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<sup>190</sup> Richard Hofstadter, *Anti-Intellectualism in American Life* (New York, NY: Alfred A. Knopf, Inc, 1969), 277. See also Robert C. Post, “‘Liberalizers’ versus ‘Scientific Men’ in the Antebellum Patent Office,” *Technology and Culture* 17/1 (Jan. 1976): 42.

<sup>191</sup> ACG, 32<sup>nd</sup> Cong., 1<sup>st</sup> sess., 1852, 748. See also *Report of the Committee on Naval Affairs on Safety Valves to Accompany Bill H.R. 594*, 28<sup>th</sup> Cong., 2<sup>nd</sup> sess., 1844, H. Rept. 115, 1-2.

<sup>192</sup> 25<sup>th</sup> Cong., 3<sup>rd</sup> sess. 1838, H. Doc. 21, 433.



party, electorate-oriented and egalitarian style of politics on the other.”<sup>193</sup> American scientists were mostly members of the professional and upper classes, and they were developing a set of values that relied less on popular approval than on rigorous and obscure methods of investigation.<sup>194</sup> If Bache and Joseph Henry were concerned about the unreliable beliefs that proliferated among the populace, common people resented the patronizing attitudes of this rising group of elitists, who seemed too worried about the dangers of “pseudo-science.”<sup>195</sup>

This did not mean that Americans were uninterested in scientific knowledge, but that their opinions on it might shift depending on how it was presented and the mental framework in which it was received. The prevailing American attitudes about scientific knowledge were layered and complex. Walt Whitman may have become tired and sick when he heard the learned astronomer, but other Americans listened to him enthusiastically, as long as he knew how to entertain his audience and evoke a quasi-religious awe at the mysteries of the universe. Tensions between the scientific elite and the common man were also mitigated by a shared sense of national pride and resentment towards Europe. Even when they did not fully understand the discoveries that scientists like Joseph Henry were making, Americans wanted their scientists to be fully as good, if not better, than European ones.<sup>196</sup>

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<sup>193</sup> Ronald P. Formisano, “Deferential-Participant Politics: The Early Republic’s Political Culture, 1789-1840,” *American Political Science Review* 68 (Jun. 1974): 473.

<sup>194</sup> Slotten, “The Dilemmas of Science,” 34. For an example of the ongoing debate between champions and critics of the Franklin Institute report and other popular theories of steamboat explosions, see Brown, “Mid-Nineteenth-Century Mechanics and Scientists,” 25-35.

<sup>195</sup> Rothenberg, ed., *The Papers of Joseph Henry*, 6, 76-77.

<sup>196</sup> Zochert, “Science and the Common Man,” 468. Some scientists shared the resentment their fellow Americans felt for the mother country. During a trip to England in 1838, Henry came away with mixed feelings about science and scientific institutions in Britain and their attitudes about Americans. He was treated with kindness and respect by some of the top scientists in England, but also aware that there was an underlying “prejudice ... against Americans” among many Englishmen that was more obvious in public than in private settings. While English professional scientists could look on Henry and other accomplished investigators as equals, some of them also exhibited the patronizing attitudes and lack of respect that many people in the mother country felt for the former colonials. See Joseph Henry to Alexander Dallas Bache, Aug. 9, 1838, in Reingold, ed., *The Papers of Joseph Henry*, 4, 102-103.

Americans were developing great store in science, especially as it showed it could master the physical world. In the 1830s and 1840s, science was extended to a wide portion of the population. The popular press carried technical presentations and commentary by professional scientists.<sup>197</sup> There was a great deal of interest in scientists, contemporary and historical, domestic and foreign. The government-sponsored exploring and survey expeditions, such as those led by Charles Fremont and Navy Lieutenant Charles Wilkes, undertook scientific investigations and dealt with issues in natural history, garnered a great deal of support and were the topic of numerous news reports and editorial commentary.<sup>198</sup> Most towns boasted a lyceum to which people could go to hear lectures and see demonstrations. Private societies sponsoring public lectures were formed in 3,500 to 4,000 communities throughout the country by 1840 and the presentations dealt with the sciences, literature, history, philosophy, current events and a myriad of other topics.<sup>199</sup>

Popular scientific lecturers of the period, however, tended to win acclaim with dramatic presentations that included flashy displays and inflated oratory, rather than by adherence to high standards of evidence. The developing community of scientists was disturbed that many of their fellow citizens valued style over content. Scientists, seeking to raise standards, began to form associations like the American Association for the Advancement of Science to promote and recognize professional expertise. As Joseph Henry put it in a letter to Alexander Dallas Bache in 1838:

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<sup>197</sup> Zochert, "Science and the Common Man," 451.

<sup>198</sup> *Ibid.*, 467.

<sup>199</sup> While some of the sponsoring groups limited the lectures to their own members, others attracted large public audiences. By the mid-1840s, most of the lectures were given by non-residents, people with reputations as speakers who gave paid courses or single lectures. See Scott, "The Popular Lecture and the Creation of a Public," 803, 806-7.

I am now more than ever of your opinion that the real working men in the way of science in this country should make common cause and endeavor by every proper means unitedly to raise our scientific character, to make science more respected at home, to increase the facilities of scientific investigations and the inducements to scientific labours.<sup>200</sup>

Bache, Henry and their allies were determined to advance the cause of American science and one of their priorities was to make sure that information came from a proper understanding of natural philosophy that was based on verifiable evidence. To them, the character of the popular lecture (and popular information in general) was a threat to this goal. They objected to using popularity as the test of legitimacy.<sup>201</sup>

But prominent scientists did not operate from an ivory tower from which they gazed down at the masses in contempt. Both Henry and Bache were motivated by a sense of duty. Henry believed that this obligated him to lend his expertise to “serve as a steward of technological progress” and he offered his advice widely to people who came to him for aid.<sup>202</sup> He made a substantial contribution to Samuel F. B. Morse’s development of the telegraph<sup>203</sup> and knew that he occupied a position his countrymen respected. Inventor Cadwallader Evans wrote and asked him to examine his boiler safety mechanism. The invention integrated design ideas that Bache had laid out in 1836 in the second part of the Franklin Institute Report. Evans sent his Safety Guard to Henry and to scientific institutions in the hope that he could get endorsements

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<sup>200</sup> Joseph Henry to Alexander Dallas Bache, Aug. 9, 1838, in Reingold, ed., *The Papers of Joseph Henry*, 4, 100.

<sup>201</sup> Scott, “Popular Lecture,” 807.

<sup>202</sup> Rothenberg, ed., *The Papers of Joseph Henry*, 6, xxi-xxiii.

<sup>203</sup> Henry had devised a telegraphic instrument to demonstrate principles of electro-magnetism for his classes at the Albany Academy in 1831, well before Morse began working on his own telegraph. Morse approached Henry for advice in 1839 and Henry aided him without expecting any material compensation, but wanted Morse to give Henry credit for his contribution and the knowledge of the physical principles underlying the device. The two later fell out when Henry believed that Morse had not offered sufficient recognition of the scientific knowledge that made the telegraph possible. See Arthur P. Molella, “The Electric Motor, The Telegraph, and Joseph Henry’s Theory of Technological Progress,” *Proceedings of the IEEE* 64/9 (Sept. 1976): 1276.

that might influence Congress to grant him a subsidy.<sup>204</sup> Henry wrote back to Evans the following year that he had tested Evans's device and thought it excellent. Henry also gave Evans permission to use his endorsement, which Evans later did.<sup>205</sup>

Henry's situation and concerns were emblematic of tensions in the wider society. Overall, scientific practice was improving and knowledge increased. However, with these advances the scientific community assumed a greater social distance from people who were in great need of their insight, expertise, and methods of careful investigation. This separation contributed to the fact that steamboat operators formed their own opinions from a stew of information that contained both healthful and potentially deadly ingredients despite the availability of useful information published by the government and others about how steam power worked and how to use it safely.

## **5. Conclusion**

Gathering and disseminating knowledge was one of the most characteristic and widely supported policies by the national government during the period. Congress transmitted information about steam technology and encouraged its safe use. This was part of the flood of documents the government produced. As Richard John has noted, "Congress bombarded the public with newspaper accounts of its proceedings, pamphlets, reprinted speeches, and reports and documents of all kinds. By 1830, these publications, along with the publications issued by

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<sup>204</sup> Cadwallader Evans to Joseph Henry, Jul. 12, 1841 in Reingold, ed., *The Papers of Joseph Henry*, 5, 63-65, 63n and 65-66n. At the time, Evans had already petitioned Congress for support for several years. See Appendix B and 25<sup>th</sup> Cong., 3<sup>rd</sup> sess., Jan. 16, 1839, H. Doc. 88, and *HJ*, 25<sup>th</sup> Cong., 3<sup>rd</sup> sess., Jan. 7, 1839, 225, and *HJ*, 26<sup>th</sup> Cong., 1<sup>st</sup> sess., Feb. 6, 1840, 349.

<sup>205</sup> Joseph Henry to Cadwallader Evans, Feb. 25, 1842 in Reingold, ed., *Papers of Joseph Henry*, 5, 152-53, 153n.

the governments of the individual states, made up fully 30% of all the imprints in the United States.”<sup>206</sup>

As we have seen, this reflected a vital print culture and public sphere where the government responded to Americans who called for information to help them deal with a changing world. Congress received demands by the public and interest groups to print information about fields including commerce and navigation, geography and demography. Public officials were also motivated to publish documents by political considerations and because of ideological predilections in favor of open government. Congressmen justified extensive printing of documents by arguing that the government of a democratic republic was responsible for providing information that gave citizens the opportunity to make intelligent choices about how to improve their condition and conduct their affairs. The military was also adopting steam technology and, like civilians, needed to make decisions on how it would expand its knowledge, evaluate innovations and improve its operations.

As part of the torrent of data, the eighty documents the government published regarding steamboat accidents from 1824 to 1852 contained a wealth of observations on safe practices, inventions and the science of steam. People who read the information could adopt safe practices and work to improve engines and vessels. Congress played the lead role in initiating these inquiries and publishing the documents, though much of their content reflected work by members of the Executive departments, outside experts and the testimony of concerned citizens. This balance shifted somewhat after 1852 when administrators began to play a larger role as the Board of Supervising Inspectors created by the 1852 Steamboat Act took on the task of

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<sup>206</sup> John, *Spreading the News*, 57.

investigation.<sup>207</sup> While Congress continued to sponsor inquiries, produce reports and initiate legislation, after 1853 the Supervising Inspectors investigated the subject more regularly than did the House and Senate and dispensed expert advice on safe practices and mechanical inventions.<sup>208</sup> Congress consulted them and was often guided by their findings when proposing action in the 1850s and afterward.

Steven Lubar has reminded us that in communicating technical information, as with any other form of communication, there is a sender, receiver and a communications channel. All are important. The sender must be able to convey it in a comprehensible manner, the channel must be able to carry it and the “receiver must be equipped to understand it.”<sup>209</sup> In the case of transmitting technical knowledge about steam, there were multiple senders, multiple channels, and multiple recipients. Not all of them were under the control of the government, and the government did not always effectively manage the factors that were under its control. As a result, the Information Option had mixed results.

The national government was good at gathering and disseminating information, what Leroy Merritt called its “research function.” Some of it, such as the Franklin Institute report of 1836 and 1837, met high standards by forming recommendations based on evidence from systematic experimentation. Publications also contained valuable information drawn from

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<sup>207</sup> The act directed the Supervising Inspectors to inquire into mechanical improvements and best practices for operating steam engines and to report their findings to the Secretary of the Treasury. See 10 *Stat. L.*, 61, Act of Aug. 30, 1852, ch. 106, Section 39.

<sup>208</sup> The reports were printed as part of the annual report of the Treasury Department. Mashaw, “Administration and ‘The Democracy,’ ” 1650, 1651-52. The supervising inspectors circulated intelligence about apparatus such as boiler safety devices, vessel floatation tanks, and fire extinguishers. As one example, see the *Annual Report of the Supervising Inspectors contained in the Report of the Secretary of the Treasury on the State of the Finances for the Year Ending Jun. 30, 1855*, 34<sup>th</sup> Cong., 1<sup>st</sup> sess., S. Exec. Doc. 2, 456-58. To further their investigations, by 1858 the Board established a number of standing committees, including ones on “lifesaving apparatus, machinery, and fire apparatus.” See Mashaw, “Administration and ‘The Democracy,’ ” 1654.

<sup>209</sup> Steven Lubar, “Representation and Power,” *Technology and Culture*, Supplement to Volume 36/2 (Apr. 1995), S60.

practical experience and functioned as “service” and “informational” functions. The thousands of pages of documents showed that the U.S. was capable of producing excellent data on a complex set of problems relating to steam power.

But while the national government was a voluble schoolmaster on steam power and steam vessels, it was not a very demanding one. Until it passed the 1852 Steamboat Act, it provided lessons to its citizen “students” without insisting that they attend classes or take any tests. The government also did not make sure that its “instructors” who produced the documents were educated to high standards of expertise. As a result, government efforts at print statism on this topic included errant data and restated common myths that it would have been better to debunk. Also, many users of steam were not prepared to receive and utilize the best of the government information and preferred to operate steam engines on the basis of their own imperfect knowledge.

Yet despite the limited popular understanding of steam, steam engines were a maturing technology by the 1840s and 1850s, and productively employed throughout the country. The Patent Office issued patents for arrangements that saved fuel, warned of low water, were designed to keep the water level high, and to measure and let off excessive steam pressure. Effective inventions, rather than redesigning the engines in ways that would bring “marked improvement,” focused on modifying elements of the system in order to gain additional efficiency and safety.<sup>210</sup> While some steamboat builders, owners, and operators remained unaware or unconvinced by expert advice and preferred familiar patterns and practices to innovative ones, they were sometimes willing to try and adopt new types of machinery and government actions encouraged this.

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<sup>210</sup> *Report of the Commissioner of Patents Showing the Operations of the Patent Office during the year 1844*, 28<sup>th</sup> Cong., 2<sup>nd</sup> sess., S. Doc. 75, 485, 486.

From the 1820s onward, most of the advances in steam engines, especially on the Western rivers, came from gradual improvements and relatively minute adjustments that had a cumulative effect on efficiency and safety.<sup>211</sup> Many of the government documents including the Franklin Institute report, for example, emphasized the necessity of well-maintained safety valves. Though safety valves were often too small, too few and poorly maintained, they were mandated by the 1838 steamboat act and became standard equipment.<sup>212</sup> It was progress of a sort.

Even with all of the imperfections of the Information Option, steam vessels became safer over time. It is difficult to quantify the impact of the government investigations and publications. As Edwin Layton noted, it is not easy to discover which inventors read particular works relating to their fields, so it is not clear how influential the government-sponsored publications were for the inventors and engineers who built and used steam engines and the people who operated them.<sup>213</sup> However, government information was available to interested parties and at least some of the concerned individuals read and became familiar with the opinions and investigations on the topic. Accidents continued and explosions were horrific and deadly, but the number of vessels and passengers increased more rapidly than the number of accidents. When measured by the number of explosions and deaths per million miles traveled by passengers, there was a trend toward increasing safety in steam vessels from about 1 explosion per 10 million passenger miles traveled in 1830 to less than 1 explosion per 100 million

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<sup>211</sup> For example, a separate auxiliary pump, generally called a “doctor,” dedicated to pumping water into the boiler to ensure that the water level did not fall too low, was added as standard equipment. This reduced some of the dangers from low water. See *Report of the Commissioner of Patents Showing the Operations of the Patent Office during the year 1844*, 28<sup>th</sup> Cong., 2<sup>nd</sup> sess., Jan. 28, 1844, S. Doc. 75, 483-84; Hunter, *Steamboats*, 162; “Report of the Committee of the Franklin Institute of the State of Pennsylvania for the promotion of the Mechanic Arts, on the Explosions of Steam Boilers. Part 2, containing the General Report of the Committee,” *JFI*, 22/6 (Dec. 1836): 366. Even without major advances, boiler design and equipment improved substantially into the 1850s. See Hunter, *Steamboats*, 166-67.

<sup>212</sup> 5 *Stat. L.* 304. See Section 7.

<sup>213</sup> Layton, “Mirror Image Twins,” 567.



passenger miles traveled in 1852.<sup>214</sup> This was due in part to increased use of safety valves and other technical improvements. While sundry steamboatmen resisted the recommendations disseminated by Congress, at least some of them adopted better equipment and safer practices. Government policies facilitated this process and probably, over time, increased safety.<sup>215</sup>

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<sup>214</sup> Richard N. Langlois, David J. Denault and Samson M. Kimenyi, “Bursting Boilers and the Federal Power Redux: The Evolution of Safety on the Western Rivers” (May 1994), University of Connecticut, Department of Economics, Working Papers, available at <http://www.lib.uconn.edu/Economics/Working/lang961.pdf> [accessed Mar. 15, 2000].

<sup>215</sup> Denault, “An Economic Analysis,” 178.

## CHAPTER 3

### “THE KNOWLEDGE WE OBTAIN ... FROM EXPERIMENT”

#### *1. Subsidizing Inventions and Inventors: “The Improvements of the Age”*

In addition to improving the environment for navigation and publishing information to enhance the safe use of steam power, the national government implemented a Mechanical Option to promote inventions and mandate certain types of equipment for steam vessels. While members of Congress expected that machinery would improve as time went on, they were not satisfied with the progress of steam vessel safety under laissez-faire in the 1810s and 1820s, and thought the government could assist technological development in this area. One concerned observer wrote to Secretary of the Treasury Levi Woodbury in 1838 that steam could only be made as safe as it was useful if the government took steps aimed at “stimulating the inventive powers of our countrymen.”<sup>1</sup>

Inventors sought government aid because they needed money to finance experimentation and to perfect their devices.<sup>2</sup> When they applied to Congress they often claimed that their work was an important national asset. Congress usually declined to authorize these appropriations, citing constitutional concerns for strict construction and the desire to operate the government frugally.<sup>3</sup> Despite these tendencies, the government adopted policies that advanced certain forms of technology. The patent system encouraged mechanical advances by providing a kind of

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<sup>1</sup> *J. P. Van Tyne to Treasury Secretary Levi Woodbury*, in 25<sup>th</sup> Cong., 3<sup>rd</sup> sess., Nov. 27, 1838, H. Doc. 21, 391.

<sup>2</sup> See, for example, *Memorial of John C. Fr. Salomon relative to a patent safety boiler*, Dec. 1835 (Referred Dec. 29, 1835), Committee on Naval Affairs, Petitions and memorials referred to committees, Various Subjects, 1834 & 1835 (HR24A-G12.2), 24<sup>th</sup> Cong., Records of the House of Representatives, RG 233, NA. Salomon wrote that though his plan had been endorsed by both “scientific men” and “practical mechanics,” his expenses had been heavy in undertaking experiments and he needed government support to continue his investigations.

<sup>3</sup> See A. Hunter Dupree, *Science in the Federal Government: A History of Policies and Activities* (reprint, Baltimore, MD: Johns Hopkins University Press, 1986), 14.

subsidy that gave the patentee a limited monopoly for fourteen years. The changes made to the patent law in 1836, when trained examiners were assigned to review patent applications to determine whether an invention was original and constituted a genuine technological advance, “led to a substantial increase in the potential returns to inventive activity.” Patenting rates per capita rose sharply from the 1820s through the 1880s.<sup>4</sup> The U.S. also facilitated a major advance in industrial practice by devising a reliable system of mass production at its armories.<sup>5</sup>

Even when inventors were *not* awarded any money directly, as most were not, they still hoped to get government support in the future, and this encouraged them to continue experimenting and petitioning for aid. In this sense, the potential for a subsidy complemented the patent system by strengthening the incentives for inventors to make and improve their devices. From the point of view of the individual inventor, the phenomenon bears a resemblance to what behavioral psychologists refer to as “intermittent reinforcement,” a situation in which the expectation of reinforcement motivates subjects to work harder, even when the chances appear slim that they will actually attain a reward for any given action.

The government was interested in steam safety not just to protect the public, but also because it was using steam technology routinely as part of its own endeavors. The Navy was particularly concerned with the subject as it made the transition from sail to steam. The news that the government was conducting investigations into steamboat technology in the 1830s and 1840s, and that Congress was considering legislation relating to the problem of steam vessel disasters induced a flurry of applications from inventors anxious to have their plans considered

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<sup>4</sup> B. Zorina Khan and Kenneth L. Sokoloff, “History Lessons: The Early Development of Intellectual Property Institutions in the United States,” *The Journal of Economic Perspectives* 15/3 (Summer 2001): 236, 239, 240. The system encouraged technological advances by motivating American inventors, particularly those in areas of the North and Midwest who resided within developing market systems and had access to improvements in transportation and investment capital.

<sup>5</sup> See Merritt Roe Smith, *Harper’s Ferry Armory and the New Technology: The Challenge of Change* (Ithaca, NY: Cornell University Press, 1977).

for government support.<sup>6</sup> As far back as 1824, the members of the House Commerce Committee had written that, since they could not anticipate future applications of steam power, they did not want to “fetter, or discourage the ingenuity and skill” of the mechanics who might improve the technology.<sup>7</sup> It was better, concluded one Congressional committee, to leave decisions about what sort of machinery to use to the “sound discretion” of steamboat operators and “to the improvements of the age.”<sup>8</sup> Despite these sentiments, the government saw fit to intervene in a number of ways. One important type of intervention was examining and testing new inventions, especially those designed to decrease the danger of boiler explosions.

## ***2. The Navy and Government Support for Investigations***

The United States Navy was transformed during the forty years before the Civil War.<sup>9</sup> The Naval Academy was founded in 1845 and new steam vessels were designed or converted from sail. The Navy built or transformed their facilities to service the new technology. Despite false starts, the potential advantages of steam warships were becoming obvious by the mid-1820s.<sup>10</sup> John Quincy Adams’s Secretary of the Navy, Samuel Southard, predicted in 1826 that

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<sup>6</sup> See, for example, 25<sup>th</sup> Cong., 3<sup>rd</sup> sess., Feb. 7, 1838, H. Doc. 170, 2; and 28<sup>th</sup> Cong., 1<sup>st</sup> sess., Jun. 17, 1844, S. Doc. 405, 3.

<sup>7</sup> *Report of the Committee on Commerce, accompanied by a bill for regulating of Steam Boats, and for the security of passengers therein*, May 22, 1824, 18<sup>th</sup> Cong., 1<sup>st</sup> sess., H. Rept. 125, 1.

<sup>8</sup> *Steamboats: Report of the Select Committee*, May 18, 1832, 22<sup>nd</sup> Cong., 1<sup>st</sup> sess., H. Rept. 478, 1.

<sup>9</sup> In 1820, expenditures for the Navy were about \$4.4 million. By 1860, they were about \$11.5 million. *Historical Statistics of the United States: Colonial Times to 1970: Part 2* (Bureau of the Census, U.S. Government Printing Office, Washington, DC, 1975), 1114. Despite the increase, this reflected a modest commitment, considering the growing size of the country and the immense amount of capital invested in merchant shipping that the Navy was charged with protecting.

<sup>10</sup> *Letter from the Secretary of the Treasury Transmitting ... Information in Relation to Steam Engines*, 25<sup>th</sup> Cong., 3<sup>rd</sup> sess., 1838, H. Doc. 21, 353. The Navy first attempted to build steam vessels during the War of 1812 when Congress authorized one or more to be used as “floating batteries.” This first steam naval vessel, the *Fulton*, was briefly put into operation in 1815. She was fitted with a low-pressure engine and maneuvered under power only during a few trials. The vessel never saw action and the engine was eventually declared unfit for use. In 1816, Congress authorized three steam batteries, vessels intended to defend harbors and coasts rather than to operate in the open sea, but they were never completed. The *Fulton* blew up from an accidental magazine explosion in 1829.

“the powerful agency of steam” would be undergoing continual improvement and would soon be a motive force employed by all the great nations of the world.<sup>11</sup>

The Navy suffered failures and setbacks while adding war steamers and other technological advances to the fleet.<sup>12</sup> Congressmen were dissatisfied with the false starts and sponsored investigations into the problems, but they also funded tests of technical innovations. Although most of the basic components of steam engines were well established, the exact designs, proportions, and features had not yet reached a standardized form, meaning that it was all too easy to build a vessel with major flaws. However, there was also the possibility that inventors and engineers would devise innovative machinery that would improve performance.<sup>13</sup>

In ways that often paralleled the dilemmas facing civilian steam vessel owners, the Navy Department and Congress needed to decide how to design its steam warships, how they would be constructed, and what equipment would be used aboard.<sup>14</sup> In 1839, for instance, Secretary of the Navy J. K. Paulding reported that the department was going to construct two steam frigates. The Navy intended that they be identical vessels, but also wanted to use them as prototypes to test different schemes of propulsion.<sup>15</sup> In the late 1830s and into the 1840s many inventors were

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<sup>11</sup> *Annual Report of the Secretary of the Navy*, 25 Dec., 1826, ASP, 2: 727.

<sup>12</sup> Kurt Hackemer, *The U.S. Navy and the Origins of the Military-Industrial Complex, 1847-1883* (Annapolis, MD: Naval Institute Press, 2001), 18-19.

<sup>13</sup> *Ibid.*, 20.

<sup>14</sup> Even though the department was trying to develop technical expertise within the service, from the 1830s onward it continued to be heavily dependent on civilian firms for their know-how in designing and building vessels and steam power plants. See Barbara B. Tomblin, “From Sail to Steam: The Development of Steam Technology in the United States Navy, 1838-1865” (Ph.D. Dissertation, Rutgers University, 1988), 23, 31-32, 46, 110. The Navy established long-term relationships with private businesses and inventors and often relied on technical advances that were developed outside the government establishment. See Tomblin, *Ibid.*, 8. For more on the relationship of the Navy with private contractors during this period, see Hackemer, *The U.S. Navy*.

<sup>15</sup> 1839 Report of the Secretary of the Navy, ACG, 26<sup>th</sup> Cong., 1<sup>st</sup> sess., 27. The two vessels were later named the *Missouri* and the *Mississippi*. In 1842 Secretary Upshur reported that the *Missouri* and the *Mississippi* consumed too much fuel and were too expensive to be used in time of peace and he planned to take them out of commission for the time being. See the 1842 Report of the Secretary of the Navy, ACG, 27<sup>th</sup> Cong., 3<sup>rd</sup> sess., 38. The Navy apparently kept the *Missouri* in service, however, as it was lost to a fire in the harbor of Gibraltar in 1843. See the 1843 Report of the Secretary of the Navy, ACG, 28<sup>th</sup> Cong., 1<sup>st</sup> sess., 13.

experimenting with versions of the screw propeller, rather than paddle wheels, and the Navy also carried out trials with different steam boiler designs.<sup>16</sup> Technological transformations took place through an often painful process of trial and error, some of them in full public view, as when a naval gun on the experimental steam warship *Princeton* exploded during a demonstration in 1842. It killed the Secretaries of the Navy and State, four other prominent guests, and narrowly missed killing President John Tyler.<sup>17</sup>

Experimenting with new technology was always a process of educated guesswork and the Navy Department wanted to find ways to improve its guesses. In the early 1840s, Secretary of the Navy Abel P. Upshur noted that it would not be prudent to build additional vessels until the department could make a more informed determination as to which mechanical improvements were most effective.<sup>18</sup> Upshur argued in his 1842 annual report that the advent of new technology called for a change in the mindset and education of members of the department. It was becoming necessary to increase the technical and scientific knowledge of naval officers and other personnel and to systematically evaluate mechanical advances using the investigative techniques of modern science. Upshur believed that greater knowledge of the physical sciences and experimentation on innovations could be used to improve the quality of the Navy while holding down costs. He requested a regular appropriation from Congress to conduct scientific and technical investigations and wrote:

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<sup>16</sup> See Tomblin, "From Sail to Steam," 108-109. When made to function efficiently, the screw propeller had advantages over paddle wheels because it was more efficient, cut down on windage and, in a feature particularly important for vessels of war, was under the water line which made the propulsion system less vulnerable to shot and shell. The Navy planned to compare two inventions, Ericsson's screw propeller and Hunter's water wheel, on the war steamers that Congress authorized in 1841. See also Taylor, *Transportation Revolution*, 118-19.

<sup>17</sup> See Lee M. Pearson, "The 'Princeton' and the 'Peacemaker': A Study in Nineteenth-Century Naval Research and Development Procedures, *Technology and Culture* 7/2 (Spring 1966): 163-83; and Spencer C. Tucker, "U.S. Navy Steam Sloop *Princeton*," *The American Neptune* 49/2 (Spring 1898): 96-113.

<sup>18</sup> *1841 Report of the Secretary of the Navy, ACG*, 27<sup>th</sup> Cong., 2<sup>nd</sup> sess., 18, 21.

The application of scientific principles in the mechanical arts is now universal. The mere artisan, whose skill is derived only from practice, is far behind the times. Science is now lending her aid to the arts, in all their departments, expanding their powers, multiplying their uses, and perfecting their works. I respectfully suggest that this aid is nowhere more important than in the various operations connected with a naval establishment. When we consider the number and variety of the materials which are used, the costliness of many of them, and the high importance that they should all be of the best and most valuable kinds, the propriety of subjecting them to all necessary tests, and of improving their quality as far as possible, will at once be admitted. This can be done only by the union of science and practical skill. The knowledge which we obtain from *experience* is always slow, always costly, and not always sure; that which we obtain from *experiment*, particularly in physical science, rarely deceives, and seldom fails richly to repay us. The experiments which have already been made, under the direction of this department, have imparted to it a degree of information which could not have been derived from any other source, and which will more than repay their cost in the building of a single ship. These experiments, however, are but the beginning of what might be accomplished . . . If the department were in a condition to avail itself of the improvements which are daily made in practical science, the most important results would soon be realized in the improved quality of our ships, and in the general economy of the service.<sup>19</sup>

Upshur also reported that many inventions to prevent explosions had been sent to the Navy Department and that having experts available to review them would be extremely useful.<sup>20</sup> Other Secretaries of the Navy and congressmen shared Upshur's perspective and priorities and procured expert advice and supported publicly funded investigations of technical advances. Upshur's predecessor, George Badger, had already asked the House Committee on Naval Affairs to apply some of the service's yearly appropriation to so the department could experiment on ordnance, construct steam war vessels and fund other matters related to technological improvements. The committee reported favorably on the request, and the Navy got its money.<sup>21</sup> By 1861, Congress instituted a regular process for adopting steam-related inventions for the armed forces and instructed the Navy to have all patented articles examined and recommended by "a competent board of naval engineers" before they were purchased.<sup>22</sup>

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<sup>19</sup>1842 *Report of the Secretary of the Navy*, ACG, 27<sup>th</sup> Cong., 3<sup>rd</sup> sess., 44.

<sup>20</sup> 27<sup>th</sup> Cong., 2<sup>nd</sup> sess., Jun. 25, 1842, S. Exec. Doc. 336, 1-2.

<sup>21</sup> *Naval Ordnance and Ordnance Stores [With Bill No. 9]*, 27<sup>th</sup> Cong., 1<sup>st</sup> sess., Jul. 7, 1841, H. Rept. 2, 1-2.

<sup>22</sup> *An Act Making Additional Appropriations for the Naval Service*, Approved Jul. 18, 1861, ACG 31, 37<sup>th</sup> Cong., 1<sup>st</sup> sess., 27.

Congress passed an act in 1841 which authorized the Secretary of the Navy to spend up to \$50,000 to test improvements for steamers and ordinance.<sup>23</sup> The following year Secretary Upshur asked for a regular appropriation so that the department could undertake “researches in practical science” to investigate matters that bore on the naval service and public interest.<sup>24</sup> In subsequent years, Congress granted the Navy Department a yearly appropriation of \$10,000 to evaluate new inventions. In 1857, Secretary Isaac Toucey asked that the appropriation be increased, noting that the service

feels itself crippled by the limited appropriation. The sum of \$10,000 is not adequate to do justice to improvements which promise public utility. Men of genius are so devoted to the one favorite pursuit that they are frequently without the means necessary to test their inventions. Were Congress to appropriate ten-fold the sum now allotted to this object for naval purposes, a single successful result, after a hundred failures, would reimburse the whole cost, while the influence of the measure in aiding the progress of improvement in the naval service could hardly be overestimated.<sup>25</sup>

Admittedly, Toucey’s motive may have been less a dispassionate view of how to procure better technology than the desire to increase the appropriations of his department and build his bureaucratic turf. But even so, Congress’s support provides evidence that the Navy and members of Congress were attempting to evaluate and foster technological improvements in the national interest.

Members of both major parties supported subsidies for mechanical innovations, though Whigs tended to be more enthusiastic. They, consistent with their support for subsidizing internal improvements, were comfortable with attempting to achieve public ends by financing

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<sup>23</sup> “An Act Making an Appropriation for the purchase of naval ordnance and ordnance stores,” Approved Sept. 11, 1842, 27<sup>th</sup> Cong., Ch. 21.

<sup>24</sup> *Report of the Secretary of the Navy in compliance with a resolution of the Senate, in relation to the Invention of Thomas S. Easton*, 27<sup>th</sup> Cong., 2<sup>nd</sup> sess., 1842, S. Exec. Doc. 336, 1-2 (Appendix B).

<sup>25</sup> 1857 Report of the Secretary of the Navy, in *ACG*, 35<sup>th</sup> Cong., 1<sup>st</sup> sess., 1858, 32.



private individuals and groups.<sup>26</sup> The Twenty-Seventh Congress, elected in 1840 and meeting for three sessions from 1841-43, was the only one where the Whigs controlled both houses of Congress along with the Presidency, and their actions during this time suggests that they were deeply committed to testing and subsidizing inventions. Despite the constraints imposed by economic downturn that began in 1837 and the rising national debt, as well as the political tug of war between congressional Whigs and President John Tyler over his opposition to portions of the Whig economic program, the 27<sup>th</sup> Congress funded a number of subsidies and investments in new technology, including \$250,000 to construct an iron war steamer, \$50,000 for the Navy Department to test a variety of ordnance, and appropriations to enable Samuel Colt and Samuel F. B. Morse to develop and test inventions.<sup>27</sup>

In 1843, Congress also passed a law requiring the Navy Department to investigate and test safety apparatus to prevent boiler explosions.<sup>28</sup> However, over the years enough Democrats supported these types of subsidies to indicate that the issue of boiler safety was not an area of deep partisan differences. A Democratic administration approved the Franklin Institute investigation, and Democratic majorities in Congress, along with Democratic presidents, approved and funded commissions to research boiler safety inventions in 1834 and in 1838.<sup>29</sup>

### ***3. Federal Aid and Investigations***

The most common governmental subsidies relating to steamboat safety came in the form of technical advice and endorsements from government-appointed experts who evaluated

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<sup>26</sup> See Michael F. Holt, *The Rise and Fall of the American Whig Party: Jacksonian Politics and the Onset of the Civil War* (New York, NY: Oxford University Press, 1999), 951-52.

<sup>27</sup> See Philip K. Lundeberg, *Samuel Colt's Submarine Battery: The Secret and the Enigma* (Washington, DC: Smithsonian Institution Press, 1974), 19-20, 24.

<sup>28</sup> Act of Mar. 3, 1843, 5 *Stat. L.* 626, Section 5.

<sup>29</sup> Act of Jun. 30, 1834, 4 *Stat. L.* 728; Act of Jun. 28, 1838, 5 *Stat. L.* 252.

inventions. Though some proposed regularly funding tests of useful inventions, Congress and the Executive branch undertook investigations on an *ad hoc* basis until the Board of Supervising Inspectors was given this responsibility in 1852.<sup>30</sup> Over the years, many inventors applied to have their devices tested. The investigators, who usually had either an academic background in science or practical experience in steam engineering, reviewed descriptions and models of inventions. In some cases they observed prototypes in operation or constructed their own versions of the mechanisms and used government appropriations to finance tests. Inventors often lacked the resources to perform their own tests and they saw that government examinations could gain them publicity and satisfy the public that their devices had merit.<sup>31</sup> Inventors probably appreciated that they could use a favorable review to advertise and promote their inventions.<sup>32</sup> In this way, the government-sponsored a sort of nineteenth-century version of the crash tests conducted on automobiles or the product ratings published in consumer magazines. Steamboat operators could compare different plans and decide which equipment to use on their vessels, just as passengers might insist in traveling on vessels that employed notable safety features.

During its investigation in the 1830s, as noted earlier, the Franklin Institute committee tested steam safety devices as part of its inquiry. While this was a secondary priority for the committee, chairman Alexander Dallas Bache examined alarm floats, gauge-cocks, (both of which are used to check the level of water within a boiler) and fusible alloy plates (designed to give way and either open a safety valve or sound an alarm when the boiler temperature or pressure was too high). Bache critiqued the design and efficacy of these devices and made

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<sup>30</sup> One observer suggested using \$20,000 per year from the Smithsonian bequest “to test the value of inventions.” “The Smithsonian Institute,” *SA* 3/20, Feb. 5, 1848, 157.

<sup>31</sup> *Report of the Commissioners to Test Inventions*, 25<sup>th</sup> Cong., 3<sup>rd</sup> sess., 1839, H. Doc. 170, 8 (Appendix B). Congress passed a law in 1843 to establish a commission to render “their opinion as to the relative merits and efficacy of such inventions and plans.” 5 *Stat. L.*, 626, Section 5.

<sup>32</sup> For example, see 28<sup>th</sup> Cong., 2<sup>nd</sup> sess., Feb. 7, 1845, H. Rept. 115, 3 (Appendix B).

suggestions as to how some might be redesigned to better effect.<sup>33</sup> The government reported on additional investigations into boiler safety inventions in 1834, 1838, 1839, 1842, 1844, 1849, and 1852.<sup>34</sup>

In 1834, Congress appropriated \$5,000 for the first federal inquiry specifically dedicated to testing the efficacy of boiler safety equipment and assigned the job to the Navy Department. Introduced in the House of Representatives, the bill does not seem to have attracted much attention. Aside from the report by a select committee, congressmen did not discuss it extensively as part of the official record. The select committee's draft version passed the House late in the session without a roll call vote.<sup>35</sup> In the Senate, the senators passed the bill on the final day of the session without debate.<sup>36</sup>

The House select committee argued that Congress had a broad responsibility to look for ways to promote greater safety on the nation's waterways and that this responsibility included conducting experiments to test safety devices. The committee characterized the expenditure as "reasonable," writing:

On the question as to the power and the expediency of aid and cooperation on the part of the Government in experiments of this kind, the Committee have [sic] come to an affirmative conclusion. When it is considered how intimately the subject matter connects itself with the general welfare, looking to the protection of the lives and property of the whole people—that it involves considerations of

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<sup>33</sup> *Letter from the Secretary of the Treasury Transmitting a Report of the Franklin Institute of Philadelphia, in Relation to the Explosion of Steam Boilers*, 24<sup>th</sup> Cong., 1<sup>st</sup> sess., Mar. 1, 1836, H. Doc. 162, 11, 12-16, 17, 27-46 (Appendix B).

<sup>34</sup> Appendix A: H.R. 452, 23<sup>rd</sup> Cong., 1<sup>st</sup> sess.; S. 73, 25<sup>th</sup> Cong., 2<sup>nd</sup> sess.; S. 389, 25<sup>th</sup> Cong., 2<sup>nd</sup> sess.; H.R. 602, 27<sup>th</sup> Cong., 2<sup>nd</sup> sess.; S. 223, 32<sup>nd</sup> Cong., 1<sup>st</sup> sess.; Appendix B: H. Rept. 426, 23<sup>rd</sup> Cong., 1<sup>st</sup> sess.; H. Doc. 170, 25<sup>th</sup> Cong., 3<sup>rd</sup> sess.; S. Exec. Doc. 336, 27<sup>th</sup> Cong., 2<sup>nd</sup> sess.; S. Exec. Doc. 439, 27<sup>th</sup> Cong., 2<sup>nd</sup> sess.; H. Rept. 1033, 27<sup>th</sup> Cong., 2<sup>nd</sup> sess.; S. Doc. 405, 28<sup>th</sup> Cong., 1<sup>st</sup> sess.; S. Exec. Doc. 18, 30<sup>th</sup> Cong., 2<sup>nd</sup> sess.

<sup>35</sup> *HJ*, 23<sup>rd</sup> Cong., 1<sup>st</sup> sess., April 26, 1834, 566; June 27, 1834, 855 and 856; June 28, 1834, 875, 878.

<sup>36</sup> *SJ*, 23<sup>rd</sup> Cong., 1<sup>st</sup> sess., June 28, 1834, 385 and 387 and June 30, 1834, 403. Benjamin Phillips also memorialized the Senate for aid to test his safety steam engine, but their Committee on Naval Affairs reported against his request. Report of the Committee on Naval Affairs to whom was referred the letter of Benjamin Phillips, Feb. 6, 1834, Committee on Naval Affairs, Jan. 23, 1834 (Sen23A-G11), 23<sup>rd</sup> Cong., Records of the Senate, RG 41, NA.

naval and national defense, as well as the general interests of commerce; it is not thought that any valid opposing argument can be drawn from the want of power.<sup>37</sup>

The committee added that if the experiments increased knowledge of how to control the powerful and dangerous agent of steam, it “would be cheaply purchased at the cost of a million [dollars].”<sup>38</sup> If any members disagreed with this expansive assessment of the powers and responsibilities of the national government, they were silent while the bill was under consideration. This would be the pattern for legislation and resolutions authorizing this type of investigation—the House and Senate tended to pass them with little fanfare and with the widespread support (or acquiescence) of the members.

The 1834 appropriation directed the Secretary of the Navy to test the steam engine safety improvements by Benjamin Phillips of Philadelphia, along with any other worthwhile inventions that were put forward.<sup>39</sup> After the law was passed, Secretary of the Navy Mahlon Dickerson reported that a number of inventors asked the government to examine their mechanisms. Dickerson noted that, in his opinion, the machines had no special value, and did not warrant expending any money in order to assess them.<sup>40</sup> However, the act specifically directed the Navy to test Phillips’s steam engine. Using government money, Phillips constructed a model engine with boilers, brought it to Washington, and displayed it to members of the Department, Congress and others. Secretary Dickerson reported that the observers could find no evidence that Phillips had constructed an especially safe engine.<sup>41</sup>

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<sup>37</sup> *Report of the Select Committee on the Memorial of Benjamin Phillips to Accompany Bill H.R. 452*, 23<sup>rd</sup> Cong., 1<sup>st</sup> sess., H. Rept. 426, 2.

<sup>38</sup> *Ibid.*

<sup>39</sup> Act of Jun. 30, 1834, 4 *Stat. L.*, 728.

<sup>40</sup> The act directed the Secretary to test Phillips’s invention, but the act was phrased in such a way as to give the Department discretion whether or not to test any others. See 4 *Stat. L.* 728.

<sup>41</sup> 1835 Report of the Secretary of the Navy, 24<sup>th</sup> Cong., 1<sup>st</sup> sess., *ASP*, 4/585: 734. The experiments may not have yielded extraordinary results, but they illustrate that the rule of parsimony was alive in the national

From the records, it does not appear that the 1834 examinations were well-thought-out or particularly useful. A public demonstration before members of Congress might be impressive to look at (or not), but Dickerson's report does not indicate that experts studied Phillips's mechanism or tested it methodically in a way similar to the examinations that Professor Bache of the Franklin Institute was conducting on steam boilers. The evaluations appear to have been based more on the impressionistic observations of laymen, rather than analysis by experts. The government evaluated another boiler safety device by inventor John C. Fr. Salomon, but this effort also did not show signs of systematic or searching inquiry.<sup>42</sup> Thus, the first set of government experiments by the Navy Department, from 1834 to 1836, ended with disappointed inventors and without identifying substantive advances in safety.

The government pursued subsequent experiments less publicly and more comprehensively, under the watchful eyes of experts, who issued lengthy and detailed reports on their findings.<sup>43</sup> Without direct evidence, one can only speculate as to the reason for the improved quality of the inquiries, but this coincided with the completion of the Franklin Institute Report, and the example of

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government. Dickerson reported, proudly, one supposes, that the department expended \$519.75 to construct and test Mr. Phillips's device and the remainder of the \$5,000 appropriation remained unexpended.

<sup>42</sup> Salomon wrote that his expenses had been heavy in undertaking experiments and that he needed government support to continue his investigations. *Memorial of John C. F. Salomon relative to a patent safety boiler, Dec. 1835* (Referred Dec. 29, 1835), Committee on Naval Affairs, Petitions and memorials referred to committees, Various Subjects," 1834 & 1835 (HR24A-G12.2), 24<sup>th</sup> Cong., Records of the House of Representatives, RG 233, NA. Salomon claimed that his new boiler design was safer than the typical cylindrical boiler and requested \$400 to test his plan. Under Salomon's guidance, the Navy Department financed the construction of two boilers to use for comparison, one a standard cylindrical one and another of Salomon's design. Secretary Dickerson reported that the Navy conducted a demonstration in February 1836 by the eastern front of the Capitol in the presence of many Congressmen and others, but "without any satisfactory result." Dickerson declined to conduct more tests, but allowed Salomon to use the boilers to make further experiments on his own. See the 1836 Report of the Secretary of the Navy, *ACG*, 24<sup>th</sup> Cong., 2<sup>nd</sup> sess., 9. Salomon did not like the results of the Navy's tests and wrote to Congress asking for further evaluation by a committee that would solicit the opinions of both "scientific and practical men." Congress printed his memorial, but did not endorse his request to reexamine his invention. See *Memorial of John C. Fr. Salomon*, Dec. 29, 1835, 24<sup>th</sup> Cong., 2<sup>nd</sup> sess., 1836, H. Doc. 114, 1.

<sup>43</sup> The officials responsible for subsequent investigations issued more detailed reports than the brief overview that Secretary Dickerson included in the Navy Department's annual report for 1834, including more extensive accounts of the devices, the tests, and the results. See 25<sup>th</sup> Cong., 3<sup>rd</sup> sess., Feb. 7, 1838, H. Doc. 170, and 28<sup>th</sup> Cong., 1<sup>st</sup> sess., Jun. 17, 1844, S. Doc. 405 (Appendix B).

a sophisticated inquiry of this caliber may have led government officials to expect investigations to meet a higher standard.<sup>44</sup>

Legislators were more inclined to take an invention seriously or offer a subsidy when the applicant had a reputation for achievement in science, invention, or construction, or could provide evidence that reputable people thought the applicant's plans and devices were worthwhile. When inventor A. B. Quinby petitioned the government for help in 1837, he attached endorsements of his apparatus from two members of the Franklin Institute Committee, Thomas P. Jones and Walter R. Johnson, and from Eli Whitney Blake, the superintendent of a gun factory outside of New Haven, Connecticut.<sup>45</sup>

In response to Quinby's petition, Senator John Davis of Massachusetts laid out a number of working criteria for when the government should consider testing a device and otherwise aiding an inventor. According to Davis, the only way to determine a mechanism's virtues was through practical experiments, and he thought that the government should undertake the tests when an inventor did not have the resources to try them himself and was unable to find private investors willing to fund them. Davis also wanted the applicants to provide endorsements to assure the government that men of "scientific attainments" believed that the invention had merit.<sup>46</sup>

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<sup>44</sup> A more direct connection is that Walter R. Johnson, who conducted a large portion of the research on the Franklin Institute Report in the 1830s, also chaired several government investigations, and thus was inclined to work by the standards set by the Franklin Institute Investigation. See 27<sup>th</sup> Cong., 2<sup>nd</sup> sess., Jun. 25, 1842, S. Exec. Doc. 336; 27<sup>th</sup> Cong., 2<sup>nd</sup> sess., Aug. 22, 1842, S. Exec. Doc. 439; and 28<sup>th</sup> Cong., 1<sup>st</sup> sess., Jun. 17, 1844, S. Doc. 405 (Appendix B).

<sup>45</sup> *Petition of A.B. Quinby, Praying an Appropriation to Test his Inventions for Preventing the Explosions of Steam-boilers*, 25<sup>th</sup> Cong., 2<sup>nd</sup> sess., Dec. 14, 1837, S. Doc. 17, 17 (Appendix B).

<sup>46</sup> *Report with Senate Bill 183, The Petition of A. B. Quinby . . .*, 24<sup>th</sup> Cong., 2<sup>nd</sup> sess., February 1, 1837, S. Doc. 125, 2 (Appendix B). While Davis thought that the U.S. had a general obligation to encourage "invention and discovery" until the dangers posed by the use of steam were removed, and that government representatives should conduct a trial of Quinby's devices, he did not believe that it had the obligation to look at every mechanism that was submitted.

The government initiated its next major effort to investigate steam boiler apparatus in 1838. At that time, Congress was considering major legislation to address the problem of steam accidents, and the Senate had introduced a bill (S. 1), which would eventually become the first law to regulate steam vessels. Congress passed two other laws (introduced as bills S. 73 and S. 389) appropriating \$6,000 and authorizing “the appointment of persons to test the usefulness of inventions to improve and render safe the boilers of steam engines.” As in 1834, the laws required the Navy Department to oversee the investigation,<sup>47</sup> but this time the Navy recruited an outside expert, James Renwick, a professor of natural and experimental philosophy and chemistry at Columbia College in New York, to head the investigation. Renwick was a popular lecturer with, as one diarist noted, a “clear, familiar and colloquial manner” while addressing an audience.<sup>48</sup> More to the point, however, he was also the author of a treatise on the steam engine.<sup>49</sup> He had served as a consultant for the government and had recently been employed by the Navy Department to survey New York harbor and recommend a site for a new dry dock.<sup>50</sup> Renwick and his fellow board members reviewed applications, constructed apparatus and conducted face-to-face consultations with inventors. Whether by coincidence or conscious decision, the commission adopted some of Senator Davis’s standards to determine which mechanisms were appropriate to test. The investigators decided that Congress had intended for them to provide a service to both the inventors and the government by experimenting only on

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<sup>47</sup> 5 *Stat. L.*, 252 and 5 *Stat. L.* 261. See Appendix A.

<sup>48</sup> Philip Hone and Bayard Tuckerman, *The Diary of Philip Hone, 1828-1851* (New York, NY: Dodd, Mead, 1889), 1:12. Years later Renwick headed an investigation into the explosion of a stationary steam boiler which killed sixty three people. “Explosions of Steam Boilers,” *SA* 5/23, Feb. 23, 1850, 181.

<sup>49</sup> See James Renwick, *Treatise on the Steam Engine*, 2<sup>nd</sup> ed. (New York, NY: Carvill & Co., 1839).

<sup>50</sup> 1837 Report of the Secretary of the Navy, *ACG*, 25<sup>th</sup> Cong., 2<sup>nd</sup> sess., 10. Renwick, like Joseph Henry, was trying “to foster the application of science to technology.” His writings were intended to help practical mechanics use natural principles to improve their machinery. See Edwin Layton, “Mirror-Image Twins: The Communities of Science and Technology in 19<sup>th</sup>-Century America,” *Technology and Culture* 12/4 (Oct. 1971): 565.

promising machines whose inventors lacked the means to test them for themselves. Through their reports they could inform the public as to the merits of the devices.<sup>51</sup> They determined that they did not have to test the apparatus of some applicants because, in their judgment, many of these plans closely resembled existing devices, were unlikely to be effective, or had apparent weaknesses in design that made breakdowns likely. For the mechanisms they did test, they gave an overview of the apparatus and summarized their test results.

The commissioners examined six types of devices: (1) instruments that would sound warnings when the water was too low in the boilers, (2) automatic pumps that would keep the water from falling below a predetermined level, (3) thermometers to measure the heat of the steam within boilers, (4) plans to redirect the energy from explosions, thus limiting the damage when boilers exploded, (5) a safety valve to release excess pressure, and (6) a redesigned steam engine without a boiler. They sought to determine whether the inventions were both useful and affordable. The commissioners reported unfavorably when the mechanisms appeared overly complex, liable to problems, or likely to be difficult to repair and replace. Also, if the inventions were already in use, the commissioners checked with people who had been utilizing them for their observations on the efficacy of the machinery. Ultimately, they recommended three devices as valuable additions to the existing safety apparatus: a feed pump designed by Paul Boynton of Fort Covington, NY, a whistle alarm invented by Owen H. Rankin of Wilmington, NC, and a thermometer constructed by A. B. Quinby of Washington, DC.<sup>52</sup>

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<sup>51</sup> *Message from the President of the United States Transmitting a Report of the Commissioners to Test Inventions to render safe the Boilers of Steam-engines*, 25<sup>th</sup> Cong., 3<sup>rd</sup> sess., Feb. 7, 1839, H. Doc. 170, 8 (Appendix B).

<sup>52</sup> Appendix B: H. Doc. 170, 25<sup>th</sup> Cong., 3<sup>rd</sup> sess., 9. As with many of the investigations, the commissioners concluded that none of the inventions, taken singly or in combination, could guarantee perfect security in using steam power.



A few years later, in 1842 the Senate passed a resolution and requested the Navy Department to evaluate a safety device designed by Thomas S. Easton.<sup>53</sup> The Navy asked Professor Walter R. Johnson of the Franklin Institute to undertake the investigation.<sup>54</sup> Like Renwick, Johnson was familiar to members of the government and had a history of serving as an outside expert on its behalf. He had conducted a large portion of the Franklin Institute investigation, researched techniques of sheathing vessels with copper to protect their wooden hulls for the Navy, and conducted research on coals.<sup>55</sup>

Johnson had become, along with Joseph Henry, Alexander Dallas Bache, and James P. Espy and others, one of a group of scientific experts who advised members of the government on questions relating to technology.<sup>56</sup> He analyzed Easton's devices by pursuing a careful set of experiments, took reams of data, and supported his conclusions by referencing his results.<sup>57</sup>

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<sup>53</sup> *SJ*, 27<sup>th</sup> Cong., 2<sup>nd</sup> sess., Apr. 15, 1842, 297-98.

<sup>54</sup> *Report of the Secretary of the Navy in Compliance with a resolution of the Senate, in relation to the invention of Thomas S. Easton, for preventing explosions in steam boilers*, 27<sup>th</sup> Cong., 2<sup>nd</sup> sess., Jun. 24, 1842, S. Doc. 336, 1 (Appendix B).

<sup>55</sup> See the *1843 Report of the Secretary of the Navy*; *ACG*, 28<sup>th</sup> Cong., 1<sup>st</sup> sess., 16; *HJ*, 27<sup>th</sup> Cong., 3<sup>rd</sup> sess., Dec. 27, 1842, 100; and the *1844 Report of the Secretary of the Navy*; *ACG*, 28<sup>th</sup> Cong., 2<sup>nd</sup> sess., 15. See also Sean P. Adams, "Promotion, Competition, Captivity: The Political Economy of Coal," *Journal of Policy History* 18/1 (2006): 78. In accepting the assignment to review Easton's device, Johnson was motivated in part by his desire to demonstrate that, with thorough scientific analysis he, and by implication all scientists, could give effective practical advice to mechanics and inventors to help them improve their devices. See *Report of the Secretary of the Navy ... in relation to the invention of Thomas S. Easton*, 27<sup>th</sup> Cong., 2<sup>nd</sup> sess., Jun. 24, 1842, S. Doc. 336, 11.

<sup>56</sup> Bache, Johnson, and Espy were part of the "scientific circle" of the Franklin Institute who contributed substantially to the research projects conducted by the organization. See Bruce Sinclair, *Philadelphia's Philosopher Mechanics: A History of the Franklin Institute, 1824-1865* (Baltimore, MD: The Johns Hopkins University Press, 1974), 152-58. For an example of Espy's work on meteorological observations for the government, see *Explanatory of Bill No. 645 - Army Appropriations for the Year and a Half Ending Jun. 30, 1844 [To accompany H.R. 645]*, 27<sup>th</sup> Cong., 3<sup>rd</sup> sess., Jan. 26, 1843, H. Doc. 89, 1-2.

<sup>57</sup> See *Report of the Secretary of the Navy ... in relation to the invention of Thomas S. Easton*, 27<sup>th</sup> Cong., 2<sup>nd</sup> sess., Jun. 24, 1842, S. Doc. 336 (Appendix B). Johnson's report included tables and graphs, as well as extensive discussion of experimental results, which were characteristic of Johnson's contributions to the 1832 report by the House of Representatives select committee, and his report on the strength of boiler metals for the Franklin Institute in 1837. See also Johnson's comments in 1844 on the amount of labor and care required to compose the report, make drawings, graphs, and tables illustrating the results of their experiments: *Security of the Lives of Passengers on Steam Vessels: Letter from the Secretary of the Navy Enclosing a Letter from Walter R. Johnson ...*, 28<sup>th</sup> Cong., 1<sup>st</sup> sess., May 27, 1844, H. Doc. 267, 2 (Appendix B).

Johnson also provided a detailed critique and a list of suggestions for how to reconfigure the apparatus to make it more effective.<sup>58</sup> Easton submitted a second invention for Johnson to review, this one designed to function as both a safety valve and warning device that would let off excess steam when the pressure became too high in the boiler. After experimenting with Easton's second invention, Johnson indicated that he liked it better than the first. He endorsed the mechanism and commented that it had "decided advantages over [the inventor's] previously patented-invention" and that it deserved "the attention of the owners and managers of steam engines and steam-vessels."<sup>59</sup> Easton was pleased with the positive evaluation of his second device, but he was not quite satisfied. Believing that his invention was superior to all others, he wanted a clear and universal recommendation that his device should be used by steamboat owners and deserved government backing. He wrote to Congress that there "were numerous other persons who profess to have invented other methods for the accomplishment of the same object, and who are praying for the patronage of the government to their inventions." He asked Congress to establish a commission that would examine and compare *all* of the inventions to determine which one was the best in order to bring it into general use.<sup>60</sup>

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<sup>58</sup> Appendix B: S. Doc. 336, 27th Cong., 2nd sess., 4, 6, 37. Easton's invention was one of several designed to attach fusible metal alloys to a boiler. The alloys were supposed to melt when the temperature was too great, forestalling an explosion, or alerting the crew to the conditions that would produce one. Johnson found that Easton's mechanism, as designed, became less effective with repeated use. It had the same drawback as other safety devices designed with alloys and exposed to high heat and pressure—namely, that the metallic components were forced apart by repeated exposure to elevated temperatures and pressure. After melting several times, they would no longer melt at the desired temperature. In the case of Easton's device, Johnson's experiments showed that it took a higher and higher temperature and pressure to produce the calculated effect. This was not, however, necessarily a major handicap. Johnson noted that this invention was not intended for regular use, but as a last defense when "willful mismanagement" had brought the steam's pressure or temperature so high as to make an explosion likely.

<sup>59</sup> *Report from the Secretary of the Navy Communicating ... a report on the second invention of Thomas S. Easton, for preventing explosions of steam-boilers*, 27<sup>th</sup> Cong., 2<sup>nd</sup> sess., Aug. 19, 1842, S. Exec. Doc. 439, 10 (Appendix B).

<sup>60</sup> *Memorial of Thomas S. Easton* (referred Jan. 13, 1843), Select Committee on Steam Boilers and Steamboats (HR27A-G25.5), 27<sup>th</sup> Cong., Records of the House of Representatives, RG 233, NA.

Easton was not the only inventor who was disappointed with the outcome of government investigations. Others, even some who had previously received favorable reviews, such as A. B. Quinby in 1838, were not pleased that the examiners could pick and choose which machines they tested. Quinby protested that under the 1842 resolution to examine boiler safety devices (and test Samuel Colt's submarine battery), the Secretary of the Navy did not take the opportunity to seek out and test additional inventions, as was permitted by the legislation, but instead only examined the ones specifically named in the resolution.<sup>61</sup> Quinby proposed that Congress pass a new resolution requiring the Navy Department to test every invention submitted to it, presumably including his own, and that the testing take place where the members of Congress could readily observe the process. Quinby also cautioned the Congressmen not to purchase the rights to any patent until every device had been tested and reported on. The Chief Engineer of the Washington Navy Yard had apparently already examined Quinby's "vaporimeter," in 1842, as well as the Safety Guard by Cadwallader Evans. Quinby thought that his invention came off favorably while Evans's device, by contrast, had substantial problems.<sup>62</sup>

Inventor Daniel Barnum also believed that he deserved a more positive evaluation than he received. The 1843 steamboat law created another commission to test inventions and the group included both "scientific" and "practical" men. Walter R. Johnson again led the inquiry. The other commissioners were Thomas P. Jones of Philadelphia, editor of the *Journal of the Franklin Institute*, who had served as a member of the Institute's steam boiler committee in the

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<sup>61</sup> 5 *Stat. L.*, 584.

<sup>62</sup> Quinby accused Evans of mixing the metal alloys for his safety guard so that they would only soften at a dangerously high pressure and temperature. See *Petition of A. B. Quinby, praying the adoption of measures to test inventions for preventing explosions of steam boilers*, Feb. 9, 1843 (Referred Feb. 13, 1843), 27<sup>th</sup> Cong., Petitions and Memorials Referred to Committees, Committee on Naval Affairs, Jan. 25, 1843–Feb. 13, 1843 (Sen27A-G11.1), Records of the Senate, RG 46, NA. Quinby speculated that some innovations in boiler design were making explosions even more likely and asked if the boiler arrangements on the U.S. steamer *Mississippi* tended to create "surcharged" (highly heated) steam which brought on greater danger.

1830s, and Charles Reeder, a longtime manufacturer of steam engines from Baltimore.<sup>63</sup> The commissioners conducted examinations and wrote a lengthy report, which they issued in 1844. Barnum had submitted an auxiliary pump designed to renew the water in a boiler when a float indicated the level was low. The commissioners liked Barnum's concept, but knew that many inventors had difficulty in devising dependable floats, and questioned whether Barnum's float would reliably trigger the auxiliary pump if muddy waters, such as those of the Mississippi River, had fouled the mechanism.<sup>64</sup> In 1845, Barnum protested that floats had already been employed effectively in these conditions, and asked for a chance to demonstrate that his float would work.<sup>65</sup> Congress, however, did not give him another chance at the time.

#### ***4. Dilemmas for Legislators and the Limits of Machinery***

There were other dilemmas associated with the Mechanical Option, and members of Congress discovered that mandating certain types of safety features could be counterproductive. The Franklin Institute committee had anticipated difficulties of this sort when they had warned in 1836 that "ill directed interference" could create more problems in managing vessels than it solved.<sup>66</sup> Their advice proved prophetic when parts of the 1838 steamboat act were unworkable,

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<sup>63</sup> See *Raub's Safety Valves [To accompany bills H.R. 484, 485, and 486.]*, 26<sup>th</sup> Cong., 1<sup>st</sup> sess., Jul. 10, 1840, H. Rept. 651, 23 (Appendix B). See also *Report by the Committee on Naval Affairs on the Petition of Charles Reeder [To accompany bill H.R. 65]*, 30<sup>th</sup> Cong., 1<sup>st</sup> sess., January 12, 1848, H. Rept. 79 and *Report by the Committee of Claims for the Relief of Charles Reeder [To accompany H.R. 65]*, 30<sup>th</sup> Cong., 1<sup>st</sup> sess., May 3, 1848, S. Rept., 142.

<sup>64</sup> Other inventors had encountered this difficulty; Cadwallader Evans had abandoned his plans to use a float to measure the height of water inside boilers, since he found that, though the devices worked well enough in clear water, every float tended to become impeded by sediment and subject to other breakdowns when it was used on the rivers. See Cadwallader Evans, *A Treatise on the Causes of Explosions of Steam Boilers with Practical Suggestions for their Prevention* (Pittsburgh, PA: William H. Whitney, Printer, 1850), 25.

<sup>65</sup> Petition of Daniel Barnum, praying the aid of Congress in testing his invention for preventing the explosions of steam boilers, Referred Jan. 29, 1845, Naval Affairs Committee, Petitions and Memorials Referred to Committees, Jan. 25, 1845–Feb. 20, 1845 (Sen28A-G11.3), 28<sup>th</sup> Cong., Records of the Senate, RG 46, NA.

<sup>66</sup> "Report of the Committee of the Franklin Institute of the State of Pennsylvania for the Promotion of the Mechanic Arts, on the Explosions of Steam Boilers, Part 2, containing the General Report of the Committee," *JFI*

and, in 1843, Congress reversed some of its requirements. The fact that Congress found it necessary to withdraw and revise portions of the 1838 steamboat act suggests that it was difficult for legislators to be certain that requiring specific design attributes or equipment would not be counterproductive, causing problems that the members did not foresee.

The 1838 steamboat act required vessels on the Great Lakes and on the sea to use iron rods or chains, rather than ropes, to attach the steering wheel to the rudder.<sup>67</sup> The provision was intended to make sure a pilot could still guide the vessel toward safety when a fire might otherwise sever the connection between the helmsman and the rudder.<sup>68</sup> This requirement for fireproof steering apparatus was well intentioned, but steamboat operators throughout the country complained when the law mandated this type of equipment.<sup>69</sup> Vessel masters on the Great Lakes attested that iron rods and chains were not strong or flexible enough to control a vessel during a storm, and noted that several vessels with steering chains had already suffered accidents, had their steering fail, and were left to the mercy of the wind and the waves.<sup>70</sup> Steamboat owners also complained that government administrators were overreaching their authority. The collector at the Port of New Orleans thought that this section of the act also

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22/4 (Oct. 1836): 217.

<sup>67</sup> 5 *Stat. L.* 304, Section 9.

<sup>68</sup> The most immediate demonstration of this danger had come while the 1838 act was being considered in Congress. The fire on the steamboat *Ben Sherrod* in May 1837 served as a grim warning of the cost of not having fireproof steering apparatus. Mississippi customs district special agent J. C. Larue reported that when the vessel caught fire on the river below Natchez, the tiller ropes burned so that the vessel could not be steered to shore. While some of the passengers and crew were saved by other steamers, most jumped into the water and drowned, unable to reach the riverbanks; as many as 130 lives were lost. See *Letter from the Secretary of the Treasury Transmitting ... Information in Relation to Steam Engines*, 25<sup>th</sup> Cong., 3<sup>rd</sup> sess., 1838, H. Doc. 21, 309 (Appendix B). See also the abstract of U.S. steamboat accidents up to 1840 in *Report [To accompany S. 247]*, 26<sup>th</sup> Cong., 1<sup>st</sup> sess., Mar. 2, 1840, S. Rept. 241, 4 (Appendix B).

<sup>69</sup> Memorials of Operators of Steamboats from New York against the provision requiring iron rods and chains, Select Committees on Steam Boilers and Steamboats, Petitions and Memorials, Various Subjects (HR27A-G26.5), 27<sup>th</sup> Cong., Records of the House of Representatives, RG 233, NA.

<sup>70</sup> *Petition of a Number of owners and masters of steamboats running on Lakes Erie, Huron and Michigan, praying the amendment of the act of Jul. 7, 1838 ...*, 26<sup>th</sup> Cong., 1<sup>st</sup> sess., Mar. 10, 1840, S. Doc. 270, 1-2 (Appendix B).

applied to vessels on the Western rivers, and threatened to initiate legal proceedings against vessel masters who did not comply. A group of steamboat owners and navigators protested against this interpretation, and argued that the provision did not apply to them. They also cited a number of boats whose owners had tried to use iron rods and chains and been forced to abandon them.<sup>71</sup> Others on the Ohio and Mississippi rivers claimed that iron rods and chains were “too unwieldy” for conditions on the rivers.<sup>72</sup> Some observers also pointed out that steamboat operators generally ignored this portion of the 1838 law, risking fines rather than altering their arrangements.<sup>73</sup> All of these petitioners asked for Congress to modify or repeal this provision of the 1838 act. It took several years, but in 1843 Congress withdrew the requirement of using iron rods or chains, provided that the vessel had an alternative position from which a craft could be guided if the pilot were driven from the wheel by smoke and flames.<sup>74</sup>

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<sup>71</sup> They wrote that steamboat operators had made sincere attempts to anticipate and obviate the danger, as well as to comply with the law. They declared that one experienced commander had “at great expense and under the supervision of some of the best mechanics in the western country,” installed steering chains on his newest boat and found them to be impracticable. Steam boat owners on the Western Waters, Referred Feb. 4, 1839, Petitions and Memorials Referred to Committees, Select Committee on Steam Boats (HR25A-G24.3), 25<sup>th</sup> Cong., Records of the House of Representatives, RG 233, NA.

<sup>72</sup> *Memorial of a Number of Citizens of Louisville, Kentucky, Praying the amendment of the act “to provide for the better security of passengers on board of vessels propelled in whole or in part by steam,”* 25<sup>th</sup> Cong., 3<sup>rd</sup> sess., Dec. 13, 1838, S. Doc. 13, 4 (Appendix B). One steamboat captain in the New York area sent an affidavit to Congress stating that it was difficult to run chains through a block, as they were liable to “kink” and make the vessel impossible to control, especially when making rapid course changes. Like his compatriots in the west, he noted that the owner of a vessel in his area had had steering chains installed, but had soon abandoned them because of the difficulties. In addition, he declared that it was not technically feasible to use iron rods for the entire steering apparatus; ropes were still necessary to attach the chain or rod to both the rudder and the wheel, leaving the steering mechanism vulnerable to fire. See *Safety of Passengers on Board of Steamboats. [To Accompany bill H.R. 602]*, 27<sup>th</sup> Cong., 2<sup>nd</sup> sess., Aug. 22, 1842, H. Rept. 1033, 3-4. See also the testimony in *Report [To accompany S. 247] by the Committee on Commerce*, 26<sup>th</sup> Cong., 1<sup>st</sup> sess., S. Rept. 241, 15.

<sup>73</sup> *Document on the subject of preventing the destruction of steamboats by fire*, 26<sup>th</sup> Cong., 1<sup>st</sup> sess., Feb. 4, 1840, S. Doc. 151, 1.

<sup>74</sup> Act of Mar. 3, 1843, 5 *Stat. L.*, 626. See also *Safety of Passengers on Board of Steamboats. [To accompany bill H.R. 602]*, 27<sup>th</sup> Cong., 2<sup>nd</sup> sess., Aug. 22, 1842, H. Rept. 1033, 1 (Appendix B). On the provisions for steering rods and chains, see also Hunter, *Steamboats*, 533-34, 535, 536. The 1843 modifications of the 1838 law also allowed the courts to drop suits against steamboat operators who were charged with violating the steering apparatus requirements if the owner or master produced an affidavit stating that they had failed to comply with this provision of the law because of safety concerns. See 5 *Stat. L.*, 626, Section 4. Other flaws in the 1838 law were that it required vessels to carry a light at night without specifying where the light should be carried, what color it should be, and without mandating that there be more than one light, so that other vessels could gain perspective on its

The improvements of the age made it tempting to try to mandate using highly touted new safety items. Attempting to identify better fireproof apparatus to connect the wheel to the rudder post, some congressional investigators were fascinated by wire ropes, which were rapidly coming into wider use. According to *Niles' National Register*, although they only became available eighteen months earlier, by 1840 two hundred and sixty four steamers were using wire cables in the West.<sup>75</sup> This also served as a practical example that vessel owners, on their own initiative, were sometimes willing to adopt technological innovations without government mandates. In 1840, members of a House Select Committee on Steam Boilers, headed by Pennsylvania Democrat David Petrikin and including Kentucky Whig Joseph Rogers Underwood, oversaw experiments to test the strength of Isaac McCord's patented wire tiller rope. McCord was a Pennsylvania native, then living in Cincinnati. Advocates for the wire rope had sent a sample to Petrikin, claiming that it was stronger than hemp ropes, inflammable, and lighter and more flexible than chains.<sup>76</sup> McCord also wrote to the committee, enclosing clippings from the Cincinnati *Daily Republican* in favor of his invention, along with the endorsements by pilots and commanders of vessels on the Ohio and Mississippi Rivers.<sup>77</sup> With the cooperation of officers at the Washington Navy Yard, the Committee tested the strength of McCord's cable for use as a metallic tiller rope, heating it to try its resiliency at different

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speed, distance and orientation. If unshielded, the light might impede the night vision of the pilot. Steamboat operators soon remonstrated that the law needed to be modified to address these flaws, and to provide "rules of the road" to direct how vessels should pass each other safely. See *Memorial of a Number of Citizens of Louisville, Kentucky, Praying the amendment of the act "to provide for the better security of the lives of passengers on board of vessels propelled in whole or in part by steam, 25<sup>th</sup> Cong., 3<sup>rd</sup> sess., Dec. 13, 1838, S. Doc. 13, 4-5 (Appendix B).*

<sup>75</sup> *NWR*, Apr. 25, 1840, 128.

<sup>76</sup> Mr. Stambaugh(?) to the Honorable David Petrikin, Chairman of the Select Committee, Mar. 25, 1840, Committee Reports and Papers, Select Committee on Steam Boilers (HR26A-D30.6), 26<sup>th</sup> Cong., Records of the House of Representatives, RG 233; NA.

<sup>77</sup> Select Committee on Steam Boilers, Committee Reports and Papers (HR26A-D30.6), 26<sup>th</sup> Cong., Records of the House of Representatives, RG 233; NA.

temperatures. They were impressed with its durability to resist fire when an ordinary hemp rope would have burned through.<sup>78</sup>

Another dilemma for legislators, one that they did not address when they sought to improve mechanical devices, was that machinery made up only part of the complex system of a steam vessel. Without adequate training, especially for emergencies, human failings could undermine even the best safety measures and equipment. The fate of the steamer *Lexington*, lost on Long Island Sound in the winter of 1840 with only four survivors of her 150 passengers and crew, is instructive.<sup>79</sup>

The *Lexington*'s original problem came from its design: wooden parts of the vessel were too close to the heated metal of the engine and caught fire.<sup>80</sup> The danger was compounded by the fact that the vessel was carrying a cargo that included bales of cotton. The cotton ignited and contributed to the fire's rapid spread. The coroner's jury inquiring into the disaster concluded that the *Lexington* was an excellent vessel, but that the officers and crew did not act effectively after the fire broke out and that the captain and pilot "sought their own safety" before attending to their craft and passengers. The *Lexington* was equipped with firefighting apparatus, but when she caught fire, the crew could not use the water pump for a time, did not employ the water buckets effectively, or see to the safe launching of the lifeboats. The pilot or other officers did

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<sup>78</sup> *Raub's Safety Valves [To accompany bills H.R. 484, 485, and 486.]*, 26<sup>th</sup> Cong., 1<sup>st</sup> sess., Jul. 10, 1840, H. Rept. 651, 9-10, 13 (Appendix B). The same committee wanted to provide apparatus to fight fires. One of their witnesses claimed that, with a small appropriation, he could build an effective forcing pump to use as a firefighting engine, and the committee introduced a bill to allow him to construct and test it. The committee introduced a bill to subsidize the pump, H.R. 485, but it did not pass the House.

<sup>79</sup> *Report [To accompany bill S. 247]*, 26<sup>th</sup> Cong., 1<sup>st</sup> sess., Mar. 2, 1840, S. Rept. 241, 15. The *Lexington* had been built in 1835 in New York for Cornelius Vanderbilt and purchased in 1839 to run the route connecting the Connecticut port town of Stonington with New York City. She was 207 feet in length and had a 21-foot beam. Joseph C. Sweeney, "The *Lexington*," *Journal of Maritime Law and Commerce* 39/1 (Jan. 2008): 68, 69.

<sup>80</sup> As it was with many disasters, inventors were soon calling attention to their plan or mechanism to prevent future occurrences. A. B. Quinby, for one, proposed a "steam chimney" to prevent such blazes by insulating the wooden structure of the vessel from the hot metal engine and exhaust apparatus. *Report [To accompany bill S. 247]*, 26<sup>th</sup> Cong., 1<sup>st</sup> sess., Mar. 2, 1840, S. Rept. 241, 31-34 (Appendix B).



not rig the alternate steering apparatus, so that when the tiller ropes burned through, the vessel could not be steered to shore.<sup>81</sup>

Commentators sometimes derided the incompetence or poor reactions of crew members and passengers when facing emergencies.<sup>82</sup> If the *Lexington*'s engineers had stopped the vessel and used the fire engine pump and hose against the flames at an early point, the fire might have been put out or contained. If buckets had been more accessible and kept filled with water and had been employed against the fire at its early stages, the vessel might have been saved, or at least run close enough to shore that more of the passengers and crew could have escaped. If the pilot had moved to the aft section and rigged the emergency tiller, he might have been able to ground the vessel and fewer people would have died in the wintry waters. With quick thinking and a disciplined response, the lifeboats might have been launched successfully and saved many of the people on board.<sup>83</sup>

The outcome of the *Lexington* disaster suggests that crew members needed to be trained to react appropriately in emergencies, or all the safety devices in the world could not protect those on board. This, however, was beyond the scope of what Congress proposed or even discussed at the time. Aside from the effort to license pilots and engineers to assure their knowledge, competence, and sobriety, Congress did not introduce legislation to compel emergency exercises or to train crews to use the required safety equipment. The legislators presumed that responsibility for using mechanical devices and for quick thinking in a crisis

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<sup>81</sup> 26<sup>th</sup> Cong., 1<sup>st</sup> sess., Mar. 2, 1840, S. Rept. 241, 24 (Appendix B). See also newspaper clipping of *The Weekly Herald*, Jan. 25, 1840 in Commerce Committee, Reports and Papers, Jan. 29, 1840–Mar. 2, 1840 (Sen26A-D2), 26<sup>th</sup> Cong., Records of the Senate, RG 46, NA.

<sup>82</sup> *NWR*, Jul. 6, 1844, 304. Sometimes crew and passengers panicked. When the steamboat *Palestine* caught fire near the mouth of the Ohio River in 1844, the passengers crowded into the yawl hanging from the stern. One of the lines holding it was cut, and all but two of the occupants fell into the river and drowned. The fire itself was quickly extinguished and did little damage.

<sup>83</sup> 26<sup>th</sup> Cong., 1<sup>st</sup> sess., Mar. 2, 1840, S. Rept. 241, 15 (Appendix B).

resided with the people on the spot, the masters, and crews of the vessels.<sup>84</sup> Their character would determine how they reacted when danger threatened their craft. This also suggests why advocates for issuing licenses to engineers and pilots stressed that people applying for licenses should provide evidence that they were of estimable moral fiber and had demonstrated sound and sober judgment before being put in charge of a vessel or an engine.

Government officials tended to think of technology as mechanical devices, rather than as complex systems that depended on humans to operate them in both typical and emergency situations.<sup>85</sup> More precisely, legislators were more concerned with optimizing the function of the mechanical part of the technological system than the human part. The steamboat legislation in the antebellum era commanded the vessel to have a backup plan to steer the vessel and to carry lifeboats, but did not set standards to train the crew or require practice drills. The assumption that captains would see to training their crews and that crew members would naturally step up to perform their duties probably contributed to the fact that Congress spent much more time trying to identify better inventions and equipment than to improve human performance in the face of danger.

### ***5. Conclusion: Testing Inventions and Mandating Equipment***

While testing of safety devices began inauspiciously in 1834, the government soon employed reputable experts to conduct its examinations and offer advice to inventors and

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<sup>84</sup> Senator John Ruggles of Maine suggested that the passengers should be active participants in their own safety, that pressure and water gauges should be visible to passengers as well as crew, to enable them to monitor the engine, and that passengers might be more inclined to fight fires if they refrained from squabbling over who could get into a limited number of lifeboats. See 26<sup>th</sup> Cong., 1<sup>st</sup> sess., S. Rept. 241, 10 (Appendix B).

<sup>85</sup> Manufacturer (and later Rhode Island Senator) Charles T. James discussed the need to attend to both the human and mechanical elements of the system, and argued that depending too heavily on mechanical safety devices, which could not assure perfect safety, might lull the operator into a false sense of security and lessen his attention to the task at hand. See 26<sup>th</sup> Cong., 2<sup>nd</sup> sess., Jan. 25, 1841, H. Doc. 79, 5-7 (Appendix B). Not surprisingly, the tendency to focus on improving machines rather than human practices still exists in our own age.

steamboat operators. Government tests of safety devices subsequently became more thorough, and many of the reports were of high quality. Periodicals like *Scientific American* also reviewed these reports and echoed their recommendations of specific apparatus, including patented mechanisms.<sup>86</sup> However, it is not clear that government endorsements alone could get steamboat operators to adopt expensive new equipment.<sup>87</sup>

The rule of parsimony also handicapped the government-mandated investigations. The Franklin Institute inquiry in the 1830s relied on the volunteer labor of the members of the Institute, along with a small subsidy from the Treasury Department. Investigators Alexander Dallas Bache and Walter R. Johnson served without compensation and the committee members labored for over five years before they completed their work in 1836. Bache gave up his own research to conduct the experiments and complained in early 1836 when the Secretary of the Treasury pressed him to complete the report.<sup>88</sup> Johnson was similarly frustrated when he headed the investigation into safety devices that was mandated by the 1843 act. Urged to complete his own report, Johnson wrote to the Secretary of the Navy in early 1844 that the commission had exhausted its appropriation and the members were completing the research with their personal funds.<sup>89</sup> Given the widespread demand for frugal government, it is not surprising that these inquiries were not funded generously. Still, because Congress was reluctant to dedicate ample resources, it likely delayed some of the investigations, and may have made the results less timely and influential as they became further removed from the impulse that had motivated the investigations. The public-spiritedness of the investigators who were working without

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<sup>86</sup> “Steam Boiler Explosions,” *SA* 4/35, May 19, 1849, 277.

<sup>87</sup> “Steam Boiler Guage [sic],” *SA* 3/22, Feb. 19, 1848, 173. H. Z. D., Engineer, “Steam Boiler Explosions,” *SA* 3/25, March 11, 1848, 198.

<sup>88</sup> See Sinclair, *Philosopher Mechanics*, 181.

<sup>89</sup> 28<sup>th</sup> Cong., 1<sup>st</sup> sess., May 27, 1844, H. Doc. 267, 1 (Appendix B).

compensation or government salaries is worthy of honorable mention, but it would probably have been more effective to hire experts, pay them salaries, and budget adequate resources to complete the jobs in a timely fashion.<sup>90</sup>

Many members of Congress supported these inquiries even if they devoted limited funds to the projects. The 1838 bills to test inventions (S. 73 & S. 389 - Appendix A) passed without roll call votes and with minimal debate or discussion, except for a disagreement between the two houses over an amendment that was resolved in favor of the Senate.<sup>91</sup> The Senate passed an 1842 request to examine the boiler safety invention of Thomas Easton by unanimous consent.<sup>92</sup> The section of the 1842 House Joint Resolution that authorized a \$6,000 appropriation for the Navy to make test the of boiler safety inventions to U.S. steamships was added to another measure without major dispute or a roll call vote. Though there was brief debate on the wording and the amount of the appropriation, no one in the House or Senate spoke on the floor to oppose the intent or substance of the bill.<sup>93</sup> The Senate passed the joint resolution without a roll call vote and the House approved the resolution by a vote of 110 to 51, with more than 68% in favor.<sup>94</sup> The 1843 act (H.R. 602) that authorized a commission to test boiler devices also passed quickly and without a roll call vote in either house.<sup>95</sup> Without debate or dissent, the Senate agreed in 1848 to resolutions asking the Commissioner of Patents to report on whether

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<sup>90</sup> Johnson may not have been motivated exclusively by public spiritedness. His researches on behalf of the Navy Department on coal as a fuel, copper as sheathing for wooden vessels and investigating dry docks meant that he saw “the federal government as [a] primary source of research support.” See Sinclair, *Philadelphia’s Philosopher Mechanics*, 185.

<sup>91</sup> *SJ*, 25<sup>th</sup> Cong., 2<sup>nd</sup> sess., Jan. 24, 1838, June 22, 1838, and July 5, 1838, 170, 487, 533; and *HJ*, 25<sup>th</sup> Cong., 2<sup>nd</sup> sess., Jun. 16 and 22, 1838, and Jul. 6, 1838, 1112, 1133, 1251.

<sup>92</sup> *SJ*, 27<sup>th</sup> Cong., 2<sup>nd</sup> sess., Apr. 15, 1842, 297-98.

<sup>93</sup> This joint resolution, H.J.R. 19, passed on Aug. 31, 1842, was originally intended to fund tests of Samuel Colt’s submarine battery. It authorized \$15,000 to test Colt’s system and an additional \$6,000 to experiment on the boiler devices. See *CG*, 27<sup>th</sup> Cong., 2<sup>nd</sup> sess., Aug., 27, 29 and 31, 1842, 919-20, 962, 977, 978.

<sup>94</sup> Appendix C: H.J.R. 19, 27<sup>th</sup> Cong., 2<sup>nd</sup> sess. 5 *Stat. L.* 584, Section 2.

<sup>95</sup> *HJ*, 27<sup>th</sup> Cong., 3<sup>rd</sup> sess., Feb. 23, 1843, 441-42; and *SJ*, 27<sup>th</sup> Cong., 3<sup>rd</sup> sess., Mar. 2, 1843, 264-65, 268, 270.

amendments to the patent laws were advisable to prevent steam boiler explosions, to give priority to applications for patents that would alleviate the danger, and to report back to the Senate concerning any promising inventions.<sup>96</sup> Finally, in the debates on the Steamboat bill in 1852, no one in the House or Senate challenged the provision that gave the Supervising Inspectors the responsibility to procure information about improvements in safety equipment. Authorizing inquiries and soliciting expert advice on technology, at least in this area, probably attracted as close to a favorable legislative consensus as the Congresses of this time would get on an issue that touched the lives of so many people.

The reason that there was such widespread support for these measures within Congress was that the dangers of steam were so public, the tests relatively inexpensive, and the possible benefits from identifying effective safety mechanisms appeared to be immense.<sup>97</sup> In 1838, Samuel Owens, Democratic representative from Georgia, argued on behalf of a House select committee that Congress should respond to the public excitement about steam engine disasters by assuming a broad responsibility to encourage the advance of technical solutions. He wrote that

In a country like ours, where traveling is so general, and the conveyance by steam so common, the welfare not only of the people, but the common feelings of humanity seem [sic] to require that a remedy should be applied, if one can be discovered, to prevent such calamities. The committee believe [sic] it will be the inclination of the House, as they certainly deem it their duty, to make every effort and to encourage every attempt having a reasonable prospect of success, by which security may be obtained in the use of the steam-engine. The personal safety of the citizen should be the first consideration of the legislature; without it, life has no enjoyment; and unless it is afforded, Government does but half its duty.<sup>98</sup>

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<sup>96</sup> *SJ*, 30<sup>th</sup> Cong., 1<sup>st</sup> sess., Jan. 24, 1848, 128 and Mar. 31, 1848, 249.

<sup>97</sup> As the House committee that sponsored the 1834 investigation concluded, the members believed that assuring the safety of people in steam vessels was part of their responsibility to promote the general welfare, protect commerce and aid in national defense. See *Report of the Select Committee on the Memorial of Benjamin Phillips to Accompany Bill H.R. 452*, 23<sup>rd</sup> Cong., 1<sup>st</sup> sess., H. Rept. 426, 2 (Appendix B).

<sup>98</sup> 25<sup>th</sup> Cong., 2<sup>nd</sup> sess., Jan. 9, 1838, H. Rept. 323, 1-2. The committee recommended appropriating \$3,000 to

As we shall see, Congress went beyond testing and recommending inventions and considered awarding monetary subsidies to inventors and mandating the use of their devices in order to do “its duty.”

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make a practical test of Samuel Raub’s safety valve.

## CHAPTER 4

### “SO GIVE ME THE MONEY” – INVENTORS AND THE QUEST FOR SUBSIDIES

#### *1. Subsidies for Innovation*

Members of Congress began to consider subsidizing steam safety mechanisms in the 1830s.<sup>1</sup> In 1832 the Louisiana legislature asked Congress to purchase the patent rights of J. O. Blair, who had asked the state to construct a 250-ton steamer, equip it with his machinery and test his mechanisms.<sup>2</sup> Blair did not get a subsidy, but he and other inventors insisted that their mechanisms could prevent explosions and address other dangers. Congress contemplated funding these proposals, driven in part by “the lure of technology– the faith that mechanical devices would solve problems of extraordinary complexity.”<sup>3</sup> However, members of Congress were divided. While some supported these policies, others blocked them and objected that they did not have the power to “prescribe the mode, manner, or form of construction” of vessels or the requisite wisdom to make choices on behalf of steamboat owners and operators.<sup>4</sup> But even when the government did not give awards, the prospect of federal funding provided an incentive for inventors to experiment with steam safety devices.

Inventors asked Congress for various types of aid, including purchasing their patent rights, requiring all vessels in the country to use their devices, or buying inventions to use on

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<sup>1</sup> For bills to subsidize steam safety devices, see Appendix A: H.R. 365, 25<sup>th</sup> Cong., 2<sup>nd</sup> sess.; H.R. 484, 485 and 486, 26<sup>th</sup> Cong., 1<sup>st</sup> sess. and H.R. 594, 28<sup>th</sup> Cong., 2<sup>nd</sup> sess.

<sup>2</sup> *Louisiana Legislature – Steam Explosion. Report of a Joint Committee of the Legislature of the State of Louisiana, On the Petition of J. O. Blair, upon the subject of steam explosion, 22<sup>nd</sup> Cong., 1<sup>st</sup> sess., 1832, H. Doc. 226, 2, 10-11 (Appendix B).* The members took their first tentative step toward controlling steam technology the previous decade, when in 1824 one member of the House of Representatives proposed to ban the use of high pressure steam engines, which he believed were especially dangerous and uniquely responsible for exploding boilers. The House, however, did not act on this proposal. *HJ*, 18<sup>th</sup> Cong., 1<sup>st</sup> sess., May 19, 1824, 544.

<sup>3</sup> Steven W. Usselman, “The Lure of Technology and the Appeal of Order: Railroad Safety Regulation in Nineteenth Century America,” *Business and Economic History*, 2<sup>nd</sup> Series, 21 (1992): 291.

<sup>4</sup> Appendix B: H. Rept. 478, 22<sup>nd</sup> Cong., 1<sup>st</sup> sess., 1832, 1.

steam engines owned by the United States.<sup>5</sup> Congress ultimately only awarded monetary subsidies for steam safety devices by purchasing apparatus to use on engines owned by the national government.<sup>6</sup> However, it nonetheless influenced technology and the market by requiring steam vessels to carry certain generic types of equipment such as safety valves, lifeboats, metal alloy boiler safety devices and metal lifeboats. These mandates created competitive advantages for inventors who produced these mechanisms.<sup>7</sup>

Inventors had been seeking government aid since before the Constitution was adopted.<sup>8</sup> They believed their work to make steamboats safer was an important national asset, saw that the government sometimes offered financial support, and cited precedents where the United States funded Eli Whitney's project to manufacture firearms using interchangeable parts, the snag boat

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<sup>5</sup> The national government owned and operated seventeen steam engines at the navy yards, arsenals and armories as of 1838. Appendix A: H. Doc. 21, 10. Subsequently, the government acquired more engines by adding steam vessels in the Navy and Revenue Marine services, as well as steam engines at the Mint.

<sup>6</sup> This was in keeping with the usual practice of depending on citizens to develop inventions and then buying "the right to use such patents as the interests of the country may, to Congress, seem to demand." *Report of the Committee of Claims, to whom was referred the memorial of the representatives of James Rumsey*, 29<sup>th</sup> Cong., 1<sup>st</sup> sess., March 5, 1846, H. Rept. 403, 1.

<sup>7</sup> The 1838 steamboat act required vessels on the Great Lakes to use at least one light at night, to carry a pump and hose to fight fires, to carry lifeboats and have boiler safety valves and, as discussed in Chapter Three, mandated the use of fireproof steering mechanisms. 5 *Stat. L.* 304, Sections 8-10. In addition to metallic lifeboats and fusible alloy devices for boilers, the Steamboat Act of August 30, 1852 also mandated fire pumps and hoses, individual flotation devices and water and steam gauges for boilers. 10 *Stat. L.* 61, Sections 3, 4, 5, and 9 (second part). Many of the bills that Congress proposed, but did not pass, included similar mandated safety features. See the bills in Appendix A, with the designation 5c in the Categories column. Beginning in the 1830s the government also recommended using certain equipment, such as pressure gauges and alarms, but did not require them. Appendix B: H. Doc. 21, 25<sup>th</sup> Cong., 3<sup>rd</sup> sess., 6 and S. Rept. 241, 26<sup>th</sup> Cong., 1<sup>st</sup> sess., 9-10. Some safety inventions were intended to function without human intervention, such as devices to keep water continuously supplied to the boiler, to let off excess steam pressure, to control the fire in the furnace or firebox and warn the crew and passengers when danger threatened. Other devices were intended to aid the engineer by measuring heat or pressure within a boiler. Stephen P. Rice, *Minding the Machine: Languages of Class in Early Industrial America*, (Berkeley: University of California Press, 2004), 130-31. Inventors also designed and tried to sell other types of safety equipment, such as firefighting gear and life jackets. Appendix B: H. Doc. 21, 6.

<sup>8</sup> James Thomas Flexner, *Steamboats Come True: American Inventors in Action* (1944; reprint, New York, NY: Fordham University Press, 1992), 79-80. Congress appropriated funds in 1824 to remove trees from the Mississippi River and the War Department asked steamboat captains for proposals. The government soon offered \$1,000 for the best idea and a Kentuckian named John Bruce received a \$65,000 contract to remove the snags, but was only marginally successful in fulfilling his obligation. Edith McCall, *Conquering the Rivers: Henry Miller Shreve and the Navigation of America's Inland Waterways* (Baton Rouge: Louisiana State University Press, 1984), 183-85.



Henry Shreve designed to clear obstructions from inland waterways and Edward Knight Collins's transatlantic packets.<sup>9</sup> Inventors asked the government for help with a variety of technological endeavors.<sup>10</sup> In 1837 and 1838, for instance, they sent applications to Congress requesting aid for a ship ventilator, a boiler safety valve, discoveries in surgery, a machine for twisting and reeling silk, a vapor bath, a rifle, a safety steam engine, a plan to improve lighthouses, a process for making cement, meteorological investigations, a proposal to establish a research institution in the physical sciences, and help in manufacturing a magnetic device.<sup>11</sup> By the mid nineteenth-century, typically "scores of inventive philosophers" regularly congregated in the national capital to request assistance when Congress was meeting.<sup>12</sup>

By contemplating subsidies for equipment on steam vessels, the national government was continuing a long-running debate over how it could best encourage economic and technical development. The Constitution did not explicitly prohibit subsidizing advances in the arts and manufactures, allowing legislators to argue that it was proper to provide aid to inventors under the right circumstances. They were likely influenced by their confidence in the capabilities of their countrymen and the conviction that they were living in an age of material progress.<sup>13</sup>

Though some people pushed to allow the government to offer regular support to science and

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<sup>9</sup> Brooke Hindle and Steven Lubar, *Engines of Change: The American Industrial Revolution, 1790-1860* (Washington, DC: Smithsonian Institution Press, 1986), 227-28; Edith McCall, *Conquering the Rivers: Henry Miller Shreve and the Navigation of America's Inland Waterways* (Baton Rouge: Louisiana State University Press, 1984), 186-88; Burrows and Wallace, *Gotham*, 649-50. In 1848 Edward Knight Collins claimed a subsidy for \$385,000 that Congress had endorsed three years earlier, in order to fulfill a regular mail contract and provide an American challenger to Englishman Samuel Cunard's regular transatlantic steam packets.

<sup>10</sup> Hindle, *Emulation and Invention*, 31-43.

<sup>11</sup> *HJ*, 25<sup>th</sup> Cong., 2<sup>nd</sup> sess., Dec. 22, 1837, 140; Dec. 29, 1837, 159-160; Dec. 29, 1837, 160 & 173; Jan. 2, 1838, 187; Jan. 4, 1838, 217; March 26, 1838, 668-9; April 9, 1838, 721 & 731; April 20, 1838, 797; May 21, 1838, 917; June 15, 1838, 1104.

<sup>12</sup> "Miscellaneous," *SA* 5/12, Dec. 8, 1849: 90.

<sup>13</sup> Paul Israel, *From Machine Shop to Industrial Laboratory: Telegraphy and the Changing Context of American Invention, 1830-1920* (Baltimore, MD: Johns Hopkins University Press, 1992), 6-9.

technology, Congress instead intervened intermittently, “based on specific needs rather than larger constitutional and philosophical arguments.”<sup>14</sup>

Political leaders acknowledged that the nation’s expanding territory and growing population and commerce, combined with military threats from other countries, necessitated government outlays for mechanical innovations.<sup>15</sup> Congress tended to invest in projects that would serve immediate needs within the federal establishment, such as advances in armaments, medicine and minting money.<sup>16</sup> There were also extraordinary occasions when a technological advance seemed to offer the *promise* of serving national interests like coastal defense, instantaneous communication and improving transportation. In the 1840s Congress appropriated money to Samuel Colt to develop and demonstrate his system of underwater mines for harbor defense and to test prototypes of Samuel F. B. Morse’s telegraph and Charles Grafton Page’s electrically-powered railway engine.<sup>17</sup> Congress also endorsed retroactive rewards in certain

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<sup>14</sup> A. Hunter Dupree, *Science in the Federal Government: A History of Policies and Activities* (reprint, Baltimore: Johns Hopkins University Press, 1986), 44. For examples of some appropriations, see “Appropriations by Last Congress for the Encouragement of Science,” SA, May 26, 1849, 283.

<sup>15</sup> James K. Polk, First Annual Message (1845), in James D. Richardson, ed., *A Compilation of the Messages and Papers of the Presidents, James Polk* (Washington, DC: U.S. Bureau of National Literature and Art, 1910), 2262-63; Merritt Roe Smith, *Harper’s Ferry Armory and the New Technology: The Challenge of Change* (Ithaca, NY: Cornell University Press, 1977).

<sup>16</sup> Spencer C. Tucker, “The Stevens Ironclad Battery,” *The American Neptune* 51/1 (1991): 12-22. In addition to contracts for equipment, such as the design and construction of steam driven warships, Congress paid a total of \$147,800 for a variety of inventions in the years before 1853. The United States purchased plans for preserving canvas, constructing steam fire ships, gas lights and fixtures, lights for lighthouses, a “submarine telescope,” a method to construct anchors, a process to make moulds for bullets, a way to administer gas vapor baths, a plan to elevate and aim heavy cannon, the use of an “anti-attribution metal” and a “manger stopper” for the Navy, and a magnetic clock and a method to refine gold at the national mint. “William T. G. Morton, M.D. – Sulphuric Ether, Majority Report of the Select Committee, to whom was referred the memorial of Dr. William T.G. Morton, asking remuneration from Congress for the discovery of the anaesthetic or pain-reducing properties of sulphuric ether,” 1852, in *Statements Supported by Evidence of Wm. T. G. Morton, M.D. on his Claim to the Discovery of the Anaesthetic Properties of Ether*, January 21, 1853, 32<sup>nd</sup> Cong., 2<sup>nd</sup> Sess, 134-5. The government paid \$20,000 to purchase William H. Bell’s patent for an invention to elevate and point heavy cannon in 1836. See 5 *Stat. L.* 126. See also *Captain M. P. Mix – Widow Of [To accompany bill H.R. 390] - Report by the Committee on Naval Affairs*, 26<sup>th</sup> Congress, April 25, 1840, H. Rept. 476, 2.

<sup>17</sup> Brooke Hindle, *Emulation and Invention* (New York, NY: New York University Press, 1981), 105; Robert C. Post, *Physics, Patents and Politics: A Biography of Charles Grafton Page* (New York, NY: Science History Publications, 1976), 87; Robert C. Post, “Science, Public Policy, and Popular Precepts: Alexander Dallas Bache and

cases, paying over \$75,000 in 1846 to the heirs of Robert Fulton to recognize their forebear's role in furthering steam navigation. In another prominent case, in the 1840s and '50s a number of congressmen advocated compensating the discoverer of surgical anesthesia.<sup>18</sup>

Steam disasters caught the attention of inventors, who responded by devising numerous plans to prevent accidents.<sup>19</sup> They argued that the United States should support any device that could provide "complete protection against ... fatal and disastrous ... steam boiler explosions" and that such support would be justified by "considerations of humanity [and] the dearest interests of society ...."<sup>20</sup> The fact that the United States was willing to reward technical innovations gave them reason to believe that the government might subsidize their ideas, and they sent flurries of petitions and memorials asking for aid.<sup>21</sup> One inventor proposed that Congress set up a system to stimulate advances by funding a prize to be given "for the best plan

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Alfred Beach as Symbolic Adversaries" in Nathan Reingold, ed., *The Sciences in the American Context: New Perspectives* (Washington, DC: Smithsonian Institution Press, 1979), 83; Robert C. Post, "The Page Locomotive: Federal Sponsorship of Invention in Mid-19<sup>th</sup> Century America," *Technology and Culture* 13, no. 1 (January 1972): 140-69. Page argued that an important reason to support the development of electro-magnetic power was "as a general substitute for the dangerous agency of steam ... [and to stimulate an] immense saving of human life and property." *Memorial of Charles G. Page, Praying an investigation of a mode discovered by him of applying electro-magnetic power to purposes of navigation and locomotion*, 30<sup>th</sup> Cong., 2<sup>nd</sup> sess., Feb. 20, 1849, S. Misc. Doc. 59, 1.

<sup>18</sup> Kirkpatrick Sale, *The Fire of his Genius: Robert Fulton and the American Dream* (New York: The Free Press, 2001), 159; *Report of the Committee on Naval Affairs, to whom was referred the petition of the heirs of Robert Fulton*, 29<sup>th</sup> Cong., 1<sup>st</sup> sess., Jan. 27, 1846, H. Rept. 145, 2. When the Senate voted for the funds, its members added language which stated that they were, in part, rewarding "the great benefits conferred on the country by Robert Fulton's improvements in the application of steam to navigation." *SJ*, 28<sup>th</sup> Cong., 1<sup>st</sup> sess., May 28, 1844, 308. 9 *Stat. L.* 660. The exact payment to Fulton's heirs was \$76,300. "William T. G. Morton, M.D. – Sulphuric Ether," Majority Report of the Select Committee," 134-5. See also Sale, *Fire of his Genius*, 179.

<sup>19</sup> "Accidents – Their Cause and Cure," *SA* 7/48, Aug. 14, 1852, 381. The *New York Times* reported that after every ferry and railroad accident it received numerous "plans and devices" from inventors to promote safety. "Market Value of Men," *NYDT*, Sept. 18, 1855, 4.

<sup>20</sup> Appendix B: H. Doc. 124, 27<sup>th</sup> Cong., 2<sup>nd</sup> sess., 1.

<sup>21</sup> Steven Lubar, "The Transformation of Antebellum Patent Law," *Technology and Culture* 32/4 (October 1991): 950-1. For examples of applications for government support, see Petition of James Montgomery of Memphis, Tennessee offering his "valuable & important improvements in the construction of steamers, steam engines, boilers, & propellers ..." Dec. 17, 1844, (folder 1); Committee on Naval Affairs; Petitions and Memorials Referred to Committees (HR 28A-G14.11), 28<sup>th</sup> Congress, Records of the House of Representatives, RG 233, NA, as well as petitions by other applicants in folders 2 and 3.

for constructing boilers so as to ensure their safety.”<sup>22</sup> The applicants in turn fed the hopes of congressmen by claiming that they had constructed mechanisms that could assure perfect security, or at least mitigate the danger from boiler explosions and other accidents.<sup>23</sup>

Since only a small number of inventors received subsidies, many of them were likely driven to apply as much by wishful aspirations as any realistic chance that they would get funding.<sup>24</sup> They tended to share a firm belief in the value of their mechanical progeny, sometimes regardless of the actual efficacy of their inventions. Most inventors functioned independently as entrepreneurs and were often “in the position of one against the world.”<sup>25</sup> They needed to be dedicated to their occupation and exhibit a “a bold energy and enthusiasm, approximating monomania, which alone [could] carry the inventor through the labyrinth of difficulties that seem to be placed in his pathway, to test, as it were, the sincerity of his belief in the truth of his creation . . . .”<sup>26</sup> Abraham Lincoln’s secretary, John Hay, remembered that the

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<sup>22</sup> *Petition of James D. Woodside*, Dec. 10, 1833, Committee on Naval Affairs, Petitions and Memorials Referred to Committees, Various Subjects (HR23A-G12.2), 23<sup>rd</sup> Congress, Records of the House of Representatives, RG 233, NA. See also the notice that the *Syracuse Star* recommended that Congress offer a reward for the best invention to prevent boiler explosions. *SA* 7/20 (Jan. 31, 1852): 153.

<sup>23</sup> “From the West: Missouri – Case of Murder – Steamboat Explosions – General News, etc.” Untitled articles, *NYDT*, April 26, 1852, 4. *NYDT*, Aug. 27, 1852, 2. *NYDT*, Oct. 13, 1852, 5.

<sup>24</sup> See, for example, *Petition of Rufus Porter*, *CG*, Jan. 23, 1851, 31<sup>st</sup> Cong., 2<sup>nd</sup> sess., 316. See also the discussion by members of the House on subsidizing the invention of Joel Haywood Tatum, *CG*, 31<sup>st</sup> Cong., 1<sup>st</sup> sess., Sept. 23, 1850, 1918. Before and during the Civil War many inventors wrote to President Lincoln to argue that the government should use their inventions. Robert V. Bruce, *Lincoln and the Tools of War* (Indianapolis: The Bobbs-Merrill Company, Inc, 1956), 75.

<sup>25</sup> Monte A. Calvert, *The Mechanical Engineer in America, 1830-1910: Professional Cultures in Conflict* (Baltimore, MD: Johns Hopkins University Press, 1967), 26. By the time of the Civil War the field of inventing was undergoing a transition as it moved into an era of “cooperative shop invention in which skilled operatives, superintendents, machinists, and manufacturers [made] up technological communities that [drew] on practical experience to design, build, and refine new technology.” Israel, *From Machine Shop to Industrial Laboratory*, 2. Firms were concentrated in some areas that served as centers for experimentation and innovation, such as the enterprises engaged in marine manufacturing located along the East River in New York City. *The New York Daily Times* described how one of the firms, Stillman, Allen and Co., included design rooms, pattern shops and instrument shops where workers labored to conceive and improve steam machinery. “Visits to our Manufactories – II,” *NYDT*, Oct. 1, 1852, 2.

<sup>26</sup> *Report of the Commissioner of Patents ... during the year 1844*, 28<sup>th</sup> Cong., 2<sup>nd</sup> sess., January 28, 1845, S. Doc. 75, 482.

inventors who sought subsidies were “men of some originality of character, not infrequently carried to eccentricity.” Hay’s fellow, John Nicolay, was less generous, describing those who sought the President’s help as “lunatics and visionaries ....”<sup>27</sup>

But in addition to whatever psychological qualities drove them to believe that they deserved funding, inventors also had practical reasons to pursue government largesse, because it was difficult to profit from their patents in the marketplace.<sup>28</sup> Despite the fact that the patent laws granted a fourteen-year monopoly, even patenting a sought-after invention was no guarantee of success because imitators often infringed on successful patents.<sup>29</sup> A class of patent solicitors and inventors were said to be more interested in stealing ideas by exploiting imperfections in patent applications than in producing and marketing their own inventions.<sup>30</sup>

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<sup>27</sup> Bruce, *Lincoln and the Tools of War*, 81, 131-2.

<sup>28</sup> One prominent exception was Isaac Singer, who was unusually successful in manufacturing and marketing his sewing machine. Brooke Hindle and Steven Lubar, *Engines of Change: The American Industrial Revolution, 1790-1860*, (Washington, DC: Smithsonian Institution Press, 1986), 85. Other inventors often could not profit from their inventions. Oliver Evans, despite creating an automatic grain mill and a high pressure steam engine, was much more financially successful as a manufacturer than as an inventor. Depressed by an unfavorable court verdict in 1809, Evans discouraged his sons from following in his footsteps. He burned all of his personal papers to impress them with his determination that they avoid becoming inventors. Carroll W. Pursell, Jr., *Early Stationary Steam Engines in America: A Study in the Migration of Technology* (Washington: Smithsonian Institution Press, 1969), 48. The 1836 patent law gave inventors the opportunity to extend their patents for an extra seven years. *Report of the Commissioner of Patents ... during the year 1844*, 28<sup>th</sup> Cong., 2<sup>nd</sup> sess., 1845, S. Doc. 75, 2-3. Some inventors applied for extensions believing that they only needed to show that they had not yet profited from the invention. However, few patent extensions were granted because they were only supposed to be issued under extraordinary circumstances, not just as a way to give inventors more time to try to earn a return from their devices. See B. Zorina Khan and Kenneth L. Sokoloff, “History Lessons: The Early Development of Intellectual Property Institutions in the United States,” *The Journal of Economic Perspectives* 15/3 (Summer 2001): 240.

<sup>29</sup> James Coppuch, the corresponding secretary of the Inventors National Institute, complained in 1849 that the typical inventor was subjected to “piracy, infringements, frauds, [and] ruinous and interminable lawsuits.” “For the Scientific American National Convention of Inventors,” *SA*, 4/36, (May 26, 1849): 283. Dupree, *Science in the Federal Government*, 13. Hindle and Lubar, *Engines of Change*, 81.

<sup>30</sup> *CG*, 31<sup>st</sup> Cong., 1<sup>st</sup> sess., May 20, 1850, 1029. Mississippi Senator Jefferson Davis described these men as “sharks.” *Scientific American* warned against the “horde of agents who thrust their pretensions [sic] upon inventors and patentees ... and cannot ... be relied upon; they are also vastly increasing, and now swarm like the locusts of Egypt – the public must either steer clear of them or suffer themselves to be stung.” “Patent Agents – A Caution,” *SA*, 8/40 (June 18, 1853): 317. Legitimate patent agents, some of the best of whom had worked as examiners in the Patent Office, combined both technical and legal expertise to facilitate the process of applying for patents. Ross Thomson, *Structures of Change in the Mechanical Age: Technological Innovation in the United States, 1790-1865* (Baltimore, MD: The Johns Hopkins University Press, 2009), 193-97.

Judges often lacked expertise in technical and scientific issues, while juries were criticized for ignoring evidence.<sup>31</sup> With all this in mind, inventors needed to manage their business affairs skillfully to reap a return.<sup>32</sup> To improve their chances to make a profit, they frequently preferred to assign the rights to their inventions or license them to others.<sup>33</sup>

Inventors had to navigate a number of obstacles before winning government subsidies. For one, strict construction of the Constitution stood in their way. During the 1787 Convention the framers rejected a system like that of France, where the government offered prizes and subsidies for scientific and technical advances.<sup>34</sup> Instead, in Article One, Section Eight, the delegates more closely followed the English system by allowing Congress to guarantee exclusive rights for creative advances for a limited time.<sup>35</sup> With this in mind, strict constructionists like

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<sup>31</sup> “Patent Property,” *The American Whig Review* 1/ 2 (Feb. 1845): 138-142.

<sup>32</sup> Carolyn C. Cooper, “A Patent Transformation: Woodworking Mechanization in Philadelphia, 1830-1856,” in Judith A. McGraw, ed., *Early American Technology: Making and Doing Things from the Colonial era to 1850* (Chapel Hill: University of North Carolina Press, 1994), 179.

<sup>33</sup> Steven Lubar, “The Transformation of Antebellum Patent Law”, 945-48. The editor of *Scientific American* complained, however, that assignees frequently reaped greater benefits than inventors. “Miscellany about Inventors – Patents,” *SA*, 5/28, March 31, 1850, 221. Some scholars have indicated that the court and patent system was more effective in protecting property rights in patents than earlier accounts have suggested. B. Zorina Khan, “Property Rights and Patent Litigation in Early Nineteenth-Century America,” *Journal of Economic History*, 55/1 (March 1995): 58-97; B. Zorina Khan and Kenneth L. Sokoloff, “ ‘Schemes of Practical Utility’: Entrepreneurship and Innovation Among ‘Great Inventors’ in the United States, 1790-1865,” *Journal of Economic History* 53, no. 2 (June 1993): 289-307. See also Naomi R. Lamoreaux and Kenneth L. Sokoloff, “Market Trade in Patents and the Rise of a Class of Specialized Inventors in the 19<sup>th</sup>-Century United States,” *American Economic Review* 91/2 (May 2001): 39-44.

<sup>34</sup> MacLeod, “Paradoxes of Patenting,” 889-91. Robert Fulton had gone to France hoping to earn subsidies from the French government and worked on weapons in Paris before returning to the United States to build his steamboat in 1806 and 1807. Edwin G. Burrows and Mike Wallace, *Gotham: A History of New York City to 1898* (New York, NY: Oxford University Press, 1999), 341-42.

<sup>35</sup> Some members of the Constitutional Convention proposed giving the national government broad powers to grant patents, establish educational institutions and create a system of rewards for advances in knowledge and other discoveries, but the delegates did not agree to these proposals. Hindle, *Emulation and Invention*, 18-19. Dupree, *Science*, 9. In later years, some reformers advocated abolishing the patent system entirely and subsidizing inventions directly. Commissioner of Patents Thomas Ewbank asked Congress to establish a fund to provide cash awards and medals for worthwhile patents. Another observer proposed a program that would have had the government purchase every successful invention and immediately place it in the public domain. Advocates for these policies might have seen that the French had been successful in stimulating major industrial innovations in the textile and iron industries though sponsored research and prizes. Christine MacLeod, “The Paradoxes of Patenting: Invention and its Diffusion in 18<sup>th</sup>-and 19<sup>th</sup>-Century Britain, France and North America,” *Technology and Culture* 32/4 (October 1991): 894.

Democrat Jefferson Davis thought that appropriating money in aid of a particular inventor was beyond Congress's delegated powers. In 1850, for instance, the Mississippi senator charged that renewing a subsidy to Charles Grafton Page would make the government the "patron" of "authors and discoverers," rather than their "guardian," and this exceeded its authority.<sup>36</sup>

Congressmen operated under additional constraints because many government officials believed that inventions should be produced and supported by "private enterprise." They noted that the patent system was already in place to help inventors secure the rights to their devices and that these inventions, when put before the people, would succeed according to their intrinsic worth.<sup>37</sup> This objection was reinforced by Jacksonian era sentiments, held especially strongly by Democrats who bridled at the prospect of awarding peculiar privileges to anyone.<sup>38</sup> Debating the 1852 steamboat bill in the House of Representatives, the Chairman of the Commerce Committee, David Seymour, Democrat of New York, stated that requiring steamboat owners to use a patented article was fundamentally unfair. Seymour urged that Congress "give every man a fair chance to present his invention before the public; because if we had legislated for it after having given the man a patent, we should give him the very worst kind of monopoly."<sup>39</sup>

These ideological objections were accompanied by a number of practical concerns. Operating under the rule of parsimony, Congressmen wanted to be frugal, a sentiment articulated by one inventor who wrote that the government should take care of the "public interest and not

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<sup>36</sup> *CG*, 31<sup>st</sup> Cong., 1<sup>st</sup> sess., Sept. 23, 1850, 1925. See also Robert C. Post, "The Page Locomotive: Federal Sponsorship of Invention in Mid-19<sup>th</sup> Century America," *Technology and Culture* 13/1 (January 1972): 158.

<sup>37</sup> *Report of the Senate Committee on Patents and the Patent Office on the memorial of Edward D. Tippet* (undated), Committee on Patents and the Patent Office, Petitions and Memorials referred to Committees, April 15-May 2, 1856 (Sen34A-H14); 34<sup>th</sup> Congress; Records of the U.S. Senate, RG 46, NA.

<sup>38</sup> Robert V. Remini, *Andrew Jackson, Volume 3: The Course of American Democracy, 1833-1845* (Baltimore: Johns Hopkins University Press, 1984), 6.

<sup>39</sup> *CG*, 32<sup>nd</sup> Cong., 1<sup>st</sup> sess., Aug. 24, 1852, 2313.

squander the public money upon simple, and useless inventions.”<sup>40</sup> In addition, legislators distrusted their ability to select the best machines. In one instance, when asked to decide between various forms of equipment intended for steam vessels in the navy, some members stated that they did not have the expertise to make the right choice. They preferred to leave the decision to departmental administrators, who they thought had a deeper understanding of the subject.<sup>41</sup> Congressmen were also reluctant to select one invention over another when inventors were engaged in disputes over patent rights. How could it be proper for them to promote or pay for a device when its authorship was uncertain and the matter had not been decided by the courts?<sup>42</sup>

In addition, Congressmen hesitated to award subsidies because they feared that they would lock themselves and the country into using mechanisms that would soon be surpassed. As Representative Willard Hall cautioned while Congress was considering subsidizing one invention: “with the continued improvements that are going on, who can tell that in a few years our most brilliant and useful discoveries may be wholly discarded for more recent and better

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<sup>40</sup> The inventor, Edward D. Tippet thought that his *own* inventions were of such great importance and utility that they should more properly be designated as “a national concern” than a “private interest” and should therefore be exempt from budgetary restraints. Petition of Edward D. Tippet, praying Congress to Appoint a Committee to Examine the navigating balloon, Jan. 24, 1855, Committee on Patents and the Patent Office, Petitions and Memorials, April 15-May 2, 1856 (Sen34A-H14); 34<sup>th</sup> Congress; Records of the Senate, RG 46, NA.

<sup>41</sup> Members made this point in 1850, and again in 1852 while debating the purchase of a steam condenser designed to provide fresh water to the boilers of oceangoing Navy vessels. *CG*, 31<sup>st</sup> Cong., 1<sup>st</sup> sess., Sept. 20, 1850, 1896. See the remarks by David A. Bokee of New York and also by John Davis of Massachusetts, Lewis Cass of Michigan, and James Shields of Illinois. *CG*, 32<sup>nd</sup> Cong., 1<sup>st</sup> sess., Aug. 30, 1852, 2446-48 and 2449-50.

<sup>42</sup> Jefferson Davis raised the question of precedence when the Senate was considering voting an additional subsidy to patent office examiner and physicist Charles Grafton Page, as there were at least two other claimants who asserted that they had done pioneering work with electric motors and should have equal rights to government patronage, or at least could reasonably ask that the government not show favoritism by supporting their rival. *CG*, 31<sup>st</sup> Cong., 1<sup>st</sup> sess., Sept. 23, 1850, 1925. Around the same time, Congress was considering compensating Massachusetts dentist William T. G. Morton for making use of ether as a surgical anesthetic. Morton petitioned and lobbied Congress in 1848 and 1849 to try to get it to acknowledge the primacy of his discovery and to compensate him for its use by the U.S. armed forces during the Mexican War. In response, the House appointed a select committee that investigated the matter extensively, but split over its conclusions. Three of the members were inclined to agree with Morton’s claim, while two dissented. While Morton may have gained some legitimacy from the majority report, he did not get any cash from Congress. Richard J. Wolfe, *Tarnished Idol: William T. G. Morton and the Introduction of Surgical Anesthesia* (Novato, CA: Norman Publishing, 2000), 226-27.



patents[?]<sup>43</sup> Senator Stephen Mallory noted in 1852 that advances in steam machinery were being developed all the time and he feared that steamboat legislation that mandated particular devices would tend to shackle future improvements rather than to unleash them.<sup>44</sup> Finally, members of Congress were also wary that granting subsidies to one inventor would inspire a flood of unworthy entreaties for aid that would absorb too much of their time.<sup>45</sup>

However, despite all of these barriers, some leaders thought that the national government should fund inventive advances. The *New York Daily Times* praised federal officials who pledged to promote inventions that would be used in the public service.<sup>46</sup> Members of Congress were inclined to be generous with public resources when they believed that the invention would serve the national interest, uphold national honor and attract support from the public. Champions of Samuel F. B. Morse's telegraph stressed the practical benefits of instantaneous communication for national defense and business, as well as upholding pride in American technical accomplishment versus a rival system being used in England.<sup>47</sup> As Morse's congressional backers wrote: "[we believe] that the American public is fully prepared, and even desirous, that every requisite effort be made on the part of Congress to consummate an object of so deep interest to the purposes of Government in peace and in war, and to the enterprise of the age."<sup>48</sup> Congressmen were more inclined to award subsidies to inventors who were their

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<sup>43</sup> *CG*, 31<sup>st</sup> Cong., 2<sup>nd</sup> sess., March 1, 1851, 762. See Appendix B: S. Exec Doc. 18, 30<sup>th</sup> Cong., 2<sup>nd</sup> Sess., 25 and Hunter, *Steamboats*, 526-27.

<sup>44</sup> *CG*, 32<sup>nd</sup> Cong., 1<sup>st</sup> sess., July 9, 1852, 1702.

<sup>45</sup> See the comments by Jefferson Davis and Daniel Dickinson. *CG*, 31<sup>st</sup> Cong., 1<sup>st</sup> sess., Sept. 23, 1850, 1925.

<sup>46</sup> "New Inventions," *NYDT*, Feb. 25, 1853, 4. The Times was particularly pleased that the Army and Navy were freeing themselves from the "shadow of blighting 'old fageyism'" by pursuing technical advances. "The Ericsson," *NYDT*, March 1, 1853, 4.

<sup>47</sup> *Report of the Committee on Commerce on Electro-Magnetic Telegraphs*, 27<sup>th</sup> Cong., 3<sup>rd</sup> sess., Dec. 30, 1842, H. Rept. 17, 1-2.

<sup>48</sup> *Report of the Committee on Commerce on Electro Magnetic Telegraphs, to accompany bill H. R. No. 713*, 25<sup>th</sup> Cong., 2<sup>nd</sup> sess., April 6, 1838, H. Rept. 753, 1.

constituents than to those who lived elsewhere. In this environment, congressmen entertained the idea of subsidizing steam equipment and introduced proposals to purchase safety apparatus in 1838, 1840 and 1845.<sup>49</sup>

In 1848 the Senate approved a resolution asking Commissioner of Patents Edmund Burke how to prevent boiler explosions and to recommend ways to modify the patent laws to encourage better inventions in this area. The Senate also requested that Burke give top priority to reviewing patent applications designed to prevent “steam explosions.”<sup>50</sup> While Burke endorsed several inventions, including Cadwallader Evans’s Safety Guard, Daniel Barnum’s self-acting pump and Thomas Easton’s apparatus,<sup>51</sup> he also cast doubt on the efficacy of the Mechanical Option as a way to prevent bursting boilers. Like previous investigators, he found that many inventions could prove helpful, but there was no device that could guarantee perfect security.<sup>52</sup> To be effective, intervention had to address the range of problems that led to accidents on steam vessels. This assessment flew in the face of the hopes and claims of inventors who were trying to achieve the goal of perfect safety and to sell their inventions under that aegis. They asserted that their mechanical progeny were up to the task of saving lives and property and continued to ask Congress to subsidize their work.

Examining the efforts by three inventors, Edward D. Tippet, Samuel Raub, Jr. and Cadwallader Evans, to win subsidies for their steam safety devices in the 1830s, ’40s and ’50s illuminates the motives, techniques and frustrations of inventors and pulls back a curtain to see

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<sup>49</sup> Appendix A: H.R. 365, 25<sup>th</sup> Cong., 2<sup>nd</sup> sess.; H.R. 484, 485 and 486, 26<sup>th</sup> Cong., 1<sup>st</sup> sess.; H.R. 594, 28<sup>th</sup> Cong., 2<sup>nd</sup> sess. See also Appendix B: H. Rept. 651, 26<sup>th</sup> Cong., 1<sup>st</sup> Sess., 3-4, 5-6 and H. Rept. 115, 28<sup>th</sup> Cong., 1<sup>st</sup> sess., 2-3.

<sup>50</sup> *SJ*, 30<sup>th</sup> Cong., 1<sup>st</sup> Sess., Jan. 24, 1848, 128 and March 31, 1848, 249.

<sup>51</sup> “Steam Boiler Explosions,” *SA* 4/35 (May 19, 1849): 277.

<sup>52</sup> Appendix B: S. Exec Doc. 18, 30<sup>th</sup> Cong., 2<sup>nd</sup> Sess., 16-25; See also H. Exec. Doc. 170, 25<sup>th</sup> Cong., 3<sup>rd</sup> Sess., 3 and H. Rept. 123, 28<sup>th</sup> Cong., 2<sup>nd</sup> Sess., 3.

the government's response. The government's experimentation with fusible alloys demonstrates that it was capable of using federal resources to facilitate the adoption of safety mechanisms. The example of another entrepreneur and inventor, Joseph Francis, provides an instance where the government worked closely with an inventor who developed a useful innovation and provided him with a competitive boost.

Tippett, Raub, and Evans have received little attention from historians. None of them created a product that represented both a technological breakthrough and commercial success on the scale of inventors like Samuel Morse or Cyrus McCormick. However, they were more representative of the many people who sought help from the national government than great inventors like Morse. Despite their relative obscurity, the stories of these three can also be recovered because they left extensive records as they pursued subsidies. Two of the three, Raub and Evans, produced inventions that had worthwhile features, were used on many steam engines and had supporters who advocated on their behalf. Edward D. Tippett was a crank with delusions of grandeur, but his tale is nonetheless instructive because he serves as a stand-in for the many inventors who sought support for unsuccessful mechanisms. His situation, motivations and lobbying tactics were consistent with those of other applicants, while his flawed grasp of physics and mechanics illustrates the idiosyncratic understanding common among many Americans, including inventors who worked with steam power.

## ***2. Edward D. Tippett***

Edward D. Tippett was born about 1789 in Maryland as the son of a Revolutionary soldier and later served during the war of 1812. He moved to Washington, D.C. and earned his

living for 27 years as a schoolteacher at the Eastern Academy.<sup>53</sup> He recorded that he had been given a vision in 1816 where the secrets of the natural world had been opened to him. Tippet saw it as his mission to advance and share three great discoveries with the rest of the nation: how to generate perpetual motion, design a powered airship and construct a safety steam engine that would never explode.<sup>54</sup> But Tippet's airship design, which was a kind of steam-powered dirigible, was impossible given the technical capabilities of the time, his dream of perpetual motion was a fantasy that had been discredited among knowledgeable people and his safety steam engine was functional, but primitive and poorly designed.<sup>55</sup> In the 1820s he began to ask the government to support his inventions and continued to press for subsidies for over forty years, petitioning Congress and the executive departments to have experts examine his work and asking for money so he could construct prototypes of his machines.<sup>56</sup> With a fair hearing, he believed, legislators would recognize his accomplishments, he would get the support he needed and the country would reap the benefits. He later cited the subsidy that Samuel Morse received for his electro-magnetic telegraph as a precedent and was confident that government backing

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<sup>53</sup> *Edward D. Tippet, House Report of the Committee on Claims*, 36<sup>th</sup> Cong., February 11, 1860, H. Rept. Committee on Claims 233, 12, 13-14.

<sup>54</sup> Edward D. Tippet, "A Synopsis of Reason," Library of Congress. Michael P. Musik, "War in an Age of Wonders: Civil War Arms and Equipment," *Prologue* 27/4 (Winter 1995). National Archives and Records Administration, <http://www.archives.gov/publications/prologue/1995/winter/civil-war-arms-and-equipment-1.html>.

<sup>55</sup> "Spheroidal State of Water," *SA* 5/34 (May 11, 1850): 272.

<sup>56</sup> *HJ*, 17<sup>th</sup> Cong., 2<sup>nd</sup> sess., Feb. 12, 1823, 215. *HJ*, 24<sup>th</sup> Cong., 1<sup>st</sup> sess., April 16, 1836, 708-9. *HJ*, 25<sup>th</sup> Cong., 2<sup>nd</sup> sess., March 26, 1838, 668-669. *HJ*, 25<sup>th</sup> Cong., 3<sup>rd</sup> sess., Jan. 9, 1839, 105. *SJ*, 25<sup>th</sup> Cong., 3<sup>rd</sup> sess., Feb. 16, 1839, 238. *HJ*, 26<sup>th</sup> Cong., 1<sup>st</sup> sess., Feb. 6, 1840, 349. *HJ*, 27<sup>th</sup> Cong., 2<sup>nd</sup> sess., April 16, 1842, 720. *HJ*, 28<sup>th</sup> Cong., 2<sup>nd</sup> sess., Feb. 4, 1845, 327. *HJ*, 29<sup>th</sup> Cong., 1<sup>st</sup> sess., April 30, 1846, 739. *SJ*, 29<sup>th</sup> Cong., 1<sup>st</sup> sess., August 1, 1846, 465. Memorial of Edward D. Tippet for Aid in the Construction of a Steam Engine; Petitions and Memorials, House Select Committee on Steam Boilers and Steamboats; April 16, 1842 (HR 27A-G26.5), 27<sup>th</sup> Congress, Records of the House of Representatives, RG 233, NA; Memorial of Edward D. Tippet on steam power, Petitions and Memorials, Senate Committee on Naval Affairs, April 1, 1846 to Jan. 5, 1847 (Sen29A-G12.1), 29<sup>th</sup> Congress, Records of the Senate, RG 46, NA. *HJ*, 31<sup>st</sup> Cong., 2<sup>nd</sup> sess., Jan. 6, 1851, 111-112. *HJ*, 33<sup>rd</sup> Cong., 1<sup>st</sup> sess., May 5, 1854, 713. January 20, 1855 Petition of Edward D. Tippet for an examination of his navigating balloon, Petitions and Memorials, Senate Committee on Patents and the Patent Office, 34<sup>th</sup> Congress, Records of the Senate, RG 46, NA; Memorial of Edward D. Tippet for discovery of self moving perpetual power, Ref'd Feb. 2, 1859, Petitions and Memorials, House Committee on Patents, various subjects, Can Riving to Valve Regulators (HR 35A-G15.9), 35<sup>th</sup> Congress, Records of the House of Representatives, RG 233, NA.

would enable him to achieve major advances.<sup>57</sup> Tippet first memorialized the House of Representatives in 1823, claiming that he had

invented a new and interesting machine, which gains power without losing time, which he believes will be of the utmost importance to the country, but that, from poverty, he is unable to make known its utility, by demonstrating its power upon a large scale; and praying that a committee of scientific gentlemen may be appointed to investigate its principles, and to make such report as they may deem it to deserve.<sup>58</sup>

This appeal set the pattern for Tippet's requests. He would petition Congress, plead poverty and ask the government to examine his plans or give him a subsidy. He would subsequently declare that, after additional thought and effort, he had discovered the secret to perfect his inventions.<sup>59</sup>

At one point Tippet composed a poem as part of a broadside to Congress. Perhaps he hoped that his lyricism would stir the hearts of the legislators when he asked Congress for a subsidy:

Now surely our Senate, a committee can give  
As sound on the science, as when Newton did live,  
If this is not so, in every respect  
Its [sic] wrong in our people such men to elect

So give me the money, I'll honor this nation  
And enable America, to take a bold station  
The spirit of war, and bloodshed must end  
And the blessing of liberty, to all we must send.<sup>60</sup>

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<sup>57</sup> Memorial of Edward D. Tippet claiming to have succeeded in discovering a self moving perpetual power, February 2, 1858, Committee on Patents, Petitions and Memorials on Various Subjects (HR35A-G15.9); 35<sup>th</sup> Congress; Records of the House of Representatives, RG 233, NA.

<sup>58</sup> *HJ*, 17<sup>th</sup> Cong., 2<sup>nd</sup> sess., Feb. 12, 1823, 215.

<sup>59</sup> Memorial of Edward D. Tippet claiming to have succeeded in discovering a self moving perpetual power, February 2, 1858, Committee on Patents, Petitions and Memorials on Various Subjects (HR35A-G15.9); 35<sup>th</sup> Congress; Records of the House of Representatives, RG 233, NA. Petition of Edward D. Tippet, praying Congress to Appoint a Committee to Examine the navigating balloon, Jan. 24, 1855, Committee on Patents and the Patent Office, Petitions and Memorials, April 15-May 2, 1856 (Sen34A-H14); 34<sup>th</sup> Congress; Records of the Senate, RG 46, NA. Tippet had other inventions in addition to his "big three" of safety steam engine, perpetual motion and the navigating balloon, including a proposal for a steam vessel design that he claimed would be unusually sturdy, lightweight and inexpensive. Petition of E. D. Tippet, praying an examination of a new plan of ship building, April 9, 1860, Committee on Naval Affairs, Petitions and Memorials, April 6, 1860-Feb. 18, 1861 (Sen36A-H10.2), 36<sup>th</sup> Congress; Records of the Senate, RG 46, NA.

<sup>60</sup> Edward D. Tippet, "Historical Review of Passing Events, Deeply Interesting, in Prose and Poetry," Rare Book and Special Collections, Library of Congress, 3-4. The broadside asked Congress to support Tippet's powered balloon. These stanzas are excerpted from Tippet's longer composition.

Tippett stated that he deserved a subsidy because the machine would confer benefits to the national community.<sup>61</sup> He stressed that he was driven by “philanthropic” motives and deeply moved by the immense toll on lives taken by steam boiler explosions.<sup>62</sup> To emphasize his public spiritedness, at one point Tippett even offered to grant his engine to the government without payment to himself, but on the condition that his investors received appropriate recompense.<sup>63</sup>

Tippett did not depend solely on his own powers of persuasion and worked to get public support. Unlike some other applicants, he could not get experts and professional users of steam to endorse his engine, but he managed to get some citizens to write to Congress and sign petitions in favor of his plans.<sup>64</sup> However, despite Tippett’s efforts, over the years the House and Senate usually referred his requests to committees, where they died quiet deaths.

Tippett came closest to earning government support in the late 1830s. He memorialized the House and Senate about his safety steam engine in 1836.<sup>65</sup> The House Committee on Patents

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<sup>61</sup> Memorial of Edward D. Tippett praying the aid of Congress to test the utility of his improvement in the steam engine, March 23, 1838, Select Committees, Petitions and Memorials on Various Subjects, January 6 1838-April 9, 1838 (Sen25A-G21), 25<sup>th</sup> Congress, Records of the Senate, RG 46, NA.

<sup>62</sup> Memorial of Edward D. Tippett Upon the Subject of Safety in Steam Power, Dec. 11, 1850, Referred Jan. 6, 1851, Committee on Commerce, Petitions and Memorials, Security of Life on Board Steam Vessels (H.R. 386) (HR31A-G3.8), 31<sup>st</sup> Cong., Records of the House of Representatives, RG 233, NA. On Tippett’s assertions of public spiritedness, see also Petition of E. D. Tippett praying an examination of a new plan of ship building, April 9, 1860 (Referred April 11, 1860), Committee on Naval Affairs, Petitions and Memorials, April 6, 1860-February 18, 1861. (Sen36A-H10.2), 36<sup>th</sup> Cong., Records of the Senate, RG 46, NA.

<sup>63</sup> Petition of Edward D. Tippett upon the Subject of Steam Explosions, May 3, 1838, Senate Select Committee on Steam, Petitions and Memorials on Various Subjects, Select Committees, January 6, 1838 – April 9, 1838 (Sen25A-G21), 25<sup>th</sup> Cong., Records of the Senate, RG 46, NA.

<sup>64</sup> Memorial of Sarah and Lucinda Tanner praying that an appropriation be made to test Tippett’s invention for preventing the explosion of steam boilers, May 20, 1852, Referred May 27, 1852, Petitions and Memorials on Various Subjects, Committee on Commerce, Feb. 3, 1852 – May 27, 1852 (Sen32A-H3.4), 32<sup>nd</sup> Congress, Records of the Senate, RG 46, NA. *SJ*, 32<sup>nd</sup> Cong., 1<sup>st</sup> sess., May 27, 1852, 1<sup>st</sup> sess., 439. Petition of Gentlemen, Residents of New York City Upon the Subject of Edward D. Tippett’s Navigating Balloon, Committee on Patents and the Patent Office, Petitions and Memorials, April 15-May 2, 1856 (Sen34A-H14); 34<sup>th</sup> Congress; Records of the Senate, RG 46, NA. Petition of Citizens of Newark, New Jersey upon the subject of Edward D. Tippett’s Navigating Balloon, *Ibid*.

<sup>65</sup> *HJ*, 24<sup>th</sup> Cong., 1<sup>st</sup> sess., April 16, 1836, 708-09.

recommended appropriating two thousand dollars to test Tippet's device, but Congress took no further action.<sup>66</sup>

Like other applicants, Tippet believed that a successful experiment might change the minds of skeptics, garner publicity and convince the public to put pressure on Congress to grant a subsidy. Representatives might be persuaded to support the invention by witnessing the device in operation. Samuel Morse's telegraphic demonstrations in the Capitol, for example, played an important role in impressing the members of Congress that his work was worthy of an appropriation.<sup>67</sup> In the summer of 1842 Samuel Colt began a series of several demonstrations to build support for his method of triggering underwater mines. He demolished a small vessel off of the Washington Arsenal in front of thousands of spectators, then destroyed the brig *Volta* in New York harbor in the fall and sank the barque *Styx* in Washington in 1844 "in the presence of the secretary of the navy and many officers, members of congress [sic], etc."<sup>68</sup>

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<sup>66</sup> Report on the Memorial of Edward D. Tippet accompanied with a resolution, July 1, 1836, Select Committee on the Patent Laws (HR24A-D24.1), 24<sup>th</sup> Congress, Records of the House of Representatives, RG 233, NA. Tippet subsequently constructed a working model of his engine and offered to demonstrate it to Congress. Memorial of Edward D. Tippet praying the aid of Congress to test the utility of his improvement in the steam engine, March 23, 1838, Select Committees, Petitions and Memorials on Various Subjects, January 6, 1838-April 9, 1838 (Sen25A-G21), 25<sup>th</sup> Congress, Records of the Senate, RG 46, NA. Printed as *Memorial of Edward D. Tippet on the Subject of a Safety Steam Engine*, 25<sup>th</sup> Cong., 2<sup>nd</sup> sess., 1838, H. Doc. 289 (Appendix B).

<sup>67</sup> Kenneth Silverman, *Lightning Man: The Accursed Life of Samuel F. B. Morse* (New York: Alfred A. Knopf, 2003), 218-19. In general, it was often an arduous task to enact any bill into law, but it could be exceptionally challenging to secure a Congressional subsidy for an advance in technology. Morse's request had been stalled for several years when he redoubled his efforts in 1842. He engaged a professional lobbyist, asked for and received a recommendation from physicist Joseph Henry, wrote to congressmen asking for their support and undertook a number of well-publicized demonstrations in New York City, including presentations to scientists from the American Institute for the Advancement of Science. With the proposal still delayed in Congress, Morse gained a champion in Representative Charles Ferris of New York and got additional support from Commissioner of Patents Henry Ellsworth, a friend from Morse's time at Yale College. In December 1842 he went to Washington and made several successful demonstrations of his apparatus within the Capitol. The House Committee on Commerce reported in favor of appropriating \$30,000 to construct a test line and the bill made it through the House of Representatives by a close vote of 89 to 83. The Senate then passed the bill on the final day of the session, March 3, 1843, without a roll call vote. Silverman, *Ibid.*, 214-221.

<sup>68</sup> Philip K. Lundeborg, *Samuel Colt's Submarine Battery: The Secret and the Enigma* (Washington, DC: Smithsonian Institution Press, 1974), 29, 34, 44; *NWR*, April 20, 1844, 113 and April 27, 1844, 130. As another example, see the exhibition of Cochrane's "patent bomb cannon" at the Washington Arsenal. "Cochrane's Patent Bomb," *NWR*, May 2, 1840, 144.

If inventors wanted to stir their audiences with public exhibitions, there was, of course, the chance that something would go wrong. From the point of view of the legislators and administrators, even a failure might accomplish some good, since it could discredit an unworthy project and might be sufficiently embarrassing so as to discourage dilettantes from bothering them with ineffective inventions. Tippett, however, was so certain of the efficacy of his mechanisms that it seems unlikely that the prospect of public embarrassment would have made him reluctant to apply--he touted the mere fact that his plans had been *presented* to members of the government as an indication of the merits of his work.<sup>69</sup>

The late 1830s were a propitious time for Tippett and other inventors of steam safety mechanisms. The Franklin Institute investigations had been completed and the results were available. A number of high profile accidents renewed public attention to the problem of steam disasters and Congress appeared ready to act.

In early 1837, responding to requests for subsidies by inventors A.B. Quinby and Samuel Raub, the Senate approved a bill which authorized the Navy to test boiler safety mechanisms.<sup>70</sup> The measure failed to become law, but the issue was still alive when the long session of the 25<sup>th</sup> Congress convened in December 1837, and President Martin Van Buren directed additional attention to the problem in his Annual Message. Senator Felix Grundy introduced a

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<sup>69</sup> Tippett had a habit of exaggerating his accomplishments and in 1858 he carefully phrased one of his missives to Congress to imply that his ideas were endorsed by credible experts. He asserted his perpetual motion plans had been "recently examined by *master mechanics and machinists*," by naval officers, Secretary of the Navy Isaac Toucey, as well as Smithsonian Institution Secretary, physicist Joseph Henry. Tippett, however, could not say that they had legitimized his ideas or even confirm that they had reviewed them, merely that they had not offered any "contradictions or dispute" when Tippett made portions of his plans available. Apparently he could not acknowledge the possibility that they had ignored him or dismissed his ideas without comment. Memorial of Edward D. Tippett claiming to have succeeded in discovering a self moving perpetual power, February 2, 1858, Petitions and Memorials on Various Subjects, Can Riving to Valve Regulators (HR 35A-G15.9); 35<sup>th</sup> Cong., Records of the House of Representatives, RG 233, NA.

<sup>70</sup> *SJ*, 24<sup>th</sup> Cong., 2<sup>nd</sup> sess., Jan. 16, 1837, 119; Jan. 26, 1837, 161; Feb. 1, 1837, 186; Feb. 7, 1837, 216; Feb. 10, 1837, 235; Feb. 11, 1837, 241-2. Appendix A: S. 183, 24<sup>th</sup> Cong., 2<sup>nd</sup> sess.



comprehensive bill (S.1) to address the problems of steamboat accidents and Senator John Ruggles introduced a bill (S.73) to create a commission to test safety mechanisms.<sup>71</sup>

In March 1838 the Senate appointed a select committee to examine Tippet's invention.<sup>72</sup> Tippet could have been overjoyed by the news, but instead he was concerned that his plan was in danger of being overshadowed by the work of other inventors. In particular, Congress was interested in the request of Samuel Raub, Jr. who had asked for aid for his patented steam safety valve. Unlike Tippet's engine, a number of experts had written to Congress endorsing Raub's invention.<sup>73</sup> Members introduced bills into the House and Senate to help Raub.<sup>74</sup> Trying to head off this rival, Tippet argued that safety valves could not prevent boiler explosions.<sup>75</sup> They were inventions, he wrote, "calculated to deceive" the public and only offered "pretensions of safety" because they could not keep vessels and passengers out of danger.<sup>76</sup> Further, Tippet believed

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<sup>71</sup> *SJ*, 25<sup>th</sup> Cong., 2<sup>nd</sup> sess., Dec. 6, 1837, 25 and Dec. 20, 1837, 64.

<sup>72</sup> *SJ*, 25<sup>th</sup> Cong. 2<sup>nd</sup> sess., March 24, 1838, 310-311.

<sup>73</sup> The experts included a naval engineer and some experienced industrial steam engine builders and operators. Appendix B: S. Rept. 159, 24<sup>th</sup> Cong., 2<sup>nd</sup> sess., 6-7.

<sup>74</sup> See Appendix A: H. R. 365, 25<sup>th</sup> Cong., 2<sup>nd</sup> sess. would have applied Raub's device to steam vessels in the public service while S. 119, 25<sup>th</sup> Cong., 2<sup>nd</sup> sess. would have mandated tests and trials to determine if Raub's valve was worth purchasing.

<sup>75</sup> Tippet had a mixed understanding of the problem of steam explosions that was partially accurate and partially fanciful. He knew that boilers exploded from an excess of steam pressure. He also had a theory that boilers sometimes, though rarely, collapsed after cold water was injected into the boiler cylinder, where contact with the steam would cool it so as to form a vacuum which, in some instances, would cause a collapse. To solve this problem, Tippet proposed adding an interior valve that would open to admit the outside atmosphere whenever a vacuum formed. Edward D. Tippet to the Honorable D. C. Merrick, April 9, 1838, Select Committees, Petitions and Memorials on Various Subjects, January 6-April 19, 1838 (Sen25A-G21), Records of the Senate, RG 46, NA. Petition of Edward D. Tippet upon the Subject of Steam Explosions, May 3, 1838, Senate Select Committee on Steam, Petitions and Memorials on Various Subjects, Select Committees, January 6, 1838 – April 9, 1838, (Sen25A-G21) 25<sup>th</sup> Cong., Records of the Senate, RG 46, NA. Samuel Raub shared Tippet's concerns about the dangers of creating a vacuum, though informed opinion insisted that both Tippet and Raub were incorrect on this point. Appendix B: S. Rept. 159, 24<sup>th</sup> Cong., 2<sup>nd</sup> sess., 2. See "Report of the Committee of the Franklin Institute of the State of Pennsylvania for the Promotion of the Mechanic Arts, on the Explosions of Steam Boilers, Part 2, containing the General Report of the Committee," *JFI* 22/4 (Oct. 1836): 367. The Institute's committee noted that the ordinary strength of a high pressure boiler would be enough to guard against any collapse from the creation of a vacuum.

<sup>76</sup> Petition of Edward D. Tippet upon the Subject of Steam Explosions, May 3, 1838, Senate Select Committee on Steam, Petitions and Memorials on Various Subjects, Select Committees, January 6, 1838 – April 9, 1838, (Sen25A-G21) 25<sup>th</sup> Cong., Records of the Senate, RG 46, NA.

that no steam engine with boilers could ever be safe because of the basic design of boilers. They were, he asserted, inherently likely to explode because the strength of the boiler deteriorated every time it was used. Tippet had designed a steam engine *without* a boiler to avoid the problem of accumulating excess steam and the danger from weaknesses in the metal.<sup>77</sup>

In 1838 and 1839 the commissioners, led by Professor James Renwick, examined plans and safety devices including Tippet's machine.<sup>78</sup> Their preliminary review inclined them to pass over Tippet's engine, but his lobbying had persuaded Congress to pass a law that directed the commission to scrutinize his device.<sup>79</sup> In addition, unlike some other inventors, Tippet could provide a working model and, living in Washington, he was available to consult with the Renwick and the other commissioners in person.<sup>80</sup> Despite this, the commissioners rejected Tippet's engine. His design, for all intents and purposes, recreated an "ancient and ruder" form of the steam engine that had been surpassed years earlier. While it had no boiler that could explode, much of the steam was lost into the atmosphere, which would make it inefficient and cause it to consume a tremendous amount of fuel. They also observed that the small quantity of steam in the generator was at a high pressure, liable to explode and that "instead of affording security [from explosions], [the engine] would be the most dangerous which could possibly be adopted."<sup>81</sup>

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<sup>77</sup> Edward D. Tippet to the Honorable D.C. Merrick, April 9, 1838, Senate Select Committee on Steam, Petitions and Memorials on Various Subjects, Select Committees, January 6-April 19, 1838 (Sen25A-G21), Records of the Senate, RG 46, NA.

<sup>78</sup> *A Report of the Commissioners to test Inventions to render safe the Boilers of Steam-engines*, 25<sup>th</sup> Congress, 3<sup>rd</sup> sess., 1839, H. Exec. Doc. 170, 2 (Appendix B).

<sup>79</sup> Appendix A: S. 389, 25<sup>th</sup> Cong., 2<sup>nd</sup> sess.

<sup>80</sup> Appendix B: H. Exec. Doc. 170, 25<sup>th</sup> Cong., 2<sup>nd</sup> sess., 2, 3.

<sup>81</sup> *Ibid.*, H. Exec. Doc. 170, 7 & 8. The board's critique did not leave much room for Tippet to alter or improve his engine, since the commissioners rejected his concept as well as the particular design of his device. Tippet also, in his conversations with the commissioners, declined to consider altering the form of his generator, since he believed that the absence of the boiler was what made his device a *safety* steam engine. The Navy's Chief Engineer examined Tippet's engine in 1843 and suggested that his "method of generating steam" could be useful if

Tippett soldiered on despite the board's rejection. He petitioned Congress to examine and subsidize his engine in 1839, 1840, 1842, 1845, 1846, 1851, 1854 and 1856, but was unsuccessful.<sup>82</sup> He became increasingly paranoid because, as he saw it, his success was being blocked by government employees determined to prevent him from getting a fair hearing and a subsidy.<sup>83</sup> Discouraged, he wrote bitterly in 1860 that bureaucrats or officers in the military could get access to Senate committees. He, on the other hand, struggled along outside and looked "like a fool."<sup>84</sup>

With the outbreak of the Civil War, Tippett saw another opportunity to get government aid.<sup>85</sup> In tones alternatively plaintive, proud and paranoid, he wrote: "Will not the Government now, help their aged friend and benefactor who has spent a lifetime in doing good ... Will this government see me longer persecuted by men in Washington[?]"<sup>86</sup> In early 1865 he wrote to

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it was modified and improved. G. L. Thompson, Engineer-In Chief, U.S.N. to David Henshaw, Secretary of the Navy, Dec. 14, 1843 (copy) in folder Committee on Commerce, Petitions and Memorials Referred to Committees, Feb. 3, 1852 – May 27, 1852 (Sen32A-H3.4); 32<sup>nd</sup> Congress, Records of the Senate, RG 46, NA.

<sup>82</sup> *SJ*, 25<sup>th</sup> Cong., 3<sup>rd</sup> sess., Jan. 9, 1839, 105. *HJ*, 25<sup>th</sup> Cong., 3<sup>rd</sup> sess., Feb. 4, 1839, 461. *SJ*, 25<sup>th</sup> Cong., 3<sup>rd</sup> sess., Feb. 16, 1839, 238. *HJ*, 26<sup>th</sup> Cong., 1<sup>st</sup> sess., Feb. 6, 1840, 349. *HJ*, 27<sup>th</sup> Cong., 2<sup>nd</sup> sess., April 16, 1842, 720. *HJ*, 28<sup>th</sup> Cong. 2<sup>nd</sup> sess., Feb. 4, 1845, 327. *HJ*, 29<sup>th</sup> Cong., 1<sup>st</sup> sess., April 30, 1846, 739. *SJ*, 29<sup>th</sup> Cong., 1<sup>st</sup> sess., Aug. 1, 1846, 465. *HJ*, 31<sup>st</sup> Cong., 2<sup>nd</sup> sess., Jan. 6 & 11, 1851, 111-112, 131. *HJ*, 33<sup>rd</sup> Cong., 1<sup>st</sup> sess., May 5, 1854, 713. *SJ*, 33<sup>rd</sup> Cong., 1<sup>st</sup> sess., June 20, 1854, 445-446. *SJ*, 34<sup>th</sup> Cong., 1<sup>st</sup> sess., April 21, 1856, 267. In 1858, a House committee recommended against testing Tippett's engine. Edward D. Tippett, January 21, 1858, Committee on Commerce, Reports and Papers, Navigational and Personal Safety on Vessels, H Rept. 8 (HR35A-D4.6), 35<sup>th</sup> Cong., Records of the House of Representatives, RG 233, NA.

<sup>83</sup> Tippett charged that his inability to secure access to government largesse was due to "secret enemies" who worked against him poisoning the minds of the officers of the government so that they would oppose his plans. Memorial of Edward D. Tippett claiming to have succeeded in discovering a self moving perpetual power, February 2, 1858, Petitions and Memorials on Various Subjects, Can Riving to Valve Regulators (HR35A-G15.9); 35<sup>th</sup> Cong., Records of the U.S. House of Representatives, RG 233, NA.

<sup>84</sup> Letter of Edward D. Tippett, April 16, 1860, Committee on Naval Affairs, Petitions and Memorials, April 6, 1860-Feb. 18, 1861 (Sen36A-H10.2); 36<sup>th</sup> Congress; Records of the Senate, RG 46, NA.

<sup>85</sup> In 1862 Tippett wrote to President Lincoln and asked him to support his powered balloon, prophesying that his invention would be necessary to win the war. Edward D. Tippett to Abraham Lincoln, Monday, January 27, 1862, The Abraham Lincoln Papers at the Library of Congress, Series 2. General Correspondence. 1858-1865. Library of Congress, American Memory Online, <http://memory.loc.gov/mss/mal/mal2/422/4220500/001.jpg> [accessed June 1, 2009].

<sup>86</sup> Edward D. Tippett, "Synopsis of Reason," The Abraham Lincoln Papers at the Library of Congress, Series 2. General Correspondence. 1858-1865. Library of Congress, American Memory Online, <http://memory.loc.gov/mss/mal/mal2/422/4220500/002.jpg> [accessed June 1, 2009].

President Lincoln, claiming that he had a vision that the war would not end until the secret of self-moving power was used by the United States. The President did not show much sympathy for Tippet or confidence in his work, writing on the back of Tippet's letter: "Tippet. Crazy. Man."<sup>87</sup>

Like Tippet, applicants for government subsidies commonly believed that they and their inventions would make a major contribution to the nation. The commissioners who examined his steam engine in 1838 and 1839 noted that many inventors were not able to view their achievements dispassionately. They may have had Tippet in mind when they wrote:

It is but too frequently true that persons who have devoted years of their lives to inventions which they hope to render applicable to any useful purpose, are, by the long and undivided attention which they have devoted to some particular object, rendered incapable of discovering its defects, and, with pardonable feelings of gratified pride, overrate the importance of their discoveries.<sup>88</sup>

### **3. Samuel Raub, Jr.: "Impossible to burst a boiler"**

Samuel Raub of Wilkes-Barre, Pennsylvania was a more successful inventor than Tippet, but he also overestimated the value of his mechanism. Raub's safety valve was already in commercial use when he applied for a subsidy in 1837.<sup>89</sup> Unlike Tippet, Raub was able to persuade many members of Congress that he had devised a foolproof preventative for boiler explosions. Over the next several years, he made a good enough case that the House and Senate introduced bills to evaluate his invention, purchase his patent to use on government-owned steam

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<sup>87</sup> Edward D. Tippet to Abraham Lincoln, Feb. 9, 1865, The Abraham Lincoln Papers at the Library of Congress, Series 2. General Correspondence. 1858-1865. Library of Congress, American Memory Online, <http://memory.loc.gov/mss/mal/mal1/405/4056200/005.jpg> [accessed June 1, 2009]. Michael P. Musik, "War in an Age of Wonders: Civil War Arms and Equipment," *Prologue* 27/4 (Winter 1995). National Archives and Records Administration, <http://www.archives.gov/publications/prologue/1995/winter/civil-war-arms-and-equipment-1.html>. Bruce, *Lincoln and the Tools of War*, 132.

<sup>88</sup> *Report of the Commissioners to test Inventions to render safe the Boilers of Steam-engines*, 25<sup>th</sup> Cong., 3<sup>rd</sup> sess., February 7, 1839, H. Exec. Doc. 170, 2-3 (Appendix B).

<sup>89</sup> Appendix B: S. Rept. 159, 24<sup>th</sup> Cong., 2<sup>nd</sup> sess., 6-7.

engines, require it on all steamboats in the country, test it on U.S. vessels, or to require it on every steam engine in the nation.<sup>90</sup>

If Tippet stubbornly clung to outmoded concepts in the face of criticism, Raub was somewhat more open to constructive suggestions to improve his design. Similar to other safety valves, Raub's "self-acting double safety valve" blew off excess steam, but it was designed to react to low water and also to sound an alarm to warn when dangerous conditions were developing.<sup>91</sup> In 1835, after the Franklin Institute Committee on Science and the Arts negatively reviewed an early version of his safety valve, Raub heeded their suggestions, altered the device and soon earned more positive reviews in the Institute's *Journal*.<sup>92</sup> Raub claimed that, though he hoped to earn remuneration for his invention, he was motivated to serve the public good by preventing damage to life and property from steam disasters.<sup>93</sup> He declared that if Congress would pass a law requiring his invention on all vessels, "they would effectually secure the safety of the lives and property of the many thousands that are now exposed to so much danger."<sup>94</sup>

At first glance, Raub's invention met many of the criteria for an ideal safety mechanism. It warned when dangerous conditions were developing, responded immediately to those dangers,

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<sup>90</sup> Appendix A: 25<sup>th</sup> Congress, 2<sup>nd</sup> sess. (H.R. 365); 26<sup>th</sup> Congress, 1<sup>st</sup> and 2<sup>nd</sup> sess. (H.R. 484); 28<sup>th</sup> Congress, 2<sup>nd</sup> sess. (H.R. 594) and *SJ*, 25<sup>th</sup> Congress, 2<sup>nd</sup> sess., (S. 119).

<sup>91</sup> Appendix B: S. Rept. 159, 24<sup>th</sup> Cong., 2<sup>nd</sup> sess., 4. Raub's valve had a lever that was attached to a weight within the boiler, with a counterweight outside the boiler at the other end of the lever. The weights were to be arranged so that whenever the interior weight was immersed in water, the lever would not move, but if the water level dropped, the relative density of the weight would increase and it would fall. Whenever this happened, the lever would activate two safety valves attached to the boiler, one which opened outward and one inward. Whenever these valves opened it would release excess steam, but when either opened it would also warn the engineer that the water level was getting too low so that he could correct the deficiency. Raub pointed out that the warning was only a secondary virtue of the device, that the valve was "self-acting" because it operated on its own to immediately relieve the danger by releasing steam pressure before the water level became dangerously low.

<sup>92</sup> *JFI*, new series, 22/3 (Sept. 1836): 181 and *JFI* 23/1 (Jan. 1837): 3-6. The review was reprinted in S. Rept. 159, 24<sup>th</sup> Cong., 4-5 (Appendix B).

<sup>93</sup> *Petition of Samuel Raub, Jr., Praying the passage of a law requiring the use of the 'double self-acting safety-valve on board of steamboats, etc.*, January 30, 1839, S. Doc. 164, 25<sup>th</sup> Cong., 3<sup>rd</sup> sess., 1 (Appendix B).

<sup>94</sup> Appendix B: S. Doc. 164, 25<sup>th</sup> Cong., 3<sup>rd</sup> sess., 2.

was “certain in its action,” and sounded an alarm. The alarm alerted passengers to hazards so that they could provide an additional check on reckless activity by the crew. The valve reset itself automatically and was of relatively simple construction, so as to be affordable and to minimize the chances of breakage or derangement that afflicted complex mechanisms in uncertain environments.<sup>95</sup>

Because it was widely believed that steamboat engineers caused accidents because they were reckless, inebriated, or both, legislators were very interested in having an automatic device that took the responsibility to monitor the water level and regulate the steam pressure out of the hands of the crew. The fact that Raub’s safety valve purportedly operated without human intervention was therefore a feature that made it especially attractive to Congress.<sup>96</sup>

Raub petitioned Congress to subsidize his valve and exhibited drawings and an operative model to members in early 1837, earning a strong endorsement from the Senate Committee on Roads and Canals.<sup>97</sup> His valve was already in use in a glass factory in Philadelphia, where it earned positive reviews from the managers and engineers.<sup>98</sup>

Raub asked Congress to apply his device to all steam engines owned and operated by the United States, including on vessels and the steam engines at the navy yards and the Mint. The

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<sup>95</sup> The House Committee on Patents outlined the characteristics of a “perfect” steam safety device. *Dr. William M. Wright, Report of the Committee on Patents*, 28<sup>th</sup> Cong., 2<sup>nd</sup> sess., Feb. 13, 1845, H. Rept. 123, 2-3 (Appendix B).

<sup>96</sup> The situation was analogous to that of the early 20<sup>th</sup> century when the Interstate Commerce Commission tried to institute a system of “automatic train control” to eliminate the possibility that railroad operators could cause collisions that resulted in spectacular wrecks and numerous deaths and injuries. For both steamboat and railroad disasters, the temptation was to blame the catastrophes on the carelessness and recklessness of those in charge, on deficiencies in the American character that valued speed over safety, and to respond by seeking out automatic devices that could operate without human agency. Concerning the railroads, see Mark Aldrich, “Combating the Collision Horror: The Interstate Commerce Commission and Automatic Train Control, 1900-1939,” *Technology and Culture* 34/1 (Jan. 1993): 49-77.

<sup>97</sup> Appendix B: S. Rept. 159, 24<sup>th</sup> Cong., 2<sup>nd</sup> sess., 1. See *HJ*, 24<sup>th</sup> Cong., 2<sup>nd</sup> sess., Jan. 16, 1837, 217 regarding Raub’s petition to the House of Representatives.

<sup>98</sup> Appendix B: S. Rept. 159, 24<sup>th</sup> Cong., 2<sup>nd</sup> sess., 6-7.

Army's Topographical Chief Engineer, Charles Gratiot, reviewed the device and found it promising. It operated on well-known natural principles and should, he concluded, lower the dangers from explosion. Gratiot asked that several U.S. steamers be fitted with the valve so that it could be tested. The committee recommended appropriating \$5,000 for this purpose.<sup>99</sup> These events occurred, however, during the short, lame duck session of Congress held after the 1836 elections. The committee made its report two months into the session, there was little time to act, and the House adjourned without taking further steps.

Raub petitioned the 25<sup>th</sup> Congress for a subsidy in late 1837.<sup>100</sup> In a campaign that must have worried Edward D. Tippet as he was lobbying for his own subsidy, Raub demonstrated the valve to steam vessel travelers onboard the Philadelphia and Charleston steam packet. He also circulated Gratiot's letter, along with the endorsements that he had received from the Senate Roads and Canals Committee. Several hundred people journeying on steamboats signed petitions in his favor and sent them to Congress, urging the government to use Raub's valve on all steamers or install and test it on the steam engines owned by the United States.<sup>101</sup>

In early 1838 the Senate Committee on Roads and Canals once again reported favorably on Raub's valve. They were impressed by the petitions and cited public support as one of the

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<sup>99</sup> C. Gratiot, Engineer Department, to Mr. Hendricks, Jan. 20, 1837, Committee on Roads and Canals, Petitions and Memorials Referred to Committees, 1837 December 11 (Sen25A-G20), 25<sup>th</sup> Congress, Records of the Senate, RG 46, NA. Appendix B: S. Rept. 159, 24<sup>th</sup> Cong., 2<sup>nd</sup> sess., 1.

<sup>100</sup> This was a busy time politically, as between the 24<sup>th</sup> and 25<sup>th</sup> Congresses Martin Van Buren had been sworn in as President and confronted a financial panic that was shaking the country. After he entered office in March 1837, Van Buren called a special session of Congress in the fall, where he pushed for his sub-treasury plan to address the economic situation. Congress met for a month and a half, then recessed and reconvened in December 1837 for their long session, which continued into the following summer.

<sup>101</sup> Certificate of 502 individuals who witnessed the operation of Raub's safety valve on board of the Philadelphia and Charleston Steam Packet; Memorial of Petition of 26 citizens of the U.S. in favor of Raub's invention of safety valves for Steam boilers & recommending its use in all steam generators in the service of the United States, Nov. 20, 1837; and Memorial from 208 persons recommending the passage of a law requiring all steamboats to be furnished with Raub's Double Self-Acting safety valve, Committee on Roads and Canals, Petitions and Memorials Referred to Committees, 1837 December 11 (Sen25A-G20), 25<sup>th</sup> Congress, Records of the Senate, RG 46, NA.

reasons to recommend the device. The committee also noted that professional users of steam had endorsed the valve and were employing it themselves. They extolled its design and especially lauded the “self-acting power” of the mechanism and the fact that it did not depend on the “continual attention and skill of an engineer.” The committee asked the Navy’s chief engineer to evaluate and test the valve and introduced a bill (S. 119) to appropriate \$5,000 to pay Raub and fit the invention onto several U.S. steamers.<sup>102</sup>

Contemporaneously, the House of Representatives formed a select committee at the end of 1837 to consider Raub’s application.<sup>103</sup> The chairman, Democrat David Petrikin, who represented Raub’s home district in Pennsylvania, had received a petition from Raub.<sup>104</sup> During that winter Raub exhibited a small boiler in the Capitol and provided “a practical demonstration” for committee members and others.<sup>105</sup> The members were favorably inclined toward Raub’s request after they had seen his model and cited the valve’s self-regulating feature as a major virtue. They proposed appropriating \$3,000 to test his device.<sup>106</sup> The committee also argued that the extensive use of steam power for travel and its dangers to the public justified government intervention in the form of subsidies for safety devices, and they were encouraged by the evidence that Raub’s invention would contribute to the safety of citizens.<sup>107</sup> Four Democrats and

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<sup>102</sup> *Report by the Committee on Roads and Canals [To accompany Senate bill 119]*, 25<sup>th</sup> Congress, 2<sup>nd</sup> sess., January 3, 1838, S. Rept. 69, 1, 2 (Appendix B). See also *SJ*, 25<sup>th</sup> Cong., 2<sup>nd</sup> Sess. Jan. 3, 1838, 104.

<sup>103</sup> *HJ*, 25<sup>th</sup> Cong., 2<sup>nd</sup> sess., Dec. 29, 1837, 159-60.

<sup>104</sup> Petrikin represented the 15<sup>th</sup> Pennsylvania congressional district. He introduced bills to purchase Raub’s safety valve in both the 25<sup>th</sup> and 26<sup>th</sup> Congresses. The bills were H.R. 365 in the 25<sup>th</sup> Congress, 2<sup>nd</sup> sess. and H.R. 484 of the 26<sup>th</sup> Congress, 1<sup>st</sup> sess. See Appendix A.

<sup>105</sup> Appendix B: H. Rept. 323, 25<sup>th</sup> Cong., 2<sup>nd</sup> Sess., 1. Inventors also opportunistically took advantage of public circumstances when they lobbied Congress. Raub used the occasion of the fire that destroyed the *U.S.S. Missouri* in Gibraltar harbor to ask Congress to subsidize his invention to extinguish fires. Appendix B: H. Rept. 115, 28<sup>th</sup> Cong., 2<sup>nd</sup> sess., 4.

<sup>106</sup> Appendix A: H.R. 365, 25<sup>th</sup> Cong., 2<sup>nd</sup> sess.

<sup>107</sup> *Report on Samuel Raub, Jr., In Relation to Steam-Engines [To accompany bill H.R. No. 365]* by the Select Committee, 25<sup>th</sup> Cong., 2<sup>nd</sup> sess., January 9, 1838, H. Rept. 323, 1 (Appendix B).



one Whig sat on the committee and the lone southern Democrat, George Welshman Owens of Georgia, introduced the report.

In this instance, the Democrats were willing to set aside their typical commitment to small and frugal government and non-interference with individual enterprise in order to recommend intervention.<sup>108</sup> While the report of one committee cannot be taken as reflecting the convictions of all of the members of Congress, the fact that it was endorsed by members whose partisan and sectional affiliations tended to make them leery of energetic government suggests that congressmen were open to an expansive interpretation of federal powers and responsibilities in the field of interstate transportation and the case of steamboat safety.

However, in this instance the whole Congress was not as broad-minded as the committee, and rather than approving a subsidy for Raub, Congress passed bills (S. 73 & S. 389) which formed the investigative commission headed by Professor Renwick. The commissioners began to examine and test steam safety inventions in October 1838 and continued their work into 1839. They gave Raub's device a better evaluation than they gave Edward D. Tippet's steam engine, but the commissioners also criticized Raub's valve. For one, though Raub claimed that his invention was new and original, the commissioners had received a similar plan from a Philadelphia inventor and they thought that Raub's was the inferior of the two.<sup>109</sup> In addition, while the commissioners were confident that Raub's safety valve would perform as advertised, they were *not* sure that opening the valve was the safest course when confronted by low water in

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<sup>108</sup> In addition to Petrikin as the chairman and Owens, the other members of the committee included Democrats Nathaniel Briggs Borden of Massachusetts and William Taylor of New York. The fifth member, Waddy Thompson, Jr. of South Carolina, was the lone Whig. *HJ*, 25<sup>th</sup> Cong., 2<sup>nd</sup> sess., Dec. 29, 1837, 159-160.

<sup>109</sup> Appendix B: H. Rept. 323, 25<sup>th</sup> Cong., 2<sup>nd</sup> sess., 2. According to the commission, the other inventor, Knight Bailey, had submitted a plan where one of his safety valves was even less liable to tampering than Raub's and had additional features such as an indicator that would show the level of the water in the boiler, as well as a method for measuring the steam pressure. One of Raub's critics wrote to Congress several years later and commented that a machine similar to Raub's had also been used for an extended period in England and was described in a well-known treatise on the steam engine. H. Doc. 79, 26<sup>th</sup> Cong. 1<sup>st</sup> sess., 7.

the boiler, since there were instances where it appeared that explosions took place shortly after safety valves had been opened.<sup>110</sup>

Raub was dismayed by the commission's conclusions and wrote to defend his invention. However, he did not address the criticisms of his design or the questions about his valve's originality, but focused on several unrelated issues. First, he complained that the commissioners tested his apparatus without allowing him to oversee its installation and, as a result, the valve had not worked as well as it ought. Second, Raub realized that just as the government had the power to promote his invention through positive reviews, negative publicity could damage its commercial prospects.<sup>111</sup> He protested that the commission's report would tend to undermine public confidence in his mechanism. Raub asked that Congress appoint *another* commission composed of "some competent practical person or persons" and engineers. He then questioned the credentials of the commissioners, claiming that it was "well-known that the mere theorist seldom possesses that mechanical knowledge which would lead to a fair judgment on an invention ...."<sup>112</sup> This was apparently a swipe at two members of the commission and an attempt to invoke popular prejudices that denigrated people who lacked extensive hands-on experience.

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<sup>110</sup> Perhaps, they wrote, this happened because the water foamed on the heated and uncovered sides of the boiler generating steam all but instantaneously, and perhaps because the engine continued to create steam more quickly than the valve could release it. Both Raub's and Bailey's devices were liable to this criticism and, as a result, the committee declined to recommend them. Appendix B: H. Doc. 170, 25<sup>th</sup> Cong., 3<sup>rd</sup> sess., 6-7. Three years earlier, the Franklin Institute had suggested in their general report that when water in the boilers was discovered to be low, the most prudent response was to bank the fires so as to slow and stop the generation of steam. Jerry L. Mashaw, "Administration and 'The Democracy': Administrative Law from Jackson to Lincoln, 1829-1861," *Yale Law Journal* 117/8 (June 2008): 1636.

<sup>111</sup> Even inventors who had received government munificence could find their chances damaged by expert reviews. Samuel Colt's attempt at gaining additional appropriations for his submarine battery was practically sunk in 1844 by lukewarm and negative notices provided by physicist Joseph Henry, chemist Robert Hare of the University of Pennsylvania, and Colonel Joseph Totten of the Army Corps of Engineers. Despite his initial 1842 appropriation, Colt never sold the United States on his submarine battery, though he did eventually get substantial government contracts for his repeating firearms. Lundeberg, *Samuel Colt's Submarine Battery*, 49-52, 56.

<sup>112</sup> Raub wrote that the commissioners had had used one of his safety valves calibrated for a low pressure engine instead of a high pressure one. *Petition of Samuel Raub, Jr. Praying for a Re-examination of his Invention of the Double Self-acting Safety-valve*, 25<sup>th</sup> Cong., 2<sup>nd</sup> sess., February 18, 1838, H. Doc. 204, 1-2 (Appendix B).

These commissioners, Professors Renwick of Columbia and Benjamin Silliman of Yale, could both be characterized as “mere theorists” because, despite their extensive knowledge, they did not operate steam machinery on a regular basis.<sup>113</sup>

Raub also drew Pittsburgh inventor Cadwallader Evans into the debate. Evans joined the voices against Raub, complaining to Petrikin’s select committee that Raub was warning members of the public that anyone who used Evans’s invention would be infringing on Raub’s patent and was thus liable to legal action. Evans published a reply in the *National Intelligencer* stating that these claims were without merit. In addition, Evans implied that *Raub’s* patent was invalid because Raub’s valve was not an original design and did not make use of any new principles.<sup>114</sup>

Raub tried again in 1840. Ignoring the criticisms and questions that Renwick and the commission had raised about the effectiveness of his valve, Raub petitioned the 26<sup>th</sup> Congress to apply his valve to all public vessels and to pay him for his invention. Representative Petrikin was again appointed to head a select committee on the subject.<sup>115</sup> Beyond considering Raub’s safety valve, the committee took up a wide variety of issues regarding steam vessel safety. It intended to review the 1838 steamboat law and, if necessary, to craft a substantial revision. The members were also interested in purchasing Raub’s valve and asked him his price to sell the patent rights to the United States. Raub declined to name a figure, declaring that he was certain

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<sup>113</sup> Benjamin Silliman to Samuel Raub, Jr., Sept. 26, 1838, Select Committee on Steam Engines, Petitions and Memorials Referred to Committees (HR25A-G24.3), 25<sup>th</sup> Congress, Records of the House of Representatives, RG 233, NA. Perhaps Raub hoped for a more favorable review from a man like Robert Stevens, one of the family of New York-area steam-engine builders, who had been invited to join the commission, but declined.

<sup>114</sup> Evans appealed for the committee to consult with Patent Office examiners and competent engineers to confirm that his device was dissimilar to Raub’s. Memorial of Cadwallader Evans to the Select Committee of the House of Representatives, Jan. 24, 1839, Petitions and memorials referred to Committees, Select Committee on Steam Engines (HR25A-G24.3), 25<sup>th</sup> Congress, Records of the House of Representatives, RG 233, NA. See also clippings from the *National Intelligencer* and other papers accompanying the memorial.

<sup>115</sup> *HJ*, 26<sup>th</sup> Cong., 1<sup>st</sup> sess., Feb. 6, 1840, 348.

the committee was aware of the thousands of lives and millions of dollars in property that had been lost in steamboat accidents, that he had labored hard to perfect his invention for the last five or six years, and he was sure that the committee would “do right” by him and recommend a fair offer.<sup>116</sup> In July, a week and a half before the close of the session, Kentucky Whig Joseph Rogers Underwood issued an extensive report on behalf of the committee and introduced three bills, including one (H.R. 484) to purchase Raub’s safety valve for \$25,000.<sup>117</sup> The committee based the proposed legislation on the testimony of “experienced practical men” and noted that the mere fact of the “appalling destruction of life and property” from “steamboat disasters” justified government intervention, while arguing that Raub’s safety valve would provide an infallible warning and response in the case of danger.<sup>118</sup> As part of a proposal to revise the 1838 steamboat act, they also introduced a bill (H.R. 486) that required all steam vessels to carry Raub’s valves.<sup>119</sup>

With little time left before Congress adjourned, it was difficult to get bills on the calendar to be considered for passage, though during the final night of the session members sometimes passed measures that slipped through without substantive review.<sup>120</sup> However, the three bills, including Raub’s subsidy, were not destined to pass as such midnight legislation. The committee report was ordered printed, but time ran out before the House took further action. Raub would

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<sup>116</sup> Samuel Raub, Jr. to David Petrikin, April 24, 1840, Select Committee on Steam Boilers (Raub’s Safety Valve), Committee Reports and Papers (HR26A-D30.6), 26<sup>th</sup> Congress, Records of the House of Representatives, RG 233, NA. Raub also reminded the committee that his valve was already in wide use and informed them that it had been installed on additional boilers, including three steam vessels, the *Chesapeake*, the *Augusta* and the *Columbia*. Samuel Raub, Jr. to Joseph Rogers Underwood, May 6, 1840, Select Committee on Steam Boilers, (Raub’s Safety Valve), Committee Reports and Papers (HR26A-D30.6), 26<sup>th</sup> Congress, Records of the House of Representatives, RG 233, NA.

<sup>117</sup> *HJ*, 26<sup>th</sup> Cong., 1<sup>st</sup> sess., March 5, 1860 and July 10, 1840, 520 & 1255. Appendix B: H. Rept. 651, 26<sup>th</sup> Cong., 1<sup>st</sup> sess., 6.

<sup>118</sup> Appendix B: H. Rept. 651, 26<sup>th</sup> Cong., 1<sup>st</sup> sess., 1, 3-4, 5-6.

<sup>119</sup> Appendix A: H.R. 486, 26<sup>th</sup> Cong., 1<sup>st</sup> sess., see Section 2.

<sup>120</sup> See the comments of Senator Willie P. Mangum, *APG*, 32<sup>nd</sup> Cong., 1<sup>st</sup> sess., 1098.

have to wait until the second session of the 26<sup>th</sup> Congress began in December 1840. In the interim, he circulated petitions asking Congress to act favorably on his invention and got hundreds of people in Pittsburgh, New York, Washington, Baltimore and Ohio to sign them.<sup>121</sup>

There were some tactical problems that weighed against H.R. 484 and H.R. 486. First, they were being considered in the short session of the 26<sup>th</sup> Congress, and thus had to compete with all the other usual business during the three-and-a-half months while the House and Senate met. This was not necessarily a fatal handicap; Samuel Morse's telegraph subsidy, for instance, would be authorized during the short session of the 27<sup>th</sup> Congress. However, it meant that there would be little time to consider the measures and that the legislation could more easily be pushed aside for priorities such as the time-consuming appropriations bills. Second, because three steamboat-related bills were introduced together, their sponsors attempted to call them up and consider them as a package. The massive overhaul of the 1838 steamboat law (H.R. 486) might engender extensive debate and discussion. Raub's subsidy was thus unlikely to slip through unobtrusively. If it made it through the House, the bill's prospects in the Senate were unclear.

While the general issue of steamboat safety was on the Senate agenda and Maine's John Ruggles

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<sup>121</sup> Petition of Citizens of Pittsburgh, Pa. (P. Downer & others) in favour of Raub's self-acting safety valve for steam boilers; Petition of citizens of Pittsburgh Pennsylvania in favour of Raub's self-acting safety valve; Petition in favour of Raub's self acting safety valves for steam boilers from citizens of Pittsburgh PA (tabled Dec. 16, 1840); Petition of Captain George Guyther and 158 others, Passengers on board the steam boat *Columbia* between Washington and Baltimore Praying Congress to pass the Bill reported at the last session ... recommending the application of Raub's double self-acting safety valves to the boilers of steam boats; October 5, 1840; Petition of Seth Lockwood and 150 others, Citizens of New York Praying the enactment of Laws to prevent accidents on board Steam Boats and recommending the passage of the Bill as reported by the Hon. Mr. Underwood at the last session of Congress; Petition of Ladies of Baltimore in favor of Raub's safety valve, Nov. 1, 1840; Petition of Henrietta Hope and 56 others, Ladies of Baltimore Praying Congress pass the Bill reported at the Last session requiring the use of "Raub's double self acting safety valves" to Steam boilers, Dec. 1, 1840; Petition of John Coates and 62 others, citizens of Chilicothe, Ohio, Praying the passage of a law by Congress to secure persons and property on board of Steam Boats and the bill reported by Hon. J.R. Underwood; Select Committee on Steam Boilers (Raub's Safety Valve), Committee Reports and Papers (HR26A-D30.6), 26<sup>th</sup> Congress, Records of the House of Representatives, RG 233, NA. At least one of Raub's supporters, James Mitchell of the steamboat *Columbia*, did double duty for Raub. As a professional user of steam, he had endorsed Raub's valve in testimony to Congress, but also recruited members of the public to sign a petition in favor of awarding Raub a subsidy. Appendix B: H. Rept. 651, 26<sup>th</sup> Cong., 1<sup>st</sup> sess. 28-29. *Petition of a Number of Citizens of Washington City, Praying the enactment of a law requiring the use in steamboats of Raub's safety-valve*, 25<sup>th</sup> Cong., 2<sup>nd</sup> sess., 1840, S. Doc. 597, 1.

had introduced a bill (S. 148) to revise and expand the 1838 steamboat law, the Senators had not weighed in on a subsidy for Raub.<sup>122</sup>

Another problem for Raub was he was competing with rivals like Tippet and Cadwallader Evans who were also memorializing the House and Senate. The House had, in fact, constituted an additional select committee during the 26<sup>th</sup> Congress to consider Cadwallader Evans's application.<sup>123</sup> Evans's supporters in Pittsburgh opposed subsidies for Raub. They claimed that Evans' invention was superior and was already in use on seventeen vessels on the western waters. They wrote to Congress that they had barely heard of Raub's mechanism and, preying on Congressmen's inclination not to award peculiar privileges, asked them not to mandate "exclusive use of the invention of any particular inventor" or to award an advantage to any "one machine or contrivance over another."<sup>124</sup>

Rhode Island steam engine manufacturer and textile industry promoter Charles T. James weighed in with additional objections. He wrote that Raub's device and theory were based on incorrect, or, at best, incomplete information and criticized the Petrikin committee for disseminating fallacious conjectures about the causes of steam explosions. James, who later served as a Democratic senator and chairman of the Committee on Patents, argued, in tune with the Franklin Institute investigation, that the greatest danger which led to bursting boilers came from gradual increases of pressure, rather than from low water. He contended that many boilers had exploded and flues collapsed even when there was a full supply of water in the boiler and

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<sup>122</sup> Appendix A: S. 148, 26<sup>th</sup> Cong., 1<sup>st</sup> sess.

<sup>123</sup> *HJ*, 26<sup>th</sup> Cong., 1<sup>st</sup> sess., Feb. 6, 1840, 349.

<sup>124</sup> *Memorial of a Number of Citizens of Pittsburg, Pennsylvania, Remonstrating Against the passage of any law compelling owners of steamboats to use any particular description of machinery*, 26<sup>th</sup> Cong., 1<sup>st</sup> sess., 1840, S. Doc. 582, 1 (Appendix B).

that Raub's "safety valve could not have prevented" these.<sup>125</sup> James further argued that the fact that Raub's valve operated without needing attention from the engineer was a weakness rather than a strength. He charged that anything that made the engineer focus less on the engine could contribute to disaster by imbuing him with a false sense of confidence that would diminish the concentration that was necessary to operate the engine safely.<sup>126</sup>

Raub responded to James and his other critics, asserting a combination of the *low water* and *steam flashing from hot metal* explanations and insisted that it was "now a well established fact" that almost every explosion was caused by low water.<sup>127</sup> Most of the people who testified to the Petrikin committee agreed.<sup>128</sup> Underwood and the other members were partial toward the testimony they had gathered themselves, rather than that from the Franklin Institute report or

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<sup>125</sup> Appendix B: H. Doc. 79, 26<sup>th</sup> Cong., 2<sup>nd</sup> sess., 2, 5-7. James also pointed out that the description of Raub's valve as "self-acting" was misleading, since even the simplest machines could be rendered useless from the actions of the environment and required regular care and maintenance to work effectively. On James, see Carroll W. Pursell, Jr., *Early Stationary Steam Engines in America: A Study in the Migration of a Technology* (Washington: Smithsonian Institution Press, 1969), 76-77.

<sup>126</sup> Appendix B: H. Doc. 79, 26<sup>th</sup> Cong., 2<sup>nd</sup> sess., 6-7. James cited testimony in support of his views from an experienced steamboat captain. In addition, James mocked the premise of Raub's valve, that its design to open valves before the water in the engine began to foam up the sides onto the uncovered boiler metal and flues was based on a "weak hypothesis, founded on mere conjecture; as though air bubbles in the boiler were more dangerous than an overloaded safety valve, with an inordinate pressure from excessively high steam!" James might have added that the greatest danger from low water, aside from metal fatigue from uneven heating, was that the flues, when uncovered by water, could become so highly heated and weakened that the pressure of the steam on their upper surface could cause them to collapse or be "crushed by its force, tearing their fastenings from the boiler head, thus producing a large aperture by which the steam and heated water may escape, and carry death and destruction to every person in their way." Rather than an additional safety valve, as Raub proposed, the best answer to this would be to have an independent water pump that would keep an adequate supply in the boilers, along with sufficient instruments to measure the height of the water. Memorial of the Board of Trade of the City of Pittsburgh on the Subject of Steam Boat explosions, referred April 18, 1848, Petitions and Memorials referred to Committees on Various Subjects, folder 2 of 3, Committee on Commerce (HR30A-G4.7), Records of the House of Representatives, 31<sup>st</sup> Congress, RG 233, NA. See also, Thomas R. Winpenny, "The Engineer as Promoter: Charles Tillinghast James and the Gospel of Steam Cotton Mills," *The Pennsylvania Magazine of History and Biography* 105/2 (April 1981): 167-68.

<sup>127</sup> *Samuel Raub, Jr., In Relation to Steam-Engines [To accompany bill H.R. 365]*, Report of the Select Committee, January 9, 1838, H. Rept. 323, 25<sup>th</sup> Cong., 2<sup>nd</sup> sess., 3. The assumption underlying this theory was that the boiler would tear open or leak if the steam was increased gradually, and therefore only a rapid generation of steam could explain the deadly violence of many explosions. Raub (incorrectly) argued that explosions from gradually increasing steam were rare and not particularly powerful or damaging. He also insisted on a version of the *explosive element theory* that steam could decompose into hydrogen and oxygen, which could also cause an explosion, but stated that this happened infrequently.

<sup>128</sup> Appendix B: H. Rept. 92, 26<sup>th</sup> Cong., 2<sup>nd</sup> sess., 1. This was a reprint of H. Rept. 51, 26<sup>th</sup> Cong., 1<sup>st</sup> sess.

investigations by scientific experts like Renwick, while the vast majority of witnesses sided with Raub and endorsed his safety valve.<sup>129</sup> The House made the steamboat bills a priority, but despite attempts by the members of the committee, the bills were repeatedly postponed, the session ended and Congress adjourned before the House took further action.<sup>130</sup>

Raub memorialized Congress again in February 1841, urging it to purchase his invention and to make it public property while mandating its use on all steam engines in the United States. He reiterated that low water was the major cause of explosions and cited a recent disaster where this had been the culprit. Raub stated that his critics' claims had no factual support and that, if Charles James' views were adopted, it would lead to many more explosions and fatalities. He pointed out that the recent explosion of the steamer *Cherokee* took place even though it was equipped with Cadwallader Evans' Safety Guard as well as gauges to measure steam temperature, pressure and the height of water. His own safety valve, he noted, had not been installed on the doomed steamer. The obvious implication was that Evans' device and the other inventions were inferior, comparatively ineffectual, and boilers would not be safe unless they

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<sup>129</sup> *Raub's Safety Valves [To accompany H.R. 484, 485, and 486], Report of the Select Committee, 26<sup>th</sup> Cong., 1<sup>st</sup> sess., July 10, 1840, H. Rept. 651, 2-5, 12, 15, 17, 18, 19-20, 21, 22, 29, 30, 31, 33, 34.* Interestingly, from the declaration by at least one of their witnesses, the committee members might have surmised that there was a viable and evidence-based alternative explanation. One witness informed them that, under normal circumstances of operation, steam can build up very rapidly in a boiler -- a steam engine could easily generate hundreds of pounds of steam in less than 15 minutes. H. Rept. 651, 7. As the Franklin Institute report had documented, this was a persuasive reason as to why so many explosions took place after vessels had been stopped at landings: the steam was not being worked off while the engine was idle, the safety valve remained closed, the fire was kept up and an explosion would take place shortly after the vessel got underway. The committee had access to this information, but still advantaged the *low water* and *hot metal* myths and concluded that Raub's valve provided the best preventative measure. Popular opinion remained confused about the reasons for explosions for many years. *Scientific American* lamented in 1848 "that although explosions of steam boilers has (sic) been the subject of much scientific investigation, and although men of the most profound understanding and diligent habits have made it the subject of their research, yet there are still clouds and darkness hovering o'er it -- it is still a variety of conflicting opinions." *SA* 3/21, (Feb. 12, 1848): 165.

<sup>130</sup> While the House Select Committee members managed to make the three steam-related bills the special orders of the day, to take priority over all other business, they were nonetheless postponed as members of the Ways and Means Committee repeatedly managed to get the steam bills deferred. For the special order, see *HJ*, 26<sup>th</sup> Cong., 2<sup>nd</sup> sess., Jan. 8, 1841, 160. For the delays, see *HJ*, 26<sup>th</sup> Cong., 2<sup>nd</sup> sess. Feb. 6, 237-39; Feb. 9, 247; Feb. 11, 254; Feb. 16, 294-5; Feb. 22, 303-4 and March 1, 1841, 341-2.



carried Raub's valve. Raub again claimed that it was "*impossible* to burst a boiler or collapse a flue" with his valve in use.<sup>131</sup>

Raub continued to apply for aid over the next few years.<sup>132</sup> In 1845 he wrote that the valve was being used by steamboats in New York harbor and elsewhere and the *New York Tribune* reprinted many of his testimonials while asserting that his valves provided security against explosions.<sup>133</sup> Though the House Naval Affairs Committee recommended purchasing his valve in 1845, Congress never again showed the degree of interest and support that it had in 1839 and 1840.<sup>134</sup> For one thing, Raub's ally in the House, David Petrikin, was no longer in Congress. Raub did not realize it, but his best chance for a subsidy passed him by when the 26<sup>th</sup> Congress adjourned. By 1848 Raub was dead and his son was requesting a subsidy on behalf of himself and Raub's other heirs.<sup>135</sup>

#### 4. *Cadwallader Evans*

Like both Raub and Tippett, Cadwallader Evans applied to Congress for assistance for many years.<sup>136</sup> Since Evans' father was Oliver Evans, the American developer of the high

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<sup>131</sup> *Memorial of Samuel Raub, Jr. praying the purchase by the government of the right to use the "double self-acting safety-valves," invented by him, and the passage of a law requiring the use of the same on all steam boilers,* 26<sup>th</sup> Cong., 2<sup>nd</sup> sess., February 8, 1841, S. Doc. 168, 2 (Appendix B).

<sup>132</sup> In 1841 Raub requested that naval engineers review his safety valve and asked that the government pay him \$5,000 to install the device on U.S. Navy steamers. *HJ*, 27<sup>th</sup> Cong., 2<sup>nd</sup> sess., Dec. 15, 1841. Appendix B: H. Rept. 115, 28<sup>th</sup> Cong., 2<sup>nd</sup> sess., 4. Raub repeated this proposition in 1844. *HJ*, 28<sup>th</sup> Cong., 1<sup>st</sup> sess., May 6, 1844, 879.

<sup>133</sup> *Memorial of Samuel Raub, Jr.*, Feb. 7, 1845 and clipping from the *New York Tribune* (vol. 2, no. 247), Committee on Naval Affairs, Petitions and Memorials Referred to Committees, Dec. 14, 1847 to May 4, 1848 (Sen30A-H11.2), 30<sup>th</sup> Congress, Records of the Senate, RG 46, NA.

<sup>134</sup> In 1845, in partnership with inventor Daniel Barnum, Raub managed to get a bill introduced (H.R. 594) that mandated that the valve be used on the public steamships of the United States. *HJ*, 28<sup>th</sup> Cong., 2<sup>nd</sup> sess., Feb. 7, 1845, 341. See Appendix A: H.R. 594, 28<sup>th</sup> Cong., 2<sup>nd</sup> sess. and Appendix B: H. Rept. 11, 28<sup>th</sup> Cong., 2<sup>nd</sup> sess.

<sup>135</sup> Petition of the Representatives of Samuel Raub, Jr. praying Congress to purchase the rights to use his apparatus for preventing explosions of steam boilers, April 14, 1848, Committee on Naval Affairs, Petitions and Memorials Referred to Committees, Dec. 14, 1847 to May 4, 1848 (Sen30A-H11.2), 30<sup>th</sup> Congress, Records of the Senate, RG 46, NA. *HJ*, 30<sup>th</sup> Cong., 1<sup>st</sup> sess., April 17, 1848, 695.

<sup>136</sup> *HJ*, 25<sup>th</sup> Cong., 3<sup>rd</sup> sess., Jan. 7, 1839, 225. Appendix B: H. Doc. 88, 25<sup>th</sup> Cong., 3<sup>rd</sup> sess. *HJ*, 26<sup>th</sup> Cong., 1<sup>st</sup>

pressure steam engine, he had an inventive pedigree that Tippet and Raub could not match. In addition to being an inventor, Evans and his brothers operated several manufacturing businesses, including a steam engine works, and he made use of the Franklin Institute's Committee on Science and the Arts to critique his inventions while he was developing them.<sup>137</sup> Evans served as an engine inspector under the 1838 Steamboat Act, and thus, in addition to his experience as a manufacturer, had opportunities to observe steamboats in operation on the Western river system.<sup>138</sup>

Evans entered the contest in January 1839. He may have been drawn into the fray before he was ready; he had not yet been issued a patent for his "Safety Guard" and one of his first moves was to respond to Samuel Raub's criticism and launch a counterattack.<sup>139</sup> Evans asked Congress to study his safety improvements and, invoking his famous father, declared that he had studied the principles of steam power and been manufacturing steam engines since his youth. He added that for five or six years he had worked to develop an invention that would prevent steam

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sess., Feb. 6, 1840, 349. Petition of Cadwallader Evans, Referred March 24, 1842, Petitions and Memorials Referred to Committees, Senate Committee on Naval Affairs, Dec. 27, 1841 to July 29, 1842 (Sen 27A-G11.1), 27<sup>th</sup> Congress, Records of the Senate, RG 46, NA; *HJ*, 27<sup>th</sup> Cong., 2<sup>nd</sup> sess., March 25, 1842, 593. Memorial of Cadwallader Evans with a plan for preventing boiler explosions, Dec. 16, 1842, Committee on Naval Affairs, Petitions and Memorials referred to Committees, various subjects, April 14, 1842-Dec. 23, 1843 (HR 27A-G14.3), 27<sup>th</sup> Congress, Records of the House of Representatives, RG 233, NA. *SJ*, 28<sup>th</sup> Cong., 2<sup>nd</sup> sess., Jan. 29, 1845, 116. *SJ*, 30<sup>th</sup> Cong., 1<sup>st</sup> sess., March 22, 1848, 227. Petitions and Memorials referred to Committees, House Committee on Patents, Cadwallader Evans's safety guard (HR 28A-G15.3) 28<sup>th</sup> Congress, Records of the House of Representatives, RG 233, NA; Petitions and Memorials referred to Committees, House Committee on Commerce (Evans's Safety Guard) (HR 28A-G14.3), 28<sup>th</sup> Congress, Records of the House of Representatives, RG 233, NA.

<sup>137</sup> Nathan Reingold, ed., *The Papers of Joseph Henry, v. 4, January 1838-December 1840: The Princeton Years* (Washington, DC: Smithsonian Institution Press, 1981), 63n.

<sup>138</sup> Cadwallader Evans, "A Treatise on the Causes of Explosions of Steam Boilers with Practical Suggestions for their Prevention" (Pittsburgh, PA: William H. Whitney, Printer, 1850), 15.

<sup>139</sup> Evans was issued a patent for his invention in April 1839 and received two more for steam safety devices over the next several years. *Cadwallader Evans, Apparatus to Prevent Explosion of Steam-Boilers*, Patent No. 1122, April 15, 1839. *C. Evans, Steam Boiler Water-Feeder*, Patent No. 1762, September 3, 1840. *Cadwallader Evans, Mode of Applying Floats to Regulate the Height of Water in Steam-Boilers*, Patent No. 2795, September 30, 1842. In addition to the dispute between Raub and Evans in 1839 and 1840, Evans later wrote a letter to a House select committee criticizing Raub's invention. C. Evans to Representative J.R. Underwood, Chairman of the Committee, Washington, April 6, 1842, Reports and Papers of the House Select Committee on Steam and Samuel Raub's Safety Valve (folder 3) (HR 27A-D25.8 ), Records of the House of Representatives, RG 233, NA.

boiler explosions and had finally achieved his goal.<sup>140</sup> A group of supporters in Pittsburgh also sent a petition expressing confidence in Evans and his mechanism.<sup>141</sup>

Evans' application arrived too late to be considered by the Renwick commission, but he tried again in 1840.<sup>142</sup> In response, the House organized a select committee in the 26<sup>th</sup> Congress to consider Evans's invention. While it was not as active as the Petrikin-led committee investigating Raub's valve, its chairman and Evans' hometown legislator, Representative Richard Biddle of Pennsylvania, wrote that Evans made a strong case for his Safety Guard, had received a positive evaluation from Professor Renwick in the past, and had presented certificates from people in Pittsburgh attesting to his character and accomplishments.<sup>143</sup> Applying to Congress two years later, Evans claimed that his Safety Guard provided a "sure method" of preventing steam boiler explosions, had given "entire satisfaction in every instance" to the

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<sup>140</sup> Memorial of Cadwallader Evans to the Select Committee of the House of Representatives, Jan. 24, 1839, Petitions and memorials referred to Committees, Select Committee on Steam Engines (HR25A-G24.3), Records of the House of Representatives, 25<sup>th</sup> Congress, RG 233, NA. See also clippings from the *National Intelligencer* accompanying the memorial and other papers. Evans's plan was in the form of several distinct devices which were integrated into one system. The invention would accomplish several things: preventing the boiler from carrying a "greater pressure than desired" by opening a safety valve triggered by a fusible metal alloy that was activated by heat, relieving the pressure when the temperature of the boiler rose above a pre-selected limit, and also automatically extinguishing the fires so that they would not generate any more steam. In addition, the device regulated the water in the boilers so that it did not get too low or too high and sounded a horn or whistle to distinguish between the possible causes of low water. If either sounded alone, the cause of the low water was likely from careening, and steps could then be taken to right the vessel. If both sounded together, then the water was more generally deficient, and the engineer could refresh the water supply. According to Evans, the mechanism was simple and not "liable to get out of order." He also counted on the intervention of the passengers as well as the crew, assuring the members of Congress that his device would at all times indicate the water level to the passengers. Petition of Cadwallader Evans to the Honorable the Senate and the House of Representatives, Jan. 24, 1839, Petitions and Memorials Received by Committees, Select Committee on Steam Engines (HR25A-G24.3), 25<sup>th</sup> Congress, House of Representatives, RG 233, NA. The *Mechanics' Magazine* of London reprinted much of Evans's memorial, along with a comprehensive description of the device with a diagram of it attached to a cross section of four boilers and a more detailed drawing of the mechanism itself. *Mechanics' Magazine, Museum, Register, Journal and Gazette*, September 7, 1839, 417-20.

<sup>141</sup> *HJ*, 25<sup>th</sup> Cong., 3<sup>rd</sup> sess., Jan. 7, 1839, 225. Appendix B: H. Doc. 88, 25<sup>th</sup> Cong., 3<sup>rd</sup> sess. In subsequent years Evans often relied on his allies to ask for subsidies while he contented himself with asking the government to examine his device.

<sup>142</sup> *HJ*, 26<sup>th</sup> Cong., 1<sup>st</sup> sess., Feb. 6, 1840, 349.

<sup>143</sup> R. Biddle to Gen. William Carter of Tenn., April 7, 1840. Select Committee on Steam Boilers (Raub's Safety Valve), Committee Reports and Papers (HR26A-D30.6), 26<sup>th</sup> Congress, Records of the House of Representatives, RG 233, NA.

steamers to which it had been applied and noted that demand for the device was “rapidly increasing.” Evans asked the government to examine his invention and to adopt it on steamers belonging to the United States and those that carried the mail.<sup>144</sup>

Like Raub, Evans claimed that it was impossible to produce an explosion with his invention attached to boilers, even if an engineer tried to do so “using all his talent and ingenuity ...”<sup>145</sup> He declared that his Safety Guard provided such flawless protection that he was willing to put money on it. “Five to ten thousand dollars is now offered,” he stated in an advertisement, “in the form of a bet, to any man, that he cannot explode a steam boiler with my Safety Guard attached.”<sup>146</sup>

Privately, Evans admitted that his Safety Guard was not as foolproof as he claimed. He explained to Joseph Henry in 1845 that several vessels had experienced boiler accidents even with the Guard attached. However, Evans said that the fault lay not with the mechanism, but with the people who oversaw it. He asserted that in every accident the Guard had been tampered with so as to thwart its function. He believed that engineers were prejudiced against the device because it undermined their pretensions to expertise – even people of limited knowledge and experience could operate an engine safely with the Safety Guard.<sup>147</sup>

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<sup>144</sup> Memorial of C. Evans, Referred March 25, 1842, Select Committee on Steam Boilers, Petitions and Memorials Referred to Committees (HR27A-G26.5), 27<sup>th</sup> Congress, Records of the House of Representatives, RG 233, NA.

<sup>145</sup> Cadwallader Evans to the Hon. Richard Biddle, Dec. 28, 1838, Select Committee on Steam Engines, Petitions and Memorials Referred to Committees, (HR25A-G24.3), Records of the House of Representatives, RG 233, NA. See also *Memorial of Cadwallader Evans for an Appropriation to Test his Invention*, 25<sup>th</sup> Cong., 3<sup>rd</sup> sess., 1839, H. Doc. 88, 25<sup>th</sup> Cong., 3<sup>rd</sup> sess., 1. Hunter, *Steamboats*, 536f.

<sup>146</sup> Evans said that he would build the boiler at his own expense and arrange it so that his challenger would be in no danger when the trial took place. Large advertising poster: “Evans’s Safety Guard to Prevent the Explosions of Steam Boilers,” House Select Committee on Steam Boilers, Reports and Papers, Folder 2 of 3 (HR26A-D30.6), 26<sup>th</sup> Congress, Records of the House of Representatives, RG 233, NA.

<sup>147</sup> Cadwallader Evans to Joseph Henry, Nov. 12, 1845 in Marc Rothenberg, ed., *The Papers of Joseph Henry*, v. 6, *January 1844-December 1846: The Princeton Years* (Washington, DC: Smithsonian Institution Press, 1992), 332-5. In his 1850 treatise, Evans noted that no invention could protect against recklessness and deliberate abuse to prevent it from working as the inventor had intended. Evans, “A Treatise on the Causes of Explosions,” 7.

As with Raub, Evans arranged a campaign to gain public support for his cause.<sup>148</sup> His backers wrote to Congress, called him a “public benefactor,” and urged the House and Senate to use his mechanism on the steamboats in the public service.<sup>149</sup> Sympathetic steamboat owners helped him circulate petitions, while Pittsburgh citizens and river travelers sent endorsements that arrived in concert with Evans’s memorials.<sup>150</sup> In 1848 his supporters pointed out that the French requirement for fusible alloy safety mechanisms had brought an excellent safety record for more than twenty years, but that Evans’s mechanism was superior to the French design. The petitioners went on to lament the recent loss of life due to explosions and urged passage of a law to require all steam engines, both on land and water, to use the Safety Guard.<sup>151</sup>

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<sup>148</sup> Pennsylvania – Two Petitions of the Citizens of the City of Pittsburgh in favor of a law applying Evans’s Safety Guard to engines belonging to the Government of the United States, Ref’d Feb. 5, 1845, Petitions and Memorials referred to Committees, Committee on Patents, folder - C. Evans (HR28A-G13.3), 28<sup>th</sup> Congress, Records of the House of Representatives, RG 233, NA. Two memorials: Memorial of Washington Miller and 171 other passengers on the Steam Boat Yorktown, Mississippi River, Dec. 16, 1844 and A Memorial of Travelers on the Mississippi and Ohio Rivers for the passage of a law compelling the use of Evans Safety Guard to prevent explosions onboard steam vessels (Referred Feb. 20, 1845) Committee on Commerce, folder – Evans’s Safety Guard (HR28A-G13.3), 28<sup>th</sup> Congress, Records of the House of Representatives, RG 233, NA. Memorial of Passengers on board Steam Boat *Yorktown*, that all steam vessels may be compelled to use “Evans’ Safety Guard,” March 17, 1848, Petitions and Memorials Referred to Committees, Committee on Commerce, folder March 6, 1848, to April 7, 1848 (Sen30A-H3.2), 30<sup>th</sup> Congress, Records of the Senate, RG 46, NA.

<sup>149</sup> Two petitions regarding Cadwallader Evans - Inhabitants of Allegheny County, Pennsylvania, in favour of paying him for the use of his invention – safety guard for steam boats, referred Jan. 9, 1843 and Jan. 24, 1843, Petitions and Memorials referred to Committees, Various Subjects, Committee on Naval Affairs (HR27A-G14.3), 27<sup>th</sup> Congress, Records of the House of Representatives, RG 233, NA.

<sup>150</sup> Evans usually let his supporters make part of the case for him. They called for Congress to grant him a subsidy while he usually limited himself to asking the government to evaluate the invention or to install the Safety Guard on engines belonging to the United States. In 1842 Evans stated that his invention had been available for three years and was being used by about sixty steam boats on the western waters “giving entire satisfaction in all cases.” He also sent an advertising flyer to Congress describing the Guard, along with charts documenting the proper proportions of metals to be used in the device with guidelines for the maximum temperatures and pressures. Petition of C. Evans, praying to have his invention for preventing explosions of steam boilers applied to the Steam Engines in the service of the U.S., Dec. 16, 1842, Referred Dec. 19, 1842, Committee on Naval Affairs, Petitions and Memorials Referred to Committees, Dec. 12, 1842 – Dec. 28, 1842 (Sen27A-G11.1), 27<sup>th</sup> Congress, Records of the Senate, RG 46, NA.

By 1850, and by contrast to Samuel Raub’s tactics, Evans publicly disavowed that he was seeking to compel steamboat owners to adopt his Safety Guard, though he noted that many of his supporters, of their own free will, had requested that the government require its use and that some of them had asked the government to purchase the invention and then make it available to everyone. Evans, “A Treatise on the Causes of Explosions,” 65. For an exception where Evans requested a subsidy directly, see *SA*, March 25, 1848, 210.

<sup>151</sup> Memorial of Passengers on board Steam Boat *Yorktown*, that all steam vessels may be compelled to use

Evans also lined up expert endorsements as part his campaign. In 1841 he sent a working model of his Safety Guard to Joseph Henry at Princeton and asked Henry to evaluate it. Evans complained to Henry that inventors could rarely profit from their devices because patents typically expired before inventors could get “a reasonable compensation.” Even though Evans persuaded some vessel owners in Pittsburgh to install his device, he needed to spread the word outside of the vicinity and believed that Henry’s support would help him gain the attention of Congress and the public.<sup>152</sup>

Professor Henry thought that government patronage for inventions was justified when a device was based on valid and well-understood scientific principles, combined with a design to put it “into practical operation.”<sup>153</sup> He had traveled extensively on steam vessels and so had more than an academic interest in steamboat safety.<sup>154</sup> He was frequently asked for his opinion on technological innovations, considered it a duty to share his expertise and, as one of the most prominent scientists in the country, his backing could carry weight with elected officials. Henry endorsed Samuel Morse’s telegraph in 1842, while his lukewarm review of Samuel Colt’s

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“Evans’ Safety Guard, March 17, 1848, Petitions and Memorials Referred to Committees, Committee on Commerce, folder March 6, 1848 to April 7, 1848 (Sen30A-H3.2), 30<sup>th</sup> Congress, Records of the Senate, RG 46, NA. The petitioners argued that “notwithstanding the opposition from prejudice and ignorance,” the mechanism was extremely valuable so long as no one tampered with the device. The *Yorktown*’s captain, Thomas J. Haldeman, was one of the strongest advocates for the Safety Guard. See Appendix B: S. Doc. 4, 31<sup>st</sup> Cong., Special sess., 62-65.

<sup>152</sup> Evans explained that he had tested the Safety Guard extensively and hoped that, in addition to addressing the dangers of high pressure and low water, it would have a salutary effect on the supervision and training of engineers, since it included an alarm that would warn the vessel master when the engineer was neglecting his duty. Evans remarked that if Henry had observed the habitual carelessness on western steam vessels he would wonder why boiler explosions were not even more common. Cadwallader Evans to Joseph Henry, July 12, 1841 in Nathan Reingold, ed., *The Papers of Joseph Henry: v. 5, January 1841-December 1843, The Princeton Years* (Washington, DC: Smithsonian Institution Press), 63-65.

<sup>153</sup> Joseph Henry to Samuel F. B. Morse, Feb. 24, 1842, in Nathan Reingold, ed., *The Papers of Joseph Henry, v. 5, January 1841-December 1843, The Princeton Years* (Washington, DC: The Smithsonian Institution Press, 1985), 151.

<sup>154</sup> Joseph Henry to Alexander Dallas Bache, Aug. 9, 1838 in Nathan Reingold, ed., *The Papers of Joseph Henry, v. 4, January 1838-December 1840: The Princeton Years* (Washington: Smithsonian Institution Press, 1981), 101.

submarine battery in 1844 counted against renewing Colt's subsidy.<sup>155</sup> After studying Evans' device, in 1842 Henry wrote a favorable evaluation of the Safety Guard. The *Journal of the Franklin Institute* later published his recommendation and Evans used the letter in his efforts to sell the Guard and lobby for a subsidy.<sup>156</sup>

Publicizing positive reviews was a standard advertising technique,<sup>157</sup> and Evans assembled an impressive list of people who endorsed his invention. He wrote to Congress in late 1842 that his Safety Guard had "received the unqualified approbation of all scientific men and practical engineers" who had examined it, as well as the Chief Engineer of the Navy.<sup>158</sup> In 1850 Evans published a pamphlet on steam engineering, which doubled as an advertisement for the Guard, filling more than half its pages with testimonials.<sup>159</sup>

Evans had some success in getting his invention adopted even without a government subsidy. By the end of 1842 he wrote that the Guard was used in about sixty vessels on the western waters, as well as at a steam engine establishment in Baltimore and on a boiler at the Washington Navy Yard.<sup>160</sup> In late 1845 he claimed that his device was being used on over 150

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<sup>155</sup> Joseph Henry to William Wilkins, May 3, 1844, in Marc Rothenberg, ed., *The Papers of Joseph Henry: vol. 6, January 1844-December 1846: The Princeton Years* (Washington, DC: Smithsonian Institution Press, 1992), 101.

<sup>156</sup> Joseph Henry to Cadwallader Evans, Feb. 25, 1842 in Nathan Reingold, ed., *The Papers of Joseph Henry, vol. 5, January 1841- December 1843: The Princeton Years* (Washington, DC: the Smithsonian Institution Press, 1985), 152-3. *JFI*, 3<sup>rd</sup> Series, 3 (1842): 210.

<sup>157</sup> Ronald J. Zboray, "Antebellum Reading and the Ironies of Technological Innovation," *American Quarterly* 40/1 (March 1988): 73.

<sup>158</sup> Petition of C. Evans praying to have his invention for preventing explosions of steam boilers applied to the Steam Engines in the service of the U.S., Dec. 16, 1842, Petitions and Memorials Referred to Committees, Committee on Naval Affairs, Dec. 12, 1842 – Dec. 28, 1842 (Sen27A-G11.1), 27<sup>th</sup> Congress, Records of the Senate, RG 46, NA. Memorial of Cadwallader Evans of Pennsylvania accompanied by a plan of an apparatus of which he is the inventor and patentee for preventing the explosion of Steam Boilers and praying the action of Congress, Dec. 16, 1842, Petitions and Memorials Referred to Committees, Committee on Naval Affairs, April 14, 1842-Dec. 23, 1842 (HR27A-G14.3), 27<sup>th</sup> Congress, Records of the House of Representatives, RG 233, NA.

<sup>159</sup> Evans, "A Treatise on the Causes of Explosions," 33-71.

<sup>160</sup> Petition of C. Evans Praying to have his Invention for Preventing Explosions of Steam Boilers applied to the Steam Engines in the Service of the U.S., Dec. 16, 1842, Petitions and Meml's Ref'd. to Committees, Comm. on Naval Affairs, Dec. 12, 1842 – Dec. 28, 1842 (Sen27A-G11.1), 27<sup>th</sup> Congress, Records of the Senate, RG 46, NA.

vessels.<sup>161</sup> Even so, Evans was disappointed that the Guard was not more popular and complained that steamboat owners and the public appeared apathetic about a device that would protect so many lives. He was also disgusted by the fact that many engineers opposed the mechanism. Still, he kept working to improve its effectiveness. In 1845 he abandoned using fusible alloys in favor of a design that relied on the expansion of heated metal to trigger his device, then patented and marketed it as the “Improved Safety Guard.”<sup>162</sup> With the modifications, Evans wrote that his invention was “now perfect and will undoubtedly prevent explosions which I think is manifest to every reflecting mind.”<sup>163</sup>

Some observers provided positive, though measured, assessments of the Guard. The Pittsburgh Board of Trade memorialized Congress in 1848 that a number of boats had adopted the invention and the Board thought it could prove beneficial, even if it was not infallible.<sup>164</sup> William W. Guthrie, who was later appointed as a local steamboat inspector in Cincinnati under the 1852 Steamboat Act, also wrote to Congress to praise the Safety Guard. He asked Congress to purchase Evans’ patent and require its use in all steam vessels. Guthrie wrote that while the device was not flawless, it was still exceptionally good at preventing explosions where undue

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<sup>161</sup> Cadwallader Evans to Joseph Henry, Nov. 12, 1845 in Marc Rothenberg, ed., *The Papers of Joseph Henry*, v. 6, *January 1844-December 1846: The Princeton Years* (Washington, DC: Smithsonian Institution Press, 1992), 332-5.

<sup>162</sup> Cadwallader Evans, *Method of Preventing the Explosion of Steam-Boilers*, Patent No. 3,921, Feb. 24, 1845. The Improved Guard was designed to activate in instances of both high heat and high pressure, operate independently in response to either danger, and then act to prevent the three greatest dangers in steam engines – excessive pressure, highly heated steam, and scarcity of water. Evans, “A Treatise on the Causes of Explosions,” 30, 65.

<sup>163</sup> Cadwallader Evans to Joseph Henry, Nov. 12, 1845 in Marc Rothenberg, ed., *The Papers of Joseph Henry*, v. 6, *January 1844-December 1846: The Princeton Years* (Washington, DC: Smithsonian Institution Press, 1992), 332-5.

<sup>164</sup> Perhaps not wanting to be too partial to one of the many inventors who hailed from their city, the Board suggested that Congress should also consider supporting Dr. William Wright’s safety apparatus. Memorial of the Board of Trade of the City of Pittsburgh on the Subject of Steam Boat explosions, referred April 18, 1848, Petitions and Memorials referred to Committees on Various Subjects, folder 2 of 3, Committee on Commerce (HR30A-G4.7), Records of the House of Representatives, 31<sup>st</sup> Congress, RG 233, NA.



heat built up in the boilers. Guthrie, however, believed that Evans's supporters had raised expectations too high by making extreme claims on behalf of the Guard. Despite its virtues, reflected Guthrie, the Guard could not prevent every possible calamity. Guthrie wrote that it was unfortunate that a few explosions had happened aboard boats on which it was installed and that this had tended to damage the device's reputation, despite the enthusiasm that had accompanied it when it was introduced.<sup>165</sup>

Evans's effort to get his Safety Guard installed on more engines was only partially successful, and not very profitable. Over the years he spent perhaps \$20,000 to develop and market it, but only earned about \$800 profit. Many vessel owners and engineers were reluctant to use it. Observers thought that steamboat owners had reacted against what they believed was Evans' excessive zeal to force the use of his device on the community. Others cited its relatively high price as a reason that it was not more popular.<sup>166</sup>

By the time Congress passed the 1852 Steamboat Act, members had been considering the use of fusible alloys for some time. In 1823 the French government had become the first country to regulate the operation of steam vessels, and their law required every boiler to carry two fusible metal discs and two safety valves.<sup>167</sup> Drafting the Steamboat Act in 1852, Senator John Davis

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<sup>165</sup> *Communication from W. W. Guthrie on the Causes of Explosions of Steam Boilers, and the remedies to be applied to prevent the loss of life and property resulting therefrom*, Referred January 29, 1851, Senate Misc. Doc. 13, 31<sup>st</sup> Cong., 2<sup>nd</sup> sess., 5-6 (Appendix B). Guthrie was the brother of manufacturer and future Secretary of the Treasury, James B. Guthrie.

<sup>166</sup> On the price, see Appendix B: S. Doc. 4, 31<sup>st</sup> Cong., Special sess., 63. Thomas Everett to S. H. Hodges, Commissioner of Patents, Jan. 7, 1853, Copy of the Report of the Examiner of the Patent Office in the Matter of the Application of Cadwallader Evans for the Extension of the Patent granted to him on the 15<sup>th</sup> of April, 1839 and Reissued on the 23<sup>rd</sup> November 1852 upon an improved apparatus to prevent the Explosion of Steam Boilers, found in Petitions and Memorials referred to Committees, Feb. 2, 1860 to March 2, 1860 (Sen36A-H11), Committee on Patents, 36<sup>th</sup> Cong., Records of the Senate, RG 46, NA.

<sup>167</sup> Burke, "Bursting Boilers," 49. The French alloy discs were designed to fuse at different temperatures; the smaller would fuse at a lower temperature and be equal to the area of one of the safety valves and the larger would fuse at a higher temperature with an area four times the area of the regular safety valve. *Report by the Committee of Commerce [To accompany bill S. No. 247]*, 26<sup>th</sup> Cong., 1<sup>st</sup> sess., March 2, 1840, S. Rept. 241, 2, 37 (Appendix B). Fusible alloys had the attractive feature that, if the metallic alloy was made correctly and encased in a tube so that it

had included a provision to require fusible metal devices on steam boilers. He later said that he had little confidence in these mechanisms, but some Western steamboat owners and their representatives had urged Davis to add them to the legislation.<sup>168</sup> While the United States did not grant Evans a subsidy, the 1852 Steamboat Act nonetheless gave him a competitive advantage because he already had a fusible metal design in use.<sup>169</sup>

This must have appeared as a great gift to Evans. It was a virtual invitation to resume manufacturing and selling his original Safety Guard, which relied on a fusible metal and would meet the law's requirements. Evans still held a patent on the fusible alloy version of the Guard, though it had been issued in 1839 and would expire in 1853. To take advantage of this, Evans applied to have this patent renewed and his request was granted a few months after the Steamboat Act of 1852 was enacted.<sup>170</sup> With over one thousand steam vessels in the United States and multiple boilers on most of them, Evans stood to make thousands of dollars if he could persuade vessel owners to purchase and install his invention, which was already used by numerous vessels.

The Steamboat Act was due to go into effect in early 1853, but it became apparent by late 1852 that there was not enough fusible alloy available to allow steamboat owners to meet the law's requirements.<sup>171</sup> The government responded in two ways: the administration began to

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would conduct heat without exposing the alloy to pressure, it would activate at the right temperature with a high degree of certainty the first time it was needed, and for a number of times thereafter.

<sup>168</sup> The French, after they had used alloy devices for many years, had eventually abandoned them while the English had also resisted using them. *CG*, 32<sup>nd</sup> Cong., 2<sup>nd</sup> sess., Feb. 22, 1853, 762.

<sup>169</sup> The Steamboat Act required that metals, fusible by the heat of the boiler at the highest allowed working pressure, be placed on the outside flues of the outside boilers. 10 *Stat. L.* 61, Section 9, Part 2.

<sup>170</sup> Cadwallader Evans, *Steam Boilers and Apparatus to be Used on Board of Steamboats to Prevent the Explosion of Boilers*, Patent No. 1,122, April 15, 1839, reissue No. 225; reissued November 23, 1852.

<sup>171</sup> Shortly after the Steamboat Act went into effect, Senator John Davis was still not certain that the fusible alloy provision was worthwhile, but he believed that Congress should give it a fair test and keep or abandon it in future legislation, as warranted. *CG*, 32<sup>nd</sup> Cong., 2<sup>nd</sup> sess., Feb. 22, 1853, 762.

produce the metals, while Congress gave owners extra time to comply with the requirements.<sup>172</sup> Starting in late 1852 the Navy Department began to manufacture the material at the navy yards. When the quality was unsatisfactory, however, in 1853 Treasury Secretary James Guthrie directed James C. Booth, a chemist and the head of melting and refining at the Mint in Philadelphia, to put together a large batch of the fusible alloy.<sup>173</sup> He also asked Booth to study Cadwallader Evans's Safety Guard and devise an improved version that would not violate Evans' patent.<sup>174</sup> By the summer of 1855, Booth had designed a new apparatus, prepared several hundred pounds of fusible metals and began to ship them to steamboat inspectors across the country to provide to steamboat owners at cost.<sup>175</sup>

By providing an additional source of alloy, Booth's work undermined the competitive edge that Evans had gained from the 1852 law while Evans was trying to use the law to increase the demand for his invention. The Steamboat Act had established a Board of Supervising Inspectors who met to establish regulations to enforce the law. Evans attended the Supervisors' general meeting in April 1854. There, the Inspectors clarified what type of fusible alloy devices they would accept as meeting the requirements of the Act. Evans contended that their

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<sup>172</sup> The idea of having the government prepare the alloys and make them available to steamboat owners had been floated before – the Pittsburgh Board of Trade had suggested it in 1848. Memorial of the Board of Trade of the City of Pittsburgh on the Subject of Steam Boat explosions, referred April 18, 1848, Petitions and Memorials referred to Committees on Various Subjects, folder 2 of 3, Committee on Commerce (HR30A-G4.7), 31st Congress, Records of the House of Representatives, RG 233, NA.

<sup>173</sup> A correspondent to *Scientific American* had argued in 1852 that the government should manufacture fusible alloy plugs to uniform standards and the steamboat inspectors should supervise their installation on steamers. "Prevention of Explosions in Steam Boilers," *SA* 7/50 (Aug. 28, 1852): 395.

<sup>174</sup> James Guthrie, Secretary of the Treasury, to James C. Booth, U.S. Mint, February 7, 1854 and May 10, 1854, Miscellaneous Correspondence Received by the Secretary of the Treasury, 1852-1862 (Bound Volume), Bureau of Marine Inspection and Navigation; Steamboat Inspection Service; RG 41, NA. Booth was appointed to the Philadelphia Mint in 1849 by President Taylor to deal with the complex task of purifying the gold ore being mined in California. Edgar F. Smith, "James C. Booth, Chemist, 1810-1888," *Journal of Chemical Education* 20 (1943): 317.

<sup>175</sup> James C. Booth, U.S. Mint, to James Guthrie, Secretary of the Treasury, Philadelphia, July 14, 1855, Miscellaneous Correspondence Received by the Secretary of the Treasury, 1852-1862 (Bound Volume), Bureau of Marine Inspection and Navigation, Steamboat Inspection Service, RG 41, NA.

interpretation mandated the use of the alloys in a way that he had already patented with his Safety Guard. This would have meant that regulations required his Safety Guard be installed on all steam vessels subject to the 1852 Steamboat Act.<sup>176</sup>

Treasury Secretary James Guthrie denied that the Supervising Inspectors had the power to prescribe the manner of applying the fusible alloys and insisted that they did not have the authority to dictate that steamboat owners use Evans' patented article.<sup>177</sup> While it is clear that *Evans* wanted to construe the Board's instructions as a requirement for vessel owners to install his device or pay him a fee for use of a patented article, it is not clear that this was the Board's intent, since they probably knew (as should have Evans) that the idea of using fusible metals had been described and used before Evans patented his first safety guard and that the law seemed to require a generic application of materials based on physical principles, rather than a particular patented device. Secretary Guthrie wrote to Attorney General Caleb Cushing in 1855 for his opinion as to whether the inspectors could mandate that fusible alloys be applied without infringing on Evans' patent. Cushing replied that Evans was making a common and overbroad claim of patent rights and that he only had the right to "one particular and specific variety" of the many forms of fusible alloy receptacles, not to every possible version.<sup>178</sup>

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<sup>176</sup> James M. Guthrie, Secretary of the Treasury, to Hannibal Hamlin, Chairman of the Senate Commerce Committee, May 27, 1854, Committee on Commerce, Petitions and Memorials Referred to Committees, Various Subjects, March 20, 1854 – July 11, 1854, (Sen33A-H3.4), 33<sup>rd</sup> Cong., Records of the House of Representatives, RG 233, NA.

<sup>177</sup> James M. Guthrie, Secretary of the Treasury, to Hannibal Hamlin, Chairman of the Senate Commerce Committee, May 27, 1854, Committee on Commerce, Petitions and Memorials Referred to Committees, Various Subjects, March 20, 1854 – July 11, 1854, (Sen33A-H3.4), 33<sup>rd</sup> Cong., Records of the House of Representatives, RG 233, NA.

<sup>178</sup> Caleb Cushing to Hon James Guthrie, Sec'y of the Treasury, May 1, 1855, C. C. Andrews, ed., *Official Opinions of the Attorneys General of the United States, Advising the President and Heads of Departments, in Relation to their Official Duties v. 7, Containing the Opinions of Hon. Caleb Cushing of Massachusetts, From October 9, 1854, to July 9, 1856* (Washington, DC: W. H. and O. H. Morrison, 1871), 134.

In the meantime, Evans' allies and supporters, engine builders and manufacturers in Pittsburgh, steamboat officers and engineers at Cincinnati, as well as the government steamboat inspectors serving in Pittsburgh and Cincinnati, petitioned Congress in 1854, asking the government to purchase his patent.<sup>179</sup> Secretary of the Treasury Guthrie recommended against the purchase. He thought that although there were plausible reasons to acquire the patent, obtaining it would bring temporary advantages that were far from guaranteed, as well as establishing a precedent that would create an "appetite for government patronage" that would have negative consequences. Guthrie also noted that "if this patent is purchased, I see no reason why Congress should not especially favor other great interests."<sup>180</sup>

Evans proposed another way that he could earn money from the government. He had examined the alloys that the U.S. had produced in the navy yards and found them to be of poor quality.<sup>181</sup> Citing his years of experience making the alloys, he offered to manufacture them for the government in return for compensation. Alternatively, he proposed that he be hired for

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<sup>179</sup> Petition of the Steamboat Inspectors, Engine Builders and other citizens of Pittsburgh, Pa., 101 in number – stating the public importance of Evans' Safety Guards for preventing explosions, and asking Congress to pass a law for the purchase of the Patent, etc., March 1854 (Referred April 19, 1854), Committee on Commerce, Various Subjects, March 20, 1854 – July 11, 1854; Petition dated at Cincinnati, of 42 Steamboat Captains and practical Engineers, Navigating the Ohio River, etc., asserting the great value & importance of Evans's Safety Guards for preventing explosions of boilers, and asking Congress to pass a law opening the same to public use by purchase of the Patent or Otherwise; March 1854, Committee on Commerce, Evans's Safety Guard; Petition of the Steamboat Inspectors of Cincinnati, and 38 licensed & practical engineers stating the public importance of Evans' Safety Guards, for preventing explosions & praying that the invention may be thrown open to the public, by purchase or otherwise, March 28, 1854; Petitions and Memorials Referred to Committees (HR33A-G4.8), 33<sup>rd</sup> Congress, Records of the House of Representatives, RG 233, NA.

<sup>180</sup> James Guthrie, Secretary of the Treasury, to Hannibal Hamlin, U.S. Senator, Washington, May 27, 1854, Letters Sent by the Secretary of the Treasury, 1852-1862; Bureau of Marine Inspection and Navigation; Steamboat Inspection Service, RG 41, NA.

<sup>181</sup> Evans claimed in 1854 that the government-produced alloys did not, even in the most favorable circumstances, melt at their designated temperatures. Evans also noted that if the government did not require the alloys to be applied so that they were protected from pressure it would, in effect, quickly render them ineffectual as their metallic components were forced apart. This often happened to the alloys that were simply inserted into the boilers as fusible "plugs." Cadwallader Evans, "A Statement of Experiments upon the Temperature of Steam, the Operations of the Common Safety Valve, and upon Government Alloys: with a Description of a Newly Invented Safety Valve, Etc." (Pittsburgh, PA: Keenan & Hopkins, 1854), 12-21.

\$10,000 to instruct government employees in making the alloys.<sup>182</sup> Congress did not grant either of these requests.

Steamboat captains and engineers who were hostile to the Steamboat Act's requirement of fusible metal devices persistently resisted Evans's Safety Guard. Many were skeptical about the alloys in general and Evans' Guard in particular. There had always been technical concerns about fusible alloy devices.<sup>183</sup> Experience had shown, steamboat captains later wrote, "that the fusible alloys change their nature and grow harder and harder every time they are melted, and are liable to lead engineers astray if they place dependence on this kind of safety guard."<sup>184</sup>

Questions about the efficacy of these mechanisms were great enough that the Senate Commerce Committee reported a bill in 1854 to amend the Steamboat Act which suspended the fusible metal requirement.<sup>185</sup>

Captains also balked at the cost. They protested that the requirement could only be met by installing Evans's patented device, that it failed to prevent boiler explosions and that the price, twenty-eight dollars for each boiler, was outrageously expensive for something they thought could be "profitably manufactured and put in for four dollars and fifty cents a boiler."

The instances where boilers equipped with the original Safety Guard had burst tended to

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<sup>182</sup> Cadwallader Evans, "A Statement of Experiments upon the Temperature of Steam, 23.

<sup>183</sup> The main problems were first, that they were designed to react to heat, rather than pressure, and needed to be coupled with a safety valve to be most effective; second, that it was difficult to create alloys that would melt at precisely the desired temperature and third, that the effects of melting and cooling tended to separate out the different elements so that they lost their properties after multiple uses. One congressional inquiry in 1845 concluded that many people on the western waters justifiably doubted that such mechanisms were reliable. Appendix B: H. Rept. 123, 28<sup>th</sup> Cong., 2<sup>nd</sup> sess., 3.

<sup>184</sup> Memorial of 55 Steamboat Captains & Engineers asking for change in law for safety of passengers on Steamboats, referred March 13, 1860, Petitions and Memorials referred to Committees on Various Subjects, March 1, 1860 – April 1, 1860, Committee on Commerce (HR36A-G3.6), Records of the House of Representatives, 36<sup>th</sup> Congress, RG 233, NA. The Captains also asked Congress to end the requirement to install water gauges on boilers because they did not function well and holes had to be cut into the boilers to insert them, which weakened the metal.

<sup>185</sup> CG, 33<sup>rd</sup> Cong., 1<sup>st</sup> sess., June 21, 1854, 1461.

discredit it in the eyes of steamboat operators, and they wrote that the Guard was “altogether useless” because steamboats had exploded even with the Guard installed.<sup>186</sup>

Cadwallader Evans himself was dead by late 1856, but his widow, Jane B. Evans, struggled to make profits from his invention. The Evans’s had overseen the manufacture of thousands of Safety Guards, which they intended to sell at twenty-five dollars each. However, it was not clear that they readily available. One of the supervising inspectors noted in 1856 that, though the Guards were the best device to fulfill the Steamboat Act’s requirements for fusible metal apparatus, there were large portions of the country where they could not be obtained to fulfill the demand. Unauthorized people were also manufacturing versions of the Guard, which Jane Evans claimed were of inferior quality and violated the patent.<sup>187</sup>

Even with these problems, some people in the Pittsburgh steamboat and manufacturing communities continued to champion the Safety Guard into the 1860s. They petitioned Congress to purchase the device and warned against modifying and weakening the requirement for fusible alloy devices.<sup>188</sup> Evans’s renewed patent was due to expire in 1860, and Jane Evans applied to

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<sup>186</sup> Remonstrance of 39 Steam Boat Officers to renewal of Safety Guard Patent, referred March 13, 1860 and July 8, 1862, Petitions and Memorials received by Committees, Evans’s Safety Guard, Committee on Patents (HR 37A-G10.1), Records of the House of Representatives, RG 233, NA.

<sup>187</sup> Memorial of Jane B. Evans, Widow & Executrix of Cadwallader Evans of Pittsburgh, Pennsylvania remonstrating against the 9<sup>th</sup> Section of the Amendment to House Bill No. 92, Referred Dec. 22, 1856, Committee on Commerce, Petitions and Memorials Referred to Committees, Steamship Safety Devices, Dec. 22, 1856 – Jan. 7, 1857 (HR34A-G3.11), 34<sup>th</sup> Congress, Records of the U.S. House of Representatives, RG 233, NA. One of the supervising inspectors suggested to Jane Evans that she should throw the manufacture of the Guards “open to competition,” by which he meant to allow others to manufacture the device using Evans’s plan in return for a royalty on each device sold. Mrs. Evans declined, believing that there would be some difficulty in securing the proceeds under such an arrangement, and that she was fully capable of manufacturing enough Guards in Pittsburgh and supplying them to fulfill demand.

<sup>188</sup> Remonstrances against the ninth section of the bill for the better security of the lives of passengers on board of vessels propelled by steam and praying the government to purchase and make free Evans’s Safety Guard, Referred Jan. 7, 1857, Committee on Commerce, Petitions and Memorials Referred to Committees, Steamship Safety Devices, Dec. 22, 1856 – Jan. 7, 1857 (HR34A-G3.11), 34<sup>th</sup> Congress, Records of the House of Representatives, RG 233, NA. Also see Three memorials of Citizens of the United States engaged in navigating the Ohio and Mississippi rivers and in the construction of steam vessels, praying that Congress will make an appropriation to purchase the right to use Evans’s Safety Guard for the prevention of explosions of steam boilers, Referred Jan 31, 1857, Committee on Commerce, Petitions and Memorials Referred to Committees, (Sen34A-H3.2),

renew it for a second time.<sup>189</sup> In response, Congress introduced several bills to award Evans another patent extension. The Senate Committee on Patents reported favorably, and the Senate passed a measure in 1862. However, it ran into substantial opposition on the House floor, and the House rejected the measure despite a favorable recommendation by the House Committee on Patents.<sup>190</sup> Jane Evans, “the poor lone woman,” as one congressman referred to her, was unable to persuade Congress to grant another extension for her husband’s patent.<sup>191</sup>

## 5. *Joseph Francis*

Inventors of engine mechanisms were the most persistent applicants for steam safety subsidies, but the inventor who probably benefited the most from the 1852 Steamboat Act was

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34<sup>th</sup> Congress, Records of the Senate, RG 46, NA.

<sup>189</sup> Jane Evans noted that the Safety Guard met the conditions that had been set for renewing patents: it was an original invention and a valuable and useful one that had not proven profitable during the time of its patent, despite substantial efforts to promote and sell it. She wrote that her husband, though an excellent inventor, had not been a good businessman, and had earned only \$3,727.43 from the Guard during the 21 years it was protected under the patent laws. This came out to less than \$180 a year in profit for an invention which, she asserted, had conveyed immense benefits to the community. Memorial of Jane B. Evans, Widow, Executrix, etc. of Cadwallader Evans, dec’d, praying for the renewal of a patent granted her late husband, Referred Feb. 21, 1860, Committee on Patents, Petitions and memorials referred to Committees, Feb. 2, 1860 - March 2, 1860, (Sen36A-H11), 36<sup>th</sup> Congress, Records of the Senate, RG 46, NA.

<sup>190</sup> See H.R. 471, *A Bill for the relief of Jane B. Evans*, March 23, 1860, 36<sup>th</sup> Cong., 1<sup>st</sup> sess. and *Report of the Committee on Patents [To accompany bill S. No. 346]*, 37<sup>th</sup> Cong., 2<sup>nd</sup> sess., June 10, 1862, S. Rept. 54, as well as S. 346, *A Bill for the Relief of Jane B. Evans*, June 10, 1862, 37<sup>th</sup> Cong., 2<sup>nd</sup> sess. The House decisively rejected renewing Evans’s patent by a vote of 77 to 36, *HJ*, 37<sup>th</sup> Cong., 3<sup>rd</sup> sess., Feb. 21, 1863, 452-53.

<sup>191</sup> In the debate on the House floor, Maine Republican John Hovey Rice advocated for the bill on behalf of the Patents Committee and was supported by Pennsylvania Democrat Charles John Biddle. The opponents of the measure included one Pittsburgh-area congressmen, Republican Robert McKnight, and the powerful Chairman of the House Commerce Committee, Republican Elihu Washburne of Illinois. In favor of the bill, Rice was able to cite extensive written testimony on the scientific and technical merits of the Safety Guard. McKnight and Washburne, by contrast, inveighed against the device as a “patent humbug” and asserted that there was universal sentiment on the rivers that the device was useless and too expensive. Washburne at one point charged that Mrs. Evans had already made “\$1,000,000 by [the] patent!” and had no adequate cause to justify another renewal. Rice and Biddle alleged that the steamboat interest, which they claimed Washburne and McKnight represented, had united against the bill because it desired to damage and discredit the Safety Guard, both to save money on safety equipment and because they preferred the least possible oversight so they could run their vessels in a reckless fashion. In the debate, Rice had better evidence, at least as to the technical merits of the Safety Guard, but Washburne carried the day when the House rejected the bill. *CG*, Feb. 21, 1863, 37<sup>th</sup> Cong., 3<sup>rd</sup> sess., 1170-73. The quotation from Washburne is on 1172. The quotation about Jane Evans is by Representative Biddle and can be found on 1173.



Joseph Francis of New York who invented and manufactured a metallic lifeboat and saw the demand for his product increase after Congress passed the law.

Francis was born in Massachusetts, but became well known as an innovative boat builder while working at the Novelty Iron Works in New York City.<sup>192</sup> He invented a metal lifeboat in 1816 and made improvements to it in 1837. Francis had a good reputation in maritime circles and later founded his own company.<sup>193</sup> His boats were constructed with airtight cylinders and were difficult to capsize and easy to right.<sup>194</sup> The American Institute awarded Francis a gold medal in 1839 in recognition of the quality of his design, and his boats were carried aboard vessels of the Revenue Marine, the Navy, and Army.<sup>195</sup> By the time Congress considered the 1852 steamboat bill, Francis had also received a contract to construct the surfboats for the early national lifesaving service.<sup>196</sup>

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<sup>192</sup> Robert G. Albion, *The Rise of New York Port: 1815-1860* (1939; reprint, New York, NY: Charles Scribner's Sons, 1970), 298. Located in an industrial section along the East River, Novelty was the largest of the ironworks among New York's growing factories. Edwin G. Burrows and Mike Wallace, *Gotham: A History of New York City to 1898* (New York, NY: Oxford University Press, 1999), 659.

<sup>193</sup> *Francis's Metallic Life Boat Company*, (NY: William C. Bryant & Co. Printers, 1852). Google Books: [http://books.google.com/books?id=k2wDAAAAYAAJ&printsec=titlepage&source=gbs\\_v2\\_summary\\_r&cad=0](http://books.google.com/books?id=k2wDAAAAYAAJ&printsec=titlepage&source=gbs_v2_summary_r&cad=0) [Accessed June 1, 2009].

<sup>194</sup> Joseph Francis of New York, NY, "Life and Other Boats," Patent No. 2018, March 26, 1841.

<sup>195</sup> Francis claimed that his iron-hulled boats were sturdier than wooden craft, while being as roomy, light and "as easy to manage" as wooden lifeboats. Communication from Joseph Francis of New York: Francis' Life Boats and copy of Report of the American Institute on Francis Life Boats, Oct. 15, 1839, Commerce Committee, Reports and Papers, Jan. 29, 1840 – March 2, 1840 (Sen26A-D2), 26<sup>th</sup> Congress, Records of the Senate, RG 46, NA. Commanders of the mail steamships *Baltic* and *Cherokee* enthusiastically recommended Francis's boats, characterizing them as "the most effective boats now in use ...." The Senate committee working on steam vessel safety legislation in 1840 endorsed the craft, though they did not try to require that steam vessels use them. H. Windle (?) Commander, Mail Steamship *Cherokee*, Aug. 12, 1850 and Joseph J. Comstock, U.S. Mail Steamer *Baltic* to Senator John Davis, August 26, 1850, Commerce Committee, Papers on Various Subjects (Sen31A-E2) 31<sup>st</sup> Congress, Records of the Senate, RG 46, NA. For the committee recommendation and supporting documents, see *Report [To accompany bill S. 247] by Mr. Ruggles for the Committee on Commerce*, 26<sup>th</sup> Cong., 1<sup>st</sup> sess., March 2, 1840, S. Rept. 241, 11 and 26-30 (Appendix B).

<sup>196</sup> The boats were to be used on the New Jersey and Long Island shores by volunteer rescuers. Clayton Evans, *Rescue at Sea: An International History of Lifesaving, Coastal Rescue Craft and Organizations* (Annapolis, MD: U.S. Naval Institute Press, 2003), 107-8.

In authoring the 1852 Steamboat bill (S. 223), Senator John Davis wanted steamers to carry at least one lifeboat made of metal because they were durable and resistant to fire.<sup>197</sup> There was some sentiment that vessels running on the interior waters did not need lifeboats at all, since they were usually close to at least one bank of the river. Davis thought this was misguided--that, in fact, substantial numbers of lives had been lost on steamers because, in emergencies, they lacked the means of transporting people short distances to the shore. Senator Hannibal Hamlin of Maine, the Chairman of the Commerce Committee, supported Davis, arguing that as many as half of the lives that had been lost in vessel fires had occurred because they were not equipped with “fire-proof boats.”<sup>198</sup>

Davis thought that Francis’ boat was the best small craft available, far superior to wooden boats.<sup>199</sup> Former Senator John A. Dix of New York, a past chairman of the Commerce Committee, owned several of the craft. Dix wrote that their galvanized iron did not rust and that “you can neither burn nor sink them.”<sup>200</sup> Hannibal Hamlin later recalled that when they were first drafting the 1852 bill, the members of the committee had provided that steamers must be equipped with Francis’s lifeboat, but witnesses had testified to the committee that there were other metallic lifeboats available, and the senators had removed the requirement.<sup>201</sup>

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<sup>197</sup> *CG*, 32<sup>nd</sup> Cong., 1<sup>st</sup> sess., July 12, 1852, 1738.

<sup>198</sup> *CG*, *Ibid.*, 1739.

<sup>199</sup> *Scientific American* recommended Francis’s boats as “the best life-boats extant.” “Francis’ Life-Boat,” *SA* 7/24 (Feb. 28, 1852): 186.

<sup>200</sup> John A. Dix to Hannibal Hamlin, July 25, 1850, Hamlin Family Papers, Special Collections, Raymond H. Fogler Library, The University of Maine at Orono. Dix wrote that he had owned four of Francis’s boats including two currently, a large schooner-rigged one and a small rowboat. Dix also noted that the expedition that explored the Dead Sea had taken Francis’s boats with them. He asked Hamlin to show his letter to John Davis and other members of the Commerce Committee as they considered the issue of safety at sea. Two years later, Dix invited Hamlin to take a sail in one of Francis’s boats he had rigged as a schooner, Dix to Hamlin, July 12, 1852, *Ibid.*

<sup>201</sup> *CG*, 32<sup>nd</sup> Cong., 2<sup>nd</sup> sess., Feb. 22, 1853, 765.

The 1852 legislation required that steam vessels carry a metallic lifeboat and life preservers, but left it up to the judgment of the owners which equipment to purchase and to the inspectors to determine if it was of acceptable quality. Davis stated that Joseph Francis had assured him that his patent was not for a generic metallic lifeboat, but for making one out of corrugated iron in a unique manner, and Davis told the Senate that if he thought the language of the measure mandated a patented article that he would “abandon it at once.”<sup>202</sup> Opponents of the measure, however, were not satisfied. Senator John P. Hale of New Hampshire charged that the bill favored Francis’s lifeboat by description, if not by name, and tried to have the provision for a metallic lifeboat removed.<sup>203</sup> Davis eventually agreed to a proviso that stated that the act did not require the purchase of any patented lifeboat, though the House removed this provision and it did not make it into the law.<sup>204</sup>

According to some senators, Francis was getting a considerable amount of business as a result of the lifeboat requirement and could not build the boats fast enough to keep up with the demand. When the act was passed in August 1852, owners of over a thousand steam vessels needed to acquire the boats within five months. Francis’ enterprise was based in New York, and

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<sup>202</sup> *CG*, 32<sup>nd</sup> Cong., 1<sup>st</sup> sess., July 9, 1852, 1704.

<sup>203</sup> Senator Hale pointed out that requiring lifeboats on many small vessels would be cumbersome and inconvenient. *CG*, 32<sup>nd</sup> Cong., 1<sup>st</sup> sess., Jul. 12, 1852, 1739. Davis responded that the inspectors could exempt tow boats and ferry boats from the requirement, as well as from smaller vessels and those traveling on interior waters, which were only required to carry one lifeboat, not multiple ones.

<sup>204</sup> Senator Hale, however, continued to oppose the bill even after this proviso. Since Francis’ metallic lifeboat was the only metal craft that was readily available, even though the law would not mandate its use, the legislation specified the standard dimensions of Francis’ craft, twenty-five feet long and six feet, six inches wide, as the minimum size of a lifeboat required by the law. In effect, as Hale pointed out, they were legislating in its favor. Davis replied that he had obtained the dimensions of an appropriate lifeboat, not from Joseph Francis, but from a naval officer whom he had consulted on the subject. *CG*, 32<sup>nd</sup> Cong., 1<sup>st</sup> sess., Jul. 12, 1852, 1740-41. The bill’s supporters later appeared to acknowledge that there was some validity to Hale’s argument. Hamlin noted in 1853 that Francis’ boat was “superior” and the “one in common use” and Senator William H. Seward of New York added that “there is no adequate and sufficient metallic life-boat, except Francis’s life-boat” and that Francis was “the only manufacturer of them in the United States.” *CG*, 32<sup>nd</sup> Cong., 2<sup>nd</sup> sess., Feb. 22, 1853, 764. Thomas Rusk of Texas, said that he had seen other manufacturers advertising their own metallic lifeboats and thought that Francis was not the only builder of such craft.

western owners complained that they had to come east in order to acquire the boats or have them shipped. Francis was also setting up a manufacturing facility in Louisville, Kentucky that would service the needs of westerners.<sup>205</sup> Vessel owners petitioned Congress, stating that they could not acquire metallic lifeboats quickly enough to comply with the law and asked for an extension.<sup>206</sup> In response, Congress passed joint resolutions (SJR 67 and SJR 79) which allowed the inspectors to grant additional time to comply with the requirements and waive the mandates for metallic lifeboats if the owners were unable to acquire them.<sup>207</sup> Still, the metallic lifeboat provision appears to have provided Francis with an excellent business opportunity to sell his products.

## ***6. Congress, Inventors and the Mechanical Option***

Under certain circumstances, members of Congress and the Executive considered awarding cash subsidies to inventors. As the stories of Tippet, Raub, Evans and Francis suggest, these conditions included a widespread belief that particular mechanisms would address a public need; the perception that the technology represented an advance over current practice; the fact that the inventor had a good reputation and endorsements from people of scientific and technical background; the fact that members of the public and interest groups offered their support; that credible witnesses saw the invention in operation; and the fact that, within Congress, there were legislators who were willing to advocate on behalf of the inventor and his machine.

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<sup>205</sup> *CG*, 32<sup>nd</sup> Cong., 2<sup>nd</sup> sess., Feb. 22, 1853, 761.

<sup>206</sup> See, for example, *SJ*, 32<sup>nd</sup> Cong., 2<sup>nd</sup> sess., Dec. 14, 1852, 35.

<sup>207</sup> Appendix A: SJR 67 and SJR 79, 32<sup>nd</sup> Cong., 2<sup>nd</sup> sess.; *SJ*, 32<sup>nd</sup> Cong., 2<sup>nd</sup> sess., Dec. 29, 1852, 60 & Jan. 5, 1853, 74; *CG*, 32<sup>nd</sup> Cong., 2<sup>nd</sup> sess., Dec. 29, 1852, 165 & Jan. 5, 1853, 226, 229-30; *HJ*, 32<sup>nd</sup> Cong., 2<sup>nd</sup> sess., Jan. 5, 1853, 104. 10 *Stat L.* 262. See also *CG*, 32<sup>nd</sup> Cong., 2<sup>nd</sup> sess., Feb. 22, 1853, 765 & March 3, 1853, 1158.

For members of Congress the Mechanical Option, the process of subsidizing and mandating safety equipment, was a balancing act where they had to manage multiple inclinations. Influenced by concern about disasters, ideological predilections, expert testimony, pressures from constituents, regional concerns and enthusiasm for various devices, they wanted to promote safety through technological advances, but resisted favoring particular inventors and their patented articles.

As discussed in Chapter Three, the government was more inclined to test inventions than it was to subsidize them with cash awards or by requiring people to use them. Senator John Davis of Massachusetts was cautious about supporting subsidies because he had observed highly touted inventions which, after investigation, were shown to be “of so equivocal and doubtful a character” that any money that the government allocated would have been wasted. He also believed that in most cases businessmen could themselves determine which inventions had “utility” and then bring them into “general use.”<sup>208</sup> However, he thought that the government should supply facilities and experts to test mechanisms that had been endorsed by reputable mechanics or scientific men.<sup>209</sup> It should avoid awarding monopoly rights that would unduly favor any inventor or business, but remain open to purchasing devices for government use where appropriate.<sup>210</sup>

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<sup>208</sup> *CG*, 25<sup>th</sup> Cong., 2<sup>nd</sup> sess., Feb. 23, 1838, 198. Davis’s senate colleague, Democrat John A. Dix of New York, also thought that it was better to leave it to private enterprise to introduce and oversee inventions. See Appendix B, S. Rpt. 135, 30<sup>th</sup> Cong., 1<sup>st</sup> sess., 1.

<sup>209</sup> Edward D. Tippet believed that the government should only grant appropriations to test or subsidize inventions when the mechanisms were based on a sound understanding of science. Memorial of Edward D. Tippet upon the subject of his Balloon asking to be presented with former papers presented to the Committee on Patents at last session to be in connection for consideration this Session, April 21, 1856, Committee on Patents and the Patent Office, Petitions and Memorials, April 15-May 2, 1856 (Sen34A-H14); 34<sup>th</sup> Congress; Records of the Senate, RG 46, NA. There was more than a little irony in Tippet’s views, since his own inventions were based on incomplete or incorrect notions of physical principles.

<sup>210</sup> Appendix B: S. Rpt. 159, 24<sup>th</sup> Cong., 2<sup>nd</sup> sess., 1. Though *Scientific American* often advocated energetically on behalf of inventors, the editor also feared “despotic and unjust grants of monopoly ...” and urged his readers to mobilize and petition against extending a particular patent, William Woodworth’s lathe. “Extension

*Scientific American* endorsed government efforts to “make prudent and unextravagant appropriations to test reasonable and plausible inventions ... that would prove beneficial to the country,” while also urging caution to make sure that “unworthy” inventions did not receive grants based on clever marketing campaigns or the assertion of inappropriate influence. The editor went on to note:

We sympathize with an inventor of moderate means who has an apparently good and useful invention, but which requires an amount of capital far beyond his ability to test it fairly; in such a case we commend the inventor who has faith in his project, in soliciting Congress to test it fairly, and demonstrate its usefulness to benefit man. But we are opposed to Congress voting money either to purchase an untried patent, or testing the merits of any new invention when the owners of the one or the author of the other has capital at his command, and abundant ability to introduce it into public use.<sup>211</sup>

Phrased this way, the editor left open the possibility that it could be appropriate for Congress to buy a *proven* patent that was “a good and useful invention.”

In general, Whigs were more likely than Democrats to support subsidies for technology, though enough Democrats supported this form of aid to suggest that partisanship was not the primary determinant.<sup>212</sup> Samuel Colt’s subsidy in 1842, for example, was combined with a

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of the Woodworth Patent,” *SA* 7/20 (Jan. 31, 1852): 157. Hindle and Lubar, *Engines of Change*, 92. For more on the extension of Woodworth’s patent see Cooper, “A Patent Transformation,” 312-16.

<sup>211</sup> “Money Paid by Government for Inventions,” *SA* 8/28 (March 26, 1853): 221.

<sup>212</sup> Samuel Morse and Samuel Colt received their subsidies from the 27<sup>th</sup> Congress, which had Whig majorities in both houses. In the House of Representatives, more Whigs than Democrats supported Morse’s subsidy. Israel, *From Machine Shop to Industrial Laboratory*, 39. National pride, specifically the desire not to be outdone by British scientific advances and enterprise, was one motivation of supporters of Morse’s telegraph. *Report of the Committee on Commerce on Electro-Magnetic Telegraphs, to accompany bill H.R. No. 641, 27<sup>th</sup> Cong., 3<sup>rd</sup> sess.*, Dec. 30, 1842, H. Rept. 17, 1. Democrats F.O.J. Smith of Maine and New Yorker Charles Ferris, as well as Whig William Boardman of Connecticut, advocated on behalf of Morse in the House of Representatives. Kenneth Silverman, *Lightning Man: The Accursed Life of Samuel F. B. Morse* (New York: Alfred A. Knopf, 2003), 217-18. While presumably Smith saw some value for the country in Morse’s telegraph, he also had a financial interest in Morse’s success. Ferris and Boardman were excited about the invention and believed it represented a worthwhile advance, which the government ought to encourage. The 30<sup>th</sup> Congress, which had a Whig majority in the House, also voted in favor of a subsidy for Charles Grafton Page’s experimental railway engine. Missouri Democratic Senator Thomas Hart Benton served as Page’s foremost champion in the Capitol. Benton thought that Page’s machine would contribute to western development, as the mining industry would benefit from an increased demand for the zinc in Page’s batteries. Post, “The Page Locomotive,” 147, 151-52. The appropriations for Morse and Page were approved by Whig presidents John Tyler and Zachary Taylor. Even a political and fiscal conservative like

measure to test steam safety devices and supported by seventy-four percent of Whigs and fifty-eight percent of Democrats in the House, while the Senate passed the measure without a roll call vote.<sup>213</sup>

Because there was little recorded debate and no roll call votes on subsidizing steam safety devices, there is limited information from which to draw conclusions, but it *is* clear that members from both major parties introduced and endorsed appropriations for these mechanisms.<sup>214</sup>

Democratic Senator John Tipton of Indiana remarked that “Congress could do nothing better than to patronize an invention which scientific and practical men had recommended.”<sup>215</sup> By favoring the purchase of safety inventions, western Democrats like Tipton may have reflected the concerns of their constituents, since steam vessel accidents were more common on the western rivers and lakes than elsewhere.<sup>216</sup> In addition to regional concerns, local boosterism played a role. The congressman from inventor Samuel Raub’s district in Pennsylvania chaired the committee that introduced two of the bills to subsidize Raub’s safety valve, while congressmen from Cadwallader Evans’ district spoke in favor of his Safety Guard. In the cases of both Raub and Evans, groups of local citizens wrote to Congress to support their fellow Pennsylvanians.<sup>217</sup>

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Tyler could advocate for government intervention to foster technical advances when he thought it would address issues of national defense and when national pride was at stake. Tyler observed in a message to Congress in 1841 that the United States ought not to be left behind other nations that were developing modern steam navies and that the U.S. could keep up if “our fellow-citizens receive proper encouragement and direction from Government.” *SJ*, 27<sup>th</sup> Cong., 1<sup>st</sup> sess., June 1, 1841, 14.

<sup>213</sup> Appendix C: H.J.R. 19, 27<sup>th</sup> Cong., 1<sup>st</sup> sess.

<sup>214</sup> See Appendix A. Democrats David Petrikin of Pennsylvania and George W. Owens of Georgia sponsored H.R. 365, 25<sup>th</sup> Cong., 2<sup>nd</sup> sess. Petrikin and Whig Joseph Rogers Underwood of Kentucky sponsored H.R. 484, 26<sup>th</sup> Cong., 1<sup>st</sup> sess., while Democrat Richard Franklin Simpson of South Carolina sponsored H.R. 594, 28<sup>th</sup> Cong., 2<sup>nd</sup> sess.

<sup>215</sup> *CG*, 25<sup>th</sup> Cong., 2<sup>nd</sup> sess., Feb. 23, 1838, 198.

<sup>216</sup> Western Democrats like Tipton were also more inclined to support a greater degree of government intervention than their southern co-partisans and evolved a history of splitting with their party by supporting federal financing for internal improvements in the west. Joel H. Silbey, *The Shrine of Party: Congressional Voting Behavior, 1841-1852* (Pittsburgh, PA: University of Pittsburgh Press, 1967), 56-57, 69, 83-84.

<sup>217</sup> See Appendix A. Representative David Petrikin of Pennsylvania championed a subsidy for Samuel Raub,

Inventors touted their inventions. A committee of the Wheeling, Virginia Board of Trade noted:

Scarcely a year has passed without some invention, deemed by the inventor and his friends the great desideratum, being presented to the public; and we now find upwards of four hundred different models have been placed in the Patent Office designed for that purpose, many of which have been more or less used, and others have died on the hands of the inventors, because deemed unworthy of a trial by those who had charge of steam navigation.<sup>218</sup>

The possibility of receiving government support, along with the prospect of alleviating the dangers to life and property, served as a stimulus for inventors.<sup>219</sup> Considering the number of inventors in the United States, it is likely that many of them would have dedicated time and effort to work on safety apparatus even without the prospect of a subsidy.<sup>220</sup> However, since many inventors asked the government for aid, it is also logical to conclude that the prospect of federal rewards gave them an additional incentive to experiment in this area and drew inventive talent to work on the problems of steam safety.

Inventors submitted a broad range of plans to improve steamboat safety, many to prevent boiler explosions. Some mechanisms, like Edward D. Tippet's safety steam engine, were primitive or poorly designed.<sup>221</sup> Tippet did not have the inventive ability, lobbying skill or

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Jr. in 1839 (H.R. 365, 25<sup>th</sup> Cong., 2<sup>nd</sup> sess.) and 1840 (H.R. 484, 26<sup>th</sup> Cong., 1<sup>st</sup> sess.). See also Appendix B documents relating to Raub: S. Doc. 582, 26<sup>th</sup> Cong., 1<sup>st</sup> sess., S. Doc. 597, 26<sup>th</sup> Cong., 1<sup>st</sup> sess., S. Doc. 188, 26<sup>th</sup> Cong., 2<sup>nd</sup> sess.

<sup>218</sup> "Report of the Committee of the Board of Trade of the City of Wheeling, Appointed to Inquire into the cause of Steamboat Disasters and Explosions ... Appointed by the Board, January 4, 1848" in Appendix B: S. Doc. 4, 31<sup>st</sup> Cong., Special sess.

<sup>219</sup> Report of the Commissioner of Patents showing the operations of the Patent Office during the year 1843, 28<sup>th</sup> Cong., 1<sup>st</sup> sess., 1844, S. Doc. 150, 276.

<sup>220</sup> Later in the nineteenth century, "numerous skilled mechanics and other creative technicians ... inevitably clustered around the industry," to devise technical innovations for the railroad industry. Steven W. Usselman, *Regulating Railroad Innovation: Business, Technology, and Politics in America, 1840-1920* (New York: Cambridge University Press, 2002), 99.

<sup>221</sup> "Spheroidal State of Water," *SA* 5/34 (May 11, 1850): 272.



public support to receive serious consideration from Congress.<sup>222</sup> However, his financial needs and his belief in his plans led him to continue asking for aid even after numerous rejections.

Samuel Raub, on the other hand, came close to earning a subsidy. Raub's adept lobbying campaign, combined with favorable testimony and advocacy within Congress helped convince several representatives to introduce legislation in his favor. Raub's Safety Valve had some clever features, but he believed that by focusing on one factor that contributed to explosions, the problem of low water in boilers, he was solving all of them. Still, Raub's best chance for a subsidy was spoiled, not by the technical limitations of his device, but by the vagaries of the legislative process which left his bills unaddressed as Congress adjourned in 1840. Among inventors, persistence was a virtue, but not a guarantee of success. They had to wait while committees reported, bills were introduced or Congress acted upon them.<sup>223</sup>

Cadwallader Evans was in a position to profit from a competitive advantage he derived from the 1852 Steamboat Act but proved himself a better inventor than a businessman. Evans' Safety Guard showed remarkable ingenuity and was based on sound physical principles, but it was not infallible. His quest for government support led him to abandon one form of it to pursue an earlier version with features that made it less reliable with extended use. Some steamboat owners and operators were also prejudiced against the Guard, in part because of its high cost. Evans could not counter the fact that many potential customers mistrusted his mechanism or the fact that the government offered alternative means to fulfill the requirements of the legislation.

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<sup>222</sup> Historian Joel Mokyr has noted that some resistance to technological change was both inevitable and appropriate, since it would be both inefficient and tremendously expensive to try and implement every "hare-brained technological idea." Joel Mokyr, "Technological Inertia in Economic History," *Journal of Economic History* 52/2 (June 1992): 328. Some inventions, like Tippet's, deserved to fail.

<sup>223</sup> Samuel Morse labored for four years to get a subsidy and was nearly destitute before Congress granted it in 1843. Carleton Mabee, *The American Leonardo: A Life of Samuel F. B. Morse* (1943; reprint New York, NY: Octagon Books, 1969), chapter 20.

Inventors, the public and representatives of the government were all liable to the seductive promise that one perfect invention could prevent boiler explosions in all cases. Perhaps, as Alexis de Tocqueville observed, Americans were naturally inclined to seek technical fixes for their problems because, eager to improve their condition, they thought that “every new method that leads by a shorter road to wealth, every machine that spares labor, every instrument that diminishes the cost of production, every discovery that facilitates pleasures or augments them, seems to be the grandest effort of the human intellect.”<sup>224</sup>

Playing before such an audience, inventors overstated the effectiveness of their mechanisms by claiming they offered foolproof protection against explosions. This attracted government interest and supporters. However, when the devices failed to meet these expectations, this could engender a more general cynicism as to whether any mechanical device could prevent or alleviate steam vessel disasters.<sup>225</sup> Some skepticism was appropriate because there were limits on what mechanical devices could accomplish. Patent Examiner Charles Keller, for one, concluded that “no apparatus of safety can ever dispense with the services of an intelligent, skilful, and prudent engineer, thoroughly versed in the theory and practice of the steam engine, the properties of steam, and the metals of which boilers are constructed, and the nature of combustion.”<sup>226</sup> The 1849 Patent Office report emphasized the fact that machinery could not do everything in a world where humans were an important part of technological

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<sup>224</sup> Alexis de Tocqueville, *Democracy in America*, Volume 2, Chapter 10, From the Henry Reeve Translation, revised and corrected, 1899. Electronic edition deposited and marked up by the American Studies Program at the University of Virginia, June 1, 1997. In [http://xroads.virginia.edu/~Hyper/DETOC/ch1\\_10.htm](http://xroads.virginia.edu/~Hyper/DETOC/ch1_10.htm) [Accessed Dec. 30, 2008.]

<sup>225</sup> Dr. William M. Wright, Report of the Committee on Patents, 28<sup>th</sup> Congress, Feb. 13, 1845, H. Rept. 123, 3 (Appendix B).

<sup>226</sup> Report of the Commissioner of Patents showing the operations of the Patent Office during the year 1843, 28<sup>th</sup> Cong., 1<sup>st</sup> sess., 1844, S. Doc. 150, 276.

systems.<sup>227</sup> James C. Booth at the U.S. Mint came to a similar conclusion. “It appears to me,” he wrote, “that the universal search after a never failing specific remedy leads men to overlook the more general efficacy of combined remedies for an evil.”<sup>228</sup> With the Steamboat Act of 1852, Congress acknowledged the notion that “combined remedies” were an appropriate method to address the problem of steam vessel accidents, and it integrated four different types of legislative policies—informational, mechanical, penal and regulatory—into a hybrid form of protective legislation.

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<sup>227</sup> Appendix B: S. Exec Doc. 18, 30<sup>th</sup> Cong., 2<sup>nd</sup> sess., 16-25. See also H. Exec. Doc. 170, 25<sup>th</sup> Cong., 3<sup>rd</sup> sess., 3 and H. Rept. 123, 28<sup>th</sup> Cong., 2<sup>nd</sup> sess., 3.

<sup>228</sup> James C. Booth, U.S. Mint, to James Guthrie, Secretary of the Treasury, Philadelphia, January 12, 1857, Miscellaneous Correspondence Received by the Secretary of the Treasury, 1852-1862 (Bound Volume), Bureau of Marine Inspection and Navigation; Steamboat Inspection Service; RG 41, NA.

## CHAPTER 5

### “TO REGULATE AND IMPROVE”

#### ***1. Introduction***

Astonishingly, in the years up to 1849, about 44% of the steamboats built in the Mississippi Valley and Gulf of Mexico were destroyed by accidents that killed over 2,500 people.<sup>1</sup> Legislators were personally familiar with the dangers of steamboat travel. As one committee noted in 1845, “of the 275 members of Congress, coming, as they do, from every district in the United States, not one gets to his post without traveling some of the route by steam.”<sup>2</sup> Other legislative bodies were aware of the problem. While Congress was considering a steamboat bill in 1838, the Mississippi state legislature passed a resolution noting that “the great public, national, and universal advantages resulting to individuals and to States, to commerce and to intercourse from the use of steamboat navigation, seem to be greatly diminished by the risk and waste of life” on American waters. The legislators thought that the operators of the vessels were reckless and that their “inexperience, carelessness, and incapacity” went unchecked because of their “immunity from punishment and responsibility.” They wrote that it was beyond the capability of Mississippi or any individual state to address the problem and asked Congress to pass a law “to regulate and improve the steamboat navigation of the rivers in the western

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<sup>1</sup> According to government estimates, 1,656 steamers had been built in the Mississippi Valley and the Gulf of Mexico up to 1849. Of these, 736 had been destroyed: 419 were sunk, the largest portion by snags, while 104 were destroyed by fire, 168 by explosions and 45 by collisions. The total loss of property, including the vessels and cargoes, was estimated at \$18.3 million. The total number of lives lost, up to December 1848, was estimated at 2,563, with 2,097 injured. *CG*, 32<sup>nd</sup> Cong., 1<sup>st</sup> sess., July 7, 1852, 1667.

<sup>2</sup> Appendix B: H. Rep. 115, 28<sup>th</sup> Cong., 2<sup>nd</sup> sess., 1. See also Leonard D. White, *The Jacksonians: A Study in Administrative History, 1829-1861* (New York, NY: The Macmillan Company, 1954), 442-3. During debate on the 1852 steamboat bill, Senator Thomas Rusk of Texas stated that “The perils accompanying steamboat navigation ... are so great, and the chances of encountering an instant and horrible death are so numerous, that, for my part, I would rather encounter almost any risk than that with which I am threatened on the journey of some three or four thousand miles from this place to my home.” *CG*, 32<sup>nd</sup> Cong., 1<sup>st</sup> sess., Aug. 28, 1852, 2426.

portion of the United States.”<sup>3</sup> The fact that a legislature in the Deep South requested congressional action on this subject despite its tendency to be wary of central government intervention indicates the broad support that developed in favor of a national policy.

Congress regulated steamboats in response to repeated disasters, as well as demands by constituents and interest groups.<sup>4</sup> Catastrophes drew public attention to the dangers of travel and acted as catalysts for change by conveying a sense of urgency in favor of remedial action and mobilized support for government intervention.<sup>5</sup> As early as 1832 one congressional committee noted that “many of our fellow citizens . . . unite in their demands . . . that Government, possessing the competent power and authority, throw around the lives and fortunes of those thus exposed [to the dangers from steamboat boiler explosions], all the safeguards which a wise and prudent legislation can give.”<sup>6</sup> The general sentiment among members of Congress was, as one observer expressed it in late 1837, that the “public feeling demands some legislation on the

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<sup>3</sup> Memorial of the Legislature of Mississippi praying the Passage of a Law to Regulate and Improve the Steamboat Navigation of the Rivers, 25<sup>th</sup> Cong., 2<sup>nd</sup> sess., 1838, S. Doc. 199 (Appendix B).

<sup>4</sup> Louis C. Hunter, *Steamboats on the Western Rivers: An Economic and Technological History* (1949; reprint, New York, NY: Dover Publications, Inc., 1993), 532 and 537. Hunter points out that disasters led to widespread calls for congressional action, and congressmen responded by introducing bills. See also R. John Brockmann, *Exploding Steamboats, Senate Debates, and Technical Reports: The Convergence of Technology, Politics and Rhetoric in the Steamboat Bill of 1838* (Amityville, NY: Baywood Publishing Company, Inc., 2002), 51. In 1838, three especially destructive explosions, including that of the *Moselle* on the Ohio River, took place in the months before the 1838 law was passed. In the eight months prior to the 1852 act, seven deadly disasters killed almost 600 people. Members of Congress cited these tragedies as reasons to act. For example, see the comments by Representative Preston King, Democrat of New York, who reminded the House of the destruction of the steamer *Henry Clay* while the 1852 bill (S. 223) was awaiting action. *CG*, 32<sup>nd</sup> Cong., 1<sup>st</sup> sess., Aug. 7, 1852, 2127. For similar comments, see Aug. 25, 1852, 2345 and Aug. 28, 1852, 2427. In a parallel vein the following decade, disasters sparked the passage of a federal law that forbade shipping explosives on vessels carrying passengers in 1866. Mark Aldrich, “Regulating Transportation of Hazardous Substances: Railroads and Reform, 1883-1930,” *Business History Review* 76/2 (Summer 2002): 270.

<sup>5</sup> Kathleen Kemp noted that similar circumstances led Congress to create the Federal Aviation Administration in 1958 after three aircraft collisions. After the agency was established, Congress responded to subsequent accidents by increasing the FAA’s appropriations while members from both major parties supported the increases. Kemp surmises that intervening was attractive to legislators because they could reap political benefits by showing that they were “doing something for both constituents and the larger public.” Kathleen A. Kemp, “Accidents, Scandals and Political Support for Regulatory Agencies,” *Journal of Politics*, v. 46, no. 2 (May 1984): 402, 404-6, 420-21. The quotation is from 406.

<sup>6</sup> Appendix B: H. Rept. 478, 22<sup>nd</sup> Cong., 1<sup>st</sup> Sess., 1.

subject and it must be given.”<sup>7</sup> They were certain Congress had the power to act by using the commerce clause and the “police power” to “prescribe the mode and manner of using [private property] ... to prevent its abuse, to the injury or annoyance of others, or of the public.”<sup>8</sup> In 1838 and 1852 Congress required that steam vessels be inspected and set standards for safe operation.<sup>9</sup> It passed these laws with overwhelming support in both the House and Senate.

Just because a broad spectrum of Americans backed federal intervention did not guarantee that Congress would act in any given year. Steamboat bills were introduced most years from 1830 to 1852, but only in 1838, 1843 and 1852, did legislators push them to passage at times when they and the public were particularly distressed about accidents.<sup>10</sup> Passing a law was a contingency-laden process: sponsors held bills in committee as they gathered information; opportunities to consider measures slipped by as Congress debated other issues. The bicameral system made it challenging because the two houses often did not coordinate their actions. Successful bills needed advocates in both houses to report them and guide them through the floor proceedings, and this usually depended on a member of a responsible committee taking the initiative to push for the measure. Even when a bill passed one house with widespread support, it often came to a standstill in the other.<sup>11</sup>

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<sup>7</sup> George Curtis to Sen. Nehemiah Rice Knight, Dec. 23, 1837, Committee Reports and Papers, Various Select Committees, Dec. 29, 1837, S. 1 (Sen29A-D19), Records of the Senate, RG 46, NA.

<sup>8</sup> James Kent, *Commentaries on American Law*, 12th ed., Oliver Wendell Holmes, Jr., ed. 4 vols. (Boston, MA: 1873), II, 339-340. Quoted in William R. Brock, *Investigation and Responsibility: Public Responsibility in the United States, 1865-1900* (New York, NY: Cambridge University Press, 1984), 59.

<sup>9</sup> Under a regulatory regime, “failure to meet a safety standard is a violation, whether or not an accident results” and “regulators and courts can force compliance with standards and procedures even if no harm has occurred.” Daniel Polisar and Aaron Wildavsky, “From Individual to System Blame: A Cultural Analysis of Historical Change in the Law of Torts,” *Journal of Policy History* 1/2 (1989): 129.

<sup>10</sup> For a compilation of the laws of 1838, 1843 and 1852, see Joseph K. Angell, *A Treatise on the Law of Carriers of Goods and Passengers by Land and by Water* (Boston, MA: Little, Brown, and Co., 1868), 609-34.

<sup>11</sup> Eight steamboat bills passed one house, but not the other, from 1850 to 1860. Appendix A: S. 60, 31<sup>st</sup> Cong., 1<sup>st</sup> sess.; H.R. 386, 31<sup>st</sup> Cong., 1<sup>st</sup> sess.; S. 242, 31<sup>st</sup> Cong., 1<sup>st</sup> sess.; S. 25, 32<sup>nd</sup> Cong., 1<sup>st</sup> sess.; S. 408, 33<sup>rd</sup> Cong., 1<sup>st</sup> sess.; S. 277, 34<sup>th</sup> Cong., 1<sup>st</sup> sess.; H.R. 92, 34<sup>th</sup> Cong., 1<sup>st</sup> & 2<sup>nd</sup> & 3<sup>rd</sup> sess., H.R. 114, 36<sup>th</sup> Cong., 1<sup>st</sup> sess.

Even when a bill was passed, there was no guarantee that it would include the extensive regulatory features that Congress eventually enacted in 1852. The Democratic sponsors of the 1838 steamboat law pushed for legislation that emphasized a Penalty Option, which was supposed to work by threatening steamboat operators with lawsuits and prosecution when accidents occurred.

Critics quickly observed that the inspections established by the 1838 law were ineffectual and called for stronger action in response to ongoing disasters. Members of Congress proposed changes almost every year.<sup>12</sup> More than a decade later, on February 18, 1852, Senator John Davis of Massachusetts unveiled a proposal that comprehensively overhauled the 1838 law.<sup>13</sup> His bill, S. 223, became the Steamboat Act of 1852.<sup>14</sup> Davis's proposals reflected his Whiggish comfort with using government power to improve society,<sup>15</sup> but also showed his talents as a legislative craftsman as he integrated features from earlier plans with innovative regulatory

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<sup>12</sup> Congress made minor changes to the 1838 law in 1843, 1847 and 1849. The 1852 Steamboat Act superseded most of the 1838 law, but the earlier law continued to apply to cargo steamers and ferries. For the other laws, see Appendix A: H. R. 602, 27<sup>th</sup> Cong., 3<sup>rd</sup> sess., 5 *Stat. L.*, 626; H.R. 637, 29<sup>th</sup> Cong., 2<sup>nd</sup> sess., 9 *Stat. L.*, 127; and H.R. 738, 30<sup>th</sup> Cong., 2<sup>nd</sup> sess., 9 *Stat. L.*, 399.

<sup>13</sup> *SJ*, 32<sup>nd</sup> Cong., 1<sup>st</sup> sess., Feb. 18, 1852, 215. Appendix A: S. 223, 32<sup>nd</sup> Cong., 1<sup>st</sup> sess.

<sup>14</sup> 10 *Stat. L.*, 61.

<sup>15</sup> Daniel Walker Howe, *The Political Culture of the American Whigs* (Chicago, IL: University of Chicago Press, 1979), 34. See also Howe's comments on John Quincy Adams and Henry Clay who "stood for a vision of coherent economic progress, of improvement both personal and national, directed by deliberate planning." Daniel Walker Howe, *What Hath God Wrought: The Transformation of America, 1815-1848*, (New York, NY: Oxford University Press, 2007), 279. Marvin Meyers, *The Jacksonian Persuasion: Politics and Belief* (Palo Alto, CA: Stanford University Press, 1960), 14. Michael F. Holt, *The Rise and Fall of the American Whig Party: Jacksonian Politics and the Onset of the Civil War* (New York, NY: Oxford University Press, 1999), 951-52. Whigs sometimes linked their desire to promote commerce with a stated intent to promote public safety. In an 1852 speech on the tariff and the public domain, Representative Hiram Bell (W, OH) equated action to reduce steamboat accidents with economic policies Whigs supported such as a protective tariff, rivers and harbors improvements, funding lighthouses and appropriating profits from the sale of public lands to pay for internal improvements. *ACG*, 32<sup>nd</sup> Cong., 1<sup>st</sup> sess., March 11, 1852, 287-8. Bell lamented that Congress had not acted effectively to prevent steam vessel disasters while, in the same speech, he urged using tariff proceeds to fund internal improvements in the name of public safety. As a westerner, he also noted that the government should act to disseminate a more equitable share of national revenue to the rapidly growing population of the west and bewailed the fact that Congress declined to direct sufficient appropriations to assure safe water transportation in interior portions of the nation.

provisions for administrative oversight.<sup>16</sup> Davis was able, to a greater extent than previous bill drafters, to compose legislation that anticipated the difficulties of administering a national system that would oversee the construction and operation of more than a thousand vessels.

Steamboat legislation was not as politically divisive as many other topics. In the 1830s, prominent leaders from both parties, such as Andrew Jackson and Daniel Webster, endorsed government intervention in steamboat operation.<sup>17</sup> The parties did not mention the issue in their national platforms and newspaper coverage from the time does not suggest that it became a campaign issue. It also did not attract the same kind of partisan rancor as measures like the national bank, protective tariff and federal land policy. Despite partisan-tinged differences between the 1838 and 1852 laws, in the 1830s, 40s and 50s Democratic sponsors set aside their ideological preferences for small government to draft legislation which included extensive regulatory features.<sup>18</sup> Democratic presidents also believed in the constitutionality and appropriateness of steamboat regulation, as James K. Polk and Franklin Pierce, both of whom vetoed rivers and harbors bills and questioned their constitutionality, nonetheless assumed that Congress had the authority to regulate steamboats “for the better security of passengers” and dictate “the proper construction and arrangement of steam vessels and all passenger ships.”<sup>19</sup>

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<sup>16</sup> As one scholar puts it: “Unlike its 1838 predecessor, the 1852 law relied upon administrative remedies rather than common law or criminal sanctions. The statute’s design and requirements, along with its inspection and licensing provisions, emphasized preventative regulatory controls rather than incentive-based deterrents.” Jerry L. Mashaw, “Administration and ‘The Democracy:’ Administrative Law from Jackson to Lincoln, 1829-1861,” *Yale Law Journal*, 117/18 (June 2008): 1641.

<sup>17</sup> Hunter, *Steamboats on the Western Rivers*, 526. White, *Jacksonians*, 437-38.

<sup>18</sup> For example, see Appendix A: S. 303, 25<sup>th</sup> Cong., 3<sup>rd</sup> sess., S. 247, 26<sup>th</sup> Cong., 1<sup>st</sup> sess. and S. 148, 26<sup>th</sup> Cong., 2<sup>nd</sup> sess. These bills were drafted by Senator John Ruggles (D, ME). Also see H.R. 71, 28<sup>th</sup> Cong., 1<sup>st</sup> sess.; H.R. 305, 29<sup>th</sup> Cong., 1<sup>st</sup> sess.; H.R. 386, 31<sup>st</sup> Cong., 1<sup>st</sup> sess.; S. 112, 34<sup>th</sup> Cong., 1<sup>st</sup> sess.; S. 138, 35<sup>th</sup> Cong., 1<sup>st</sup> sess. All of the main sponsors of these bills were Democrats.

<sup>19</sup> James K. Polk, “Veto Message” (1847) in James D. Richardson, ed., *A Compilation of the Messages and Papers of the Presidents*, 4 (Washington, DC: U.S. Congress, 1897), 626. and Franklin Pierce, “Second Annual Message” (1854) in James D. Richardson, ed. *A Compilation of the Messages and Papers of the Presidents*, 4 (Washington, DC: U.S. Bureau of National Literature and Art, 1897), 2822.



## 2. From “*The Spirit of Intelligent Enterprise*” to “*Suitable Penalties in Case of Disasters*”

William C. Redfield, a steamboat builder and Agent of the Steam Navigation Company of New York, wrote in 1831 that having the government conduct inspections and prescribe uniform standards for equipment and operations would do more harm than good.<sup>20</sup> Many steamboat operators shared his view and wanted no interference from Congress.<sup>21</sup> They attributed their success to their own “inventive and discriminative powers, prudent foresight, and persevering spirit ... [driven by the] spirit of intelligent enterprise, [and] producing results which have ... been more and more favorable to the security and advantage of the public.”<sup>22</sup> Some

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<sup>20</sup> Appendix A: William C. Redfield to Secretary of the Treas. Louis McLane, Dec. 23, 1831 in H. Rept. 478, 23<sup>rd</sup> Cong., 1<sup>st</sup> sess., 1. Redfield opposed the 1838 steamboat law and continued to argue afterward against most forms of government intervention. He claimed that the dangers of steamboat travel had been exaggerated, that accusations against steamboat operators were overstated and overwrought, and that travelers had a greater chance of being caught in a conventional shipwreck than in a steamboat accident. He also wrote that it would be almost impossible to adapt legislation to the differing circumstances in various parts of the country. He noted that steam navigation was still in its infancy and he expected it would become progressively better as time went by. Redfield argued that by shifting the burden for safety to the government, intervention would lessen the sense of responsibility that steamboat operators felt for their charges and they would navigate with less care. Appendix B: H. Doc. 21, 25<sup>th</sup> Cong., 3<sup>rd</sup> sess., 437-8, 449, 450. See also Brockmann, *Exploding Steamboats*, 51 and 54 and Hunter, *Steamboats*, 520.

<sup>21</sup> Steamboat owners tended to frame their objections along five lines: 1) government intervention would have a negative impact on business growth, 2) it was inappropriate for the government to interfere with private property rights, 3) requirements for testing, such as hydraulic tests of boilers, would harm the machinery, 4) the technical requirements would impede the progress of developing safer and more efficient steamboats, and 5) legislative intervention would lead the government down a slippery slope where it would try to regulate all forms of transport. Memorial of Amos Reeder and others praying that the Bill passed by the House of Reps. to provide for the better security of the lives of passengers on board of vessels propelled in whole or in part by steam may not become a law without certain modifications, Committee on Commerce, Referred Jan. 2, 1850, Petitions and Memorials Ref'd to Committees, Various Subjects. Sept. 17, 1850 to Jan. 31, 1851 (HR31A-H3.3), 31<sup>st</sup> Cong., Records of the House of Representatives, RG 233, NA. See also Appendix B: H. Doc. 284 and H Doc. 335, 25<sup>th</sup> Cong., 2<sup>nd</sup> sess. Also see Memorial of Citizens of Wheeling protesting against the passage of a bill before Congress ..., Committee on Commerce, Referred Jan. 22, 1851, Petitions and Memorials Ref'd to Committees, Security of Life on Board Steam Vessels (H.R. 386) (HR31A-G3.8), 31<sup>st</sup> Cong., Records of the House of Representatives, RG 233, NA. The Petition of Citizens of Baltimore, MD Remonstrating against the passage of Senate Bill No. 223, Ref'd July 20, and Memorial of J.J. Taylor and others praying that the Senate Bill for the regulation of Steam Boats may not pass into law, Committee on Commerce, 1852, Petitions and Memorials Ref'd to Committees, Steam Boat Laws, Feb. 4, 1852-July 20, 1852, (HR32A-G4.10), 32<sup>nd</sup> Cong., Records of the House of Representatives, RG 233, NA. As Taylor and his co-signers put it: “the best and surest plan is to leave competition unshackled and to allow rivals in the same business to recommend themselves to an observant and sagacious public ... by the zeal and success with which they shield the passenger from danger and disaster.”

<sup>22</sup> *Steamboat Owners – New York, and Long Island Sound. Memorial of Sundry Proprietors and Managers of American Steam vessels on the impolicy of certain enactments contained in the law relating to steamboats ...*, 26<sup>th</sup> Cong., 1<sup>st</sup> sess., 1840, H. Doc. 158, 1-2 (Appendix B). *Letter from the Secretary of the Treasury Transmitting ...*

members of the government shared this outlook, believing that intervention would be counterproductive. James Monroe's Secretary of the Treasury, William Crawford, discouraged Congressional action in 1825, writing that, in cases like this, "legislative enactments are calculated to do mischief, rather than to prevent it."<sup>23</sup>

Laissez-faire attitudes were somewhat more justified in the East, where steam travel was safer, than in the West.<sup>24</sup> Owners and masters of western boats drove them hard and wanted to get their money's worth. Recalling common practices, Riverman Emerson W. Gould criticized steamboat overseers as callous and careless, writing that accidents were

almost wholly the result of bad management, were set down by [owners] as among the unavoidable chances of navigation, and instead of adopting measures to prevent them, they were deliberately subtracted from the supposed profits, as matters of course. As the boat was not expected to last more than five or six years, at best, and would probably be burned up, or sunk within that period, it was considered good economy to reduce the expenditures, and to make money by any means, during the brief existence of the vessel. Boats were hastily and slightly built, furnished with cheap engines, and placed under the charge of wholly incompetent persons ... the most criminal indifference to the safety of the boat and those on board [was] observable during the trip.<sup>25</sup>

These factors created a recipe for danger and editors like Hezekiah Niles responded by vilifying masters and owners for "criminal carelessness or fool-hardiness."<sup>26</sup> Others blamed the

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*Information in Relation to Steam Engines*, 25<sup>th</sup> Cong., 3<sup>rd</sup> sess., 1838, H. Doc. 21, 3 (Appendix B). See also Appendix B: S. Doc. 113, 26<sup>th</sup> Cong., 2<sup>nd</sup> sess., 1.

<sup>23</sup> Appendix B: H. Exec. Doc. 69, 18<sup>th</sup> Cong., 2<sup>nd</sup> sess., 1. See also Hunter, *Steamboats*, 527.

<sup>24</sup> Citing a study by the Treasury Department, Senator John Davis stated that nearly 700 of the 1,000 persons who had died in marine accidents during the year ending June 30, 1851 had perished on Western waters. *CG*, 32<sup>nd</sup> Cong., 1<sup>st</sup> sess., July 7, 1852, 1668.

<sup>25</sup> Hunter, *Steamboats*, 103f. On the incompetence of steamboat engineers, see *Ibid.*, 298. Columbia Professor James Renwick, who evaluated steam safety devices for the government in 1838 and 1839, noted that the profession did not appear to offer sufficient compensation to attract "enterprising, educated, and intelligent young men" into the field. *Message from the President of the United States Transmitting a Report of the Commissioners to test Inventions to render safe the Boilers of Steam-engines*, Received Feb. 7, 1839, H. Doc. 170, 25<sup>th</sup> Cong., 3<sup>rd</sup> Sess., 10 (Appendix B). A correspondent of the *New York Daily Times* in Dayton, Ohio, noted that, according to insurance underwriters, the average western steamboat lasted only four years and added that it was a wonder that they lasted that long, given their cheap and flimsy construction. *Hesperian*, "The West," *NYDT*, Nov. 16, 1852, 2.

<sup>26</sup> *NWR*, May 1, 1830, 173 and May 9, 1835, 161. Niles was angry enough that he expressed grim satisfaction when offending engineers were killed. *Ibid.*, May 30, 1835, 219.

greed of proprietors, decried the “legalized murders,” urged relatives of those killed to sue companies for damages and dreamed of avenging the slain and wounded.<sup>27</sup> The only thing that would change the behavior of captains and engineers and prevent disasters, wrote the editor of *Scientific American*, was the “certain fear of punishment.”<sup>28</sup> Support for a Penalty Option grew from these emotional responses, but also from the belief that tough criminal and monetary penalties would improve future conduct. According to Niles, “prudence must be taught through the pockets of proprietors – and feeling will follow the infliction of adequate damages, until it shall be so arranged that capital punishments are awarded for foolhardiness or base neglect.”<sup>29</sup> If “prompt punishment” was meted out, wrote *Scientific American*, “fear would act as a restraint,” on the owners and crew,<sup>30</sup> and if consequences were severe enough, wrote the *New York Daily Times*, including forfeiting corporate charters when accidents resulted in loss of life, steamboat operators might provide the protection that their passengers deserved.<sup>31</sup>

Some policy makers agreed. Though, as stated earlier, Treasury Secretary Crawford had discouraged government intervention in 1825, he also argued that steamboatmen would become more cautious and responsible if they were punished when they misbehaved, and it would therefore be appropriate to “subject the owners and managers of those boats to suitable penalties in case of disasters, which cannot fail to render the masters and engineers more attentive, and the owners more particular in the selection of those officers.”<sup>32</sup> Jacksonian Democrats appreciated

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<sup>27</sup> “Steamboat Accidents and the Bursting of Boilers,” *SA*, Jun. 29, 1850, 323. “Steam Boiler Explosions,” *SA*, Jan. 24, 1852, 149.

<sup>28</sup> “Let the fear of the law be the beginning of wisdom,” wrote the editor. “Explosions of Steam Boilers,” *SA*, Feb. 23, 1850, 181. Emphasis in the original.

<sup>29</sup> *NWR*, Nov. 16, 1833, 180.

<sup>30</sup> “Accidents, Their Cause and Cure,” *SA*, Aug. 14, 1852, 381.

<sup>31</sup> “Market Value of Men,” *NYDT*, Sep. 18, 1855, 4.

<sup>32</sup> Appendix B: H. Doc. 69, 18th Cong., 2<sup>nd</sup> sess., 1.

this argument. While Democrats sometimes supported government intervention favoring economic growth and accepted that certain forms of commercial regulation could be both constitutional and appropriate, they were uncomfortable having the government exercise control over private businesses.<sup>33</sup> Also leery of putting power in the hands of unelected administrators, they tended to favor legislation which relied more on penalties than regulation and depended on informers to bring violations to the attention of the courts, prosecution by United States Attorneys, lawsuits by injured parties, and enforcement by the judiciary.<sup>34</sup>

If they were to use the Penalty Option as a tactic to prevent accidents, lawmakers assumed that steamboat operators understood the reasons that boilers exploded and other disasters occurred, and that captains, owners and crews simply needed to be persuaded, or intimidated, to avoid practices that created undue risks. When Representative Charles Wickliffe introduced a steamboat bill in 1832, he included provisions to have boats inspected and boilers tested, but raised doubts whether these features were worthwhile by urging the government not

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<sup>33</sup> Joel H. Silbey, *A Respectable Minority: The Democratic Party in the Civil War Era, 1860-1868* (New York, NY: W.W. Norton & Co., 1977), 24. Democrats were more willing to have the United States regulate interstate and international commerce than they were to wield federal power in other areas of economic policy. David P. Currie, *The Constitution in Congress: Democrats and Whigs, 1829-1861*, (Chicago, IL: University of Chicago Press, 2005), 124.

<sup>34</sup> Relying on the courts to enforce the laws was standard procedure for the national government in the nineteenth century. With a small executive branch and, with the exception of the board of supervising inspectors of steamboats created by the 1852 Steamboat Act, no independent commissions to administer federal regulations, the courts provided most of the administrative oversight. This is consistent with Stephen Skowronek's description of the national state in the United States as a "state of courts and parties." Stephen Skowronek, *Building a New American State: The Expansion of National Administrative Capacities, 1877-1920*, (New York, NY: Cambridge University Press, 1982), 39-45 and Skowronek, "National Railroad Regulation and the Problem of State Building: Interests and Institutions in Late Nineteenth Century America," *Politics and Society*, 10/3 (1981): 225-250, especially 244. See also Charles C. Bright, "The State in the United States in the Nineteenth Century," in Charles Bright and Susan Harding, eds. *Statemaking and Social Movements: Essays in History and Theory*, (Ann Arbor, MI: University of Michigan Press, 1984), 139. The public was also expected to lend a hand in overseeing the laws. Relying on informers to report violations was a standard way of employing citizens, rather than government administrators. As part of the 1838 act, informers would be compensated with half of the damages recovered through suits brought by U.S. attorneys in federal court, and this was consistent with the "public-private partnerships which were a way of stretching capacity, spreading costs, and lessening the need for an expansive professional bureaucracy." William J. Novak, "Public Private Governance: A Historical Introduction," in Jody Freeman and Martha Minow, eds., *Government by Contract: Outsourcing and American Democracy* (Cambridge, MA: Harvard University Press, 2009), 31.

to interfere with managing the vessel, instead urging “rewards and punishments” to guard against misconduct.<sup>35</sup> President Andrew Jackson pursued a similar line of reasoning, contending in his 1833 Annual Message that, since steam machinery was improving and science was gaining a better understanding of steam power, the only reason that disasters kept occurring must be “the result of criminal negligence.” Jackson thought that the government ought to pass some “precautionary and penal legislation” in response.<sup>36</sup> In 1836 Jackson’s Secretary of the Treasury, Levi Woodbury, argued for “subjecting [steamboat] commanders, and ... their owners, to ... severe penalties in cases of carelessness or neglect [that were] destructive to property or life.”<sup>37</sup>

Like Jackson, President Martin Van Buren also called for Congress to intervene. Van Buren focused congressional attention on the issue in his Annual Message of 1837 at a time when concern was at a high level in response to recent disasters.<sup>38</sup> Treasury Secretary Woodbury

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<sup>35</sup> Appendix A: H.R. 582, 22<sup>nd</sup> Cong., 1<sup>st</sup> sess. Appendix B: H. Rept. 478, 22<sup>nd</sup> Cong., 1<sup>st</sup> sess., 2. See also Burke, “Bursting Boilers,” 11 and Brockmann, *Exploding Steamboats*, 34-37. Wickliffe was a Tennessean and supporter of President Jackson

<sup>36</sup> Annual Message of President Andrew Jackson, *SJ*, 23<sup>rd</sup> Cong., 1<sup>st</sup> sess., Dec. 3, 1833, 19. See also Brockmann, *Exploding Steamboats*, 43-45. Jackson was also affected by the death of Senator Josiah Johnson of Louisiana who had been killed in an explosion of the steamboat *Lioness* in 1833. White, *Jacksonians*, 442-3. Whig Senator Daniel Webster, though he suggested that boilers should be tested and safety devices required, like President Jackson posited that accidents were the result of “negligence” and the most effective government response would be to quickly investigate, prosecute and punish crew members who caused them. Speech of Daniel Webster, Dec. 23, 1833 in Andrew J. King, ed., *Papers of Daniel Webster, Legal Papers, v. 3, The Federal Practice, Pt. 2* (Hanover, New Hampshire: University Press of New England, 1989), 765. Webster expanded on this theme on the Senate floor where he said “It is the general opinion, I believe, not only of practical engineers, but of the public also, that nearly all these accidents have arisen from negligence, and some of them from a very highly criminal degree of negligence .... Those who carry passengers for hire, by means of such a mighty agent as steam ... are bound in duty, and should be bound by law, to apply to their business the strictest attention, and the utmost degree of diligence.” *RD*, 23<sup>rd</sup> Cong. 1<sup>st</sup> sess., Dec. 23, 1833, (Washington, DC: Gales & Seaton, 1833), 54. Senator Thomas Hart Benton, while agreeing with Webster that action needed to be taken to curb steamboat disasters, defended most western steamboat captains as men of “high professional character and great skill.” *Ibid.*, 57.

<sup>37</sup> *Annual Report of the Sec’y of the Treasury on the Finances*, 24<sup>th</sup> Cong., 2<sup>nd</sup> sess., 1836, S. Doc. 2, 23.

<sup>38</sup> Van Buren wrote that “the distressing casualties in steamboats which have so frequently happened during the year, seem to evince the necessity of attempting to prevent them, but means of severe provisions connected with their customhouse papers.” Annual Message of President Martin Van Buren, *SJ*, 25<sup>th</sup> Cong., 2<sup>nd</sup> sess., Dec. 5, 1837, 24. Brockmann, *Exploding Steamboats*, 2-3. The destruction of the *Ben Sherrod* by fire and the *Monmouth* by collision were among the more prominent and deadly accidents in 1837. Hunter, *Steamboats*, 532. On the influence of the President’s annual messages to Congress, see Joseph Cooper, “The Origins of the Standing Committees and the Development of the Modern House,” *Rice University Studies* 56/3 (Summer 1970): 14.

offered additional guidance and, at the opening of the long session of the Twenty-fifth Congress in December, asked the House and Senate to assure that boiler metal was strong, vessels were properly constructed, and that the government punish steamboat owners who did not adopt “all approved safeguards [i.e. technical improvements] against the calamities of explosions, conflagrations and wrecks.”<sup>39</sup>

But Woodbury was not the key player in 1837 and 1838. Senator Felix Grundy of Tennessee assumed the lead role when he was appointed chairman of a Select Committee on Steam.<sup>40</sup> A Democrat and ally of former President Jackson, Grundy, like Jackson, favored legislating through the Penalty Option. Democrats made up a majority of Grundy’s committee and he reported a bill that required steamboat owners to have their boats inspected, but deleted regulatory requirements to have inspectors designate the maximum safe pressure for the boilers and test them with a hydraulic pump.<sup>41</sup> Grundy told the Senate that the committee had not provided for testing the boilers because steamboat “masters and engineers” opposed it.<sup>42</sup> Neither

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<sup>39</sup> *Annual Report of the Secretary of the Treasury on the State of the Finances*, 25<sup>th</sup> Congress, 2<sup>nd</sup> sess., 1837, H. Doc. 4, 18. Woodbury’s request duplicated some of the recommendations the Franklin Institute had recently made to require steamboats to carry safety devices and have the government regulate materials and practices. Bruce Sinclair, *Philadelphia’s Philosopher Mechanics: A History of the Franklin Institute, 1824-1865* (Baltimore, MD: The Johns Hopkins University Press, 1974), 189. Woodbury may have also been influenced by provisions of a bill that Senator Samuel Southard of New Jersey, a Jackson opponent, had introduced in 1834. Appendix A: S. 201, 23<sup>rd</sup> Cong., 1<sup>st</sup> sess.

<sup>40</sup> *SJ*, 25<sup>th</sup> Cong., 2<sup>nd</sup> sess., Dec. 6, 1837, 25. The other members of the Select Committee were Thomas Hart Benton (D, MO), John C. Calhoun (SC), Thomas Clayton (W, DE), Daniel Webster (W, MA), Robert Walker (D, MS) and Garrett D. Wall (D, NJ). A copy of Grundy’s original bill can be found at Library of Congress, American Memory, Lawmaking, Senate Bills and Resolutions: <http://memory.loc.gov/cgi-bin/ampage?collId=llsb&fileName=019/llsb019.db&recNum=99>. On Grundy and Jackson see Orval W. Baylor, “The Career of Felix Grundy, 1777-1840,” *The Filson Club Historical Quarterly*, 16/2: 102.

<sup>41</sup> *SJ*, 25<sup>th</sup> Cong., 2<sup>nd</sup> sess., Jan. 9, 1838, 120. The amended version of S. 1 reported by the Select Committee is at: Library of Congress, American Memory, Lawmaking, Senate Bills and Resolutions: <http://memory.loc.gov/cgi-bin/ampage?collId=llsb&fileName=019/llsb019.db&recNum=106>. See also Hunter, *Steamboats*, 533.

<sup>42</sup> Letter of Thomas B. Eastland and others to Felix Grundy, Chairman, Jan. 8, 1838, Committee Papers, Various Select Committees, Dec. 29, 1837 (S. 1), Select Committee on Steamboats (Sen25A-D19), 25<sup>th</sup> Cong., Records of the Senate, RG 46, NA. Eastland and other commanders who ran their vessels between Nashville and New Orleans objected that hydraulic testing would weaken the boilers. However, they thought that threatening to punish crew members for negligence was worthwhile because it would get the crew to pay closer attention to their duties. See also R. John Brockmann, *Twisted Rails, Sunken Ships: The Rhetoric of Nineteenth-Century Steamboat*

did the committee provide for a program to inspect boiler metal and assure safe construction of hulls, though these had been recommended by the Franklin Institute and by Woodbury.

Grundy's committee also declined to mandate examining and licensing pilots and engineers because they were not certain how to set it up.<sup>43</sup>

While Grundy may have believed that testing boilers was a bad idea and that the committee was not prepared to devise a system to examine and license steamboat personnel, the evidence indicates that he and the other members preferred a law which emphasized retribution over regulation. The committee had access to earlier bills which provided examples of how a system of licensing could be framed and could also have turned to the Franklin Institute report for suggestions.<sup>44</sup> The committee papers show they had even outlined some procedures for inspections, designating safe maximum working pressures for boilers, mandating various practices of operation, spelling out requirements for training and assessing engineers, as well as requiring safety devices. However, they included none of these provisions in the bill they reported.<sup>45</sup> Instead, Grundy later said that he "deemed it probably sufficient to punish ... neglect and misconduct, when disaster should actually occur."<sup>46</sup> By leaving most of the regulatory

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*and Railroad Accident Investigation Reports, 1833-1879* (Amityville, NY: Baywood Publishing Company, Inc., 2005), 95, 114-115.

<sup>43</sup> *CG*, 25<sup>th</sup> Cong., 2<sup>nd</sup> sess., Jan. 22, 1838, 124.

<sup>44</sup> Appendix A: H.R. 458, 21<sup>st</sup> Cong., 1<sup>st</sup> sess.; H.R. 582, 22<sup>nd</sup> Cong., 1<sup>st</sup> sess.; S. 201, 23<sup>rd</sup> Cong., 1<sup>st</sup> sess. Sinclair, *Philadelphia's Philosopher Mechanics*, 189. The 1838 law ultimately dictated that owners and masters must hire "experienced and skilful engineers" and, if they did not, it made the owners responsible for property damages caused by explosions. 5 *Stat. L.*, 304, Section 6. See also Mashaw, "Administration and 'The Democracy':" 1665.

<sup>45</sup> Document in relation to a mode of preventing the explosions of Steam Boilers, Ref'd Dec. 29, 1837, Committee Papers, Various Select Committees, Dec. 29, 1837 (S. 1), Select Committee on Steamboats (Sen25A-D19), 25<sup>th</sup> Cong., Records of the Senate, RG 46, NA.

<sup>46</sup> *NWR*, Jan. 27, 1838, 346 and 347. Some opponents of government intervention appeared fatalistic and resigned to the idea that little could be done to prevent the disasters. One St. Louis engineer and manufacturer claimed in 1848 that it was a widespread opinion along the western waters that "if an engineer could not see the terrors in the inevitable symptoms of an explosion that would in all likelihood blow the boat, himself, and all on board into atoms and eternity, he could certainly not be made to see any in an act of Congress, no matter how sanguinary its provisions, for its decisions would be stripped of their alarm to such a being by their remoteness. The

features out of the bill, S. 1 reflected Grundy's priorities, providing that when "misconduct, negligence or inattention" by masters or crew members resulted in the loss of life, they would be charged with manslaughter and, if convicted, could serve from two to ten years at hard labor.<sup>47</sup> One of Grundy's allies, Senator Robert Strange of North Carolina, agreed that these penalty provisions would assure the safety of passengers.<sup>48</sup>

In addition to playing a crucial role in shaping S. 1 in committee, Grundy functioned as floor manager to oversee the amendment process and push his version of the bill through the Senate in January 1838. He directed the defeat of amendments that would have required more safety equipment, including life preservers and multiple navigation lights.<sup>49</sup> He also opposed efforts, supported by Whigs, to increase the bill's regulatory requirements.<sup>50</sup> Senator Oliver Smith, for one, thought that many accidents happened because of "ignorance or want of skill," rather than recklessness, and offered to draft a provision to examine and license personnel if

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same may be said of pilots, by whose acts of positive carelessness boats, with their cargoes and passengers, pilots and crew are sunk, and totally and forever lost." Appendix B: William C. Anderson to George M. Dallas, March 13, 1848 in S. Doc. 4, 31<sup>st</sup> Cong., Special Session, 48-49.

<sup>47</sup> Library of Congress, American Memory, Lawmaking, Senate Bills and Resolutions, 25<sup>th</sup> Cong., S. 1: <http://memory.loc.gov/cgi-bin/ampage?collId=llsb&fileName=019/llsb019.db&recNum=112>.

<sup>48</sup> *CG*, 25<sup>th</sup> Cong., 2<sup>nd</sup> sess., Jan. 22, 1838, 124. In the House, David Petrikin (D, PA) made a similar point that "he preferred leaving the captains to their responsibility: prosecute them in case of accident, and let them guard against it as they pleased." *NWR*, June 30, 1838, 282. Some Whigs wanted even stricter penalties and asked for a provision like that which Daniel Webster had submitted in 1833, that the injurious and destructive release of steam should serve as *prima facie* evidence of negligence in any legal action against the master or crew, putting the burden of proof on the steamboat owners as defendants. Speech of Daniel Webster, Dec. 23, 1833 in Andrew J. King, ed., *Papers of Daniel Webster, Legal Papers, v. 3, The Federal Practice, Pt. 2* (Hanover, New Hampshire: University Press of New England, 1989), 766. Whig Senator Richard Henry Bayard wanted "explosion or loss of life" to serve as "prima facie evidence of . . . misconduct" in S. 1 because it would otherwise be difficult to prove that such misconduct occurred. Senator Oliver Smith moved an amendment to that effect, which did not succeed at the time. *NWR*, Jan. 27, 1838, 347. The *prima facie* provision was later added and became part of the law. 5, *Stat L.*, 304, Sec. 13.

<sup>49</sup> *CG*, 25<sup>th</sup> Cong., 2<sup>nd</sup> sess., Jan. 22, 1838, 124-5 and Jan. 24, 1838, 128-9. *NR*, Jan. 27, 1838, 346 and 347. Hunter, *Steamboats*, 533.

<sup>50</sup> See Burke, "Bursting Boilers," 16: "The Whigs," writes Burke, "appear to have seen the situation as one in which the federal government should use its powers and interpose firmly." However, the congressional Democratic majority "hewed to the doctrine that enlightened self-interest should motivate owners to provide safe operation."



Grundy and the committee members would not.<sup>51</sup> Smith also proposed an amendment which forbade steamboat racing, which was widely believed to lead to recklessness. As he explained it, he wanted to engage in “*preventative justice*,” rather than prosecuting “*crimes after they had been committed*.” Smith stated, “[I] would rather be the means of saving the lives of the crew and passengers of one boat, than of punishing, by incarceration in the walls of a prison, all the surviving officers of boats that may be blown up in the world.”<sup>52</sup> Grundy, however, opposed the amendment and two-thirds of the Democrats lined up with him to defeat it by a vote of 21 to 15.<sup>53</sup> In general, the Senate followed Grundy’s lead and preserved the essence of the committee’s version of S. 1. Though Senate Whigs would have preferred additional regulatory requirements in the bill, they ultimately supported the final version that was favored by Grundy and the Democrats, and the senators passed S. 1 without a contested roll call vote.<sup>54</sup>

Grundy had guided S.1 through the Senate in less than two months, but the House of Representatives acted more slowly. Forwarded to the House in January 1838, the bill was referred to the Judiciary Committee, which made a few minor changes and sent it to the Committee of the Whole in April, where it sat on the table.<sup>55</sup> Steamboat owners and captains objected to S. 1, and this, along with a busy calendar as Congress grappled with the problems in

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<sup>51</sup> Smith was a Whig from Indiana. *CG*, 25<sup>th</sup> Cong., 2<sup>nd</sup> sess., Jan. 22, 1838, 124. William Dodd, a self-described “practical and theoretical engineer” from New Jersey, wrote to President Van Buren and claimed that many engineers knew almost nothing about steam and could not correctly operate engines or fix problems. Dodd attributed this to economic factors since inexperienced and ignorant men would work for lower wages and steamboat owners, to save money, would hire them. Appendix B: H. Doc. 21, 25<sup>th</sup> Cong., 3<sup>rd</sup> sess., 398.

<sup>52</sup> *CG*, 25<sup>th</sup> Cong., 2<sup>nd</sup> sess., Jan. 22, 1838, 124.

<sup>53</sup> Appendix C: S. 1, 25<sup>th</sup> Cong., 2<sup>nd</sup> sess. Senator Smith did not give up on his effort to forbid steamboat racing and, the following session, asked the Committee on Commerce to investigate banning it. *SJ*, 25<sup>th</sup> Cong., 3<sup>rd</sup> sess., Dec. 20, 1838, 65.

<sup>54</sup> *SJ*, 25<sup>th</sup> Cong., 2<sup>nd</sup> Sess., Jan. 24, 1838, 170.

<sup>55</sup> *HJ*, 25<sup>th</sup> Cong., 2<sup>nd</sup> sess., Jan. 25, 1838, 316-17. The Judiciary Committee does not appear to have dealt with the bill expeditiously: one reason may be that they were busy with other matters, including a proposal to change the naturalization laws. *HJ*, 25<sup>th</sup> Cong., 2<sup>nd</sup> sess., Feb. 19, 1838, 465.

the economy, may have slowed its consideration.<sup>56</sup> The fact that a measure, which later enjoyed wide support, could gather dust on the table, illustrates a pitfall of the legislative process. While the Committee of the Whole allowed members to review and amend legislation in an informal manner, bills were considered in a regular order and could wait for an extended period before they were considered. It could be a place of indefinite delay and was derided as the “tomb of the Capulets,” where legislation was sent to expire.<sup>57</sup> To jump a bill to the head of the line, advocates needed to push for expedited consideration, and no one in the House took the bill in his charge as Grundy had in the Senate. As the House waited, the explosions of the *Moselle* and *Oronoko* in April renewed national attention to the problem.<sup>58</sup> However, it was not until after the explosion of the steamer *Pulaski* off the Carolina coast that Samuel Cushman of New Hampshire and Richard Biddle of Pennsylvania called up S. 1 on June 16, 1838.<sup>59</sup> Biddle reminded the House that this was a vital issue “affecting the lives of all who traveled by steam,” and majorities from both major parties, including 64% of Democrats and 72% of Whigs, agreed to consider it by a vote of 121 to 57.<sup>60</sup> Because this was a procedural vote, it is not clear that the members who opposed suspending the rules were fighting against the bill itself. They may have simply

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<sup>56</sup> As the Judiciary Committee considered S. 1, they received memorials opposing it from steamboat owners on the Delaware and Hudson Rivers, Raritan Sound and New York City. New Jersey - Memorial of Owners of Steam Boats and others, Citizens of Camden, New Jersey, Ref'd March 26, 1838, Committee of the Whole House, Steamboat Bill, S. 1, Committee Papers (HR25A-G25.3), 25<sup>th</sup> Cong., Records of the House of Representatives, RG 233, NA. Appendix B: H. Docs. 284, 314 and 335, 25<sup>th</sup> Cong., 2<sup>nd</sup> sess.

<sup>57</sup> *RD*, 23<sup>rd</sup> Cong., 2<sup>nd</sup> Sess., Feb. 21, 1835, 1457. *NWR*, March 26, 1836, 49. *CG*, 33<sup>rd</sup> Cong., 1<sup>st</sup> sess., March 27, 1854, 760. *CG*, 36<sup>th</sup> Cong., 1<sup>st</sup> sess., March 1, 1860, 953. See also Brockmann, *Twisted Rails*, 95, 114-115. See *HJ*, 25<sup>th</sup> Cong., 2<sup>nd</sup> sess., April 18, 1838, 784 for the reference to the Committee of the Whole.

<sup>58</sup> *NWR*, May 5, 1838, 145 and 160. *NWR*, May 12, 1838, 176.

<sup>59</sup> *CG*, 25<sup>th</sup> Cong., 2<sup>nd</sup> sess., June 16, 1838, 455. Louis Hunter credits these explosions with driving S. 1 “to passage.” Hunter, *Steamboats*, 532.

<sup>60</sup> *CG*, 25<sup>th</sup> Cong., 2<sup>nd</sup> sess., June 16, 1838, 455. Cushman, a Democrat, was the chairman of the Commerce Committee. His odd pairing with Biddle, a Pennsylvania Anti-Mason, suggests that steamboat legislation made for broad alliances and strange bedfellows. The vote met the requirement for a two-thirds majority to suspend the rules and consider business out of its regular order. Appendix C: S. 1, 25<sup>th</sup> Cong., 2<sup>nd</sup> sess., House vote of June 16, 1838. This was the only recorded roll call vote on S. 1 in the House.

preferred to continue with the regular order of business. In any case, those who voted “nay” did not later demand a roll call vote on passage and the fact that the House passed the bill without a contested vote indicates that opponents were not deeply committed to defeating the measure.

The House’s deliberations on S. 1 resembled those in the Senate. Chairman of the Judiciary Committee Francis Thomas mirrored Grundy’s role as floor manager and the majority tended to defer to his recommendations and those of other members of the committee.<sup>61</sup> Backers like Representative David Petrikin, a Pennsylvania Democrat and champion of Samuel Raub’s safety valve, cited recent disasters as reasons to act and Petrikin pleaded that “the voice of humanity ... called loudly for some legislation to guard the lives of our citizens from the recklessness of persons intrusted [sic] with the command of steamboats.”<sup>62</sup>

Overall, the House made few changes to S. 1 and defeated attempts by some members to increase the bill’s regulatory attributes.<sup>63</sup> The House passed the measure without a roll call vote and sent it back to the Senate, which amended it by adding Daniel Webster’s proviso to make

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<sup>61</sup> Francis Thomas was a Democrat from Maryland. Part of the debate revolved around whether Congress had the power to regulate steamboats that operated exclusively within the confines of individual states. Some members wanted to limit the law to apply only to steamers engaged in interstate and international commerce. *NWR*, June 30, 1838, 282-83. Representative John Robertson (W, VA) was unsuccessful in adding a proviso stating “that nothing in this act contained shall be held to apply to steamboats employed in plying between a port or place in any State to another port or place in the same State, and not employed in commerce with any foreign nation, or among the several States, or to any persons owning or navigating such steamboats, or employed on board of the same.” *HJ*, 25<sup>th</sup> Cong., 2<sup>nd</sup> sess., July 6, 1852, 1252.

<sup>62</sup> *NWR*, June 30, 1838, 283.

<sup>63</sup> *CG*, 25<sup>th</sup> Cong., 2<sup>nd</sup> sess., June 16, 1838, 455. *HJ*, 25<sup>th</sup> Cong., 2<sup>nd</sup> sess., June 22, 1838, 1133-24. For example, John Aycrigg (W, NJ) and George Evans (W, MD) were not able to add a system of examination and licensing for engineers and Joseph Rogers Underwood (W, TN) was unsuccessful in getting an amendment to provide uniform rules for passing other vessels. Most other amendments, by both Whigs and Democrats, did not succeed, though New York Whig Timothy Childs got an amendment adopted to make monetary penalties, in addition to imprisonment, punishments in cases of misconduct and negligence. Committee of the Whole House, Steamboat Bill, S. 1, Committee Papers (HR25A-G25.3), 25<sup>th</sup> Cong., Records of the House of Representatives, RG 233, NA. One minor regulatory addition provided for inflammable steering apparatus. This resulted in problems which are examined in Chapter 3. Some versions of S. 1 and its proposed amendments are available in digital format: Library of Congress, American Memory, Lawmaking, Senate Bills and Resolutions, 25<sup>th</sup> Congress, S.1, <http://memory.loc.gov/cgi-bin/ampage?collId=llsb&fileName=019/llsb019.db&recNum=125>.

explosions “*prima facie* evidence of negligence,” then passed it, also without a roll call vote.

The House approved the final version.<sup>64</sup> President Van Buren signed it into law on July 7, 1838.

Effective in October, the 1838 law required steamboat owners to make a new enrollment with the Customs Service and subjected them to fines if they did not comply. The law provided for inspections, but did not specify how these were to be conducted, and did not spell out qualifications for the inspectors, or indicate what safety standards the vessels needed to meet, save that the inspectors certify that the boilers were “sound and fit for use” and the hull of the vessel was “in all respects seaworthy.” The law mandated that boats employ skilled engineers, but did not stipulate what qualifications were needed. It also contained a few brief requirements for safety equipment.<sup>65</sup>

The center of the 1838 steamboat act was the manslaughter provision, which stated that captains and crew members could be prosecuted if their “misconduct, negligence or inattention” resulted in the loss of life. A clause made the injurious escape of steam *prima facie* evidence of negligence, so that the owner or crew members would be presumed guilty and would have to demonstrate their innocence, and was intended to lend further weight to the penalties by making it easier to convict wrongdoers.<sup>66</sup> Though the regulatory features in the 1838 law were vague

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<sup>64</sup> *NWR*, July 14, 1838, 309. *HJ*, 25<sup>th</sup> Cong., 2<sup>nd</sup> sess., July 6, 1838, 1252.

<sup>65</sup> *5 Stat L.* 304. District court judges were to appoint persons “skilled or competent to make inspections of such vessels” who would inspect the hulls every year and boilers every six months, for which they would be paid five dollars per inspection. Inspectors would give the vessel master a certificate to post indicating that the machinery and hull were sound. The vessel owner was required to employ “a competent number of skilful and experienced engineers,” and to open the safety valve when the vessel was stopped so that steam did not build up. They were also required, if they operated on the Great Lakes, to carry life boats, a suction hose and fire engine, and inflammable steering apparatus. They should carry “one or more signal lights” when operating at night. The act imposed penalties for non-compliance, which could be sued for in district and circuit courts. *5 Stat. L.*, 304.

<sup>66</sup> This provision ran counter to a trend in American tort law that occurred to reduce the exposure of railroad operators to civil liability through legal theories such as the “fellow servant rule, which held that an employer was not responsible for injuries to an employee engaged in common employment.” James W. Ely, Jr., *Railroads and American Law*, (Lawrence, KS: University Press of Kansas, 2001), 214. Another doctrine that developed in the first part of the nineteenth century was that of contributory negligence, where an injured party could not sue for negligence if they were in some way negligent themselves. Lawrence M. Friedman, *A History of American Law*, 3<sup>rd</sup>

and undeveloped, the threat of punishment in the case of explosions represented a fist ready to strike at owners and crews who transgressed.<sup>67</sup>

### 3. “Existing Laws of the United States Are Insufficient”

Detractors criticized the 1838 act while it was under consideration and called for changes after it was passed.<sup>68</sup> Some thought the law was “totally inadequate” because it would do little to assure the construction of “vessels and machinery of suitable strength,” or “secure a competent number of skilful and prudent officers.”<sup>69</sup> Some wanted to reinstate and expand the regulatory features in S. 1 that had been discarded in committee or defeated on the floor.<sup>70</sup> A number also

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edition (New York, NY: Simon and Schuster, 2005), 225.

<sup>67</sup> As one scholar characterized the 1838 act, “politicians ignored most of the specific technical solutions and over-emphasized the civil liability solutions.” Brockmann, *Exploding Steamboats*, 67. The law was consistent with the “common law doctrine of *respondeat superior*, which required owners to take responsibility for the negligent acts of their workers.” Ryken Grattet, “Sociological Perspectives on Legal Change: The Role of the Legal Field in the Transformation of the Common Law of Industrial Accidents,” *Social Science History* 21/3 (Fall 1997): 368. The act also anticipated expansion of federal jurisdiction in admiralty law: “in 1845, Congress passed an act that gave district courts jurisdiction of ‘matters of contract and tort’ concerning ‘steamboats and other vessels of twenty tons burden and upwards, enrolled and licensed for the coasting trade,’ and operating on ‘lakes and navigable waters.’” This law, in combination with the 1851 Supreme Court *Genessee Chief* decision, gave the national government clear admiralty jurisdiction over all public navigable waterways, bringing to an end the English common law tradition that admiralty law only extended as far as the tides. Lawrence M. Friedman, *A History of American Law*, 2<sup>nd</sup> ed. (New York, NY: Simon and Schuster, Inc., 1985), 259-60.

<sup>68</sup> In the Senate, for example, Oliver Smith (W, IN), renewed his effort to outlaw steamboat racing after the law had been in effect for only two months. *SJ*, 25<sup>th</sup> Cong., 3<sup>rd</sup> sess., Dec. 20, 1838, 65. In the House, Albert G. Harrison (D, MO) introduced a motion in January 1839 to amend the 1838 Act by certifying and licensing all steam vessel engineers, examining and certifying pilots, as well as requiring that all captains have at least two years of experience and show evidence of “sober, moral, and industrious habits” before they were permitted to command a steamboat. Motion of Mr. Harrison for the Select Committee on Steam, Jan. 14, 1839, Petitions and Memorials, Various Subjects, Select Committee on Steam Engines (HR25A-G24.3), 25<sup>th</sup> Congress, Records of the House of Representatives, RG 233, NA. See also *HJ*, 25<sup>th</sup> Cong., 3<sup>rd</sup> sess., Jan. 14, 1839, 268-9.

<sup>69</sup> *Report of the Committee Appointed by the Citizens of Cincinnati, April 26, 1838, to Enquire into the Causes of the Explosion of the “Moselle”* (Cincinnati, OH: Alexander Flash, 1838), 69-74. This committee also thought that the 1838 act should have set standards for construction of machinery, and could have employed France’s steamboat act as a model to mandate mechanical safety devices and to forbid unsafe practices, such as racing.

<sup>70</sup> The suggested revisions included examining and licensing captains, pilots and engineers. Letter of Captain John D. Daggett to Representative George W. Jones, Feb. 10, 1838, Committee Reports and Papers, Various Select Committees, Dec. 29, 1837, Committee Regarding Steamboats, S. 1 (Sen29A-D19), Records of the Senate, RG 46, NA. Daggett, an experienced steamboat captain, was not enthusiastic about having government appointees inspect vessels and contended that private insurance inspectors would do an adequate job inspecting hulls and that good engineers would maintain the machinery. He also disagreed with the practice of rewarding informers with half of the recovered fines, since Daggett thought that this would incite scoundrels to “bring better men into difficulty.”

objected that it was unjust to force operators to prove their innocence in the case of an explosion and unfair that the law seemed to allow steamboat operators to be prosecuted for the actions of their crews.<sup>71</sup>

A massive 1838 report compiled by the Treasury Department showcased the differences over whether or how to alter the law.<sup>72</sup> Printed shortly after the law went into effect, it included hundreds of pages of testimony on the practices aboard steamboats, and many of the correspondents asked for an increase in government regulation.<sup>73</sup> Interested parties weighed in over the next several years, including the Massachusetts legislature, which in 1840 charged that the “existing laws of the United States are insufficient, and not properly enforced.”<sup>74</sup>

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<sup>71</sup> Appendix B: H. Doc. 21, 25<sup>th</sup> Cong., 3<sup>rd</sup> sess., 390, 397-8; S. Doc. 13, 25<sup>th</sup> Cong., 3<sup>rd</sup> sess., 7; H. Doc. 158, 26<sup>th</sup> Cong., 1<sup>st</sup> sess., 14-15; H. Rept. 651, 26<sup>th</sup> Cong., 1<sup>st</sup> sess., 27. Memorial of the Members of the Cincinnati and Pittsburg Associations of Steamboat Engineers, of captains and owners of Steamboats, of officers of insurance companies and other citizens . . . praying the enactment of such laws as will more effectually secure the safety of life & property on board of vessels propelled in whole or in part by steam, and recommending some remedies which their practical experience in the business of steam navigation has suggested to them, Feb. 3, 1852, Petitions and Memorials Laid on the Table, Steam Vessels, March 24, 1852 – Aug., 14, 1852 (Sen32A-J6), 32<sup>nd</sup> Cong., Records of the Senate, RG 46, NA, 2.

<sup>72</sup> *HJ*, 25<sup>th</sup> Cong., 2<sup>nd</sup> sess., June 29, 1838, 1184. Believing that they needed more information while they deliberated on S. 1, the House had asked the Secretary of the Treasury to gather more data, but the report was not available until after the law had been passed. Congress was interested in the effects of the 1838 law and, from the late 1830s into the 1850s, it published information from outside parties, reports from the Executive, as well as inquiries by its own committees. They were encouraged in these efforts by members of the press. After the 1838 law had been in effect for almost a decade, *Scientific American's* editor asked Congress to launch a thorough investigation into “the causes of explosions, [and] the evils of the present ill regulated steamboat system” as well as finding the best remedies. “Explosions of Steam Boilers,” *SA* 3/20, Feb. 5, 1848: 157. The editor also thought that state and local governments ought to investigate explosions within their jurisdictions.

<sup>73</sup> Appendix B: H. Doc. 21, 25<sup>th</sup> Cong., 3<sup>rd</sup> sess., 21, 80, 121, 283, 291, 311, 338, 341. Critics of the 1838 law who advocated for more extensive regulatory measures included three prominent academic scientists, Robert Hare, Professor of Chemistry at the University of Pennsylvania, *Ibid.*, 380-87, Benjamin Silliman of Yale College, 387, and James Renwick of Columbia, 388-390.

<sup>74</sup> The legislature suggested altering the penalty provisions, making it so that, when the proprietors or crew member’s “neglect or misconduct” resulted in the loss of life, the proprietor should pay a sum to the widows and heirs. However, they also asked for (unspecified) “other effective measures to be adopted by the General Government.” Resolutions of Massachusetts in relation to Steam Boats, March 12, 1840, Ref’d May 18, 1840, Petitions and Memorials, Various Subjects, Committee on Commerce (HR26A-G3.11), 26<sup>th</sup> Congress, Records of the House of Representatives, RG 233, NA. For critiques of the provisions of the 1838 law and suggestions for changes, see also Appendix B: H. Rept. 651, 26<sup>th</sup> Cong., 1<sup>st</sup> sess., 6, 16, 20-1, 25-7, 30 and Burke, “Bursting Boilers” in LaFollette and Stine, 59.

Commentators asked Congress for additional intervention into the 1850s.<sup>75</sup> Critics of the 1838 act differed as to the path the government should take. Some policy makers wanted to continue working within the framework of a penalty-centered law using “enhanced civil and criminal liability to promote steamboat safety.”<sup>76</sup> Representatives and officials who supported this approach included Whigs who defended the property rights of businesses and were sympathetic to commercial interests, like Daniel Webster, as well as Democrats who doubted that regulation could be effective.<sup>77</sup> Among the latter was Commissioner of Patents Edmund Burke.<sup>78</sup> A former Congressman from New Hampshire, Burke questioned the logic behind government regulations. Why would they succeed in altering the behavior of engineers and

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<sup>75</sup> Hunter, *Steamboats*, 530. See also, for example, Petitions and Memorials concerning safety of passengers on steam vessels, January 19, Feb. 12, March 6 and April 16, 1846, House of Representatives, Library of Congress Collection, National Archives Box 67 of Library of Congress Box 228, Records of the House of Representatives, RG 233, NA. Petitions and Memorials concerning navigation on the Great Lakes, Jan. 31, 1848 - Feb. 20, 1849; Box 69 of Library of Congress Box 234, Records of the House of Representatives, RG 233, NA. Petitions and Memorials referred to the Commerce Committee regarding the Steamboat Laws, February 4, 1852-July 20, 1852 and August 10-August 13, 1852 (Sen32A-H3.3), Records of the House of Representatives, RG 233, NA. The "Library of Congress Collection" includes materials that were transferred to the Library of Congress from the National Archives and later returned, but not organized or reintegrated. There are note cards referring to the missing documents within the regular Archives folders. There is a hardcopy index of this material in the Center for Legislative Archives. The small Library of Congress boxes were combined into larger National Archives boxes, hence the notation.

<sup>76</sup> Mashaw, “Administration and ‘The Democracy:’ ” 1634. Supporters of the Penalty Option believed that if accidents were investigated promptly and the right combination of sanctions could be applied, the self interest of owners and masters would do the rest. Appendix A: William H. Hale of Brooklyn to Sec’y of Treas. Levi Woodbury, Sept. 16, 1838 in H. Doc. 21, 25<sup>th</sup> Cong., 3<sup>rd</sup> Sess., 395-97.

<sup>77</sup> In 1840, Webster wanted to reinforce the civil and criminal penalty aspects of the 1838 law by deeming all steamboats common carriers so that they would be subject to common law restrictions and lawsuits. He sought to make it clear that any injuries suffered by passengers would require that owners and crews prove that they had not been negligent. Because inspectors had been accused of not performing their duties, Webster also wanted to make them subject to be charged with a high misdemeanor, as well as civil action, if they knowingly declared a vessel to be safe when it was not. *SJ*, 26<sup>th</sup> Cong., 1<sup>st</sup> sess., Feb. 4, 1840, 153-54. On Webster and property rights, see Robert Remini, *Daniel Webster: The Man and His Time* (New York, NY: W. W. Norton & Co., 1997), 459.

<sup>78</sup> Appointed to head the Patent Office by President James K. Polk, Burke wrote in a report printed in 1849 that the “legal remedies for explosions,” could be either “preventative or penal.” He added that the “preventative measures are such as relate to the qualities of the engine, and the qualifications of those who are to inspect and manage it. The penal provisions are those which provide for actions, civil or criminal, against the parties through whose fault injury has been committed.” Burke stated that he preferred penalty legislation. Appendix B: S. Exec. Doc. 18, 30<sup>th</sup> Cong., 2<sup>nd</sup> sess., 25.

other members of the crew, he wondered? The steamboat operators were already willing to risk their own lives. How could a few inspectors make a stronger impression?<sup>79</sup>

Despite the fact that some members of Congress doubted the efficacy of stricter regulations, the 1838 Act made intervention increasingly palatable.<sup>80</sup> While some officials had suggested provisions for more extensive government oversight even before 1838, others converted, including Treasury Secretary Levi Woodbury, who, from 1836 through 1838 became increasingly attracted to regulatory intervention as he learned more about the issue.<sup>81</sup> By the mid-to-late 1840s, congressmen were also tiring of their flirtation with a Technical Option. As we saw in chapter 4, they had grown skeptical that technological advances alone would prevent explosions and were looking for alternate ways to address the problem.<sup>82</sup> However, probably the

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<sup>79</sup> Appendix B: S. Exec. Doc. 18, 30<sup>th</sup> Cong., 2<sup>nd</sup> sess., 29. Burke thought that steamboat men would respond to the fear of financial sanctions, and recommended holding both personal and corporate property as “a *lien*, to respond to the damages of a plaintiff, and that all of the members of the corporate body owning a boat, be held liable jointly and individually for damages.” The assets could then be awarded to the injured or the relatives of those who had been killed. “Steam Boiler Explosions,” SA 4/35, May 19, 1849, 277. See also Mashaw, “Administration and ‘The Democracy.’” 1637.

<sup>80</sup> Hunter, *Steamboats*, 528 and 532. According to Congressman Joseph Rogers Underwood (W, KY), the 1838 law “manifested its sense of the propriety of subjecting steam power . . . and the persons who manage the steam-engine and apparatus, to regulation prescribed by law.” Appendix B: H. Rept. 651, 26<sup>th</sup> Cong., 1<sup>st</sup> sess., 1.

<sup>81</sup> For regulatory bills introduced before 1838, see Appendix A: H.R. 238, 18<sup>th</sup> Cong., 1<sup>st</sup> sess.; H.R. 582, 22<sup>nd</sup> Cong., 1<sup>st</sup> sess.; S. 201, 23<sup>rd</sup> Cong., 1<sup>st</sup> sess.; S. 20, 23<sup>rd</sup> Cong., 2<sup>nd</sup> sess. Secretary Woodbury endorsed a penalty option in the 1836 Treasury Department annual report. *Annual Report of the Sec’y of the Treasury on the Finances*, 24<sup>th</sup> Cong., 2<sup>nd</sup> sess., 1836, S. Doc. 2, 23.

The following year, after reviewing the report by the Franklin Institute, Woodbury shifted his opinion and came to support additional regulatory measures. *Annual Report of the Secretary of the Treasury on the State of the Finances*, 25<sup>th</sup> Cong., 2<sup>nd</sup> sess., 1837, H. Doc. 4, 18. Subsequently, though he continued to advocate for civil and criminal penalties in cases of misconduct, Woodbury endorsed regulatory provisions which would have dictated many operating practices in steamboats. His change of heart came as the Treasury Department compiled extensive testimony on steam accidents and ways to prevent them. At the close of 1838, he recommended that Congress dictate which metals could be used to construct boilers, require boilers to be cleaned frequently, mandate the use of devices to measure the steam pressure and the height of water, limit the maximum amount of steam that could be legally carried, and forbid the use of engines that had not been examined by inspectors. Further, he wanted all vessels, not just steam-driven ones, to carry lifeboats and life-preservers on the Oceans and Great Lakes, have alternate forms of steering available, show lights at night and carry fire-fighting equipment. He also proposed testing and licensing engineers, making sure that the inspectors were knowledgeable and compensating them with government salaries. Appendix B: H. Doc. 21, 25<sup>th</sup> Cong., 3<sup>rd</sup> sess., 6-8.

<sup>82</sup> The New Orleans Chamber of Commerce stated that “ingenuity may exhaust itself in devising contrivances for safety, but her teachings will meet with little favor, unless they point to present gain.” Report and Resolutions adopted by the New Orleans Chamber of Commerce at their meeting on the 10<sup>th</sup> of April, 1851, relative to the



most important factor was that the 1838 law appeared stunningly ineffective despite its severe penalty provisions: explosions and other accidents continued, accompanied by deaths and injuries.<sup>83</sup>

As Senator John Ruggles commented in 1840 while proposing changes to the 1838 law, supporters of a penalty-centered law believed that steamboat operators would look out for the safety of the public, both because their own lives were at stake and because endangering the passengers would damage their own business interests. But Ruggles noted that owners often did not operate their vessels in person and therefore did not identify with the perils experienced by passengers and crews. He also thought that owner's pursuit of profit led them to "underrate the dangers which constantly surround the unwary traveler."<sup>84</sup> Ultimately, Ruggles observed that "we have had too many proofs of the futility of relying alone on the self-interest of proprietors, or the sense of personal hazard of engineers against steamboat disasters. Legislative regulations and penalties must, therefore, interpose their protection."<sup>85</sup> Senator John Davis reasoned similarly when he renewed the call for regulation in 1852. The Penalty Option had proven deficient; he noted that even before the 1838 law, steamboat operators and owners who were

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causes of the Explosion of Steam Boilers, and the measures deemed necessary for the prevention, Ref'd Jan. 22, 1852, Petitions and Memorials Ref'd to Committees, Committee on Commerce, Jan. 22, 1852 – Feb. 17, 1853 (Sen32A-H3.3) Records of the Senate, RG 46, NA, 6. See also Mashaw, "Administration and 'The Democracy:'" 1635.

<sup>83</sup> For a discussion of the failings of the 1838 Act, the problems with enforcing it and ways to evade some of its provisions, see Hunter, *Steamboats*, 532-5, Burke, "Bursting Boilers" in LaFollette and Stine, 59-61 and Mashaw, "Administration and 'The Democracy:'" 1633-36.

<sup>84</sup> Ruggles was a Democrat from Maine who introduced several detailed steamboat bills into the 25th and 26th Congresses. He contended that steamboat engineers became numb to hazards over time, and also that if they were "ignorant of their duties, or [were] of reckless character" they would show little "regard for their own personal safety." *Report of the Committee on Commerce [To accompany bill S. 247] [and] to inquire if the law regulating vessels propelled in whole or in part by steam does not require amendment ...*, 26<sup>th</sup> Cong., March 2, 1840, S. Rept. 241, 1. See also Report and Resolutions adopted by the New Orleans Chamber of Commerce at their meeting on the 10<sup>th</sup> of April, 1851, relative to the causes of the Explosion of Steam Boilers, and the measures deemed necessary for the prevention, Ref'd Jan. 22, 1852, Petitions and Memorials Ref'd to Committees, Committee on Commerce, Jan. 22, 1852 – Feb. 17, 1853 (Sen32A-H3.3) Records of the Senate, RG 46, NA, 3 and Hunter, *Steamboats*, 528-9.

<sup>85</sup> Appendix B: S. Rept. 241, 26<sup>th</sup> Cong., 1<sup>st</sup> Sess., 1.

negligent or careless had been subject to lawsuits and liable for damages under the common law, yet the accidents occurred, regardless.<sup>86</sup> In addition, United States Attorneys had not energetically pursued prosecutions under the 1838 law and this undercut its value as a deterrent.<sup>87</sup>

Critics called the administrative provisions of the 1838 law inadequate, particularly the inspections, because the inspectors did not have the ability, authority or incentive to assure public safety.<sup>88</sup> Tales multiplied of how, eager to earn their fees and move on, inspectors only conducted perfunctory examinations of vessels and, without concrete ways to measure the strength of boilers, such as pressure tests, were in no position to judge if the machinery was

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<sup>86</sup> *CG*, 32<sup>nd</sup> Cong., 1<sup>st</sup> sess., July 12, 1852, 1742. Under the common law, "the master of a vessel who undertakes to convey passengers for a reward [was] bound to carry them safely to the end of the voyage, and ... it [was] incumbent on him ... to exercise the utmost care." Angell, *Law of Carriers*, 557. As one example of a successful suit, passenger John Smith won a jury award of \$8,000 from the owners of the steamboat *Advocate* after his wife was injured and three of his children were killed in an explosion. *NWR*, May 28, 1836, 218.

<sup>87</sup> Criminal violations of the act were rarely prosecuted and despite numerous explosions between 1838 and 1852, the government only indicted 18 people under the manslaughter provisions of the 1838 act. Nine defendants were convicted, but most were punished only by fines, which were later remitted. Burke, "Bursting Boilers," 18 and Hunter, *Steamboats*, 534. Prosecutors may have hesitated to pursue cases and juries been reluctant to convict because, regardless of the strict liability standard and presumption of guilt in the 1838 law, it was often "difficult to isolate a negligent act or to identify a single causally responsible agent" in legal cases that dealt with complex technological systems. Nan Goodman, *Shifting the Blame: Literature, Law, and the Theory of Accidents in Nineteenth-Century America* (New York, NY: Routledge, 2000), 74. The lack of prosecutions, convictions and tough sentences was probably an example of what Lawrence Friedman has described as a gap between the "formal harshness" of law as "compared to what the moral sense of the community allowed." Friedman, *History of American Law*, 284.

<sup>88</sup> Hunter, *Steamboats*: 533-4. Under the 1838 act, the \$5 fee per inspection was scant compensation, making it difficult to attract capable people to be inspectors and inclining them to do their jobs quickly. Because the vessel's proprietor paid the fee directly to the inspector it increased the opportunities for bribery. Appendix B: H. Rpt 651, 26<sup>th</sup> Cong., 1<sup>st</sup> sess., 26. See also Report and Resolutions adopted by the New Orleans Chamber of Commerce relative to the causes of the Explosion of Steam Boilers, and the measures deemed necessary for their preservation, adopted April 10, 1851, ref'd Jan. 22, 1852, Petitions and Memorials Ref'd to Committees, Commerce Committee, Jan. 22, 1852-Feb. 17, 1853 (Sen32A-H3.3), Records of the Senate, RG 46, NA, 10-11. Inspectors were appointed by district court judges, who were generally not qualified to determine the expertise of their appointees. How could anyone, asked one critic, "expect, or reasonably hope for the prosperity of any art, law, or science, conducted or administered by improper hands[?]" Appendix B: S. Doc. 217, 25<sup>th</sup> Cong., 3<sup>rd</sup> sess., 1. See also Appendix B: H. Rpt. 651, 26<sup>th</sup> Cong., 1<sup>st</sup> sess., 32. Steamboat operators were free to shop around for the least stringent inspectors. See comments by Senator Solomon Downs (D, LA), *CG*, 31<sup>st</sup> Cong., 2<sup>nd</sup> sess., Jan. 27, 1851, 346 and *CG*, 32<sup>nd</sup> Cong., 1<sup>st</sup> sess., Feb. 9, 1852, 504. Legislators complained that inspectors were not available in certain areas and many steamboats had to travel long distances to be inspected. See the remarks by Senators Joseph Rogers Underwood (W, KY) and Stephen A. Douglas (D, IL), *CG*, 31<sup>st</sup> Cong., 2<sup>nd</sup> sess., Jan. 27, 1851, 346-7 and Solon Borland (D, AR), *CG*, 32<sup>nd</sup> Cong., 1<sup>st</sup> sess., Feb. 9, 1852, 504.

safe.<sup>89</sup> As Representative Elihu Washburne later stated, “the inspection required by the law of 1838 is a mere farce, and ineffectual for the objects contemplated.”<sup>90</sup>

#### **4. “Much Good will result from Legislation on the Subject”**

Two years after the 1838 law was passed, Whig Congressman (and later Senator) Joseph Rogers Underwood wrote that government intervention was justified by “the appalling destruction of life and property resulting from steamboat disasters,” was convinced that Congress could do more and stated “that much good will result from legislation on the subject.”<sup>91</sup>

Lawmakers introduced 26 bills and joint resolutions dealing with steamboat safety from 1839 through 1852. Eleven of the bills centered on new regulations, seven proposed minor alterations in the existing law, and nine focused on testing or purchasing safety equipment.<sup>92</sup>

By the early 1850s, a wide array of individuals and groups wanted to change the 1838 law, including concerned steamboatmen, marine insurers, lifesaving societies, newspaper editors,

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<sup>89</sup> *CG*, 32<sup>nd</sup> Cong., 1<sup>st</sup> sess., Feb. 9, 1852, 505.

<sup>90</sup> *Report of the Committee on Commerce on Better Security of Life on Board of Vessels Propelled by Steam [to accompany bill H.R. No. 92]*, 34<sup>th</sup> Cong., 1<sup>st</sup> sess., April 22, 1856, H. Rept. 68, 1. The 1838 law continued to govern inspections for cargo and tow vessels even after the 1852 law went into effect. As a member and chairman of the House Commerce Committee, Washburne oversaw attempts to completely replace the 1838 system with the one founded in 1852. See Appendix A: H.R. 92, 34<sup>th</sup> Cong., 1<sup>st</sup> sess.; H.R. 45, 35<sup>th</sup> Cong., 1<sup>st</sup> sess.; H.R. 114, 36<sup>th</sup> Cong., 1<sup>st</sup> sess.

<sup>91</sup> Appendix B: H. Rpt. 651, 26<sup>th</sup> Cong., 1<sup>st</sup> sess., 1.

<sup>92</sup> One of the bills, H.R. 602, fell into two of these categories as it both made minor changes in the 1838 law and authorized additional tests of safety devices. Appendix A: the eleven regulatory bills were S. 303, 25<sup>th</sup> Cong., 3<sup>rd</sup> sess.; S. 247, 26<sup>th</sup> Cong., 1<sup>st</sup> sess.; H.R. 486, 26<sup>th</sup> Cong., 1<sup>st</sup> sess.; S. 148, 26<sup>th</sup> Cong., 2<sup>nd</sup> sess.; H.R. 71, 28<sup>th</sup> Cong., 1<sup>st</sup> sess.; H. R. 305, 29<sup>th</sup> Cong., 1<sup>st</sup> sess.; H.R. 218, 30<sup>th</sup> Cong., 1<sup>st</sup> sess.; H.R. 254, 30<sup>th</sup> Cong., 1<sup>st</sup> sess.; S. 284, 31<sup>st</sup> Cong., 1<sup>st</sup> sess.; H.R. 386, 31<sup>st</sup> Cong., 1<sup>st</sup> sess.; S. 223, 32<sup>nd</sup> Cong., 1<sup>st</sup> sess. Seven bills proposed minor alterations in the 1838 law by adding additional penalties, modifying the requirements for safety equipment or adding inspectors: H.R. 1071, 25<sup>th</sup> Cong., 3<sup>rd</sup> sess.; H. R. 602, 27<sup>th</sup> Cong., 2<sup>nd</sup> and 3<sup>rd</sup> sess.; H.R. 609, 29<sup>th</sup> Cong., 2<sup>nd</sup> sess.; H.R. 254, 30<sup>th</sup> Cong., 1<sup>st</sup> sess.; S. 242, 31<sup>st</sup> Cong., 1<sup>st</sup> sess.; S. 60, 31<sup>st</sup> Cong., 1<sup>st</sup> sess.; S. 25, 32<sup>nd</sup> Cong., 1<sup>st</sup> sess. Nine bills and joint resolutions provided for testing or purchasing safety inventions, or investigating the causes of explosions: H. R. 484, 26<sup>th</sup> Cong., 1<sup>st</sup> sess., H. R. 485, 26<sup>th</sup> Cong., 1<sup>st</sup> sess.; H.J.R. 19, 27<sup>th</sup> Cong., 2<sup>nd</sup> sess. H.R. 602, 27<sup>th</sup> Cong., 2<sup>nd</sup> and 3<sup>rd</sup> sess.; S.J.R. 8, 27<sup>th</sup> Cong., 3<sup>rd</sup> sess., H. R. 829, 27<sup>th</sup> Cong., 3<sup>rd</sup> sess.; H. R. 594, 28<sup>th</sup> Cong., 2<sup>nd</sup> sess.; H. J. R. 11, 29<sup>th</sup> Cong., 1<sup>st</sup> sess.; S. J. R. 12, 32<sup>nd</sup> Cong., 1<sup>st</sup> sess.

citizens in ports and river towns, travelers, and immigrant protection organizations.<sup>93</sup>

Contemporary maritime dangers of other sorts probably made the public and legislators

sympathetic to calls for more government intervention. Stories of poor conditions aboard ships

headed to California during the gold rush likely increased the general aura of concern.<sup>94</sup>

Growing immigration also called attention to the problem and led the Mayor and City Council of

St. Louis to ask Congress in 1850 to regulate carriage of emigrant passengers on Mississippi

River steamers to prevent the overcrowding which increased both the number of casualties from

exploding boilers and contributed to the spread of disease.<sup>95</sup>

Marine insurers had both commercial and charitable concerns when they organized a

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<sup>93</sup> John K. Brown, *Limbs on the Levee: Steamboat Explosions and the Origins of Federal Public Welfare Regulation, 1817-1852* (Middlebourne, WV: International Steamboat Society, 1989), 62-64; J. B. D. Debow, "Editorial and Literary Department," *Debow's Review* 11/1 (July 1851): 96; Appendix B: S. Doc. 11, 29<sup>th</sup> Cong., 2<sup>nd</sup> sess., 9, 11-12, 14, 17; Memorial of the Cincinnati and Pittsburg Associations of Steamboat Engineers, of captains and owners of steamboats, of officers of insurance companies and other citizens ... praying enactment of such laws as will more effectually secure the safety of life and property on board vessels ... , Feb. 3, 1852, Petitions and Memorials Laid on the Table, Steam Vessels, March 24, 1852-Aug. 14, 1852 (Sen32A-J6), 32<sup>nd</sup> Congress, Records of the Senate, RG 46, NA; Proceedings of a Public Meeting of Masters of Steamers and Forwardens, held at the City of Buffalo, N.Y. in Relation to a plan of Signal Lights on Steam and Sail vessels ... , Committee on Commerce, Referred Feb. 21, 1849, Petitions and Memorials Referred to Committees, Various Subjects, Folder 1 of 3 (HR30A-G4.7), 30<sup>th</sup> Cong., Records of the House of Representatives, RG 233, NA; Petitions from Citizens of Buffalo (and others in Indiana and Pennsylvania on the Lakes) that vessels may be compelled to carry lights at night so as to indicate their course ... , Committee on Commerce, Referred Feb. 5, 6, 9, 17, and 27, 1849, Petitions and Memorials Referred to Committees, Various Subjects, Folder 3 of 3 (HR30A-G4.7), 30<sup>th</sup> Cong., Records of the House of Representatives, RG 233, NA; J. B. D. Debow, "Miscellaneous," *Debow's Review* 8/1 (Jan. 1850): 91; J. B. D. Debow, "Internal Improvements," *Debow's Review* 13/4 (Oct. 1852): 411-412; Petition of the German Society of New Orleans, praying Congress to pass some law regulating the number of Passengers to be carried on steamers on the inland waters of the United States, Referred Feb. 15, 1850, and Petition of Citizens of Louisville, KY praying the passage of a law to regulate the number of steerage passengers on Steamboats, Referred June 14, 1850, Committee on Commerce, Petitions and Memorials Referred to Committees, Security of Life on Board Steam Vessels, H.R. 386 (HR31A-G3.8), 31<sup>st</sup> Congress, Records of the House of Representatives, RG 233, NA. Many of the communications sent to the House of Representatives when the 1852 Steamboat Act was being considered can be found in Petitions and Memorials referred to Committees, Committee on Commerce, Steam Boat Laws, Feb. 4, 1852-July 20, 1852; Aug. 10-11, 1852; Aug. 12, 1852; and Aug. 13, 1852-Feb. 23, 1853 (HR32A-G4.10), Records of the House of Representatives, RG 233, NA. See also Hunter, *Steamboats*, 535.

<sup>94</sup> Memorial of the passengers onboard the Steam Ship *Falcon* bound for California ... and praying Congress for immediate action ... to prevent ... imposition and injustice, referred June 27, 1850, Committee on Commerce, Petitions and Memorials, Security of Life on Board Steam Vessels, H.R. 386 (HR31A-G3.8), 31<sup>st</sup> Congress, Records of the House of Representatives, RG 233, NA. Resolutions of the Legislature of Maine in relation to the abuses of passengers in California Steamers, March 22, 1852, Petitions and Memorials Laid on the Table, Steam Vessels, March 24, 1852-Aug. 14, 1852 (Sen32A-J6), 32<sup>nd</sup> Congress, Records of the Senate, RG 46, NA.

<sup>95</sup> *CG*, 31<sup>st</sup> Cong., 1<sup>st</sup> Sess., June 3, 1850, 1110-1111.

petitioning campaign to change the law in 1852.<sup>96</sup> They were already in the habit of asking Congress to fund lighthouses and other aids to navigation<sup>97</sup> and were looking to expand their businesses as markets for marine insurance grew in the 1840s and 50s while foreign trade expanded and passenger traffic to California increased during the gold rush.<sup>98</sup> One leading figure, Walter Restored Jones, the head of Atlantic Mutual Insurance, had already established his humanitarian bona fides by founding the Life-Saving Benevolent Association of New York, which sought to rescue shipwreck victims along the approaches to New York harbor.<sup>99</sup>

Even with widespread and diverse support, bill drafters were challenged to devise a law that, in the words of the *North American Review*, could be “intelligently adopted, systematically pursued, and rigidly enforced.”<sup>100</sup> To formulate it they drew information from European nations, technical experts, state and local governments, professional associations of steamboat engineers, and other sources.<sup>101</sup> Though the specifics varied, the regulatory proposals typically included five types of provisions: 1) government inspectors would test boilers and approve other aspects

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<sup>96</sup> Brown, *Limbs on the Levee*, 62-64.

<sup>97</sup> For example, see Memorial of Walter R. Jones, President of the Atlantic Mutual Insurance Company & other Merchants ... of New York City asking Congress to cause another light-house to be erected off Cape Hatteras & also for a Light-House on Flynn’s Knoll, January 9, 1851, referred Jan. 14, 1851, Petitions and Memorials referred to Committees, Committee on Commerce, Jan. 3, 1851-Feb. 11, 1851 (HR31A-G3.1), 31<sup>st</sup> Congress, Records of the House of Representatives, RG 233, NA. Memorial of Ship Owners & Insurance Companies of the City of New York praying for the locating of a Light Ship & Fog Bell off Cape Roman, Jan. 24, 1852, referred Feb. 3, 1852, Petitions and Memorials referred to Committees, Committee on Commerce, Breakwaters, Buoys, etc., Feb. 3, 1852 (Sen32A-G4.1), 32<sup>nd</sup> Congress, Records of the Senate, RG 46, NA.

<sup>98</sup> Johnson & Higgins Co., *The First Hundred Years of an American Institution: The Story of Johnson & Higgins, Insurance Brokers and Average Adjusters, From 1845 to 1945* (New York, NY: Johnson & Higgins, 1945), 40-41.

<sup>99</sup> On Jones, see Robert G. Albion, *The Rise of New York Port: 1815-1860* (1939; reprint, New York, NY: Charles Scribner’s Sons, 1970), 273. On the Benevolent Association, see Memorial of the Life Saving Benevolent Association of New York, referred Mar. 15, 1850, Committee on Commerce, Petitions and Memorials on Various Subjects, March 4, 1850-March 29, 1850 (HR31A-G3.9), 31<sup>st</sup> Congress, Records of the House of Representatives, RG 233, NA.

<sup>100</sup> “Steamboat Disasters.” *North American Review* 50/106 (January 1840): 37.

<sup>101</sup> Hunter, *Steamboats*, 525-26, 530-31, 535; Burke, “Bursting Boilers,” 45 and 61. For accounts of European laws, see Appendix B: H. Doc. 131, 21<sup>st</sup> Cong., 2<sup>nd</sup> sess., 2; H. Doc. 478, 23<sup>rd</sup> Cong., 1<sup>st</sup> sess., 63-76; S. Doc. 270, 26<sup>th</sup> Cong., 1<sup>st</sup> sess., 9; S. Doc. 4, 31<sup>st</sup> Cong., Special sess., 17-18.

of design and materials, including boiler metal; 2) members of the crew, such as pilots and engineers, would be tested and licensed; 3) the inspectors should ensure that vessels had certain types of safety equipment, including safety valves, fire engines, lifeboats, and life jackets; 4) the government should set standards for operation, such as maximum pressures for boilers and rules indicating how to pass other vessels; and 5) those who refused to comply with these provisions should be fined or otherwise punished, including having their licenses suspended or revoked.<sup>102</sup> While there was a general consensus that regulatory intervention, if pursued, would include some version or subset of these five categories, observers were less certain of how to implement them effectively. The editor of *Scientific American*, for instance, was not confident that regulations could be enforced.<sup>103</sup>

Louis Hunter credits passage of the 1852 Steamboat Act to the disasters that increased the pressure for change which overwhelmed the status quo, while he attributes the specific characteristics of the law to a process as members of Congress learned how to regulate.<sup>104</sup> John Burke concludes that the “scientific and technologically knowledgeable members of society,” like members of the Franklin Institute, played a special role in formulating the act and supporting its passage.<sup>105</sup> Jerry Mashaw has noted that Steamboat Act introduced the major innovation by creating the first example of a bureaucratically “modern” administrative structure.<sup>106</sup>

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<sup>102</sup> Appendix A. Early outlines of these features can be traced back to an 1817 report by the British House of Commons. Hunter, *Steamboats*, 531-32. Another early source was an 1817 report by a committee of the Philadelphia Common Council. Appendix B: H. Rept. 125, 18<sup>th</sup> Cong., 1<sup>st</sup> sess., 8. Members of Congress proposed some regulatory elements in the earliest bills going back to 1824; Appendix B: H. Doc. 69, 18<sup>th</sup> Cong., 2<sup>nd</sup> sess., 9, 12-13, 16.

<sup>103</sup> “Bill to Prevent Explosions,” *SA*, 7/45 (July 25, 1852): 357 and “The New Safety Steamboat Law,” *SA*, 8/1 (Sept. 18, 1852): 5.

<sup>104</sup> Hunter, *Steamboats*, Ch. 13. In the same vein, historian George Rogers Taylor wrote that the public forced Congress to act in 1852 after numerous boiler explosions. George Rogers Taylor, *The Transportation Revolution, 1815-1860* (New York, NY: Rinehart & Co., 1951), 68, 69.

<sup>105</sup> Burke, “Bursting Boilers:” 3.

<sup>106</sup> Mashaw, “Administration and ‘The Democracy:’ ” 1638.

Despite the virtues of these histories, Hunter, Burke and Mashaw have not provided an adequate account of how the form and passage of the 1852 Act was contingent on the actions of a small number of legislators in the House and Senate who played indispensable rolls in drafting the bill and guiding it to passage. Given the ongoing disasters, widespread support for government action, and the fact that members introduced a number of bills that passed at least one house of Congress during the 31<sup>st</sup> and 32<sup>nd</sup> Congresses, they were likely to revise the 1838 law in some way. But calls for change from the public and interest groups did not automatically translate into congressional action and did not dictate the specific features of any new law. Congress could have continued to make minor adjustments, as it did in 1843, 1847 and 1849, rather than creating a new regulatory system.<sup>107</sup> It could also have enhanced the Penalty Option in the vein suggested by Commissioner of Patents Edmund Burke and others.<sup>108</sup>

Another possible scenario could have entailed passage of a law that included all or some of the five major regulatory features, but without the administrative provisions designed to make them effective. Though members proposed various bills that fit this profile, legislation of this sort came close to passing the 31<sup>st</sup> Congress after Robert M. McLane, Chairman of the House

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<sup>107</sup> Appendix A: H.R. 602, 27<sup>th</sup> Cong., 3<sup>rd</sup> sess.; H. R. 637, 29<sup>th</sup> Cong., 2<sup>nd</sup> sess.; H. R. 738, 30<sup>th</sup> Cong., 2<sup>nd</sup> sess. Senator Solon Borland of Arkansas sponsored bills (which were passed by the Senate, but not the House) that would have simply permitted the appointment of additional inspectors under the 1838 statute. Appendix A: S. 60, 31<sup>st</sup> Cong., 1<sup>st</sup> sess.; S. 25, 32<sup>nd</sup> Cong., 1<sup>st</sup> sess.

<sup>108</sup> On Edmund Burke's plans, see Appendix B: S. Exec. Doc. 18, 30<sup>th</sup> Cong., 2<sup>nd</sup> sess., 29. For an example of a bill that would have provided a revised penalty-centered law, see Appendix A: H.R. 254, 30<sup>th</sup> Cong., 1<sup>st</sup> sess. Legislators who preferred a penalty option included Senator Stephen Mallory (D, FL) who objected to imposing regulations and said that passengers would be better protected by provisions "by which the owners of steam passenger vessels *will be held accountable for losses*, and leaving them to choose what means [of keeping their vessels safe] they choose to employ." *CG*, 32<sup>nd</sup> Cong., 1<sup>st</sup> sess., July 9, 1852, 1702. Emphasis added. He later elaborated by suggesting that the owners of vessels should post a bond when their vessels were registered or enrolled and that the bond would compensate those who were injured or whose property was damaged in a boiler explosion. *Ibid.*, July 12, 1852, 1742. While the House debated S. 223 in 1852, New York Whig Obadiah Bowne proposed a substitute that would have cut all of the regulatory portions of the bill and instead imposed a \$1,000 fine on the owners if a boiler explosion caused the loss of life; it would have also made the captain, pilot, and engineer liable to fines and up to 10 years of imprisonment if they defaulted on the fine. No new administrative apparatus would be required; the federal district attorney would initiate legal proceedings in district court. *CG*, 32<sup>nd</sup> Cong., 1<sup>st</sup> sess., Aug. 25, 1852, 2345. See also "The Steamboat Safety Bill," *SA*, 7/51 (Sept. 4, 1852): 402.

Commerce Committee, introduced H.R. 386 in September 1850.<sup>109</sup> McLane's bill was slightly more than seven pages long, mandated inspections and standards for construction, and directed steamboats to carry firefighting equipment and other safety devices.<sup>110</sup> McLane shepherded it through the House in less than a month and it passed without a roll call vote.<sup>111</sup> John Davis assumed charge of the measure and reported it out of the Senate Commerce Committee without amendment, but the Senate took no further action as the session ended shortly thereafter.<sup>112</sup> In the second session, Davis held the bill in committee while amending it extensively, reporting it in February 1851 with two weeks left in the session. The bill expired when the 31<sup>st</sup> Congress concluded in March.<sup>113</sup>

Despite the fact that the measure was not enacted, Davis's amendments to H.R. 386 marked a significant step toward a more modern set of standards for regulatory oversight. One of the biggest challenges for Davis, or for anyone who revised the system, was to address the flawed provisions for administering the 1838 act.<sup>114</sup> Doing so necessitated creating "formal legality in administration," with "rules, routines, and organizational checks and balances that promoted bureaucratic adherence to effective and consistent implementation of statutory mandates" overseen by "officials who were detached, objective, expert and legally accountable."<sup>115</sup> To this end Davis developed more detailed specifications than had been found in any previous bill. For example, in one lengthy section he divided the tasks of the inspectors

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<sup>109</sup> McLane was a Democrat from Maryland.

<sup>110</sup> Appendix A: H.R. 386, 31<sup>st</sup> Cong., 1<sup>st</sup> and 2<sup>nd</sup> sess.; *HJ*, 31<sup>st</sup> Cong., 1<sup>st</sup> sess., Sept. 7, 1850, 1415.

<sup>111</sup> *CG*, 31<sup>st</sup> Cong., 1<sup>st</sup> sess., Sept. 7, 1850, 1769; Sept. 24, 1850, 1952 and Sept. 25, 1850, 1961; *HJ*, 31<sup>st</sup> Cong., 1<sup>st</sup> sess., Sept. 25, 1850, 1529-30.

<sup>112</sup> *SJ*, 31<sup>st</sup> Cong., 1<sup>st</sup> sess., Sept. 25, 1850, 674 and Sept. 28, 1850, 688 and 697. See also *CG*, 31<sup>st</sup> Cong., 1<sup>st</sup> sess., Sept. 28, 1850, 2050 and 2068.

<sup>113</sup> *SJ*, 31<sup>st</sup> Cong., 2<sup>nd</sup> sess., Feb. 15, 1851, 183.

<sup>114</sup> Hunter, *Steamboats*, 534.

<sup>115</sup> Mashaw, "Administration and 'The Democracy:'" 1618, 1619.



into subspecialties and outlined the types of practical experience that would qualify them to serve. He elaborated on the duties of the inspectors and laid out the criteria for boats to pass inspection. Davis also listed the prerequisites for engineers and pilots to earn their licenses, as well as circumstances that would justify revoking them.<sup>116</sup>

Davis, a lawyer and experienced legislator, enjoyed latitude to amend H.R. 386 because he had become the *de facto* point person on the Senate Committee on Commerce at a time when the commerce committees of the two houses were the main venues for considering the issue of steamboat safety.<sup>117</sup> He had been looking into the problems of the 1838 steamboat act since 1847, reviewing reports on steam vessel accidents, composing bills and taking charge of ones that originated in the House.<sup>118</sup> Davis had received a 94-page compilation of government reports on steamboat disasters in March 1849 which indicated that representatives of steamboat engineers were willing to come to Washington to help frame a bill, endorsed the establishment of boards to examine and license engineers as in Britain and France, noted the limits of the Penalty Option, requested better inspections, and asked for more extensive requirements for safety devices.<sup>119</sup>

With the amendments Davis made to H.R. 386 during the winter of 1850-51, he composed bureaucratic specifications that he eventually included in the 1852 Steamboat Act, however, he also likely undermined the bill's chances for passing the 31<sup>st</sup> Congress because he

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<sup>116</sup> Copies of versions of H.R. 386, 31<sup>st</sup> Cong., can be found at Library of Congress, American Memory, A Century of Lawmaking for a New Nation, Bills and Resolutions, <http://memory.loc.gov/cgi-bin/ampage>.

<sup>117</sup> Davis introduced a brief bill on the topic in July 1850. Appendix A: S. 254, 31<sup>st</sup> Cong., 1<sup>st</sup> sess. He took charge of H.R. 386 in the Senate when the second session of the 31<sup>st</sup> Congress began in December. *SJ*, 31<sup>st</sup> Cong., 2<sup>nd</sup> sess., Dec. 10, 1850, 31.

<sup>118</sup> *SJ*, 20<sup>th</sup> Cong., 1<sup>st</sup> Sess. Dec. 15, 1847, 56. Appendix B: S. Rept. 241, 30<sup>th</sup> Cong., 1<sup>st</sup> sess.; S. Exec. Doc. 18, 30<sup>th</sup> Cong., 2<sup>nd</sup> sess.; S. Doc. 4, 31<sup>st</sup> Cong., Special sess.; S. Misc. Doc. 13, 31<sup>st</sup> Cong., 2<sup>nd</sup> sess.; S. Exec. Doc. 42, 32<sup>nd</sup> Cong., 1<sup>st</sup> sess.; S. Misc. Doc. 32, 32<sup>nd</sup> Cong., 1<sup>st</sup> sess.; S. Misc. Doc. 84, 31<sup>st</sup> Cong., 1<sup>st</sup> sess. Appendix A: S. 284, 31<sup>st</sup> Cong., 1<sup>st</sup> sess.; H.R. 386, 31<sup>st</sup> Cong., 1<sup>st</sup> sess.; S. 223, 32<sup>nd</sup> Cong., 1<sup>st</sup> sess.; S.J.R. 67, 32<sup>nd</sup> Cong., 2<sup>nd</sup> sess.; S.J.R. 79, 32<sup>nd</sup> Cong., 2<sup>nd</sup> sess.

<sup>119</sup> Appendix B: S. Doc. 4, 31<sup>st</sup> Cong., Special sess., 14, 16, 17, 39-41, 48-49, 71-73, 91-93.

completed his amendments late in the second and final session. Had Davis begun pushing for the House's version of the bill rather than keeping it in committee, or had some other senator been in charge of advancing it, H.R. 386 might have become law.<sup>120</sup> This measure would have put in place more extensive regulations than the 1838 act, but would still have been less sophisticated than the bill Davis eventually proposed in 1852.

Davis was more responsible than any other lawmaker for shaping the 1852 Steamboat Act. Like many Americans, he embraced the ways that steam power was transforming the country.<sup>121</sup> Originally a Federalist, then a National Republican opposing Andrew Jackson, he later joined the Whig Party. Nicknamed "Honest John," he was well liked and respected in Massachusetts.<sup>122</sup> Elected to the House in 1824 from the Worcester area, he served from 1825 to 1834, and was then elected governor, serving for 14 months in 1834-35. He was a senator from 1835 to 1841, Massachusetts's governor again from 1841-1843, and then returned to the Senate in 1845, where he remained until he retired in March 1853. He died the following year.

Davis served most of his professional life in the shadow of his colleague, Daniel Webster. He did not have Webster's transcendent skills as an orator, but his thoughtful speeches, weighty with evidence, reflected his particular strengths and interests.<sup>123</sup> Of the two, Davis was

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<sup>120</sup> The fact that the House had already passed H.R. 386 and that the Senate had passed a set of minor additions to the 1838 act, S. 242, indicated that members in both house supported changing the steamboat laws. It seems unlikely that President Millard Fillmore would have vetoed the measure since he signed an even more elaborate steamboat bill in 1852.

<sup>121</sup> Hon. John Davis' Address Delivered before the American Institute in New York, Oct. 18, 1838 (Springfield, MA: A. G. Tannant, 1839), 10-11. American Antiquarian Society, Worcester, MA.

<sup>122</sup> *The National Cyclopaedia of American Biography* (New York, NY: James T. Whitehead and Co., 1891), 113. Additional biographical background on Davis is taken from Allen Johnson and Dumas Malone, eds. *Dictionary of American Biography*, vol. 3, part 1 (New York, NY: Charles Scribner's Sons, 1958), 133-134, and *The Imperial Dictionary of Universal Biography: A Series of Original Memoirs of Distinguished Men*, vol. 2 (London, England: William MacKenzie, n.d.), 39. Davis is perhaps best known to historians for his ill-timed speech on the Wilmot Proviso that inadvertently prevented a Senate vote on the measure in 1846. David M. Potter, *The Impending Crisis: 1848-1861* (New York, NY: Harper Torchbooks, 1976), 22, and David Herbert Donald, *Charles Sumner and the Coming of the Civil War* (New York, NY: Fawcett Columbine, 1960), 157.

<sup>123</sup> Introducing S. 223 in the Senate, Davis provided considerable statistical information that he had gathered

almost certainly the better legislator. Webster never shepherded a prominent piece of legislation through Congress despite his rhetorical skills, fame, and long service.<sup>124</sup> Davis, by contrast, was a Senate workhorse.<sup>125</sup> Though he was remembered for his authorship of the Steamboat Act, his greatest interest through his career was the protective tariff. He excelled at committee work and devoted substantial labor to issues like tariffs and supporting the New England fishing industry. The fact that he crafted a Steamboat Act that was both “disinterested in its aims, and politically unobscured [sic]” was typical of the man.<sup>126</sup>

Davis’s attention to detail helped him compose complex legislation, and he had the patience and ability to work with colleagues to guide it through Congress. A fellow Whig, Charles Hudson of Massachusetts, recalled that Davis would quietly cultivate members of the House Ways and Means Committee to shape pending tariff bills and also buttonhole senators to prepare the way for a “favorable reception” in the upper chamber.<sup>127</sup> Davis had been a member of the Commerce Committee in the House and later served on the Senate Committee on Commerce, including a stint as chairman during the 24<sup>th</sup> Congress. As a member he worked on various issues related to maritime safety. In 1837 he introduced bills to test boiler safety

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while drafting the bill. *CG*, 32<sup>nd</sup> Cong., 1<sup>st</sup> sess., July 7, 1852, 1667-8 and “32nd Congress ... First Session,” *NYDT*, July 8, 1852, 1. See also Thomas Kinnicut, *Notice of the Life and Character of Hon. John Davis, Read Before the American Antiquarian Society, at the Meeting Held in Boston on the 26<sup>th</sup> of April, 1854* (Boston, MA: John Wilson & Son, 1854), 8.

<sup>124</sup> Robert Remini, *Daniel Webster, The Man and His Time* (New York, NY: W. W. Norton and Co., 1997), 107, 214, 272-273, 474. Webster tended to avoid the pedestrian aspects of his senatorial duties, typically arriving late to Washington for the opening of Congress. Charles Hudson, “The Character of the Late Hon. John Davis of Worcester, Mass.,” unpublished manuscript, 1864, 20-21, 26. American Antiquarian Society, Worcester, MA.

<sup>125</sup> In addition to the steamboat bill, Davis worked on a number of time-consuming projects from 1850-52, including the 1850 census, the contested election between David Yulee and Stephen Mallory in Florida, and took charge in the Senate of the massive 1852 rivers and harbors bill. *CG*, 31<sup>st</sup> Cong., 1<sup>st</sup> sess., Feb. 4, 1850, 283; *SJ*, 32<sup>nd</sup> Cong., 1<sup>st</sup> sess., Dec. 2, 1851, 8; *APG*, 32<sup>nd</sup> Cong., 1<sup>st</sup> sess., Aug. 18, 2012, 985.

<sup>126</sup> Alonzo Hill, “The Perfect Man: A Sermon on the Death of Hon. John Davis,” preached at Worcester, MA, April 23, 1854 (New York, NY: Charles B. Norton [private printing]), 15. American Antiquarian Society, Worcester, MA.

<sup>127</sup> Hudson, “The Character of the Late Hon. John Davis of Worcester, Mass.,” 18-20, 27.

inventions and allow U.S. vessels to cruise the coast during the winter to aid distressed vessels. He had been in charge of lighthouse appropriations in the Senate, oversaw bills to improve passenger safety on ocean voyages and was interested in supporting marine hospitals for aged seamen.<sup>128</sup>

After the 31<sup>st</sup> Congress ended, Davis requested a study of the country's steam marine from the Treasury Department.<sup>129</sup> He and the Whigs were in the minority when the 32<sup>nd</sup> Congress opened in December 1851, but this did not substantially affect his role in drafting steamboat legislation.<sup>130</sup> Davis was reappointed to the Commerce Committee,<sup>131</sup> and Chairman Hannibal Hamlin designated him as a one-person "subcommittee" to work on the issue.<sup>132</sup> In the winter of 1852, Davis explained that the subject was "so complicated that a great deal of information is necessary to frame a bill. That information has come in, some of it more slowly than I could wish. ... The whole subject ... will be brought under the consideration of the Senate, with the design of giving the most ample protection to life and property which it is in the power

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<sup>128</sup> *CG*, 24<sup>th</sup> Cong., 2<sup>nd</sup> Sess., Feb. 1, 1837, 144 and Feb. 10, 1837, 170; *NWR*, Dec. 16, 1837, 250; "In Senate, Tuesday, Jan. 23, 1838," *The Globe* (Washington, DC: Blair and Rives), January 24, 1838. See also Appendix A: S. 183, 24<sup>th</sup> Cong., 2<sup>nd</sup> sess.; S. 310, 26<sup>th</sup> Cong., 1<sup>st</sup> sess.; S. 177, 29<sup>th</sup> Cong., 2<sup>nd</sup> sess.; H.R. 292, 30<sup>th</sup> Cong., 1<sup>st</sup> sess.; S. 260, 32<sup>nd</sup> Cong., 1<sup>st</sup> sess. Regarding lighthouses, see *SJ*, 31<sup>st</sup> Cong., Special sess., March 15, 1849; *SJ*, 32<sup>nd</sup> Cong., 1<sup>st</sup> sess., Jan. 26, 1852, 147. Regarding marine hospitals, see *SJ*, 32<sup>nd</sup> Cong., 2<sup>nd</sup> sess., March 3, 1853, 284.

<sup>129</sup> *SJ*, 31<sup>st</sup> Cong., 2<sup>nd</sup> sess. (Special Sess.), March 5 and March 12, 1851, 285 and 296; Appendix B: S. Exec Doc. 42, 32<sup>nd</sup> Cong., 1<sup>st</sup> sess.

<sup>130</sup> In the 32<sup>nd</sup> Congress there were 36 Democrats, 23 Whigs, and 3 Free Soilers in the Senate and 127 Democrats and 85 Whigs in the House, with 21 other seats filled by minor parties or factions (1 Independent Whig, 4 Free Soilers, 10 Unionists, 3 States Rights, and 3 Independent Democrats). Kenneth C. Martis, *The Historical Atlas of Political Parties in the United States Congress, 1789-1989* (New York, NY: MacMillan, 1989), 105. Subsequent discussion of party affiliations rely on this source.

<sup>131</sup> *SJ*, 32<sup>nd</sup> Cong., 1<sup>st</sup> sess., Dec. 8, 1851, 35.

<sup>132</sup> *SJ*, 32<sup>nd</sup> Cong., 1<sup>st</sup> sess., Dec. 9, 1851, 44-45. Hamlin was a Democrat from Maine, but he and Davis worked well together in the Commerce Committee, despite being from different parties. According to Hamlin, all of the communications received on steamboat legislation during the first session of the 32<sup>nd</sup> Congress were referred to Davis, who "manifested great industry and signal ability" in drafting the legislation. After introducing the bill, Davis took charge of managing it on the Senate floor, with an occasional assist from Hamlin. *CG*, 32<sup>nd</sup> Cong., 1<sup>st</sup> sess., March 12, 1852, 724.

of Congress to afford.”<sup>133</sup> Using his amended version of H.R. 386 from the previous Congress as a starting point, Davis added standards for boiler construction, procedures for compensating inspectors, and requirements for record-keeping.<sup>134</sup>

Davis reported a bill, S. 223, out of the Commerce Committee in February 1852.<sup>135</sup> In it, he integrated and elaborated on many of the proposals that had reached Congress over the years. For example, he included provisions to pay inspectors government salaries in order to end the scandalous and widely criticized fee structure of the 1838 act.<sup>136</sup> Davis tried to keep these salaries modest because he did not want applicants to chase the positions exclusively for political patronage.<sup>137</sup> The law depended on the inspectors to enforce it, and there was some concern that they would not “feel the responsibility of their position, and faithfully and fearlessly discharge the duties imposed on them.”<sup>138</sup> Davis composed a lengthy and elaborate section, section nine, which included 15 subsections spelling out the duties of the inspectors, as well as procedures and standards for inspection and penalties for inspectors who failed to fulfill their responsibilities. Even after reporting S. 223, Davis continued to receive information on it while the bill awaited Senate action, including visits from representatives of steamboat interests.<sup>139</sup> Though the topic

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<sup>133</sup> *CG*, 32<sup>nd</sup> Cong., 1<sup>st</sup> sess., Feb. 9, 1852, 505.

<sup>134</sup> S. 223, Original Senate Bills, S. 200 to S. 226 (Sen32A-B1), 32<sup>nd</sup> Cong., Records of the Senate, RG 46, NA.

<sup>135</sup> *SJ*, 32<sup>nd</sup> Cong., 1<sup>st</sup> sess., Feb. 18, 1852, 215.

<sup>136</sup> Project of an Amendment to the Law regulating vessels propelled by Steam on the waters of the Mississippi, Missouri, and Ohio rivers – drawn up by the Pittsburgh Society of Steamboat Engineers, Papers, Committee on Commerce, S. 223, Folder 2 of 2 (Sen32A-E2), 32<sup>nd</sup> Cong., Records of the Senate, RG 46, NA. Memorial of the Cincinnati and Pittsburg Associations of Steamboat Engineers, of captains and owners of steamboats, of officers of insurance companies and other citizens ... praying enactment of such laws as will more effectually secure the safety of life & property on board vessels ... , Feb. 3, 1852, Petitions and Memorials Laid on the Table, Steam Vessels, March 24, 1852-Aug. 14, 1852 (Sen32A-J6), 32<sup>nd</sup> Congress, Records of the Senate, RG 46, NA.

<sup>137</sup> *CG*, 32<sup>nd</sup> Cong., 1<sup>st</sup> sess., July 9, 1852, 1707. Davis also wanted the system to be self-supporting, with the inspectors’ salaries paid for by fees from inspections and licenses.

<sup>138</sup> “Steamboat Traveling,” *NYDT*, March 22, 1852, 2.

<sup>139</sup> “Bill to Prevent Explosions,” *SA*, 7/45 (July 25, 1852): 357.

came up for discussion in the Senate a few times and senators introduced two other steamboat measures, members and the media were anticipating that Davis's bill would be the key measure to address the topic.<sup>140</sup>

As ongoing disasters built support for the legislation during the winter and spring of 1852 and opened Congress up to criticism for delay,<sup>141</sup> Davis composed a long list of amendments and did not push for action until he was ready. Though Davis's ongoing work held up consideration of S. 223 until July, his efforts enhanced his reputation with colleagues.<sup>142</sup> Several of them noted that they were grateful for Davis's investigation and labors, and Arkansas Democrat Solon Borland's statement is worth highlighting:

I defer more to the judgment of the Senator from Massachusetts than to any one else upon this subject, because I know that for the last year or two he has devoted himself to it with a fidelity, an earnestness, and an energy which I have never seen equaled in the legislation of this body; and which ... reflects the highest credit upon his head and upon his heart, and for which I, as one of the representatives of the valley of the Mississippi, tender him the gratitude of the people of the whole of that vast region of the country.<sup>143</sup>

Senator Stephen Mallory, who was not a supporter of Davis's bill, later commented that one reason the Steamboat Act had passed was that "the utmost confidence [was] placed in the judgment of the honorable Senator [John Davis] who had devoted his time to it."<sup>144</sup> Davis's credibility was also bolstered by Commerce Committee Chairman Hamlin, who praised Davis's work, supported S. 223 on the floor and said that the other members of the committee were

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<sup>140</sup> *CG*, *Ibid.*, 505. "Boiler Explosions," *SA*, 7/40 (June 19, 1852): 320. "Steamboat Explosion," *NYDT*, April 22, 1852, 4.

<sup>141</sup> After the explosion of the steamboat *Saluda* in April 1852, for example, *Scientific American* criticized Congress for "deliberating ... about who shall have the spoils next year" rather than acting to curb the disasters. "Another Boiler Explosion," *SA*, 7/33, (May 1, 1852): 262.

<sup>142</sup> See the remarks by Sen. Thomas Rusk (D, TX), *CG*, 32<sup>nd</sup> Cong., 1<sup>st</sup> sess., Aug. 28, 1852, 2426 and Sen. George Badger, (W, WI) *CG*, 32<sup>nd</sup> Cong., 2<sup>nd</sup> sess., Feb. 22, 1853, 763.

<sup>143</sup> *CG*, 32<sup>nd</sup> Cong., 2<sup>nd</sup> sess., Feb. 22, 1853, 762; see also Thomas Rusk's comments, *Ibid.*, 761-62.

<sup>144</sup> *CG*, 32<sup>nd</sup> Cong., 2<sup>nd</sup> sess., Feb. 22, 1853, 764.

supporting the measure and would back additional provisions as necessary.<sup>145</sup> Advocates also preyed on the emotions of the colleagues; Davis and Solomon Downs of Louisiana reminded the Senate of the terrible cost of steamboat accidents and that they needed to be curbed as quickly as possible because many people had been killed even as the bill was being considered.<sup>146</sup>

Guiding the bill through the process of amendment required constant attention, but Davis held an additional advantage: senators were inclined to look to committee members for guidance concerning certain complex pieces of legislation. David Rice Atchison compared S. 223 to other lengthy bills, such as recent legislation on rivers and harbors, and noted that

not half a dozen gentlemen beyond those who reported the bills, knew the effect of a single amendment. We knew something about the general provisions, but nothing about the details of those bills. What could I, who have never been on the lakes, know about the appropriations for the harbors situated there? I never saw the estimates and surveys upon which those appropriations were recommended, but was obliged to confide in those gentlemen who took the subject in hand. *We have to take these things on trust*, and I am prepared to swallow this steamboat bill on trust, just as we have done many others.<sup>147</sup>

Senators Borland and John Weller remarked that they did not have the knowledge that would allow them to evaluate the technical requirements of the bill, but were relying on the Commerce Committee and the experts whom it had consulted to assure them that the bill was the best that could be offered.<sup>148</sup> When S. 223 came to the floor on July 8, Davis recommended a large number of amendments, many of them minor changes in wording, which the Senate adopted.<sup>149</sup>

The following day, a Friday, Davis made a motion to suspend the rule setting aside Fridays for

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<sup>145</sup> *CG*, 32<sup>nd</sup> Cong., 1<sup>st</sup> sess., March 12, 1852, 724; see also *CG*, 32<sup>nd</sup> Cong., 2<sup>nd</sup> sess., Feb. 22, 1852, 762, and *CG*, 32<sup>nd</sup> Cong., 1<sup>st</sup> sess., July 9, 1852, 1702. Commerce Committee members Hamlin, Pierre Soule (D, LA), and Henry Dodge (D, WI) all voted with Davis against a motion to table S. 223 on August 25, 1852. Another member, William H. Seward (W, NY), did not vote. *SJ*, 32<sup>nd</sup> Cong., 1<sup>st</sup> sess., Aug. 28, 1852, 655-56.

<sup>146</sup> *CG*, 32<sup>nd</sup> Cong., 1<sup>st</sup> sess., Aug. 25 and Aug. 28, 1852, 2345 and 2427.

<sup>147</sup> Atchison was a Democrat from Missouri. *CG*, 32<sup>nd</sup> Cong., 1<sup>st</sup> sess., Aug. 28, 1852, 2428. Emphasis added.

<sup>148</sup> Weller was a Democrat from California. *CG*, 32<sup>nd</sup> Cong., 1<sup>st</sup> sess., July 7 and July 12, 1852, 1670, 1742. See also the inquiry by Lewis Cass (D, MI) of Davis, *CG*, 32<sup>nd</sup> Cong., 2<sup>nd</sup> sess., Feb. 22, 1853, 761.

<sup>149</sup> *CG*, 32<sup>nd</sup> Cong., 1<sup>st</sup> sess., July 9, 1852, 1703-8.

the consideration of private bills. Two senators objected, but the majority wanted to continue work on the measure and sustained Davis's motion by a margin of 29 to 4.<sup>150</sup> Davis was becoming concerned that the House would not have time to review the bill unless the Senate passed it soon. He exercised considerable control over the process as the Senate adopted numerous amendments that Davis proposed over the next several days. Other senators offered their own amendments, some of which the Senate approved, but only one of them was passed over Davis's objections.<sup>151</sup> The Senate endorsed the bill on July 13 without a contested roll call vote.<sup>152</sup>

The deference that the legislators showed to Davis and the Senate Commerce Committee did not transfer to the House of Representatives along with S. 223. The House Commerce Committee considered the bill and its chairman, David Seymour, and committee member Thomas J. D. Fuller, sponsored and managed it on the floor.<sup>153</sup> Seymour and the committee accepted the bill's basic structure but made some important changes, including a crucial one that limited the reach of the law. Desiring to make sure that it did not apply to vessels operating exclusively within one state, and wanting to limit its application to protect passengers and not crews, the committee amended S. 223 to make the law inapplicable to tugboats, canal boats, ferry boats, towboats, and some small steamers.<sup>154</sup> These changes kept the 1838 law in effect for

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<sup>150</sup> *CG*, *Ibid.*, 1701-2. Davis also headed off a delaying tactic that would have caused the bill to be read in its entirety. *Ibid.*, 1703.

<sup>151</sup> The exception was an amendment by Senator Henry Geyer that would allow passenger steamers to carry flammable materials or explosives, provided that they were transported in a sealed metal container. *CG*, 32<sup>nd</sup> Cong., 1<sup>st</sup> sess., July 7, 1852, 1669-71.

<sup>152</sup> *SJ*, 32<sup>nd</sup> Cong., 1<sup>st</sup> sess., July 8, 9, 12, and 13, 515, 519, 522, 525.

<sup>153</sup> Seymour was a Democrat from Troy, New York, while Fuller was a Democrat from Maine. *HJ*, 32<sup>nd</sup> Cong., 1<sup>st</sup> sess., July 16, 1852, 906 and Aug. 16, 1852, 1032.

<sup>154</sup> *CG*, 32<sup>nd</sup> Cong., 1<sup>st</sup> sess., Aug. 24, 1852, 2314. S. 223, Section 42, Senate Bills and Resolutions Considered in the House, S. 223 to S. 573 (HR32A-C1), Records of the House of Representatives, RG 233, NA. In addition, the House limited the inspections to once per year, rather than every six months, and delayed the dates when the law was to take effect from November 1, 1852 to January and March 1, 1853. It also eliminated the requirements for



these vessels. The practical effect was that in subsequent years barely-regulated freight and towboats created hazards for other vessels, and the Board of Supervising Inspectors and Congress sought to bring them under the 1852 system until the law was revised in 1864.<sup>155</sup>

While they were altering some features of the Senate's bill, members of the House followed similar patterns in their *process* of considering the legislation. The representatives followed the lead of their Commerce Committee, endorsing the amendments recommended by Seymour and Fuller and defeating attempts to delay the bill or replace it with a substitute.<sup>156</sup> The House voted down an attempt to consider S. 223 in the Committee of the Whole, 122 to 54, which might have sidetracked it.<sup>157</sup> On August 25, 1852, they voted to pass it, 147 to 27, with 84.5% in favor and 15.5% opposed. About 94% of Whigs, 78% of Democrats, 93% of free state representatives and 71% of congressmen from slave states supported the measure.<sup>158</sup>

When the House sent the amended version of S. 223 back to the Senate, senators opposing it made a final effort against the bill on August 28, moving to delay it by calling for a

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some vessels to carry lifeboats, required smaller pumps, and allowed small steamers to carry fewer pumps. The number of required lifeboats would depend on the tonnage of the vessel, as would the requirements for fire buckets and axes. The bill required that there be sufficient life preservers for the passengers, but not for the crews.

By contrast to these changes which limited the scope of S. 223, the House also increased the power of the inspectors by allowing local boards of inspectors to compel witnesses to attend their hearings in the same manner as a court of law; it also added the power to revoke a license as well as suspend it (Sec. 9, Part 13). The House gave the Board of Supervising Inspectors the discretionary power to compose and enforce regulations directing how boats were to safely pass each other, which are commonly referred to in our time as the "rules of the road." See *CG*, 32<sup>nd</sup> Cong., 1<sup>st</sup> sess., Aug., 24, 1852, 2312-15, and Aug. 25, 1852, 2343-45. See also Hunter, *Steamboats*, 543.

<sup>155</sup> Hunter, *Steamboats*, 540, 543-4. Appendix A: H.R. 757, 33rd Cong., 2nd sess.; S. 112, 34th Cong., 1st sess.; H.R. 92, 34th Cong., 1st sess.; S. 599, 34th Cong., 3rd sess.; H.R. 45, 35th Cong., 1st sess.; S. 138, 35th Cong., 1st sess.; H.R. 114, 36th Cong., 1st sess.

<sup>156</sup> *HJ*, 32<sup>nd</sup> Cong., 1<sup>st</sup> sess., Aug. 23, 1852, 1061-62; Aug. 24, 1852, 1068; and Aug. 25, 1852, 1071-72.

<sup>157</sup> Appendix C: S. 223, 32<sup>nd</sup> Cong., 1<sup>st</sup> sess., Aug. 23, 1852 vote in the House of Representatives. It is not clear if this vote to commit the bill to the Committee of the Whole was purely a delaying tactic or an honest attempt to consider the bill in a less formal setting. It probably was something of both. Of the fifty four members of the House who voted to commit the bill only twenty three of them voted against passing S. 223 on August 25. Twenty five of the fifty four members who voted to commit the bill on August 23, subsequently voted to pass it on August 25. Six of the members who voted to commit the bill on August 23 did not vote on the question of passage on August 25. *HJ*, 32<sup>nd</sup> Cong., 1<sup>st</sup> sess., Aug. 23, 1852, 1061-1062 and *HJ*, 32<sup>nd</sup> Cong., 2<sup>nd</sup> sess., Aug. 25, 1852, 1071-1072.

<sup>158</sup> Appendix C: S. 223, 32<sup>nd</sup> Cong., 1<sup>st</sup> sess., Aug. 25, 1852 vote in the House of Representatives.

special committee to consider it over the recess, and then attempted to table the measure. Supporters protested that the moves to delay the bill were in reality attempts to defeat the legislation.<sup>159</sup> Senator Rusk claimed that an attempt to set S. 223 aside was solely to gratify the steamboat owners so they could continue to recklessly sacrifice human lives.<sup>160</sup>

On August 28 John Davis reviewed the changes made by the House and stated that these had weakened the measure. Nonetheless, he urged the Senate to endorse it.<sup>161</sup> It is unknowable what would have happened if Davis had asked the Senate to insist on its version of S. 223 and how hard Seymour, Fuller and the other representatives would have fought for their version. What *is* known, however, is that Davis recommended that the Senate should accept the House's version rather than risk having the session conclude before the two houses could come to an agreement, and the Senate approved the measure shortly thereafter.<sup>162</sup>

The Senate majority defeated a motion to table the bill by a vote of 43 to 8. The percentage of support was very similar to that in the House, as 84.3% of the senators voted not to delay the bill and only 15.7% voted to table it. Supermajorities of both parties and sections endorsed the measure, including 94% of Whigs (16 of 17), 80% of Democrats (24 of 30), 89% of free state senators and 79% of senators from slave states.<sup>163</sup> The Senate then passed the bill without an additional roll call vote.<sup>164</sup> Whigs were more likely to vote for the 1852 law than

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<sup>159</sup> *CG*, 32<sup>nd</sup> Cong., 1<sup>st</sup> sess., Aug. 28, 1852, 2425 and 2426; also see the comments by Sen. Hamilton Fish, Whig of New York, *Ibid.*, 2428.

<sup>160</sup> *Ibid.*, 2426.

<sup>161</sup> *CG*, 32<sup>nd</sup> Cong., 1<sup>st</sup> sess., Aug., 28, 1852, 2425.

<sup>162</sup> *Ibid.*, 2425. One can speculate that Davis was gun-shy from his experiences of having the House session expire in 1846 before the Senate could vote on the Wilmot Proviso and when the Senate had not had time to address his amended version of H.R. 386 during the 31st Congress. On the Proviso, see Potter, *Impending Crisis*, 22. Davis might have been more inclined to insist on the Senate's version or work to find a compromise with the House if Congress had addressed S. 223 earlier in the session and there was more time left before Congress recessed.

<sup>163</sup> Appendix C: S. 223, 32<sup>nd</sup> Cong., 1<sup>st</sup> sess., Aug. 28, 1852 vote in the Senate.

<sup>164</sup> *SJ*, 32<sup>nd</sup> Cong., 1<sup>st</sup> sess., Aug. 28, 1852, 656.

Democrats, and legislators from free states were more supportive than those from slave states. However, this should not distract from the fact that the representatives and senators throughout the country and from the major parties and sections endorsed S. 223 by impressive margins, which indicated the widespread support for federal action. On August 30, 1852, President Millard Fillmore signed the Steamboat Act into law.

Despite the broad support for the law, some members of Congress opposed S. 223 because they represented steamboat interests that objected to government intervention. As they had since the 1830s, many Eastern steamboat interests resisted federal regulation.<sup>165</sup> Of the eight senators who voted to table the bill, seven, with the exception of Jeremiah Clemens (D) of Alabama, were located in Atlantic states.<sup>166</sup> Two years earlier, Senator Thomas Pratt had received a memorial from Baltimore merchants asking that a bill intended to protect the lives of steamboat passengers not become law,<sup>167</sup> and he supported the wishes of Maryland's steamboat interests in 1852, declaring before he voted to table the bill that

I hold in my hand a representation from the steamboat interests of the State of Maryland, in direct opposition to this bill; and I believe that feeling is shared by the same interest along the whole of the Atlantic sea-board. They state, that if the bill should pass, it will break up the steamers they have now running; that the bill is unnecessarily severe, so far as they are concerned; and that it would be completely ruinous to their interests. *As I represent those interests on this floor, I cannot permit this motion to pass without making a solemn protest against it.*<sup>168</sup>

Virginia's Senator Robert M. T. Hunter (D) similarly justified his opposition by stating that

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<sup>165</sup> Hunter, *Steamboats*, 529-530.

<sup>166</sup> Steamboat interests from New York City, the Long Island Sound and Raritan River had opposed the 1838 act. Appendix B: H. Docs. 284 and 314, 25<sup>th</sup> Cong., 2<sup>nd</sup> sess. and H. Doc. 335, 25<sup>th</sup> Cong., 3<sup>rd</sup> sess. Steamboat interests in New York, Baltimore and Pittsburgh objected to government intervention and asked Congress to repeal the 1852 Steamboat Act after it was passed. *SJ*, 31<sup>st</sup> Cong., 2<sup>nd</sup> sess., 90, 93 and 32<sup>nd</sup> Cong., 1<sup>st</sup> sess., 636 and 32<sup>nd</sup> Cong., 2<sup>nd</sup> sess., 163, 167. See also Hunter, *Steamboats*, 529-30.

<sup>167</sup> *SJ*, 31<sup>st</sup> Cong., 2<sup>nd</sup> sess., Dec. 19, 1850, 46.

<sup>168</sup> *CG*, 32<sup>nd</sup> Cong., 1<sup>st</sup> sess., Aug., 28, 1852, 2425. Emphasis added. Senator Pratt said he would agree to the bill if it applied solely to the western section of the country, where the majority of accidents had taken place. However, John Davis responded that the law must be general and that it was an "impossibility ... to make a law for the reckless, while it must not extend to the prudent." *Ibid.*, 2426.

steamboat owners told him that the bill would be "ruinous to their interests and especially in its operation on the Atlantic sea-board."<sup>169</sup>

Democrats were more likely to oppose S. 223 than Whigs, and made up six of the eight who voted to table the bill.<sup>170</sup> Some Democrats remained more attached to the Penalty Option than Whigs. Stephen Mallory and Robert F. Stockton of New Jersey argued that they should avoid setting up a regulatory system and instead try to punish steamboat owners when accidents occurred.<sup>171</sup> Stockton was one of the few senators who spoke out strongly against passing the bill. He affirmed the traditional Democratic support for individual liberty, limited government, and property rights. He protested that the legislation was too intrusive, that instead it was

our duty to consider what is due to the protection of steamboat *owners*, as well as what is due to steamboat travelers. They are our fellow-citizens, equally entitled to our consideration. But ... there is a principle in my judgment, involved in this bill far beyond, in importance, either of those questions. It is this--how far the Federal Government through the instrumentality of the two Houses of Congress, shall be permitted to interfere with the rights of personal property--or the private business of any citizen ... When you are about adopting measures to save human life from destruction on board of steam-boats, I would have you consider the value of a man's life compared with his happiness and liberty, with the freedom and happiness of our race. Life is transient and evanescent, but liberty and equal rights, I hope, will endure as long as truth shall endure.<sup>172</sup>

Most senators, however, were not persuaded and only 20% of the Democrats joined with Stockton to try to table the bill.<sup>173</sup> Democrat Solomon Downs of Louisiana rebuked Stockton.

He was frustrated by the ongoing disasters and voted with the majority, declaring

the argument against the bill just delivered by the Senator from New Jersey [Mr. Stockton], is the most extraordinary I have ever listened to .... This bill is to punish murder, and nothing else ... I consider that the only question involved in

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<sup>169</sup> *CG*, 32<sup>nd</sup> Cong., 1<sup>st</sup> sess., Aug. 28, 1852, 2426.

<sup>170</sup> Appendix C: S. 223, 32<sup>nd</sup> Cong., 1<sup>st</sup> sess. Senate vote of Aug. 28, 1852.

<sup>171</sup> *Ibid.*, Aug. 28, 1852, 2427.

<sup>172</sup> *CG*, *Ibid.*, 2426-7. Emphasis added. See also Hunter, *Steamboats*, 528.

<sup>173</sup> Appendix C: S. 223, 32<sup>nd</sup> Cong., 1<sup>st</sup> sess., Aug. 28, 1852 vote in the Senate.

this bill is this: Whether we shall permit a legalized, unquestioned, unchecked and peculiar class in the community [steamboat owners], to go on committing murder at will, or whether we shall make such enactments as will compel them to pay some attention to the value of life?<sup>174</sup>

Southerners in both houses were more inclined to oppose S. 223 than Northerners, and this probably reflects Southern sensitivity to the assertion of national power. The roll call results, and the fact that Southerners like Downs and Thomas Rusk of Texas spoke out strongly in favor of the measure, indicate that this was not a universal sentiment in the South. Editor and spokesman for Southern interests J. B. D. Debow also came out in favor of John Davis's bill. Debow noted that steam disasters had claimed nearly five hundred lives in the previous six months, including 80 people killed in the fire of the steamer *Henry Clay* on the Hudson River and about 40 who were killed by the boiler explosion of the steamboat *St. James* near New Orleans. Debow praised Davis's effort as a "stringent" bill which would "secure the lives of passengers from the perils of human cupidity, human recklessness, and ... iron and steam."<sup>175</sup>

Southern resistance to the measure also becomes less apparent, at least in the House of Representatives, when we examine the voting patterns in the individual states.<sup>176</sup> In every state, a majority of House members voted in favor of S. 223, with the exception of South Carolina.<sup>177</sup>

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<sup>174</sup> *CG*, *Ibid.*, 2427.

<sup>175</sup> J. B. D. Debow, "Internal Improvements," *Debow's Review* 13/4 (Oct. 1852): 411-412.

<sup>176</sup> Listed by congressional district within each state, the representatives who voted against S. 223 are as follows: Alabama: 3rd, William R. Smith (Union); 6th, Williamson R. W. Cobb (D); Florida: 6th, Elijah W. Chastain (Union); Kentucky: 9th, John C. Mason (D); Maryland: 2nd, William T. Hamilton (D); 3rd, Edward Hammond (D); 4th, Thomas Yates Walsh (W); Michigan: 1st, Ebenezer J. Penniman (W); New York: 2nd, Obadiah Bowne (W); 10th, Marius Schoonmaker (W); 11th, Josiah Sutherland (D); 21st, William W. Snow (D); 25th, Thomas W. Howe, Jr. (D); North Carolina: 7th, William S. Ashe (D); Ohio: 5th, Alfred P. Edgerton (D); 17th, Joseph Cable, (D); South Carolina: 1st, Daniel Wallace (D); 2nd, James L. Orr (D); 3rd, Joseph A. Woodward (D); 4th, John McQueen (D); 6th, William Aiken (D); 7th, William F. Colcock (D); Tennessee: 9th, Isham G. Harris (D); Texas: 1st, Richardson Scurry (D); Virginia: 2nd, Richard K. Meade (D); 3rd, Thomas H. Averett (D); 6th, John S. Caskie (D).

The roll call vote is from *HJ*, 32nd Cong. 1st Sess., Aug. 25, 1852, 1072. The legislative districts and affiliations are from Martis, *Historical Atlas*, 104.

<sup>177</sup> The South Carolinians who voted against S. 223 in the House were all Democrats: William Aiken, William F. Colcock, John McQueen, James L. Orr, Daniel Wallace, and Joseph A. Woodward. The remaining representative

The state has often been an outlier and the nay votes by six of South Carolina's seven representatives tend to make Southern opposition appear deeper than it was. However, even with the opposition of the South Carolinians, a large majority of slave state representatives, more than 71%, voted for the bill.<sup>178</sup>

Despite the high degree of overall support for the measures, the majorities in favor of S. 223 become somewhat less impressive when we consider that many legislators did not vote in the roll calls: 59 abstained or were absent in the House and 11 in the Senate. It is difficult to know why they did not vote, but a few of them expressed conflicted feelings about the measure. One of the abstainers in the House, Richard H. Stanton of Kentucky, stated that he was not prepared to oppose the bill, but had received a memorial from river pilots who opposed its licensing provisions.<sup>179</sup> In the Senate, Democratic abstainers Stephen Mallory of Florida and William Gwin of California said they believed that some sort of legislation was necessary.<sup>180</sup> They also both expressed misgivings, though not absolute opposition to the measure, and Mallory objected to imposing safety regulations on the masters and owners of steam vessels and voiced his continuing support for legislation built around a Penalty Option.<sup>181</sup>

When it was approved, S. 223 was 55 pages long, with 44 separate sections.<sup>182</sup> Congress established an extensive bureaucracy of inspectors, specified their duties and set standards of

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from the Palmetto state, Armistead Burt, did not vote. *HJ*, 32<sup>nd</sup> Cong., 1<sup>st</sup> sess., 1072. Of South Carolina's Senators, Andrew P. Butler voted to table the bill on August 28, while William Ford De Saussure did not vote.

<sup>178</sup> Appendix C: S. 223, 32<sup>nd</sup> Cong., 1<sup>st</sup> Cong., House of Representatives vote of Aug. 25, 1852. Over 79% of the slave state senators supported S. 223. Appendix C: S. 223, 32<sup>nd</sup> Cong., 1<sup>st</sup> sess., Senate vote of Aug. 28, 1852. By 1860 Southern representatives had become more concerned about assertions of federal power and nearly 75% of the slave state representatives voted *against* expanding the Steamboat Act. Appendix C: H.R. 114, 36<sup>th</sup> Cong., 1<sup>st</sup> sess., House of Representatives vote of May 18, 1860.

<sup>179</sup> *Ibid.*, Aug. 23, 1852, 2300.

<sup>180</sup> *Ibid.*, July 9 and Aug. 28, 1852, 1741-42 and 2425-26.

<sup>181</sup> *Ibid.*, July 9, 1852, 1702 and 1741-42. See also Hunter, *Steamboats*: 527-8.

<sup>182</sup> S. 223, Senate Bills and Resolutions Considered in the House, S. 223 to S. 573 (HR32A-C1), Records of the

professional conduct. The law created offices for nine supervising inspectors of steamboats, appointed by the President and confirmed by the Senate, at annual salaries of \$1,500 each. They were to be men of “knowledge, skill, and experience in the uses of steam for navigation” and would oversee local inspectors in 30 collection districts throughout the country. There would be 60 local inspectors, two in each district: an inspector of hulls and an inspector of boilers. The local inspectors would perform most of the inspections, but the supervisors would inspect vessels in customs districts that did not have local inspectors. The supervising inspectors would also meet as a board to make administrative rules to oversee the system, inquire into technical improvements, report on the operation of the system to the Secretary of the Treasury and Congress, and, if necessary, recommend changes. The law included elaborate provisions for testing boilers and boiler metal, licensing pilots and engineers, and mandating safety equipment, along with requirements for operating vessels and penalties for infractions.<sup>183</sup>

### ***5. Conclusion: “A Stronger Arm”***

In early 1852, Alfred Guthrie, engineer at the Chicago Waterworks, wrote to Congress that the 1838 steamboat act had proven ineffective. Guthrie, who would later be appointed a supervising inspector under the 1852 Steamboat Act, stated that Congress needed to do more to prevent disasters and that this required “a stronger arm, a higher power, than individual effort or individual example.”<sup>184</sup> Officials considered new options in the 1830s as they became increasingly concerned about steamboat accidents, and the fact that the actions of private individuals were not improving the situation. However, facilitating technical improvements,

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House of Representatives, RG 246, NA.

<sup>183</sup> Hunter, *Steamboats*, 537-39.

<sup>184</sup> Appendix B: S. Misc. Doc. 32, 32<sup>nd</sup> Cong., 1<sup>st</sup> sess., 3. See also “Steam Boiler Explosions,” *SA*, 7/23 (Feb. 21, 1852): 178.

combined with the threat of penalties in the 1838 act, did not appear to alleviate the danger. The public and interest groups pressured Congress for action. Senator John Davis stated in 1852 that, although people had varying opinions about the causes and solutions of steamboat disasters, every individual with whom he had communicated believed that “something should be done by Congress--that something may be usefully done to suppress the calamities, or at least the dangers which now exist.”<sup>185</sup> Others in Congress shared Davis’s impression; as documented in Appendix A, members from different parties and regions introduced legislation on the subject from 1824 to 1860. As we can see in Appendix C, at the time of decision, large bipartisan majorities tended to support congressional intervention. The fact that bills, such as the 1838 act and the 1843 revisions, were approved by a general consensus and that large majorities in both the House and Senate supported the 1852 act in the final roll call votes gives an indication of the widespread support for these measures.

However, even popular legislation was subject to the rhythms and idiosyncrasies of Congress. Bills that lacked the driving forces of partisan machinery and sectional advocacy depended on the actions of individual committee members to introduce, sponsor and guide them through both houses. In 1838, the committee system gave great autonomy to Felix Grundy to compose a bill. He determined its provisions and the Democratic majority supported him by passing a law that tried to shape behavior by threatening to penalize steamboat operators for recklessness. The measure was also ultimately endorsed by Whigs and others who supported *some* type of government intervention, even if they would have preferred more aggressive regulatory provisions.

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<sup>185</sup> CG, 32<sup>nd</sup> Cong., 1<sup>st</sup> sess., July 7, 1852, 1667. See also Davis’s remarks, *Ibid.*, 1669 and those of Senator Hamlin: CG, 32<sup>nd</sup> Cong., 2<sup>nd</sup> sess., Feb. 22, 1853, 762.



Steamboat legislation was also affected by the inclinations and talents of key legislators. Rapid turnover in Congress meant that few senators and representatives focused on legislation for more than one or two Congresses in succession.<sup>186</sup> This short tenure made them less knowledgeable and impeded their abilities as bill drafters. Many of the proposals members introduced in the 1830s and 1840s used previous bills as templates, rather than synthesizing new and more comprehensive proposals from the available information.<sup>187</sup> In this situation, John Davis stands out for his talents as a bill drafter. In 1850 and 1851 Davis tried to add administrative muscle to the bones of a steamboat bill drawn up in the House of Representatives, but ran out of time. He might have had more leeway had the 31<sup>st</sup> Congress not been spending so much time dealing with a sectional crisis during its first session. The work was complex and, without a professional staff, Davis had to devise a new type of organization out of a vast array of plans and testimony. He was better prepared to undertake the task in the 32<sup>nd</sup> Congress than he had been the previous year. He also got an earlier start and had time to review and refine his proposal in the winter and spring of 1852. A particularly destructive set of accidents made Congress amenable, even eager, to endorse a new law, and Davis's expertise and position on the Commerce Committee lent him authority within the Senate. Davis established the basic features for S. 223, but accepted significant alterations from the House of Representatives. He had intended to entirely supplant the 1838 law with a new national regulatory system. Instead, because the inclinations of the key actors in the House differed from those in the Senate, they left the 1838 law in place for ferries and cargo vessels.<sup>188</sup>

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<sup>186</sup> Silbey, *American Political Nation*, 185.

<sup>187</sup> Brockmann, *Twisted Rails*, 95. See also Appendix A.

<sup>188</sup> Hunter, *Steamboats*, 543-44.

Both the 1838 and 1852 laws serve as examples of the complex set of factors that influenced the composition and passage of legislation on steamboat safety. The particular circumstances of leading actors, the policy-related inclinations of the drafters of the legislation, the legislative environment at the time, and the peculiar workings of Congress, were as important in determining how proposals were shaped and when laws were passed as outside pressures, such as those from interest groups and the public.

## CHAPTER 6

### CONCLUSION

Americans celebrated the ways that steam transportation was transforming their country during the first half of 19<sup>th</sup> century. Editor Hezekiah Niles exulted that it enabled astonishing feats where “every river is penetrated, mountain passed or valley crossed ... as with the flight of a bird! ... *Science has conquered space*. The people of places 1,000 miles apart, are near neighbors. How wonderful!”<sup>1</sup> But naturalist Louis Agassiz recognized that American’s compelling need to travel rapidly could be dangerous. “There is something infernal in the irresistible power of steam,” he wrote, “carrying such heavy masses along with the swiftness of lightning ... If here and there something goes to pieces, no one is astonished; never mind! We go fast—we gain time—that is the essential thing.”<sup>2</sup> Thousands of Americans died from the power of steam in the years before the Civil War. People feared the sudden violence from boiler explosions, but the public also demanded government action to tackle dangers from fires, collisions and other accidents.<sup>3</sup> It was a challenge to deal with these problems because even if their causes were well understood, it was not clear that they were preventable through legislation.<sup>4</sup> In early 1850, editor J. B. D. Debow listed casualties from steamboat accidents, including the recent explosion of the steamboat *Louisiana* in New Orleans, and asked “can no remedy be devised?”<sup>5</sup>

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<sup>1</sup> *NWR*, June 27, 1835, 289. Emphasis in the original.

<sup>2</sup> Robert V. Bruce, *The Launching of Modern American Science, 1846-1876* (New York, NY: Alfred A. Knopf, 1987), 43.

<sup>3</sup> Paul F. Paskoff, *Troubled Waters: Steamboat Disasters, River Improvements, and American Public Policy, 1821-1860* (Baton Rouge, LA: Louisiana State University Press, 2007), 19-22.

<sup>4</sup> “Steamboat Disasters.” *North American Review* 50/106 (January 1840): 21.

<sup>5</sup> J. B. D. Debow, “Miscellaneous,” *Debow’s Review* 8/1 (Jan. 1850): 91.

Rather than being resigned to the danger as an inevitable cost of technical progress and hazard of transport, members of Congress felt responsible for the safety of travelers and experimented to curtail the deaths and destruction. This was consistent with the manifest intent to protect life on American waters and the open seas.<sup>6</sup> By 1852 Congress had also used federal power and money to preserve the lives of travelers by funding aids to navigation, removing hazards from waterways and saving victims of shipwrecks. The fact that members were aware of the dangers of navigation, knew that they were widely covered in the media and feared for their own safety imbued them with a sense of urgency to address the problem.

This study fits into the category of policy history that Julian Zelizer has labeled “process evolution,”<sup>7</sup> and has mapped the national government policies designed to influence the operation of steam vessels from the 1820s through 1860, as well as examined the process by which they were enacted to delineate some of Congress’s “complex internal mechanisms ... that affect the way things turn out.”<sup>8</sup>

Steamboat legislation resembled a slot machine where the external and internal factors needed to line up before members of Congress could overcome their hesitancy to intervene aggressively. Developments in the larger society, including demands by the public and press for congressional intervention, lobbying by constituents and other citizens, and interest groups

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<sup>6</sup> The government imposed its first safety requirements on U.S. sailing vessels in 1790 and 1819. 1 *Stat. L.* 131 and 3 *Stat. L.* 488. In 1847, 1848, 1849, 1855, and 1860 it passed laws to prevent overcrowding and provide for adequate food and ventilation for passengers, as well as to protect female passengers from abusive treatment. Appendix A: H.R. 637, 29<sup>th</sup> Cong., 2<sup>nd</sup> sess.; H.R. 292, 30<sup>th</sup> Cong., 1<sup>st</sup> sess.; H.R. 738, 30<sup>th</sup> Cong., 2<sup>nd</sup> sess.; H.R. 752, 33<sup>rd</sup> Cong., 2<sup>nd</sup> sess.; H.R. 19, 36<sup>th</sup> Cong., 1<sup>st</sup> sess. See also Leonard D. White, *The Jacksonians: A Study in Administrative History, 1829-1861* (New York, NY: MacMillan, 1956), 446-47.

<sup>7</sup> Julian E. Zelizer, “Clio’s Lost Tribe: Public Policy History Since 1978,” *Journal of Policy History*, 12/3 (2000): 387-88.

<sup>8</sup> Joel H. Silbey, “Current Historiographical Trends in the Study of the Twentieth-Century Congress,” *Social Science History*, 24/2 (Summer 2000): 319. See also Zelizer, “Clio’s Lost Tribe,” 387-88; Laura S. Jensen, “Polity Forum: Politics, History, and the State of the State,” *Polity* 40/3 (July 2008): 322; and William James Hull Hoffer, *To Enlarge the Machinery of Government: Congressional Debates and the Growth of the American State, 1858-1891* (Baltimore, MD: Johns Hopkins University Press, 2007), 197-98.

calling for action pushed items onto the legislative agenda. As Congress responded to these outside pressures, its internal structure and workings guided members in a crucial “negotiation over power, resources, and relationships” before it took action.<sup>9</sup> Some forms of intervention, such as the Information Option of investigating steamboat accidents and publishing reports, required only a few slot machine reels to align, so Congress did this repeatedly from 1824 to 1860. Congress embarked on more intrusive forms of intervention, such as the experiments with penal and regulatory intervention in 1838 and 1852, only when a host of factors lined up favorably.

While scholars have studied steamboat legislation, they have not emphasized that Congress responded to the problem with multiple policies. Some of these, such as the Information Option and the Mechanical Option of testing safety equipment, were in sync with typical forms of 19<sup>th</sup> century policy. Members of Congress were more cautious about implementing other forms of intervention, such as the version of the Mechanical Option where the government required safety devices and subsidized inventors, but these were also parts of the legislative repertoire.

The major scholarly accounts of steamboat legislation have focused on the Regulatory Option as Congress put in place a system to oversee steamboat design, equipment, and operation. This is not surprising as scholars of Congress and the growth of the national state have been searching for the origins and apparatus of the modern state and measuring its power by “the existence of formal, coercive and administrative power lodged within public bureaucracies.”<sup>10</sup> One problem with this, however, is that it sets unrealistic standards for what qualifies as

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<sup>9</sup> Romain Huret, “All in the Family Again? Political Historians and the Challenge of Social History,” *Journal of Policy History* 21/3 (2009): 248.

<sup>10</sup> Desmond King and Robert C. Lieberman, “Finding the American State: Transcending the ‘Statelessness’ Account,” *Polity* 40/3 (July 2008): 370.

government activism because it measures the nineteenth-century government by what it failed to do, rather than by what it did.<sup>11</sup> By this standard, only the regulations propagated by the Steamboat Act of 1852 and, to a lesser extent, the 1838 law qualify as evidence of state power. However, as Richard John and Brian Balogh have noted, indirect or unobtrusive government activities have often had a more significant impact than direct regulatory oversight.<sup>12</sup>

Congress's efforts to gather and print information were among these unobtrusive, but common, activities.<sup>13</sup> The documents about steamboat accidents that Congress produced were part of a larger "print statism" project to inform the public about their country, the actions of its government, and give them tools to improve their lives.<sup>14</sup> The government sponsored some exemplary investigations into the causes of accidents, including one in the 1830s by the country's foremost technical organization, the Franklin Institute of Philadelphia.<sup>15</sup> These inquiries yielded important insights about steamboat operations and understandings of physical and mechanical processes. However, Congress employed flawed processes for vetting and disseminating data and could not control the fact that many steamboat owners and operators declined to accept guidance as to how they could improve their practices. We have seen that, despite their limitations as instruments of policy, government publications facilitated the spread of knowledge and inspired discussions about steam power and transportation among a range of

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<sup>11</sup> Laura S. Jensen, "Government, the State, and Governance," *Polity* 40/3 (July 2008): 382-83.

<sup>12</sup> Richard R. John, "Rethinking the Early American State," *Polity* 40/3 (July 2008): 341; Brian Balogh, *A Government Out of Sight: The Mystery of National Authority in Nineteenth-Century America* (New York, NY: Cambridge University Press, 2009), 379. These represent instances of "infrastructural power," or "the actual power of state policies in action to have real effects on population." William J. Novak, "The Myth of the 'Weak' American State," *American Historical Review* 113/3 (June 2008): 763.

<sup>13</sup> Oz Frankel, *States of Inquiry: Social Investigations and Print Culture in Nineteenth-Century Britain and the United States* (Baltimore, MD: Johns Hopkins University Press, 2006).

<sup>14</sup> Frankel, *States of Inquiry*.

<sup>15</sup> Appendix B: H. Doc. 162, 24<sup>th</sup> Cong., 1<sup>st</sup> sess., and Report of the Franklin Institute, Parts 2 and 3, 24<sup>th</sup> Cong., 2<sup>nd</sup> sess. and 25<sup>th</sup> Cong., 2<sup>nd</sup> sess.

scientists, engineers, mechanics, and professional users of steam.<sup>16</sup>

The government began evaluating the effectiveness of steam safety devices in 1834. Other scholarly accounts have said little about this process, despite the fact that inventors hungry for publicity and government assistance embraced the opportunity to have their devices critiqued by experts and demonstrated to public officials. Members of Congress endorsed these versions of the Mechanical Option with minimal dissent and believed that this was a reasonable application of federal resources and expertise. Assessments by government employees and outside experts continued until Congress delegated this responsibility to the Supervising Inspectors of Steamboats in 1852.<sup>17</sup> Government specialists examined steam safety mechanisms, helped inventors improve them, and later assisted steamboat owners in complying with the technical requirements of the 1852 Steamboat Act. Further research is needed on the processes of technological development and diffusion to measure how much influence the government had on the practices of steamboat builders and inventors. How extensively and effectively did they use government resources to design mechanisms and construct vessels?

As with the project to evaluate safety devices, scholars of steamboat legislation have not extensively scrutinized the requirements for safety equipment that Congress instituted in 1838 and 1852, or the government's interactions with inventors who were seeking subsidies. Some legislators championed subsidizing inventions, often in response to demands from local constituents.<sup>18</sup> However, members resisted the entreaties by inventors. Many shared a liberal

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<sup>16</sup> One student of these policies has concluded that, over time, the new information encouraged better techniques of operation and the adoption of important safety innovations. David John Denault, "An Economic Analysis of Steam Boiler Explosions in the Nineteenth-Century United States." Ph.D. Dissertation, University of Connecticut, 1993, 178.

<sup>17</sup> Appendix A: H.R. 432, 23<sup>rd</sup> Cong., 1<sup>st</sup> sess.; S. 73, 25<sup>th</sup> Cong., 2<sup>nd</sup> sess.; S. 389, 25<sup>th</sup> Cong., 2<sup>nd</sup> sess.; H.J.R. 19, 27<sup>th</sup> Cong., 2<sup>nd</sup> sess.; H.R. 602, 27<sup>th</sup> Cong., 2<sup>nd</sup> and 3<sup>rd</sup> sess.; 10 *Stat. L.* 61, Sec. 39.

<sup>18</sup> Appendix A: H.R. 365, 25<sup>th</sup> Cong., 2<sup>nd</sup> sess.; H.R. 484 and 486, 26<sup>th</sup> Cong., 1<sup>st</sup> sess.

belief that the government should play a limited role and that private enterprise would develop and adopt technical advances according to their merits.<sup>19</sup> Inventors opposed government support for their rivals, while legislators wanted to avoid awarding unfair advantages, and had a number of other practical concerns. They knew they lived in an age of fraudulent mechanisms as well as technological wonders, and did not want to endorse or pay for inventions that users of steam would resist or were less effective than their advocates claimed. Lawmakers distrusted their own ability to choose the best inventions and feared impeding the march of technological progress by mandating equipment that could soon become obsolete. Thus they were willing to require generic categories of inventions, such as boiler safety valves, lifeboats, and lifejackets, but avoided mandating patented devices. Despite members' stated desire not to play favorites, these requirements provided advantages to some inventors and suppliers, such as lifeboat manufacturer Joseph Francis.

We know that the government issued more patents as the century progressed, that inventors continued to seek government aid for their projects, and that the United States purchased some inventions or held out the prospect for subsidies to inventors. We do not, however, have a clear idea how much time and energy inventors directed toward fulfilling public needs. Future research could provide a fuller picture of how the inventive community in this area responded to the prospect of federal subsidies.

Policies to spread information and sponsor safety devices challenge the misconception that the United States government focused almost exclusively on distributive rather than regulatory policies until the late nineteenth century. Instead, in these instances “the line between

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<sup>19</sup> On the influence of liberal philosophy, see William J. Novak, “Long Live the Myth of the Weak State? A Response to Adams, Gerstle, and Witt,” *American Historical Review* 115/3 (June 2010): 799.



promotion and regulation [was] thin,”<sup>20</sup> and there was not always a clear “functional distinction” between the two.<sup>21</sup> Together, the Information Option and Mechanical Option resembled other government activities that were motivated by the dual desires to promote economic growth and protect public safety.<sup>22</sup> The government forged partnerships with steamboat operators and worked “through links to society,” attempting to mobilize “private actors to participate in functions that are usually considered public.”<sup>23</sup>

During this period, Congress rarely implemented regulatory requirements to the degree that it later did in the twentieth century. However, members believed that regulatory intervention in the area of maritime safety was constitutional. Because they had examples where Congress had already used its power to regulate commerce for sailing vessels, the regulations in the 1852 Steamboat Act were innovative in instituting *more extensive* requirements than other passenger laws, along with a new bureaucracy, rather than putting in place an entirely new form of national government intervention.

Scholars who have examined steamboat legislation have focused most of their attention on government regulation, because it was both “innovative” and “modern.” A recent treatment concludes that the 1852 Act “pioneered regulation ... [that was] based on new scientific understandings” and served as a precursor to twentieth century forms of “governance” by

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<sup>20</sup> Donald J. Pisani, “Promotion and Regulation: Constitutionalism and the American Economy,” *Journal of American History* 74/3 (Dec. 1987): 755.

<sup>21</sup> William J. Novak, “Common Regulation: Legal Origins of State Power in America,” *Hastings Law Journal* 45 (April 1994): 1075.

<sup>22</sup> For example, advocates of surveying rivers and harbors, mapping the coast, dredging waterways, and removing rocks, snags, and wrecks claimed that their actions would advance both commerce and safety. Paskoff, *Troubled Waters*, 4, 22, 35-36.

<sup>23</sup> Desmond King and Robert C. Lieberman, “Review Article: Ironies of State Building—A Comparative Perspective on the American State,” *World Politics* 61/3 (July 2009): 549, 566.

creating “[the] . . . prototype of an independent regulatory commission.”<sup>24</sup> Members introduced bills with regulatory features as early as the 1820s, and passed some minimal requirements in 1838, but did not pass a law until 1852 with modern safety regulations dictating the use of equipment, setting up a system for licensing pilots and engineers, and creating a corps of professional inspectors to examine vessels and oversee the arrangement.

Students of regulation have described a standard path for how it is implemented. First, a tragedy or crisis takes place.<sup>25</sup> Events illustrate that market forces and private actions do not protect the public interest, and the public demands that elected officials respond. The government then steps in to guide or control the operation of businesses.<sup>26</sup> This describes the pattern of how the national government implemented a law in 1819 to protect passengers on international voyages in sailing ships. To justify restricting the number of passengers and directing that ships carry sufficient provisions, the main sponsor cited instances where hundreds of passengers had died on overcrowded vessels bound for the United States and many who arrived “in a very emaciated state from the want of water and food.”<sup>27</sup> He believed that Congress had a right, responsibility, and moral duty to respond.

Previous accounts of steamboat legislation have framed the regulatory process in this

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<sup>24</sup> Mashaw, *Ibid.*

<sup>25</sup> Daniel Carpenter and Gisela Sin, “Policy Tragedy and the Emergence of Regulation: The Food and Cosmetic Act of 1938,” *Studies in American Political Development* 21 (Fall 2007): 153.

<sup>26</sup> Carpenter and Sin, “Policy Tragedy,” 149. The history of early federal regulation of the transporting of explosives suggests a similar process, as several explosions led to an 1866 law forbidding them to be shipped on passenger vessels. Mark Aldrich, “Regulating Transportation of Hazardous Substances: Railroads and Reform, 1883-1930,” *Business History Review* 76/2 (Summer 2002): 270. Aldrich points out that, in the early twentieth century, railroad companies formed an industry-wide private association that set standards and enforced rules designed to safeguard the transport of explosive material, thus duplicating the regulatory practice without government coercion. *Ibid.*, 269.

<sup>27</sup> *Annals of Congress*, 15<sup>th</sup> Cong. 2<sup>nd</sup> sess., Dec. 16, 1818, 413. In the previous session of Congress, concerned about injuries to passengers in mail coaches, the Senate inquired whether they should pass legislation “providing for the security of passengers in stage coaches, in which the mail of the United States may be transported, against danger arising from gross negligence of proprietors and drivers.” *Annals of Congress*, 15<sup>th</sup> Cong., 1<sup>st</sup> Sess. Jan. 28, 1818, 135.

way.<sup>28</sup> While there is some merit to this outline, it is incomplete because does not provide an adequate description of the process by which Congress devised and implemented its policies. This study has attempted to add to our understanding of steamboat regulation by looking at how Congress acted and delineating contingent factors that influenced legislative outcomes.<sup>29</sup>

The actions and abilities of individual legislators were one of the important contingencies. A small number senators and representatives, such as Felix Grundy, John Davis and David Seymour, had a great deal of say over regulatory legislation. They could not pass bills by fiat, but their positions on key committees gave them substantial influence and entitled them to some deference from their colleagues. Sponsors had to clear the path for their legislation, moving it out of committee and calling it up. Even when majorities in Congress favored acting, sponsors needed to pilot bills ahead of competing items, often by mobilizing supporters who had a nascent desire to respond to the public outcry for intervention. They also guided proposals over procedural hurdles and had to counteract efforts by opponents to delay and defeat them.

The members of Congress lived in a partisan world and partisanship affected their actions in several ways. Partisan competition helped motivate members of Congress to establish an

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<sup>28</sup> Louis Hunter saw laissez-faire as the regrettable norm that congressional representatives had to overcome Louis C. Hunter, *Steamboats on the Western Rivers: An Economic and Technological History* (1949; rpt. New York, NY: Dover Publications, Inc, 1993), 527-28. See also George Rogers Taylor, *The Transportation Revolution, 1815-1860* (Armonk, NY: M. E. Sharpe, 1951), 68-69. Leonard White portrayed steamboat regulation as one of a number of actions that showed that, despite “laissez-faire ideas,” the national government “could not stand entirely aloof from the expanding economy.” White, *Jacksonians*, 438; see also 442, 445. John G. Burke identified the disasters as the crucial factor that led to government intervention, as did John K. Brown, who argued that steam vessel accidents undermined Americans’ utopian optimism about progress through technical improvements and led them to insist that the government bring the offending technology under control. John G. Burke, “Bursting Boilers and the Federal Power,” in Marcel C. LaFollette and Jeffrey K. Stine, eds., *Technology and Choice: Readings from Technology and Culture* (Chicago, IL: University of Chicago Press), 2; John K. Brown, *Limbs on the Levee: Steamboat Explosions and the Origins of Federal Public Welfare Regulation* (Middlebourne, WV: The International Steamboat Society, 1989), 14.

<sup>29</sup> On the importance of historical contingency, see Richard R. John, “Ruling Passions: Political Economy in Nineteenth Century America,” in Richard R. John, ed., *Ruling Passions: Political Economy in Nineteenth Century America* (University Park, PA: The Pennsylvania State University Press, 2006), 2, 8.

infrastructure of government printing that made the Information Option viable by creating incentives to publish huge numbers of documents so the parties could award patronage to publishers, use publications for electioneering, and help legislators foster relations with constituents. Partisanship also influenced the features of legislation. Part of chapter five built on an insight by John G. Burke to discuss how Democrats in Congress in 1838, led by Felix Grundy and eventually supported by the Whig minority, constructed a law around a Penalty Option. The 1838 law was supposed to modify the behavior of steamboat operators by threatening them with lawsuits and prosecution. This approach was in tune with legislator's preferences to depend on steamboat operators and passengers to police themselves and use the court system, rather than government administration, to enforce the law. The fact that it did not curb accidents led to the 1852 Steamboat Act, where Congress made more muscular use of its power to regulate commerce in ways that were usually limited to the exercise of the "police power" by the "states."<sup>30</sup>

Partisan divisions were evident when members of Congress considered penalty and regulatory policies. Whigs were enthusiastic about exercising national authority and more eager than Democrats to impose regulations on private businesses.<sup>31</sup> Roll call votes show that more Whigs than Democrats supported the 1838 and 1852 laws.<sup>32</sup> As we saw in chapter five, in 1838 Democrats, led by Senator Felix Grundy, pushed for a Penalty Option and blocked regulatory provisions preferred by many Whigs that would have licensed engineers, required boilers to be

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<sup>30</sup> Mashaw, "Administration and 'The Democracy':" 1629.

<sup>31</sup> Burke, "Bursting Boilers," 58. Appendix C: S. 1, 25<sup>th</sup> Cong., 2<sup>nd</sup> sess.; S. 223, 32<sup>nd</sup> Cong., 1<sup>st</sup> sess. Melvyn Dubofsky has posited that Whig activism broke ground for later forms of government intervention, arguing that "the Whig ideal can be considered an antebellum precursor of the New Deal and the 'General Welfare' state." Melvyn Dubofsky, "Daniel Webster and the Whig Theory of Economic Growth: 1828-1848," *New England Quarterly*, 42 (December 1969): 553.

<sup>32</sup> Appendix C: S. 1, 25<sup>th</sup> Cong., 2<sup>nd</sup> sess.; S. 223, 32<sup>nd</sup> Cong., 1<sup>st</sup> sess.

tested regularly, limited their working pressures, and outlawed steamboat racing.

Even so, the history of steamboat legislation provides exceptions to the “party period” framework and deviates “from the pattern” where legislative activity during the era was characterized by deep and persistent partisan divisions in roll call votes.<sup>33</sup> Partisanship in this area of policy ought to be understood as more of a partisan preference than a partisan imperative. At a time when the Whig and Democratic parties had profound differences about public policy, representatives of the parties tended to agree on some aspects of steamboat policy and disagree on others. We have seen that members from both parties supported investigating the causes of disasters and publishing the results. Legislators from both sides of the aisle also advocated examining safety devices and passed acts to test them without demanding roll call votes in 1834, 1838 and 1843. The differences between the parties were sometimes visible, but did not predominate, as in 1842 when 75% of Whigs and more than 57% of Democrats in the House favored a joint resolution authorizing the government to examine boiler safety inventions.<sup>34</sup>

On the issue of steamboat safety, partisan affiliations were sometimes useful, but imperfect indicators of the policies members of Congress composed and advocated. Ronald Formisano notes that the claims that “party organizations” were the primary conduits for policymaking during the nineteenth century have frequently lacked direct supportive evidence.<sup>35</sup> In our story, other factors were often more important than partisan loyalties and ideological predilections in influencing the opinions and shaping the actions of individual congressmen. The

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<sup>33</sup> Joel H. Silbey, *The Partisan Imperative: The Dynamics of American Politics before the Civil War* (New York, NY: Oxford University Press), 21. See also Silbey, “‘To One or Another of these Parties Every Man Belongs’: The American Political Experience from Andrew Jackson to the Civil War,” in Byron E. Shafer and Anthony J. Badger, eds., *Contesting Democracy: Substance and Structure in American Political History, 1775-2000* (Lawrence, KS: University Press of Kansas, 2001): 74.

<sup>34</sup> Appendix C: H.J.R. 19, 27<sup>th</sup> Cong., 2<sup>nd</sup> sess. This joint resolution also authorized a subsidy to inventor Samuel Colt for a naval defense project.

<sup>35</sup> Ronald P. Formisano, “The ‘Party Period’ Revisited,” *Journal of American History* 86/1 (Jun. 1999): 98

desire to support local constituents could sway legislators, as when David Petrikin of Pennsylvania sponsored bills on behalf of inventor Samuel Raub, Jr., or Thomas Pratt of Maryland opposed the 1852 Steamboat Act at the behest of steamboat interests in his state. Many Democrats, like Hannibal Hamlin and David Seymour in 1852, sponsored or supported regulatory legislation that was sophisticated and intrusive, even when it was inconsistent with Democratic ideological predilections for a small and unobtrusive government.<sup>36</sup>

Steamboat legislation was usually drafted by a member of a responsible committee in either house, often a select committee or the Commerce Committee. We can see in Appendix A that Whigs, Democrats and Republicans all served as prime authors and sponsors of these bills. Democratic sponsors, such as Charles Wickliffe of Kentucky in the 1830s and John Ruggles of Maine in the early 1840s, shaped bills with provisions similar to those introduced by Whigs such as Samuel Southard of New Jersey in the 1830s and Joseph Rogers Underwood of Kentucky in the early 1840s. In these instances, their individual inclinations, the expertise they developed on the issue, and their positions on responsible committees probably exercised a stronger influence on their views than their partisan affiliation.

Despite the contentious nature of politics at the time, members of Congress usually exhibited a high degree of consensus in supporting steamboat penal and regulatory legislation, as when they passed laws without contested roll call votes in 1838 and 1843.<sup>37</sup> This resembled the process by which other laws regarding maritime safety were enacted, such as the 1818, 1848, 1849, 1855 and 1860 laws where Congress approved bills regulating carriage of passengers in

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<sup>36</sup> Appendix A: S. 303, 25<sup>th</sup> Cong., 1<sup>st</sup> sess.; S. 247, 26<sup>th</sup> Cong., 1<sup>st</sup> sess.; S. 148, 26<sup>th</sup> Cong., 2<sup>nd</sup> sess.; H.R. 71, 28<sup>th</sup> Cong., 1<sup>st</sup> sess.; H.R. 305, 29<sup>th</sup> Cong., 1<sup>st</sup> sess.; H.R. 386, 31<sup>st</sup> Cong., 1<sup>st</sup> sess.; S. 112, 34<sup>th</sup> Cong., 1<sup>st</sup> sess.; S. 138, 35<sup>th</sup> Cong., 1<sup>st</sup> sess. Democrats were the main sponsors of these bills.

<sup>37</sup> Appendix A: S. 1, 25<sup>th</sup> Cong., 2<sup>nd</sup> sess.; H.R. 602, 27<sup>th</sup> Cong., 3<sup>rd</sup> sess.

ocean vessels without roll call votes.<sup>38</sup> This situation draws attention to Margaret Susan Thompson's observation that studying legislatures by focusing on roll call votes can divert attention from instances of consensus by emphasizing divisive issues, and that it can also shift the focus away from activities, such as consideration of bills in committee, that have a significant impact on legislation before proposals come to the floor.<sup>39</sup>

When final votes *were* held, as in 1852, huge majorities of both parties supported steamboat laws, regardless of their provisions.<sup>40</sup> Even partisans who disagreed with particular aspects of steamboat proposals tended to support or acquiesce in passing them. Few were prepared to fight to the finish for their own versions of legislation.<sup>41</sup> The extent of cooperation raises questions about how far the southern advocates of states' rights, in alliance with Democrats, "constrict[ed] nation-state development" before the Civil War.<sup>42</sup> In this area, at least, Democrats appear to have shaped the government response, but not blocked it, as in the 1838 law, and either supported, or at least acquiesced, to a significant instance of governmental activism with the 1852 Steamboat Act.

While these observations do not overthrow the notion of a "party period" for public policy during the 19<sup>th</sup> century, scholars should be alert to exceptions and watchful for other factors that influenced legislative decision-making and outcomes. Partisan impulses were

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<sup>38</sup> Appendix A: H.R. 128, 15<sup>th</sup> Cong., 1<sup>st</sup> sess.;

<sup>39</sup> Margaret Susan Thompson, *The "Spider Web": Congress and Lobbying in the Age of Grant* (Ithaca, NY: Cornell University Press, 1985), 17.

<sup>40</sup> The exception to this pattern came in 1860, when most House Democrats and Southerners opposed amending the 1852 Steamboat Act. Appendix C: S. 114, 36<sup>th</sup> Cong., 1<sup>st</sup> sess. See also Bensel, *Yankee Leviathan*, 70-72, 74.

<sup>41</sup> In chapter five we saw that in 1838 Whigs wanted to see Congress respond in some fashion to steamboat disasters and ultimately acquiesced to the Democratic framework by endorsing a bill shaped by Felix Grundy and the Democrats. When the time came to pass the 1838 steamboat bill, S. 1, there was sufficient consensus that members in the House and Senate did not insist on recording their votes, and it passed without a roll call or division.

<sup>42</sup> Formisano, "State Development in the Early Republic:" 21; see also 24-25.

present, but researchers ought to be careful to demonstrate how partisanship affected policy, rather than to assume its influence.<sup>43</sup>

The study of steamboat legislation offers insights into the internal operations of Congress. Most bills did not win through. Less than one in seven measures were enacted and just two-thirds of these represented significant changes.<sup>44</sup> Of the sixty-two bills and joint resolutions on the subject of steam vessel safety that were introduced from 1824 to 1860, only nine passed both houses to become law, and three of these were supplemental measures that made minor changes in previous legislation. Over the years a shifting number of congressmen, Democrats, Whigs and Republicans, acted as both gatekeepers and advocates, usually because of their positions on relevant committees. Sponsors had to deal with the fact that their proposals could easily be stopped at numerous choke points, even when many members supported congressional intervention.

Individual legislators in key positions exercised a great deal of influence because of their positions on committees and their individual expertise. The intricate and somewhat novel nature of steamboat regulation inclined senators to follow the lead of committee members like Senator John Davis who were charged with studying the issue and drafting the bills. In both the House and Senate, the committee members in charge of the legislation were usually able to shape the bills to their liking and keep control of them during the amendment process. On several occasions in 1852, members indicated that they were deferring to the expertise of their colleagues in order to endorse legislation that they themselves did not fully understand. Further research could explore if other congressional actions to preserve public health and safety during the period, including authorizing public vessels to patrol for ships in distress, attempting to

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<sup>43</sup> John, "Ruling Passions," 5.

<sup>44</sup> Appendix A.



curtail illness among transatlantic passengers, establishing lifesaving stations, funding lighthouses and other aids to navigation, and creating the Lighthouse Board, followed similar patterns. Further investigation is also warranted as to the effectiveness of the 1852 Steamboat Act. Louis Hunter believed that the administrative entity it created oversaw steamboat operations effectively and reduced the number of accidents, whereas more recent scholarship has questioned this claim.<sup>45</sup>

Through this study I have sought to call attention to an undeservedly obscure piece of public policy, expand our understanding of governmental activism and provide insight into the operations of the 19<sup>th</sup>-century Congress. Scholars have long been interested in the history of the American state, and especially in how large the government was and what powers and influence it wielded.<sup>46</sup> They undermined the myth of nineteenth-century laissez faire by documenting the role that state and local governments and the courts played in encouraging economic growth.<sup>47</sup> An influential group of historically minded social scientists has worked to “bring the state back in,” insisting that the state apparatus has exercised a degree of autonomy and been an essential actor that shaped American life.<sup>48</sup> Others have argued that energetic military and foreign policies challenge the myth that the United States had a weak national state.<sup>49</sup> William Novak contends that students of the nineteenth century need to move beyond the traditional dichotomy of strong vs. weak states, and he and Richard John, in particular, have called on scholars to

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<sup>45</sup> Hunter, *Steamboats*, 539-546. Paskoff, *Troubled Waters*, 20-22.

<sup>46</sup> Ronald P. Formisano, “State Development in the Early Republic: Substance and Structure, 1780-1840,” in Shafer and Badger, eds., *Contesting Democracy*: 7.

<sup>47</sup> Harry N. Scheiber, “Public Economic Policy and the American Legal System: Historical Perspectives,” *Wisconsin Law Review* (1980): 1161-63.

<sup>48</sup> Steven M. Gillon, “The Future of Political History,” *Journal of Policy History*, 9/2 (1997): 248; Zelizer, “Clio’s Lost Tribe,” 378-79; Novak, “Myth of the ‘Weak’ American State:” 756, 757.

<sup>49</sup> Ira Katznelson and Martin Shefter, eds., *Shaped by War and Trade: International Influences on American Political Development* (Princeton, NJ; Princeton University Press, 2002).

reevaluate the actions of the national and state governments during the nineteenth century.<sup>50</sup>

This investigation furthers our understanding of how governmental institutions impacted the lives of Americans. Stephen Skowronek has argued that United States in the 19<sup>th</sup>-century had “a highly developed democratic politics without a concentrated governing capacity.”<sup>51</sup> This view posits that the national government had little taste for directly supervising the economy and, even if it had the desire, it lacked the administrative capacity to oversee it effectively.<sup>52</sup> If Skowronek’s framework applied in this case, steamboat legislation might not have been enacted at all or, if passed, it would resemble the 1838 law with its emphasis on penalties, undeveloped administrative provisions, and dependence on the court system. Instead, Congress pursued a multi-track policy to protect travelers and enacted a modern and sophisticated regulatory plan in 1852. As with subsequent instances where Congress expanded governmental authority, the laws were the product of deliberations by legislators trying to address societal problems in a practical manner.<sup>53</sup> Through the 1852 Steamboat Act, and the other policies we have examined, the vast majority of the members of Congress showed a substantial commitment to, in the words of Senator John Davis, “interpose and prevent [the] reckless [and] unnecessary sacrifice of human beings.”<sup>54</sup>

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<sup>50</sup> William J. Novak, “The American Law of Association: The Legal-Political Construction of Civil Society,” *Studies in American Political Development*, 12 (Fall 2001): 171; Novak, “Myth of the ‘Weak’ American State”; Richard R. John, “Farewell to the ‘Party Period’: Political Economy in Nineteenth-Century America,” *Journal of Policy History* 16/2 (2004): 122; John, “Ruling Passions:” 1-20. See also Balogh, *Government Out of Sight*.

<sup>51</sup> Stephen Skowronek, *Building a New American State: The Expansion of National Administrative Capacities, 1877-1920* (New York, NY: Cambridge University Press, 1982), 8.

<sup>52</sup> White, *Jacksonians*, viii.

<sup>53</sup> Williamjames Hull Hoffer, *To Enlarge the Machinery of Government: Congressional Debates and the Growth of the American State, 1858-1891* (Baltimore, MD: Johns Hopkins University Press, 2007), x-xi.

<sup>54</sup> CG, 32<sup>nd</sup> Cong., 1<sup>st</sup> sess., July 9, 1852, 1668.

APPENDIX A – BILLS AND JOINT RESOLUTIONS ON VESSEL SAFETY, 1790-1860

<i>Bill or Resolution</i>	<i>Congress – Session and Date Introduced</i>	<i>Brief Name/ Description</i>	<i>Responsible Committee(s) &amp; (Legislator(s))</i>	<i>Related Report or Document</i>	<i>Roll Call</i>	<i>Outcome</i>	<i>Comments</i>	<i>Categories</i>
H.R. 61 <i>All</i>	1-2 (May 3, 1790)	Regulation of Seamen in Merchant Service	Select Committee (Thomas Fitzsimons, Pro-Administration-PA)		No	Becomes Law July 20, 1790  1 Stat. L. 131	First mate can insist on vessel safety inspection. Ships must carry medicine & adequate provisions	4 5, b, p
H.R. 128 <i>All</i>	15-1 (March 10, 1818)	Regulating Passenger Ships and Vessels	House Commerce & Manufactures (Thomas Newton, Jr., Republican – VA); Senate Commerce & Manufactures Committee (Nathan Sanford, Democratic Republican-NY)		No	Becomes Law March 2, 1819  3 Stat. L. 488	Ships cannot exceed 2 passengers per 5 tons. Must carry adequate provisions mandated for passengers and crew. Sec’y of State to compile an annual report on passengers arriving in the U.S.	4 5, a, b
H.R. 238 <i>Steam</i>	18-1 (May 22, 1824)	Regulating Steam Boats and for the Security of Passengers	House Commerce Committee (Thomas Newton, Jr., Adams-Clay Republican – VA)	H. Rept. 125	No	Does not pass House		4, a 5, c, d, f, i
H.J.R. 10 <i>Steam</i>	18-1 (May 25, 1824)	Provide security for passengers on steamboats	(Lewis Condict Jackson Republican-NJ)	H. Rept. 125	No	Does not pass House	Sec’y of the Treasury to inquire into the causes of explosions and be given power to regulate the construction and use of engines	

APPENDIX A (CONTINUED)

<i>Bill or Resolution</i>	<i>Congress – Session and Date Introduced</i>	<i>Brief Name/ Description</i>	<i>Responsible Committee(s) &amp; (Legislator(s))</i>	<i>Related Report or Document</i>	<i>Roll Call</i>	<i>Outcome</i>	<i>Comments</i>	<i>Categories</i>
H.R. 361	18-2 (Feb. 25, 1825)	Enrolling or Registering Steam Vessels	House Commerce Committee (Thomas Newton, Jr., Adams-Clay Republican – VA)		No	Becomes Law March 3, 1825  4 Stat. L. 129		5
S. 128 <i>All</i>	21-1 (March 10, 1830)	Vessels to show lights at night	(Samuel Smith, Jacksonian-MD) Senate Commerce Committee (Levi Woodbury, Jacksonian-NH)			Does not pass Senate		4, b 5, c, p
H.R. 458 <i>Steam</i>	21-1 (May 4, 1830)	Amend Acts for registering and licensing steamboats and provide for the security of passengers	House Select Committee on Memorial of Merchants and Steamboat Owners (Charles Wickliffe, Jacksonian-KY)		No	Does not Pass House		4 5, f, h, i
H.R. 582 <i>Steam</i>	22-1 (May 18, 1832)	Provide for the Better Security of Passengers in Steam Vessels	Select Committee on Steam (Charles Wickliffe, Jacksonian-KY)	H. Rept. 478	No	Does not Pass House		4, a 5, c, d, f, h, p
H.R. 749 <i>All</i>	22-2 (Feb. 25, 1833)	Amend 1819 Act Regulating Passenger Ships and Vessels	Commerce Committee (Benjamin Chew Howard, Jacksonian-MD)		No	Does not pass House	Allows some exceptions to the 1819 Act so as to carry more passengers per ton for blacks emigrating to Liberia	5, a

APPENDIX A (CONTINUED)

<i>Bill or Resolution</i>	<i>Congress – Session and Date Introduced</i>	<i>Brief Name/ Description</i>	<i>Responsible Committee(s) &amp; (Legislator(s))</i>	<i>Related Report or Document</i>	<i>Roll Call</i>	<i>Outcome</i>	<i>Comments</i>	<i>Categories</i>
H.R. 452 <i>Steam</i>	23-1 (April 26, 1834)	Authorizes Navy to test Steam Engine Improvements	House Select Committee on the Memorial of Benjamin Phillips (Edward D. White, Whig-LA); Sen. Nav. Affairs Comm. (Samuel Southard, Anti-Jacksonian-NJ)	H. Rept. 426	No	Becomes Law June 30, 1834  4 Stat. L. 728	Appropriates \$5,000 to test steam engines of Benjamin Phillips and others	2
S. 201 <i>Steam</i>	23-1 & 23-2 (June 12, 1834)	Regulation of Steam Vessels	Senate Committee on Naval Affairs (Samuel Lewis Southard, Anti-Jacksonian-NJ)		No	Does not pass Senate		4, a 5, b, c, f, h, i, j, k, n, o, p
S. 20 <i>Steam</i>	23-2 (Dec. 15, 1834)	Regulate Steam Vessels	Senate Naval Affairs – (Samuel Southard, Anti-Jacksonian—NJ)		No	Does not pass Senate	President appoints inspectors. Inspect hulls 1/year & test boilers every 3 months. License & test engineers.	4, a 5, b, c, f, h, i, j, k, n, o, p
S. 183 <i>Steam</i>	24-2 (Feb. 1, 1837)	Authorize Tests of Steam Engine Inventions	Senate Select Committee on Memorial of A.B. Quinby (John Davis, W-MA)	S. Rept. 125	No	Passes Senate, Not House	The House received this bill late in the short session and took no action on it	1 2 5, 1

APPENDIX A (CONTINUED)

<i>Bill or Resolution</i>	<i>Congress – Session and Date Introduced</i>	<i>Brief Name/ Description</i>	<i>Responsible Committee(s) &amp; (Legislator(s))</i>	<i>Related Report or Document</i>	<i>Roll Call</i>	<i>Outcome</i>	<i>Comments</i>	<i>Categories</i>
S. 1 <i>Steam</i>	25-2 (Dec. 6, 1837)	Better Security of Passengers in Steam Vessels (The 1838 steamboat act)	Senate Select Committee on Steam (Felix Grundy, D-TN) House Judiciary Committee (Thomas Corwin, W-OH)		Jan. 22, 1838: Senate defeats amendment to forbid racing: Yeas 15 Nays 21; June 16, 1838: House agrees to suspend the rules to consider the bill: Yeas 121 Nays 56	Becomes Law July 7, 1838  5 Stat. L. 304	Inspect hulls and boilers to determine if they are safe and seaworthy. Keep safety valve open when stopped. Inspectors to be appointed by district court judges and paid \$5 per inspection by vessel masters. Explosions to serve as prima facie evidence of negligence.	4, a 5, c, d, f, i, p
S. 73 <i>Steam</i>	25-2 (Dec. 20, 1837)	Test Inventions to Prevent Boiler Explosions	Senate Committee on Patents (John Ruggles, D-ME); House Commerce Committee (F.O.J. Smith, D-ME & Samuel Cush-man, D-NH)		June 16, 1838: House agrees to suspend the rules to consider the bill: Yeas 121 Nays 56	Becomes Law June 28, 1838  5 Stat. L. 252	This resulted in an investigation chaired by Prof. James Renwick which produced H. Doc. 170 (25-3)	2
S. 119 <i>Steam</i>	25-2 (Jan. 3, 1838)	Examine Samuel Raub's Safety Valve	Senate Committee on Roads & Canals (John Tipton, D-IN)	S. Rept. 69		Does not pass Senate	Superseded by S. 73, 25-2	2

APPENDIX A (CONTINUED)

<i>Bill or Resolution</i>	<i>Congress – Session and Date Introduced</i>	<i>Brief Name/ Description</i>	<i>Responsible Committee(s) &amp; (Legislator(s))</i>	<i>Related Report or Document</i>	<i>Roll Call</i>	<i>Outcome</i>	<i>Comments</i>	<i>Categories</i>
H.R. 365 <i>Steam</i>	25-2 (Jan. 9, 1838)	Apply Samuel Raub’s Safety Valve to U.S. Vessels	Select Committee on Steam (David Petrikin, D-PA; George W. Owens, D-GA)	H. Rept. 323	No	Does not pass House		3
<b>S. 389</b> <i>Steam</i>	<b>25-2 (July 4, 1838)</b>	<b>Supplemental to S. 73 to Test Inventions to Prevent Boiler Explosions</b>	<b>Senate Select Committee on the Memorial of Edward D. Tippet (William D. Merrick, W-MD)</b>		<b>No</b>	<b>Becomes Law July 7, 1838</b> <b>5 Stat. L. 261</b>	<b>Test Tippet’s safety steam engine and other promising inventions. Results reported in H. Doc. 170 (25-3)</b>	<b>2</b>
H.R. 1071 <i>Steam</i>	25-3 (Jan. 23, 1839)	Supplementary to the 1838 Steamboat Act	Select Committee on Steam Boilers (John Sergeant, W-PA)		No	Does not pass House	Modify iron rods & chains provision of 1838 Steamboat Act	3 4
S. 303 <i>Steam</i>	25-3 (Feb. 25, 1839)	Better Security of Passengers in Steam Vessels	Commerce Committee (John Ruggles, D-ME)	Senate Document 13 (25-3)	No	Does not pass Senate	This was one of the most extensive early Senate steamboat bills with regulatory, penal and administrative provisions	4, a 5, c, f, h, i, k
S. 247 <i>Steam</i>	26-1 (March 2, 1840)	Better Security of Steam Vessel Passengers	Commerce Committee (John Ruggles, D-ME)	S. Rept. 241	No	Does not pass Senate	Extensive early Senate steamboat bill with regulatory, penal and administrative provisions	1 4, a, b 5, d, f, g, h, j, k, n, o, p

APPENDIX A (CONTINUED)

<i>Bill or Resolution</i>	<i>Congress – Session and Date Introduced</i>	<i>Brief Name/ Description</i>	<i>Responsible Committee(s) &amp; (Legislator(s))</i>	<i>Related Report or Document</i>	<i>Roll Call</i>	<i>Outcome</i>	<i>Comments</i>	<i>Categories</i>
S. 310 <i>All</i>	26-1 (April 16, 1840)	Amend 1819 Act for Regulating Passenger Ships and Vessels	Senate Commerce Committee (John Davis, W-MA); House Commerce Committee (Edward Curtis, W-NY)	S. Rept. 390	No	Passes Senate, not House		5, a
H.R. 484 <i>Steam</i>	26-1 (July 10, 1840)	Purchase Samuel Raub’s Safety Valve	Select Committee on the Petition of Samuel Raub (David Petrikin, D-PA; Joseph Rogers Underwood, W-KY)	H. Rept. 651	No	Does not pass House	Consideration postponed several times in order to deal with appropriations bills. Session ended without action	3
H.R. 485 <i>Steam</i>	26-1 (July 10, 1840)	Test Fire Prevention Apparatus for Steamboats	Select Committee on Petition of Samuel Raub (David Petrikin, D-PA; Joseph Rogers Underwood, W-KY)	H. Rept. 651 (July 10, 1840)	No	Does not pass House	Postponed several times in order to consider appropriations bills. Session ended without action	2
H.R. 486 <i>Steam</i>	26-1 (July 10, 1840)	Amend the 1838 Steamboat Act	Select Committee on the Petition of Samuel Raub (Joseph Rogers Underwood, W-KY)	H. Rept. 651 (July 10, 1840)	No	Does not pass House	This was the most detailed bill drafted by the House to date & required Raub’s Safety Valve. Considered mainly in the 2nd, brief session of Congress – postponed several times in order to consider appropriations bills.	3 4 5, c, f, h, i, k, p



APPENDIX A (CONTINUED)

<i>Bill or Resolution</i>	<i>Congress – Session and Date Introduced</i>	<i>Brief Name/ Description</i>	<i>Responsible Committee(s) &amp; (Legislator(s))</i>	<i>Related Report or Document</i>	<i>Roll Call</i>	<i>Outcome</i>	<i>Comments</i>	<i>Categories</i>
H.R. 486							Session ended without action	
S. 148 <i>Steam</i> <sup>1</sup>	26-2 (Dec. 24, 1840)	Better Security of Steam Vessel Passengers	Commerce Committee (John Ruggles, D-ME)		No	Does not pass Senate	Revised from S. 247 (26-1)	4, a 5, c, h, i, j, k, l, n, o, p
<b>H.J.R. 19</b> <i>Steam</i>	<b>27-2</b> <b>(Aug. 23, 1842)</b>	<b>Test Samuel Colt’s Submarine Battery and also test Boiler Safety Devices</b>	<b>House Committee on Naval Affairs (Francis Mallory, W-VA)</b> <b>Senate Committee on Naval Affairs (William S. Archer, W-VA)</b>		<b>August 25, 1842:</b> <b>House Passes:</b> <b>Yeas 110</b> <b>Nays 51</b>	<b>Enacted August 31, 1842</b> <b>5 Stat. L. 584</b>	<b>Authorizes \$15,000 to test Colt’s invention and \$6,000 to test boiler inventions by Thomas Easton, Ethan Campbell, A. B. Quinby &amp; others</b>	<b>2</b>
<b>H.R. 602</b> <i>Steam</i>	<b>27-2</b> <b>(Aug. 22, 1842)</b> <b>and 27-3</b> <b>&amp;</b> <b>(Feb. 3, 1843)</b>	<b>Modify the 1838 Steamboat Act</b>	<b>Select Committee on Steam (Joseph Rogers Underwood, W-KY)</b> <b>Senate Commerce Committee (Jabez Huntington, W-CT)</b>	<b>H. Rept. 1033</b>	No	<b>Becomes Law March 3, 1843</b>  <b>5 Stat. L. 626</b>	<b>Requires extra steering apparatus and amends 1838 provision for rods &amp; chains; adds \$5,000 for H.J.R. 19 Commission to test inventions, which resulted in S. Document 405 (28-1)</b>	<b>2</b> <b>4</b> <b>5, m, p</b>
S.J.R. 8 <i>Steam</i>	27-3 (Feb. 10, 1843)	Test Invention to protect steamboats			No	Does not pass Senate	Protect against snags	2

<sup>1</sup> S. 148, 26<sup>th</sup> Cong., 2<sup>nd</sup> sess., Bound Volumes of Bills, NA.

APPENDIX A (CONTINUED)

<i>Bill or Resolution</i>	<i>Congress – Session and Date Introduced</i>	<i>Brief Name/ Description</i>	<i>Responsible Committee(s) &amp; (Legislator(s))</i>	<i>Related Report or Document</i>	<i>Roll Call</i>	<i>Outcome</i>	<i>Comments</i>	<i>Categories</i>
H.R. 829 <i>Steam</i>	27-3 (Feb. 23, 1843)	Test Josiah Kirk’s Snag Fender	Committee on Roads and Canals (Thomas McKennan, W-PA)		No	Does not pass House		2
H.R. 71 <i>Steam</i>	28-1 (Jan. 18, 1844)	Amend the 1838 Steamboat Act	Commerce Committee (John W. Tibbatts, D-KY; Preston King, D-NY)		No	Does not pass House	Includes proposal for \$20,000 to establish schools to train engineers in Cincinnati and St. Louis	4 5, c, f, h, j, k, l, n
H.R. 594 <i>Steam</i>	28-2 (Feb. 7, 1845)	Purchase Raub’s and Barnum’s Safety Valve for Public Steamships	Naval Affairs Committee (Richard Franklin Simpson, D-SC)	H. Rept. 115	No	Does not pass House	Appropriates \$5,000 to test and attach Raub’s valve and Barnum’s fire extinguisher to 5 public steamships	2
H.J.R. 11 <i>Steam</i>	29-1 (Jan. 27, 1846)	Test James Montgomery’s boiler safety invention	Naval Affairs (Thomas Butler King, W-GA)		No	Does not pass House		3
H.R. 305 <i>Steam</i>	29-1 (March 27, 1846)	Amend the 1838 Steamboat Act	Commerce Committee (John W. Tibbatts, D-KY)	H. Doc. 25	No	Does not pass House	Requires hydrostatic testing of boilers every 6 months	4, a, b 5, g, h
H.R. 501 <i>Efficient</i>	29-1 (July 13, 1846)	Test Seth Lamb’s Paddle Wheels	Naval Affairs Committee (William B. Maclay, D-NY)	H. Rept. 762	No	Does not pass House	\$2,000 to be appropriated for testing	2
H.R. 551 <i>Efficient</i>	29-1 (August 10, 1846)	Sickels & Cook’s cut-off for Steam Engines	Naval Affairs Committee (William B. Maclay, D-NY)	H. Rept. 834	No	Does not pass House	Authorize Navy to purchase the “patent cut-off” for navy steamers—this was an efficiency device	3

APPENDIX A (CONTINUED)

<i>Bill or Resolution</i>	<i>Congress – Session and Date Introduced</i>	<i>Brief Name/ Description</i>	<i>Responsible Committee(s) &amp; (Legislator(s))</i>	<i>Related Report or Document</i>	<i>Roll Call</i>	<i>Outcome</i>	<i>Comments</i>	<i>Categories</i>
H.R. 609 <i>Steam</i>	29-2 (Jan. 20, 1847)	Steamboats on bays, sounds and lakes to have anchors, etc.	(Robert C. Winthrop, W-MA); Commerce Committee (John W. Tibbatts, D-KY)		No	Does not pass House	Requires steamers on bays, sounds, & lakes to carry anchors, chains, cables, pumps, etc.	5, c
<b>H.R. 637</b> <i>All</i>	<b>29-2</b> <b>(Feb. 1, 1847)</b>	<b>Carriage of Passengers in Merchant Vessels</b>	<b>House Judiciary Committee (George Rathbun, D-NY); Senate Commerce Committee (John Adams Dix, D-NY)</b>		<b>Feb. 1, 1847</b> <b>House passes: Yeas 94 Nays 48</b>	<b>Becomes Law Feb. 22, 1847</b> <b>9 Stat. L. 127</b>	<b>Limits number of passengers in relation to deck space</b>	<b>4</b> <b>5, a</b>
S. 177 <i>All</i>	29-2 (Feb. 23, 1847)	Carriage of Passengers in Merchant Vessels	Senate Commerce Committee (Senator John Davis, W-MA); House Judiciary Committee (George Rathbun, D-NY)		No	Becomes Law March 2, 1847  9 Stat. L. 149	Clarifies time when 9 Stat. L. 127 will go into effect.	5, a
S. 54 <i>All</i>	30-1 (Jan. 5, 1848)	Exempt Colonization Vessels from Acts re: Carriage of Passengers	Senate Commerce Committee (Reverdy Johnson, W-MD)		No	Becomes Law Jan 31, 1848  9 Stat. L. 210	Exempts Am. Colonization Society vessels carrying people to Africa from 1847 Acts regulating passengers	5, a
H.R. 115 <i>All</i>	30-1 (Jan. 25, 1848)	Amend Act to Regulate Passengers in Merchant Vessels	Commerce Committee (Joseph Grinnell, W-MA)		No	Does not pass House		5, a

APPENDIX A (CONTINUED)

<i>Bill or Resolution</i>	<i>Congress – Session and Date Introduced</i>	<i>Brief Name/ Description</i>	<i>Responsible Committee(s) &amp; (Legislator(s))</i>	<i>Related Report or Document</i>	<i>Roll Call</i>	<i>Outcome</i>	<i>Comments</i>	<i>Categories</i>
H.R. 218 <i>Steam</i>	30-1 (Feb. 9, 1848)	Amend the 1838 Steamboat Act	(James B. Bowlin, D-MO); Commerce Committee (Bannon G. Thibodeaux, LA)		No	Does not pass House		
H.R. 254 <i>Steam</i>	30-1 (Feb. 29, 1848)	Supplementary to the 1838 Steamboat Act	Commerce Committee (Bannon G. Thibodeaux, LA)	H. Rept. 260	No	Does not pass House	Inspections to be in front of witnesses; additional penalties for bursting boilers	4 5, c, f, p
<b>H.R. 292</b> <i>All</i>	<b>30-1</b> <b>(March 6, 1848)</b>	<b>Ventilation of Passenger Vessels</b>	<b>House Commerce Committee (Joseph Grinnell, W-MA); Senate Commerce Committee (John Davis, W-MA)</b>		<b>No</b>	<b>Becomes Law May 17, 1848</b>  <b>9 Stat. L. 220</b>	<b>Provide for adequate ventilation, cooking facilities and provisions; Customs inspectors to check on compliance; suits may be brought in district courts</b>	<b>4</b> <b>5, a, b, l</b>
<b>H.R. 738</b> <i>All</i>	<b>30-2</b> <b>(Jan. 25, 1849)</b>	<b>Extend Laws Re: Carriage of Passengers in Merchant Vessels</b>	<b>House Commerce Committee (Joseph Grinnell, W-MA)</b>		<b>No</b>	<b>Becomes Law March 3, 1849</b>  <b>9 Stat. L. 399</b>	<b>Apply laws for carriage of passengers to ports on the Pacific Ocean</b>	<b>4</b> <b>5, a, b, l</b>
S. 60 <i>Steam</i>	31-1 (Jan. 21, 1850) 31-2	Authorizes District Courts to Appoint Additional Steamboat Inspectors	(Sen. Solon Borland, D-AR) Senate Commerce Committee (Hannibal Hamlin, D-ME)		No	Passes Senate, not House	Extend existing (1838) steamboat inspection system to the Arkansas River. Similar to S. 25 (32-1)	4 5

APPENDIX A (CONTINUED)

<i>Bill or Resolution</i>	<i>Congress – Session and Date Introduced</i>	<i>Brief Name/ Description</i>	<i>Responsible Committee(s) &amp; (Legislator(s))</i>	<i>Related Report or Document</i>	<i>Roll Call</i>	<i>Outcome</i>	<i>Comments</i>	<i>Categories</i>
S. 242 <i>Steam</i>	31-1 (May 24, 1850)	Additional Security for Lives and Property of Persons navigating the Western Waters	William K. Sebastian (D-AR); Senate Comm. Comm. (Hannibal Hamlin, D-ME); House Comm. Comm. (Charles Stetson, D-ME)		No	Passes Senate, not House	Require non-steam vessels on the western rivers to display navigation lights and to use bells in poor visibility	4 5, c
S. 284 <i>Steam</i>	31-1 (July 16, 1850)	Amend Act Providing for the Security of Steam Vessel Passengers	Commerce Committee (John Davis, W-MA)		No	Does not pass Senate	In the Special Session (March 4-13, 1851) Senator John Davis asked for a comprehensive report on steam vessels in the U.S. Results in S. Exec. Doc. 42 (32-1)	4 5, c, p
H.R. 386 <i>Steam</i>	31-1 (Sept. 7, 1850)	Amend 1838 Steamboat Act	House Commerce Committee (Robert M. McLane, D-MD); Senate Commerce Committee (John Davis, W-MA)		No	Passes House, not Senate	H.R. 386 was passed by the House very late in the 1 <sup>st</sup> session. The bill was reported out of the Senate Commerce Committee in the 2 <sup>nd</sup> session, but the Senate took no action. Senator John Davis asked for a report on steam vessels in the U.S., which resulted in S. Exec. Doc. 42 (32-1)	4 5, a, c, h, i, j, k, l, o, p

APPENDIX A (CONTINUED)

<i>Bill or Resolution</i>	<i>Congress – Session and Date Introduced</i>	<i>Brief Name/ Description</i>	<i>Responsible Committee(s) &amp; (Legislator(s))</i>	<i>Related Report or Document</i>	<i>Roll Call</i>	<i>Outcome</i>	<i>Comments</i>	<i>Categories</i>
S. 25 <i>Steam</i>	32-1 (Dec. 9, 1851)	Supplementary to the 1838 Steamboat Act	Senate Commerce Committee (Solon Borland, D-AR) House Commerce Committee		No	Passes Senate, not House	Make Little Rock, AR a port of entry & authorizes district court to appoint additional steamboat inspectors (under the 1838 Steamboat Law)	4 5, i
H.R. 33 <i>All</i>	32-1 (Dec. 17, 1851)	Amend Acts Regulating Carriage of Passengers in Merchant Vessels	(John Henry Hobart Haws, W-NY) Commerce Committee Thomas J.D. Fuller, (D-ME)	H. Rept. 25	No	Does not pass House	Imposes additional penalties for carrying too many passengers	4 5, a
S.J.R. 12 <i>Steam</i>	32-1 Jan. 15, 1852	Authorize investigation into boiler explosions	(Charles T. James, D-RI); Committee on Naval Affairs (William M. Gwin (D-CA)		No	Does not pass Senate	Appoint a 5-member board to investigate causes prevention of explosions	1
S. 216 <i>All</i>	32-1 (Feb. 16, 1852)	Amend Feb. 22, 1847 Act to Regulate Carriage of Passengers on Merchant Vessels	Commerce Committee (Hamilton Fish, W-NY)		No	Does not pass Senate		

APPENDIX A (CONTINUED)

<i>Bill or Resolution</i>	<i>Congress – Session and Date Introduced</i>	<i>Brief Name/ Description</i>	<i>Responsible Committee(s) &amp; (Legislator(s))</i>	<i>Related Report or Document</i>	<i>Roll Call</i>	<i>Outcome</i>	<i>Comments</i>	<i>Categories</i>
S. 223 “The Steamboat Act”  <i>Steam</i>	32-1 (Feb. 18, 1852)	Amend the Act for the Better Security of Passengers on Steam Vessels	Senate Commerce Committee (John Davis W-MA); House Commerce Committee (David Seymour, D-NY; Thomas J.D. Fuller, D-ME)	S. Exec. Doc. 42; S. Misc. Doc. 32	Aug. 25, 1852 House passes: Yeas 147 Nays 27; Aug. 28, 1852 Senate motion to table is defeated: Nays 43 Yeas 8	Becomes Law August 30, 1852  10 Stat. L. 61	Inspect vessels and boilers; Appoint salaried inspectors; Examine and license engineers and pilots; penalties for noncompliance	4 5, b, c, g, h, i, j, k, m, n, o, p
S. 260  <i>All</i>	32-1 (March 3, 1852)	Amend 1847 and 1848 Acts to Regulate Carriage of Passengers on Merchant Vessels	Senate Commerce Committee (John Davis, W-MA);		No	Passes Senate, not House	Impose additional penalties on vessel masters for violations of the passenger laws	4 5, a
H.R. 267  <i>All</i>	32-1 (May 26, 1852)	Guard Against Vessel Collisions at Night	Commerce Committee (Thomas B. Florence, D-PA)		No	Does not pass House	Sec. of Treasury to make regulations for night signal lights	4, a 5, c
S. 492 [Originally S.J.R. 50]  <i>All</i>	32-1 (July 14, 1852)	Provide additional Security to Passengers on the Western Waters	(William K. Sebastian, D-AR); Senate Comm. Comm. (Hannibal Hamlin, D-ME)		No	Passes Senate, not House	Require signal lights at night on non-steamboats and bells during fog. Similar to S. 242 (31-1)	4 5, c

APPENDIX A (CONTINUED)

<i>Bill or Resolution</i>	<i>Congress – Session and Date Introduced</i>	<i>Brief Name/ Description</i>	<i>Responsible Committee(s) &amp; (Legislator(s))</i>	<i>Related Report or Document</i>	<i>Roll Call</i>	<i>Outcome</i>	<i>Comments</i>	<i>Categories</i>
S.J.R. 67 <i>Steam</i>	32-2 (Dec. 29, 1852)	Allow more time for steamers to comply with the 1852 Steamboat Act	Senate Commerce Committee (John Davis, W-MA); House Commerce Committee (David L. Seymour, D-NY)		No	Becomes Law Jan 7, 1853  10 Stat. L. 261	Give inspectors discretionary power to give steamers more time to comply with the 1852 Steamboat Act	5
S.J.R. 79 <i>Steam</i>	32-2 (Feb. 22, 1853)	Amend S.J.R. 67	Senate Commerce Committee (John Davis, W-MA); House Commerce Committee (James H. Duncan, W-MA)		Feb. 22, 1853 amend to give vessel owners 4 additional months to comply with the Steamboat Act is defeated: Yeas 14 Nays 35	Becomes Law March 3, 1853  10 Stat. L. 262	Allows inspectors flexibility to exempt steamers from some penalties & give more time to comply with the 1852 Steamboat Act	5
S. 393	33-1 (June 8, 1854) & 33-2	Preserve Life & Property in Shipwrecks	Senate Commerce Committee (Hannibal Hamlin, D-ME); House Commerce Committee (Thomas J.D. Fuller, D-ME)		No	Becomes Law Dec 14, 1854  10 Stat. L. 597	Establish additional lifesaving stations with keepers and superintendants on NY & NJ coasts	5



APPENDIX A (CONTINUED)

<i>Bill or Resolution</i>	<i>Congress – Session and Date Introduced</i>	<i>Brief Name/ Description</i>	<i>Responsible Committee(s) &amp; (Legislator(s))</i>	<i>Related Report or Document</i>	<i>Roll Call</i>	<i>Outcome</i>	<i>Comments</i>	<i>Categories</i>
S. 408 <i>Steam</i>	33-1 (June 21, 1854)	Supplemental to the Steamboat Act	Senate Commerce Committee (Hannibal Hamlin, D-ME)		No	Passes Senate, not House		
S. 489 <i>All</i>	33-1 (Aug. 2, 1854)	Better Protection of Life and Health on Passenger Ships	Select Committee on Sickness in Passenger Ships (Hamilton Fish, W-NY)	S. Rept. 386	No	Does not pass Senate	Require space for air and exercise; limit the number of passengers; require ventilation, sufficient food & water; protect female passengers; compile log of passengers; customs officials to inspect	4 5, a, b
H.R. 559 <sup>2</sup> <i>Steam</i>	33-2 (Dec. 7, 1854)	Further Security of Steam Vessel Passengers	Commerce Committee (Felix Zollicoffer, W-TN)		No	Does not pass House	Replaces 1838 inspectors with the 1852 act's inspectors. Creates Supervising Inspector for Pacific Coast	5, j
H.R. 632 <i>All</i>	33-2 (Jan. 10, 1855)	Regulate Carriage of Turpentine	(Phillip Phillips, D-AL); Commerce Committee (Tappan Wentworth, W-MA)		No	Does not pass House	Reported adversely by Mr. Wentworth and tabled with no further action	

<sup>2</sup> H.R. 559, 33rd Cong., 2<sup>nd</sup> sess., Bound Volumes of Bills, NA.

APPENDIX A (CONTINUED)

<i>Bill or Resolution</i>	<i>Congress – Session and Date Introduced</i>	<i>Brief Name/ Description</i>	<i>Responsible Committee(s) &amp; (Legislator(s))</i>	<i>Related Report or Document</i>	<i>Roll Call</i>	<i>Outcome</i>	<i>Comments</i>	<i>Categories</i>
S. 669 <i>All</i>	33-2 (Feb. 15, 1855)	Better Protection of Life and Health on Passenger Ships	Commerce Committee (William Henry Seward, R-NY)		No	Does not pass Senate	Limit the number of passengers; require sufficient food & water; customs officials to inspect	4 5, a, b, c
H.R. 757 <i>Steam</i>	33-2 (Feb. 23, 1855)	Further Amend 1838 Steamboat Act	Commerce Committee (Aaron Harlan, W-OH)		No	Does not pass House	Extend 1852 Steamboat Act to ferry boats, tug boats, & tow boats; hire additional inspectors; mandate emergency signals for disasters & additional penalties for violations	4 5, c, e, j, p
H.R. 752 <i>Steam &amp; All</i>	33-2 (Feb. 24, 1855)	Regulate Carriage of Passengers in Steamships and Other Vessels	House Commerce Committee (Thomas J.D. Fuller, D-ME); Senate Commerce Committee (Judah P. Benjamin, W-LA)		No	Becomes Law March 3, 1855  10 Stat. L. 715	Required additional food & water. Better ventilation & living conditions to secure to and from foreign ports. Customs officials to inspect and administer the act	4 5, a, b, c

APPENDIX A (CONTINUED)

<i>Bill or Resolution</i>	<i>Congress – Session and Date Introduced</i>	<i>Brief Name/ Description</i>	<i>Responsible Committee(s) &amp; (Legislator(s))</i>	<i>Related Report or Document</i>	<i>Roll Call</i>	<i>Outcome</i>	<i>Comments</i>	<i>Categories</i>
S. 112 <i>Steam</i>	34-1 (Feb. 25, 1856)	Amend the Act for the Security of Passengers	Commerce Committee (Hannibal Hamlin, D-ME)	S. Rept. 138	No	Does not pass Senate	Extend 1852 Steamboat Act to ferry boats, tug boats, & towing boats; regulate transport of hazardous materials; rules for signal lights and passing vessels; hire additional inspectors	4, a 5, c, e, g, j, l, n, o, p
H.R. 92 <i>Steam</i>	34-1 & 34-2 & 34-3 (Feb. 28-Apr. 22, 1856)	Further to Amend the Act for the Security of Passengers	Committee of Commerce (Elihu Benjamin Washburne, Opposition-IL)	H. Rept. 68	No	Passes House, not Senate	Extend 1852 Steamboat Act to ferry boats, tug boats, & tow boats. Similar to H.R. 757 (33-2)s	4 5, c, f, g, n, o, p
S. 168 <i>Steam</i>	34-1 (Mar. 14, 1856)	Amend the Act for the Security of Passengers	Committee of Commerce (Clement C. Clay, D-AL)	S. Rept. 138	No	Does not pass Senate		
S. 188 <i>All</i>	34-1 (Mar. 24, 1856)	Amend 1819 Act Regulating Passenger Vessels	Committee of Commerce (Charles Sumner, Opposition- MA; Hannibal Hamlin, D-ME)		No	Does not pass Senate	Keep record of people entering U.S. by land	5
S. 277 <i>All</i>	34-1 & 34-2 (May 1, 1856)	Provide Uniform Code of Maritime Signals	Committee of Commerce (Judah Philip Benjamin, Opposition-LA)	S. Rept. 150	No	Passes Senate, not House		3 4

APPENDIX A (CONTINUED)

<i>Bill or Resolution</i>	<i>Congress – Session and Date Introduced</i>	<i>Brief Name/ Description</i>	<i>Responsible Committee(s) &amp; (Legislator(s))</i>	<i>Related Report or Document</i>	<i>Roll Call</i>	<i>Outcome</i>	<i>Comments</i>	<i>Categories</i>
H.R. 437 <i>All</i>	34-1 (July 2, 1856)	Better Security of Sail and Steam Passengers	(William W. Valk, American-NY)			Does not pass House		
S. 506 <i>Steam</i>	34-3 (Jan. 15, 1857)	Further to amend the 1838 Steamboat Act	Commerce Committee (William Henry, R-NY)	S. Doc. 9 & S. Exec. Doc. 15	No (p. 91 SJ)	Does not pass Senate	Additional provisions to prevent and extinguish fires	5, c
S. 599 <i>Steam</i>	34-3 (Feb. 18, 1857)	Further Amend 1838 Steamboat Act	Commerce Committee (William Henry Seward, R-NY)		No	Does not pass Senate	Similar to S. 112 (34-1)	4, a 5, c, g, j, l, o, p
H.R. 676 <sup>3</sup> <i>Steam</i>	34-3	Establish Inspection District in Paducah, KY	Commerce Committee (Henry C. Burnett, D-KY)		No	Does not pass House		5, j
H.R. 45 <i>Steam</i>	35-1 & 35-2 (Jan. 6, 1858)	Further to Amend the Steamboat Act	Commerce Committee (Elihu Benjamin Washburne, R-IL)		No	Does not pass House	Similar to H.R. 757 (33-2)	4, a 5, a, c, j, k, o, p
H.R. 103 <i>Steam</i>	35-1 (Jan. 18, 1858)	Amend the Steamboat Act	Commerce Committee (Miles Taylor, D-LA)		No	Does not pass House		4, b 5, c
H.R. 162 <i>Steam</i>	35-1 (Jan. 20, 1858)	Provide better Security for Ocean Steamer Passengers	Commerce Committee (Charles Lewis Scott, D-CA)		No	Does not pass House		3 4 5, a, c

<sup>3</sup> H.R. 676, 34<sup>th</sup> Cong., 3<sup>rd</sup> sess., Bound Volumes of Bills, NA.

APPENDIX A (CONTINUED)

<i>Bill or Resolution</i>	<i>Congress – Session and Date Introduced</i>	<i>Brief Name/ Description</i>	<i>Responsible Committee(s) &amp; (Legislator(s))</i>	<i>Related Report or Document</i>	<i>Roll Call</i>	<i>Outcome</i>	<i>Comments</i>	<i>Categories</i>
H.R. 205 <i>All</i>	35-1 (Jan. 21, 1858)	Introduce National Code of Marine Signals	Commerce Committee (John Cochrane, D-NY)		No	Does not pass House		3 4, a 5, p
S. 84 <i>All</i>	35-1 (Jan. 25, 1858)  [Amended March 19, 1858]	Provide for better night signals on sailing vessels	Commerce Committee (Charles Edward Stuart, D-MI; Judah P. Benjamin, D-LA)		No	Passes Senate, not House		4 5, c, p
H.R. 241 <sup>4</sup> <i>Steam</i>	35-1 (Jan. 28, 1858)	Establish Inspection District in Paducah, KY	Commerce Committee (Henry C. Burnett, D-KY; Elihu Washburne, R-IL)		No	Does not pass House		5, l
S. 138 <i>Steam</i>	35-1 (Feb. 15, 1858)	Further Security of Steamboat Passengers	Commerce Committee (Judah Philip Benjamin, D-LA)		No	Does not pass Senate	Similar to S. 599, 34-3	3 4, a 5, a, c, g, j, k, l, m, o, p
S. 174 <i>All</i>	35-1 (March 2, 1858)	Amend March 3, 1855 Act to Regulate Carriage of Passengers	Committee on the Judiciary (William Henry, R-NY)		No	Does not pass Senate	Protect female passengers on ocean voyages	4 5

<sup>4</sup> H.R. 241, 35<sup>th</sup> Cong., 1<sup>st</sup> sess., Bound Volumes of Bills, NA.

APPENDIX A (CONTINUED)

<i>Bill or Resolution</i>	<i>Congress – Session and Date Introduced</i>	<i>Brief Name/ Description</i>	<i>Responsible Committee(s) &amp; (Legislator(s))</i>	<i>Related Report or Document</i>	<i>Roll Call</i>	<i>Outcome</i>	<i>Comments</i>	<i>Categories</i>
S. 192 <i>All</i>	35-1 (Mar. 12, 1858)	Provide for International Code of Marine Signals	Commerce Committee (Judah Philip Benjamin, W- LA)		No	Does not pass Senate		3
H.R. 401 <sup>5</sup> <i>Steam</i>	35-1 (March 16, 1858)	Establish Inspection District at Napoleon, Ark.	Commerce Committee (Edward A. Warren, D-AR; Elihu Washburne, R-IL)		No	Does not pass House		5, 1
H.R. 485 <i>All</i>	35-1 (Apr. 15, 1858)	Amend the March 3, 1855 Act Regulating the Carriage of Passengers in Steamships	Commerce Committee (John Cochrane, D-NY)		No	Does not pass House		4 5
S. 285 <sup>6</sup> <i>Steam</i>	35-1 (April 24, 1858)	Better Security of Passengers on Ocean Steamers	Committee of Post Offices and Post Roads (William M. Gwin, D-CA)		No	Does not pass Senate		4 5, a, c, k
H.R. 694 <sup>7</sup> <i>Steam</i>	35-2 (Dec. 23, 1858)	Establish Inspection District at Memphis, TN	Commerce Committee (William T. Avery, D-TN; Elihu Washburne, R-IL)		No	Does not pass House		5, 1

<sup>5</sup> H.R. 401, 35<sup>th</sup> Cong., 1<sup>st</sup> sess., Bound Volumes of Bills, NA.

<sup>6</sup> S. 285, 35<sup>th</sup> Cong., 1<sup>st</sup> sess., Bound Volumes of Bills, NA.

<sup>7</sup> H.R. 694, 35<sup>th</sup> Cong., 2<sup>nd</sup> sess., Bound Volumes of Bills, NA.

APPENDIX A (CONTINUED)

<i>Bill or Resolution</i>	<i>Congress – Session and Date Introduced</i>	<i>Brief Name/ Description</i>	<i>Responsible Committee(s) &amp; (Legislator(s))</i>	<i>Related Report or Document</i>	<i>Roll Call</i>	<i>Outcome</i>	<i>Comments</i>	<i>Categories</i>
S. 3 <i>All</i>	36-1 (Dec. 21, 1859)	Amend March 3, 1855 Act to Regulate Carriage of Passengers in Steamships	House Committee on the Judiciary; Senate Commerce Committee (James Asheton, Bayard, Jr. D-DE)		No	Passes Senate, not House		4 5
H.R. 62 <i>Steam</i>	36-1 (Feb. 16, 1860)	Amend the Steamboat Act	Commerce Committee (Miles Taylor, D-LA)		No	Does not pass House		
H.R. 77 <sup>8</sup> <i>Steam</i>	36-1 (Feb. 16, 1860)	Establish Inspection District for Paducah, KY	Commerce Committee		No	Does not pass House		5, 1
H.R. 83 <sup>9</sup> <i>Steam</i>	36-1 (Feb. 16, 1860)	Establish Local Inspectors at Memphis, TN	Commerce Committee (William T. Avery, D-TN)		No	Does not pass House		5, 1
H.R. 114 <i>Steam</i>	36-1 (Mar. 1, 1860)	Further Safety of Steam Vessel Passengers	Commerce Committee (Elihu Washburne, R-IL; John Cochrane, D-NY); Senate Commerce Committee (Hannibal Hamlin, R-ME)	H. Rept. 9	May 18, 1860 House vote to recommit the bill to the Commerce Committee Failed: 55 Yeas	Passes House, not Senate	Extensively debated in the House; provisions similar to S. 138, 35-1 and H.R. 45, 35-1; House printed 500 extra copies of the committee report	

<sup>8</sup> H.R. 77, 36<sup>th</sup> Cong., 1<sup>st</sup> sess., Bound Volumes of Bills, NA.

<sup>9</sup> H.R. 83, 36<sup>th</sup> Cong., 1<sup>st</sup> sess., Bound Volumes of Bills, NA.

APPENDIX A (CONTINUED)

<i>Bill or Resolution</i>	<i>Congress – Session and Date Introduced</i>	<i>Brief Name/ Description</i>	<i>Responsible Committee(s) &amp; (Legislator(s))</i>	<i>Related Report or Document</i>	<i>Roll Call</i>	<i>Outcome</i>	<i>Comments</i>	<i>Categories</i>
H.R. 114					97 Nays May 18, 1860 House vote on passing the bill Succeeded: 87 Yeas 74 Nays			
<b>H.R. 19</b> <i>All</i>	<b>36-1</b> <b>(Mar. 7, 1860)</b>	<b>Amend March 3, 1855 Act Regulating the Carriage of Passengers</b>	<b>House Commerce Committee (John Cochrane, D-NY)</b> <b>Senate Commerce Committee (James A. Bayard, Jr., D-DE)</b>		<b>No</b>	<b>Becomes Law March 24, 1860</b>  <b>12 Stat. L. 3</b>	<b>Further protection of emigrant female passengers</b>	<b>4</b> <b>5</b>
S. 267	36-1 (Mar.12, 1860)	Additional Equipment for Lifesaving Stations	Commerce Committee (John C. Ten Eyck, R-NJ)		No	Does not pass Senate		
S. 288 <i>Steam</i>	36-1 (Mar. 16, 1860)	Create Pacific Coast Steamboat Inspection District	(Milton Slocum Latham, D-CA); Commerce Committee (Clement Claiborne Clay, Jr., D-AL)	S. Rept. 162	No	Does not pass Senate		5, j
S. 320 <i>All</i>	36-1 (Mar. 29, 1860)	Introduce International Code of Marine Signals	Commerce Committee (Clement Claiborne Clay, Jr., D-AL)		No	Does not pass Senate		3



## APPENDIX A (CONTINUED)

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Most of the bills cited are available online at the Library of Congress, American Memory, Lawmaking Home, Bills and Resolutions. <http://memory.loc.gov/ammem/amlaw/lwhbsb.html> (accessed August 1-15, 2009). Others are available in the National Archives, Record Groups 46 and 233 in the Original Bill Files and the files of Bills Upon Which Further Action was Taken, as well as the Bound Volumes of Bills.

The list is comprehensive for the years 1824 to 1860 regarding bills introduced to address the safety of sail and steam vessels. There are several other relevant bills documented, including the original act to have steam vessels registered, as well as two acts before 1824 concerning the health of passengers and crews on sailing vessels.

Rows in **bold type** indicate bills enacted into law.

### **Columns:**

***Bill or Resolution:*** Number of the bill and indication of whether it was first introduced into the House or Senate. “*Steam*” indicates that the bill was intended to apply to steam vessels. “*All*” indicates that the bill was primarily directed toward sailing vessels, but that some provisions would generally affect steam vessels. “*Efficient*” indicates an invention to be examined and tested intended to improve performance, rather than safety. “*Steam and All*” refers to a bill in 1855 that was directed toward both sail and steam vessels, as by that time a growing number of steamers were regularly making lengthy oceanic voyages.

***Congress — Session and Date Introduced:*** Self-explanatory.

***Brief Name/Description:*** Abbreviated name or description of the bill or resolution.

***Responsible Committee(s) & (Legislator(s)):*** Committees to which the bills were referred and legislators who either introduced and/or were the major sponsors of the legislation, including their party affiliations and state. When the bill reached the other house, the institutional affiliation of the legislator and committee is indicated.

***Related Report or Document:*** Committee report or Executive document (see Appendix B) that initiated, accompanied or was produced as a result of the bill.

***Roll Call:*** Whether or not a roll call vote was held on the legislation and the results. Detailed results from these bills are in Appendix C.

## APPENDIX A (CONTINUED)

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**Outcome:** Whether or not the bill passed the House or Senate and date it was signed into law, as well as reference in the Statutes-at-Large.

**Comments:** Additional information about the bill or the process of consideration.

**Categories:** Components of the bills and legislation. In the case of laws, these apply to what was enacted, not as introduced or any intermediate amendments. In some cases, a copy of the bill was not identified, and the Categories section has been left blank.

- 1) – Investigate and report on the causes of accidents
- 2) – Examine and Test inventions and apparatus, such as safety valves, engines, life preservers and lifeboats
- 3) – Subsidize or Purchase safety apparatus with payment by the government or require vessels to use particular types of apparatus. E.g. Purchase patents for use by the U.S. (such as Raub’s Safety Valve) or mandate use of patented articles on all vessels, or give competitive advantages to certain safety devices (such as Evans’s Safety Guard) by requiring use of generic devices
- 4) – Penalize vessel owners, masters, and/or operators with imprisonment or fines for reckless, unsafe behavior and noncompliance with other requirements
  - a) Informers to receive part of monetary penalties
  - b) Deny insurance reimbursement & force those liable to pay for damages
- 5) – Regulate operation of steam or other vessels
  - a) Limit number of passengers
  - b) Require adequate food stores and/or medicines
  - c) Require safety equipment, such as fire pumps, lifeboats, & navigational lights
  - d) Inspect hulls — standards left to discretion of inspector
  - e) Inspect hulls, with specific standards for design and construction
  - f) Inspect boilers/engines/machinery — leave standards to the discretion of inspectors
  - g) Inspect boilers/engines/machinery — specify standards for design, construction, & operation
  - h) Test the strength of boilers at regular intervals, as by hydrostatic/hydraulic pressure
  - i) Appoint inspectors at request of vessel owners and masters – vessel owner/master compensates them directly
  - j) Hire and pay expert inspectors as salaried government employees
  - k) Impose sanctions on inspectors for not performing duties
  - l) Create or assign government administrative body to oversee operation of the act

APPENDIX A (CONTINUED)

- m)** Inspect and certify quality of materials, such as boiler iron
- n)** Issue licenses to pilots and engineers after examining them for competence and character
- o)** Regulate transport of dangerous materials
  - e.g. require protective containers for explosive or flammable cargo
- p)** Set standards for safe operation – e.g. rules for passing other vessels, opening safety valves when stopped, etc.

APPENDIX B – CONGRESSIONAL DOCUMENTS RELATING TO STEAMBOAT SAFETY, 1824-1852

<i>Document(s) Produced</i>	<i>Congress: Session &amp; Date</i>	<i>Contents of Report or Document</i>	<i>Source(s) and/or Reference &amp; [Legislator]</i>	<i>Comments</i>	<i>Related Bill(s), Joint Resolution or Other Action</i>	<i>Number of Extra Copies Printed --- Was Printing Contested? (Yes/No)</i>
H. Rept. 125	18-1 (May 22, 1824)	Report on causes of Steamboat Disasters	Commerce Committee [Thomas Newton, Jr., Adams-Clay Republican-VA]	Rejected a ban on high- pressure engines, but advocated testing boiler strength boilers, requiring safety valves, penalizing weighting down safety valves & forbidding cast iron boilers	Joint Resolution (H.J.R. 10) and bill H.R. 238 -- do not pass House	— No
H. Exec. Doc. 69	18-2 (Jan. 31, 1825)	Report on accidents involving steamboats	Sec'y of the Treasury	Sec'y of the Treasury William Crawford recommended against legislation, except to penalize operators in case of disasters		— No
H. Doc. 131	21-2 (March 3, 1831)	Information re: Dangers of Bursting Boilers	Sec'y of the Treasury; Select Committee on Improving the Mississippi River and Protecting Passengers [Charles Wickliffe, Jacksonian-KY]	Sec'y of the Treasury Samuel Ingham reported that steamboat owners and masters resisted giving information about bursting boilers, but that the department and Franklin Institute were cooperating to investigate the matter	The Treasury Department eventually funded the Franklin Institute Investigation	— No

APPENDIX B (CONTINUED)

<i>Document(s) Produced</i>	<i>Congress: Session &amp; Date</i>	<i>Contents of Report or Document</i>	<i>Source(s) and/or Reference &amp; [Legislator]</i>	<i>Comments</i>	<i>Related Bill(s), Joint Resolution or Other Action</i>	<i>Number of Extra Copies Printed --- Was Printing Contested? (Yes/No)</i>
H. Doc. 226	22-1 (May 2, 1832)	Petition Requesting experiment on J.O. Blair's safe method for steam generation	House Select Committee On Steam	Includes a report by a committee of the Louisiana Legislature on Blair's design for a safe steam engine along with Blair's petition and discussion of the causes of boiler explosions. Contains versions of the <i>water flashing into steam myth</i> and <i>explosive element myth</i>		— No
H. Rept. 478	22-1 (May 18, 1832)	Committee Report and Info. Collected re: Bursting Boilers and Protecting Passengers	Sec'y of the Treasury; House Select Committee on Steam [Charles Wickliffe, Jacksonian-KY]	194-page report included a draft bill for greater security of passengers, testimony from people in the U.S. and information from abroad. Some errant theories were repeated, including the <i>low water alone &amp; water flashing into steam myths</i> . Prof. Walter R. Johnson of the Franklin Institute gave results of experiments with steam. Reprints diagrams of J.O. Blair's safety devices	H.R. 582 – Does not pass the House	6,000 — No

APPENDIX B (CONTINUED)

<i>Document(s) Produced</i>	<i>Congress: Session &amp; Date</i>	<i>Contents of Report or Document</i>	<i>Source(s) and/or Reference &amp; [Legislator]</i>	<i>Comments</i>	<i>Related Bill(s), Joint Resolution or Other Action</i>	<i>Number of Extra Copies Printed --- Was Printing Contested? (Yes/No)</i>
S. Doc. [Document number not listed]	22-2 (March 1, 1833)	Reprints H. Rept. 478 from 22 <sup>nd</sup> Congress, 1 <sup>st</sup> Session	Reprinting House Select Committee Report of May 18, 1832 [William Wilkins, Jacksonian-PA]	See above H. Rept. 478 (22-1)		3,000 — No
S. Doc. 12	23-1 (Dec. 19, 1833)	Schenectady, NY inhabitants to prevent steamboat accidents	Committee on Naval Affairs	Asks for fire-fighting equipment on steam vessels, licensing for engineers and other measures	S. 201 – does not pass Senate	— No
H. Rept. 426	23-1 (April 26, 1834)	Recommends that the Sec’y of the Navy be authorized to test steam improvements	House Select Comm. on the Invention of Benjamin Phillips; [Edward D. White, W-LA] <sup>1</sup>	Propagates the myths of <i>low water alone</i> and <i>water flashing into steam</i> . Phillips’s steam engine was designed to avoid low water in the boilers and limit the damage if an explosion took place. See also comments on H. Doc. 35 (24-1)	H.R. 452 became law – Appropriated \$5,000 for tests by the Navy	— No

<sup>1</sup> Representative Edward D. White of Louisiana was wounded in an explosion of the steamboat *Lioness* on the Red River on May 19, 1833. Senator Josiah Johnston of Louisiana was killed in the same accident. See James T. Lloyd, *Lloyd’s Steamboat Directory and Disasters on the Western Rivers* (Cincinnati, OH: James T. Lloyd & Co., 1856), 83, 87.

APPENDIX B (CONTINUED)

<i>Document(s) Produced</i>	<i>Congress: Session &amp; Date</i>	<i>Contents of Report or Document</i>	<i>Source(s) and/or Reference &amp; [Legislator]</i>	<i>Comments</i>	<i>Related Bill(s), Joint Resolution or Other Action</i>	<i>Number of Extra Copies Printed --- Was Printing Contested? (Yes/No)</i>
H. Doc. 35	24-1 (Dec. 29, 1835)	Memorial of John C. Fr. Salomon to have his steam safety devices tested	House Committee on Naval Affairs; Sec'y of the Navy	Salomon was responding to the tests by the Navy Dept. authorized under H.R. 452 (23-1) and wanted to present his improvements; Referred to the Sec'y of the Navy		— No
H. Doc. 162	24-1 (March 1, 1836)	Report from the Franklin Institute – Part 1 (Technical Report on Experiments)	Committee of the Franklin Institute of Philadelphia; Sec'y of the Treasury	Provides evidence from experiments on steam power & investigations into the causes of explosions. Reports ways to prevent them. The evidence contradicts common myths about the causes of explosions		The Sec'y of the Treasury printed 500 copies for the members of Congress. The House printed 1035 copies (“the usual number”) -- 5,000 extra copies were <i>proposed</i> , but not ordered – the report was printed & excerpted in other publications --- No
H. Doc. 114	24-2 (Dec. 31, 1836)	Memorial of John C. Fr. Salomon	Commerce Committee	Salomon complains that the experiments on his engine plan by the Navy Department in February 1836 were unfair		— No

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<i>Document(s) Produced</i>	<i>Congress: Session &amp; Date</i>	<i>Contents of Report or Document</i>	<i>Source(s) and/or Reference &amp; [Legislator]</i>	<i>Comments</i>	<i>Related Bill(s), Joint Resolution or Other Action</i>	<i>Number of Extra Copies Printed --- Was Printing Contested? (Yes/No)</i>
Not printed as a House Document	24-2 (Dec. 20, 1836)	Report from the Franklin Institute – Part 2 – General Report	Committee of the Franklin Institute of Philadelphia; Sec’y of the Treasury; Select Committee on Steamboat Navigation	General report includes a detailed analysis of the causes of steamboat accidents plus a draft bill for Congress to consider. Report was referred to the House Select Committee on Steamboat Navigation	Portions of the Institute’s draft bill were used as a template for S. 1 (25-2)	Printed serially in <i>The Journal of the Franklin Institute</i> & excerpted elsewhere <sup>2</sup> --- Yes and No - The report was referred to a committee and was never printed
S. Rept. 125	24-2 (Feb. 1, 1837)	Recommends testing steam safety devices	Select Committee on Memorial of A.B. Quinby [John Davis, W-MA]	Committee recommends an appropriation to test steam apparatus submitted by all interested inventors	S. 183 – passed by Senate, not House	— No
S. Rept. 159	24-2 (Feb. 7, 1837)	Committee report and petition of Samuel Raub for his steam safety valve	Committee on Roads & Canals [William Hendricks, Anti-Jackson-IN]	The Committee asked the Chief Engineer of the Navy to inspect Raub’s invention and recommended a \$5,000 appropriation to test it. Includes diagram of Raub’s apparatus & a favorable review published in the <i>Journal of the Franklin Institute</i>	S. 183 – passed by Senate, not House	2,000 — No

<sup>2</sup>Bruce Sinclair, *Philadelphia’s Philosopher Mechanics: A History of the Franklin Institute, 1824-1865* (Baltimore, MD: The Johns Hopkins University Press, 1974), 181.



APPENDIX B (CONTINUED)

<i>Document(s) Produced</i>	<i>Congress: Session &amp; Date</i>	<i>Contents of Report or Document</i>	<i>Source(s) and/or Reference &amp; [Legislator]</i>	<i>Comments</i>	<i>Related Bill(s), Joint Resolution or Other Action</i>	<i>Number of Extra Copies Printed --- Was Printing Contested? (Yes/No)</i>
Not printed as a House Document	25-2 (Dec. 7, 1837)	Report on the strength of materials relating to steam boilers	Franklin Institute on behalf of the Treasury Department	Third part of Franklin Institute Report with tests overseen by Prof. Walter R. Johnson on boiler materials		Printed serially in the <i>Journal of the Franklin Institute</i> --
S. Doc. 17	25-2 (Dec. 14, 1837)	A.B. Quinby's petition to have his invention tested	[John Davis, W-MA] Committee on Patents and the Patent Office [John Ruggles, D-ME]	Includes copy of Feb. 1, 1837 S. Rept. #125 (24-2) and also endorsements for Quinby's invention	S. 73 & S. 389 -- Both bills to test safety devices became law	— No
H. Doc. 51	25-2 (Dec. 29, 1837)	Petition of Samuel Raub	Select Committee [David Petrikin, D-PA]	Raub asked to have his invention applied to all steam engines owned by the U.S. (see H. Rept. 323, 25-2, below)	H.R. 365 – did not pass the House -- bills S. 73 and S. 389 became law	— No
S. Rept. 69	25-2 (Jan. 3, 1838)	Report on Samuel Raub's petition to test his invention	Committee on Roads and Canals [John Tipton, D-IN]	The committee had seen Raub demonstrate a model of his invention during the 24 <sup>th</sup> Cong. Includes diagrams of Raub's modified apparatus	S. 119 to test Raub's Invention – did not pass Senate (though S. 73 & S. 389 to test inventions became law)	— No
H. Rept. 323	25-2 (Jan. 9, 1838)	Report on the Petition of Samuel Raub for the government to purchase his safety valve	Select Committee on Samuel Raub's Memorial [George Welshman Owens, D-GA]	Raub requested his invention be used on all steam engines owned by U.S. Gov't. Committee recommended \$3,000 to test it	H.R. 365 – this bill did not pass the House, but related bills S. 73 and S. 389 became law	— No

APPENDIX B (CONTINUED)

<i>Document(s) Produced</i>	<i>Congress: Session &amp; Date</i>	<i>Contents of Report or Document</i>	<i>Source(s) and/or Reference &amp; [Legislator]</i>	<i>Comments</i>	<i>Related Bill(s), Joint Resolution or Other Action</i>	<i>Number of Extra Copies Printed --- Was Printing Contested? (Yes/No)</i>
H. Doc. 100	25-2 (Jan. 15, 1838)	Petition of Jonathan Morgan of Maine on Boiler Explosions		Puts forth theory of explosions contrasting with some of the findings of the Franklin Institute along with an <i>explosive element myth</i>		— No
S. Doc. 199	25-2 (Feb. 15, 1838)	Memorial of the Mississippi Legislature		Asks for Congress to take action to improve the quality of steamboats and steamboat officers	S. 1 – Becomes law	— No
H. Doc. 284	25-2 (March 26, 1838)	Memorial of Delaware River Steamboat Owners	Committee of the Whole	Protests against S.1 becoming law and critiques the bill that had already passed the Senate. Repeats the <i>low water alone</i> and <i>water flashing into steam myths</i>	S. 1 – Becomes law	— No
H. Doc. 289	25-2 (March 26, 1838)	Memorial of Edward D. Tippet for his safety steam engine		Tippet asks for a subsidy from Congress	S. 73 and S. 389 to test inventions became law	— No

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<i>Document(s) Produced</i>	<i>Congress: Session &amp; Date</i>	<i>Contents of Report or Document</i>	<i>Source(s) and/or Reference &amp; [Legislator]</i>	<i>Comments</i>	<i>Related Bill(s), Joint Resolution or Other Action</i>	<i>Number of Extra Copies Printed --- Was Printing Contested? (Yes/No)</i>
H. Doc. 314	25-2 (April 9, 1838)	Memorial of New York Steamboat Owners	Judiciary Committee	Duplicates arguments and text in H. Doc. 284, (25-2) as it memorializes against the bill S.1 becoming law. Also repeats the <i>low water alone</i> and <i>water flashing into steam myths</i>	S. 1 – Becomes law	— No
H. Doc. 335	25-2 (April 16, 1838)	Memorial of Raritan River Steamboat Owners against the steamboat bill S.1	Committee of the Whole	Duplicates arguments and text in H. Doc. 314 (25-2) as it memorializes against the bill S.1 becoming law. Also repeats myths	S. 1 – Becomes law	— No
H. Doc. 21	25-3 (Dec. 13, 1838)	Information Re: Use of Steam Engines in the U.S.	Sec’y of Treasury; Select Committee on Steam Engines [John Sergeant, W-PA]	472-page document gives the numbers of steam engines, explosions & other losses. Extensive testimony gathered by Customs collectors. Reports that many believe in the <i>low water alone</i> and <i>water flashing into steam myths</i>	H.R. 1071 – does not pass House.	10,000 — No
S. Doc. 13	25-3 (Dec. 13, 1838)	Memorial of Louisville, KY Steamboat Proprietors and Operators	Commerce Committee [John Ruggles, D-ME]	Suggests extensively modifying the 1838 steamboat act, including licensing engineers and more effectively inspecting hulls and engines	S. 303 – does not pass Senate	— No

APPENDIX B (CONTINUED)

<i>Document(s) Produced</i>	<i>Congress: Session &amp; Date</i>	<i>Contents of Report or Document</i>	<i>Source(s) and/or Reference &amp; [Legislator]</i>	<i>Comments</i>	<i>Related Bill(s), Joint Resolution or Other Action</i>	<i>Number of Extra Copies Printed --- Was Printing Contested? (Yes/No)</i>
H. Doc. 87 (Duplicate of S. Doc. 13, 25-3, above)	25-3 (Dec. 20, 1838); (ordered printed Jan. 16, 1839)	Memorial of Louisville, KY Steamboat Proprietors and Operators	Select Committee on Steam [John Sergeant, W-PA]	See S. Doc. 13 (25-3) above	H.R. 1071 – does not pass House	— No
H. Doc. 88	25-3 (Jan. 16, 1839)	Petition from Pittsburgh endorsing Cadwallader Evans's Invention	Select Committee on Steam [John Sergeant, W-PA]	Cadwallader Evans asks for a committee to examine his invention and a small appropriation to test it. Accompanied by a description and endorsement by Pittsburgh citizens	H.R. 1071 – does not pass House	— No
S. Doc. 66 & H. Doc. 99	25-3 (January 9, 1839) & (January 19, 1839)	Letter from the Sec'y of the Navy concerning tests on steam inventions	Sec'y of the Navy; Prof. James Renwick of NY chaired the Commission of Examiners	Status report on examinations of inventions under S. 73 (passed June 28, 1838) & S. 389 (passed July 9, 1838) – the tests were not yet complete		— No
H. Doc. 87 (Duplicates S. Doc. 13, 25-3 and H. Doc. 87, 25-3 – see above)	25-3 (Jan. 16, 1839)	Petition of Louisville, KY Steamboat Owners	Select Committee on Steam	Suggests modifying the 1838 Steamboat Act, licensing engineers & conducting more effective inspections of engines and hulls	H.R. 1071 – does not pass House	— No

APPENDIX B (CONTINUED)

<i>Document(s) Produced</i>	<i>Congress: Session &amp; Date</i>	<i>Contents of Report or Document</i>	<i>Source(s) and/or Reference &amp; [Legislator]</i>	<i>Comments</i>	<i>Related Bill(s), Joint Resolution or Other Action</i>	<i>Number of Extra Copies Printed --- Was Printing Contested? (Yes/No)</i>
S. Doc. 164	25-3 (Jan. 30, 1839)	Petition of Samuel Raub for his safety valve to be used on U.S. government steam engines	Commerce Committee	Includes a copy of Raub's 1837 petition with description and illustrations of his safety valve. Also reprints S. Report 69 (25-2) & H. Report 323 (25-2) [see above] which recommended testing Raub's device		— No
H. Doc. 173	25-3 (Feb. 4, 1839)	Essay on Steam by Jacob Walter -- originally printed in a Louisville Newspaper	Select Committee on Steam	Walter was one of the inspectors in Louisville under the 1838 Steamboat Act. He combined good recommendations for safe practices with fanciful theoretical speculations, including the <i>explosive element</i> and <i>water flashing into steam myths</i>		— No
H. Doc. 170	25-3 (Feb. 7, 1839)	Report of the Commissioners to Test Boiler Inventions under the Acts of June 28, 1838 and July, 1838	Sec'y of the Navy; Prof. James Renwick of NY chaired the Commission of Examiners	The report noted that some of the inventions (such as by Paul Boynton of NY, Owen Rankin of NC and A.B. Quinby of DC) were useful, but that no device could provide perfect safety		— No
S. Doc. 192	25-3 (Feb. 7, 1839)	Document by Robert Schuyler on the causes of boiler explosions	Commerce Committee	Suggests modifying the 1838 Steamboat Law, which Schuyler says is ineffective. Propagates the <i>low water alone myth</i>	S. 303 – does not pass Senate	— No

APPENDIX B (CONTINUED)

<i>Document(s) Produced</i>	<i>Congress: Session &amp; Date</i>	<i>Contents of Report or Document</i>	<i>Source(s) and/or Reference &amp; [Legislator]</i>	<i>Comments</i>	<i>Related Bill(s), Joint Resolution or Other Action</i>	<i>Number of Extra Copies Printed --- Was Printing Contested? (Yes/No)</i>
S. Doc. 217	25-3 (Feb. 14, 1839)	Document by Loudon J. McCormick on Preventing Boiler Explosions	Commerce Committee	Criticizes the 1838 Steamboat Law because it is not effectively administered. Recommends better training for engineers, requiring larger safety valves, and more thorough inspections	S. 303 – does not pass Senate	— No
H. Doc. 204	25-3 (Feb. 18, 1839)	Petition of Samuel Raub requesting new tests on his safety valve	Select Committee on Steam Boilers [David Petrikin, D-PA]	Raub asks to demonstrate his invention and claims he did not get a fair test of it under the laws of June 28 and July 9, 1838 (S. 73 & S. 389)		— No
S. Doc. 151	26-1 (Feb. 4, 1840)	Communication from Noah Fairbank on steamer fires	Commerce Committee	Recommends changes to vessel design to allow vessels to be steered in case of fire		— No
S. Rept. 241	26-1 (March 2, 1840)	Report on Amending the 1838 Steamboat Act	Commerce Committee [John Ruggles, D-ME]	92-page report argues for a more comprehensive steamboat law, gives information on safety innovations, foreign technical developments & actions by European governments	S. 247 -- does not pass Senate	1,000 — No

APPENDIX B (CONTINUED)

<i>Document(s) Produced</i>	<i>Congress: Session &amp; Date</i>	<i>Contents of Report or Document</i>	<i>Source(s) and/or Reference &amp; [Legislator]</i>	<i>Comments</i>	<i>Related Bill(s), Joint Resolution or Other Action</i>	<i>Number of Extra Copies Printed --- Was Printing Contested? (Yes/No)</i>
S. Doc. 270	26-1 (March 10, 1840)	Western lakes Steamboatmen asking modification of 1838 Steamboat Law		Argues that 1838 Steamboat Act is flawed by requirement that steering apparatus must have iron rods and chains to maintain steerage in case of fire	S. 247 – does not pass Senate	— No
S. Doc. 309	26-1 (March 24, 1840)	Steam Vessel Proprietors for modifying the 1838 Steamboat law; appends information on American & English steamers & accidents		Says the 1838 Steamboat Act is intrusive & ineffectual and that steamboat owners are improving safety on their own (Portions repeated in H. Doc. 158, 26-1 [below] & S. Doc. 113, 26-2)		— No
H. Doc. 158	26-1 (March 30, 1840)	Steam Vessel Proprietors for modifying the 1838 Steamboat law;	Commerce Committee	Says the 1838 Steamboat Act is intrusive & ineffectual and that steamboat owners are improving safety on their own (Repeats S. Doc. 309, 26-1 [above] & portions repeated in S. Doc. 113, 26- 2)		— No
H. Doc. 208	26-1 (May 18, 1840)	Resolution of the Mass. Legislature	Commerce Committee	Asks national government for more action to prevent loss of life in steamboats		— No

APPENDIX B (CONTINUED)

<i>Document(s) Produced</i>	<i>Congress: Session &amp; Date</i>	<i>Contents of Report or Document</i>	<i>Source(s) and/or Reference &amp; [Legislator]</i>	<i>Comments</i>	<i>Related Bill(s), Joint Resolution or Other Action</i>	<i>Number of Extra Copies Printed --- Was Printing Contested? (Yes/No)</i>
S. Doc. 582	26-1 (June 29, 1840)	Pittsburgh citizens memorial against requiring particular steam machinery		Pittsburgh citizens claim that the invention of Cadwallader Evans is superior to that of Samuel Raub, and that Congress should not give an advantage to any inventor	H.R. 484 & H.R. 486 – Do not pass House	— No
S. Doc. 597	26-1 (July 7, 1840)	Washington DC citizens for requiring Raub's safety valve		Claim that Raub's safety valve is used by steamboats in the DC area and will prevent most explosions	H.R. 484 – Does not pass House	— No
H. Rept. 651 [Report was reprinted as H. Rept. 92, (26-2) below]	26-1 (July 10, 1840)	Recommends purchasing Raub's Safety Valve, Testing Apparatus to Extinguish Steamboat Fires, and Amending the 1838 Steamboat Act	Select Committee on Steam [Joseph Rogers Underwood, W-KY]	34-page report recommends testing boilers, purchasing Raub's safety valve, licensing engineers and changes in vessel design; gives testimony about the causes of explosions. Propagates the <i>low water alone myth</i>	H.R. 484 H.R. 485 H.R. 486 [None of these bills passed the House]	Mr. Underwood made a motion to print 5,000 extra copies – no record that this was approved before the end of the session  — No
H. Doc. 21	26-2, (Dec. 21, 1840)	List of Steam Vessel Accidents compiled by J.P. van Tyne (a private citizen)	Select Committee on Steam [Joseph Rogers Underwood, W-KY]	Van Tyne compiled tables from H.Doc. 21 (25-3) & other sources. Blames a few reckless steamboat owners for the accidents & says the 1838 law is ineffective		— No



APPENDIX B (CONTINUED)

<i>Document(s) Produced</i>	<i>Congress: Session &amp; Date</i>	<i>Contents of Report or Document</i>	<i>Source(s) and/or Reference &amp; [Legislator]</i>	<i>Comments</i>	<i>Related Bill(s), Joint Resolution or Other Action</i>	<i>Number of Extra Copies Printed --- Was Printing Contested? (Yes/No)</i>
H. Rept. 92 [Reprinting H. Rept. 651, (26-1)]	26-2 (Jan. 8, 1841)	Recommends purchasing Samuel Raub's Safety Valve -- Testing Apparatus to Extinguish Steamboat Fires, & Amending 1838 Steamboat Act	Select Comm. on Steam (Joseph Rogers Underwood, W-KY)	34-page report recommends testing boilers, purchasing Raub's safety valves, licensing engineers, changes in vessel design and testimony about the causes of explosions. Propagates the <i>low water alone myth</i> as a primary cause of explosions	H.R. 484 H.R. 485 H.R. 486 [None of these bills passed the House]	— No
S. Doc. 113 [Partial duplicate of S. Doc. 309, 26-1]	26-2 (Jan. 23, 1841)	Memorial of Steam Vessel Proprietors to modify 1838 Steamboat Act		New York citizens engaged in steam navigation protest the 1838 Steamboat Law as unjust and injurious		— No
H. Doc. 79	26-2 (Jan. 25, 1841)	Charles T. James on Steamboat Boilers	Committee of the Whole	James insists there is definitive evidence that boilers burst only from too much pressure or from weakness of the boiler. Criticizes H. Repts. 651 (26-1) & 92 (26-2) for misinformation on the causes of boiler explosions, especially for repeating the <i>low water alone myth</i>	H.R. 486 – does not pass House	— No

APPENDIX B (CONTINUED)

<i>Document(s) Produced</i>	<i>Congress: Session &amp; Date</i>	<i>Contents of Report or Document</i>	<i>Source(s) and/or Reference &amp; [Legislator]</i>	<i>Comments</i>	<i>Related Bill(s), Joint Resolution or Other Action</i>	<i>Number of Extra Copies Printed --- Was Printing Contested? (Yes/No)</i>
S. Doc. 168	26-2 (Feb. 8, 1841)	Samuel Raub's Memorial for the Government to purchase his safety valve and require its use	Commerce Committee	Raub reasserts his belief that "deficiency of water" is the major cause of boiler explosions, a version of the <i>low water alone myth</i>		— No
S. Doc. 188	26-2 (Feb. 15, 1841)	Memorial of Pittsburgh citizens to examine inventions to prevent boiler explosions		Pittsburgh engineers, engine builders, vessel captains and merchants <i>against</i> requiring Raub's safety valve on steamers. They assert that two inventions by Pittsburgh citizens are superior to Raub's device		— No
H. Doc. No. 124	27-2 (March 7, 1842)	Memorial of Thomas S. Easton asking the government to test his invention and purchase his patent	Select Committee on Steam [Joseph Rogers Underwood, W-KY; Mr. Shields]	Easton's device was examined by the Navy Department. See Senate Exec. Doc. 336 (below)	Sec'y of the Navy A. P. Upshur suggests that a regular appropriation be made for the Navy to test valuable inventions	— No

APPENDIX B (CONTINUED)

<i>Document(s) Produced</i>	<i>Congress: Session &amp; Date</i>	<i>Contents of Report or Document</i>	<i>Source(s) and/or Reference &amp; [Legislator]</i>	<i>Comments</i>	<i>Related Bill(s), Joint Resolution or Other Action</i>	<i>Number of Extra Copies Printed --- Was Printing Contested? (Yes/No)</i>
S. Exec. Doc. 336	27-2 (June 25, 1842)	Report on Thomas Easton's first invention to prevent explosions	Sec'y of the Navy	39-page report by Prof. Walter R. Johnson, states that, with modifications, Easton's invention can be useful in preventing boiler explosions. The report gives numerous recommendations to improve the mechanism	Sec'y of the Navy Abel P. Upshur suggests that a regular appropriation be made for the Navy to test valuable inventions	500 — No
S. Exec. Doc. 439	27-2 (Aug. 22, 1842)	Report on Thomas Easton's second invention to prevent explosions	Sec'y of the Navy; Committee on Naval Affairs	Report authored by Prof. Walter R. Johnson says Easton's second invention "merits attention" -- Includes printed diagram of Easton's apparatus		— No
H. Rept. 1033	27-2 (Aug. 22, 1842)	Report on the petition of steamboat owners to modify the 1838 Steamboat Act	Select Committee on Steam [Joseph R. Underwood, W-KY]	Recommends repealing provision of 1838 steamboat act requiring iron rods or chains as part of steering mechanisms	H.R. 602 – becomes law in 1843 & directs the Navy Dept. to examine inventions	— No
H. Doc. 59	27-3 (January 13, 1843)	Thomas Easton's memorial asking for more tests to compare his invention to all others	Select Committee on Steam [Joseph Rogers Underwood, W-KY]	Easton includes a copy of the report by the Navy Department on his previous invention [S. Exec. Doc. 439, 27-2] as evidence of its effectiveness		— No

APPENDIX B (CONTINUED)

<i>Document(s) Produced</i>	<i>Congress: Session &amp; Date</i>	<i>Contents of Report or Document</i>	<i>Source(s) and/or Reference &amp; [Legislator]</i>	<i>Comments</i>	<i>Related Bill(s), Joint Resolution or Other Action</i>	<i>Number of Extra Copies Printed --- Was Printing Contested? (Yes/No)</i>
H. Doc. 145  [Partially identical to H. Doc. 68, 28-1]	27-3 (Feb. 13, 1843)	Supplement to the Petition of Cincinnati Association of Steam Engineers for a new investigation into the causes of explosions	Select Committee on Steam [Joseph Rogers Underwood, W-KY]	The engineers cite contradictory opinions on the causes of boiler explosions from sources including the Franklin Institute reports. Argue that Congress needs information from practical engineers, not theorists		— No
H. Doc. 178	27-3 (Feb. 15, 1843)	Statement of Boats Lost on the Western Rivers from 1840-43		Statement by insurance representative Calvin Case on the values of boats and cargoes lost on the Missouri, Mississippi and Ohio Rivers, 1840-42		— No
H. Doc. 170	27-3 (Feb. 22, 1843)	Information re: steamboats on the Mississippi River and Northern Lakes	Sec'y of the Treasury	Statement of the numbers, values and losses of steamboats on the Mississippi and the Great Lakes from Jan 1, 1841 to Jan. 1, 1843		— No
H. Doc. 68  [Partially identical to H. Doc. 145, 27-3]	28-1 (Jan. 18, 1844)	Supplement to the Petition of Steam Engineers of Cincinnati	Commerce Committee [John W. Tibbatts, D-KY]	Reprints the engineer's petition published Feb. 13, 1843 as H. Doc. 145 (27-3). It also critiques the 1838 law and suggests amending it to give greater safety to passengers	H.R. 71 – Does not pass House	— No

APPENDIX B (CONTINUED)

<i>Document(s) Produced</i>	<i>Congress: Session &amp; Date</i>	<i>Contents of Report or Document</i>	<i>Source(s) and/or Reference &amp; [Legislator]</i>	<i>Comments</i>	<i>Related Bill(s), Joint Resolution or Other Action</i>	<i>Number of Extra Copies Printed --- Was Printing Contested? (Yes/No)</i>
H. Doc. 267	28-1 (May 27, 1844)	Letter re: Report on experiments on inventions to prevent boiler explosions	Sec'y of the Navy; Prof. Walter R. Johnson led a commission conducting experiments	Prof. Johnson writes that the investigation is proceeding, but that the appropriation has been exhausted and the board members are using their personal funds for experiments	H.R. 602 – authorized tests on safety devices  5 Stat. L. 626	— No
S. Doc. 405	28-1 (June 17, 1844)	Report on experiments on inventions to prevent boiler explosions	Sec'y of the Navy; Prof. Walter R. Johnson of Philadelphia was the lead examiner	Investigation authorized by the March 3, 1843 revisions of the 1838 Steamboat Act. The examiners judged that some mechanisms were effective, but that no device could provide security in the face of “ignorance and temerity.” Includes diagrams of some devices	H.R. 602 – authorized tests on safety devices  5 Stat. L. 626	— No
H. Rept. 115	28-2 (Feb. 7, 1845)	Report on safety devices including Raub's & Barnum's safety valves	Naval Affairs Committee [Richard Franklin Simpson, D-SC]	Endorses Samuel Raub's and D. Barnum's safety valves – Report propagates <i>low water alone myth</i>	H.R. 594 – does not pass the House. Proposed \$5,000 to install the valves on public vessels	— No

APPENDIX B (CONTINUED)

<i>Document(s) Produced</i>	<i>Congress: Session &amp; Date</i>	<i>Contents of Report or Document</i>	<i>Source(s) and/or Reference &amp; [Legislator]</i>	<i>Comments</i>	<i>Related Bill(s), Joint Resolution or Other Action</i>	<i>Number of Extra Copies Printed --- Was Printing Contested? (Yes/No)</i>
H. Rept. 123	28-2 (Feb. 13, 1845)	Dr. William M. Wright of Pittsburgh asks for tests of his safety valve	Committee on Patents [Thomas J. Henley, D-IN]	Committee likes the concept of Wright's valve but asks for tests before recommending its purchase. Report propagates <i>low water alone myth</i>		— No
H. Doc. 25  [Reprints H. Doc. 145 (27-3) and H. Doc. 68 (28-1)]	29-1 (Dec. 11, 1845)	Supplement to the Petition of practical steam engineers of Cincinnati	Commerce Committee	The petition recommends a new steamboat law, including funding experiments on boilers to be conducted by practical steam engineers	H.R. 305 – does not pass House	— No
S. Doc. 174	29-1 (Feb. 26, 1846)	Report by the Sec'y of the Treasury on Vessels carrying lights	Sec'y of the Treasury, Commerce Committee	The Sec'y recommends that vessels on the Delaware River should carry lights at night to avoid collision		— No
S. Doc. 11	29-2 (Dec. 15, 1846)	Report by the Sec'y of the Treasury on all vessels on the coasts to carry lights	Sec'y of the Treasury, Commerce Committee	The Sec'y recommends that while lights should be used on vessels in the interior, many believe that they will cause confusion on the coasts		— No

APPENDIX B (CONTINUED)

<i>Document(s) Produced</i>	<i>Congress: Session &amp; Date</i>	<i>Contents of Report or Document</i>	<i>Source(s) and/or Reference &amp; [Legislator]</i>	<i>Comments</i>	<i>Related Bill(s), Joint Resolution or Other Action</i>	<i>Number of Extra Copies Printed --- Was Printing Contested? (Yes/No)</i>
H. Rept. 260	30-1 (Feb. 29, 1848)	Revisions of 1838 Steamboat Act	Commerce Committee [Bannon G. Thibodeaux, LA]	Proposes to add penalties for violating the 1838 law, that inspections take place before witnesses & more fire safety equipment be required	H.R. 254 – Did not pass the House	— No
S. Rept. 135	30-1 (April 19, 1848)	Report on Requiring Use of Cadwallader Evans's Safety Valve	Commerce Committee [John A. Dix, D-NY]	The committee believed that Evans's Guard was effective, but preferred to leave introduction and use of inventions in private hands		— No
S. Rept. 241	30-1 (Aug. 11, 1848)	Committee Report on Loss of Life and Property in Steamers	Commerce Committee [John Davis, W-MA]	Report asks Sec'y of the Treasury to gather and report on all useful information about steam vessel explosions and collisions		— No
S. Exec. Doc. 9	30-2 (Jan. 8, 1849)	Report on Patented Innovations to Prevent Boiler Explosions	Commissioner of Patents; Committee on Patents; [Senator James Westcott, D-FL]	The Commissioner reported that none of the inventions that Congress asked about were novel or had been issued patents		— No

APPENDIX B (CONTINUED)

<i>Document(s) Produced</i>	<i>Congress: Session &amp; Date</i>	<i>Contents of Report or Document</i>	<i>Source(s) and/or Reference &amp; [Legislator]</i>	<i>Comments</i>	<i>Related Bill(s), Joint Resolution or Other Action</i>	<i>Number of Extra Copies Printed --- Was Printing Contested? (Yes/No)</i>
S. Exec. Doc. 18	30-2 (Jan. 8, 1849)	Report on Explosions of Steam Boilers and on the question of whether Amending the Patent Laws is appropriate	Commissioner of Patents; Commerce Committee, [Sen. James Westcott, D-FL and Sen. John Davis, W-MA]	Concludes that safety mechanisms can be helpful, but none can guarantee perfect safety -- Includes extensive information from the Franklin Institute Report		10,000 (9,500 for use of the Senate and 500 for the Commissioner of Patents ordered on Jan. 24, 1849)  — No, though Senator Westcott requested 30,000 extra copies
S. Doc. 4	31-Special Session (March 15, 1849)	Documents on Preventing Steam Boiler Explosions	Commerce Committee [John Davis, W-MA]	94-page compilation of information received by Congress on the subject since 1842		— No
S. Misc. Doc. 13	31-2 (Jan. 29, 1851)	Communication from W.W. Guthrie re: Causes of Boiler Explosions	Commerce Committee [John Davis, W-MA]	Criticizes S. 242 of 31st Cong., 1 <sup>st</sup> Sess. Includes treatise on explosions. Recommends limiting pressure & using Evans's Safety Guard		— No
S. Exec. Doc. 42	32-1 (Jan. 21, 1852)	Report on the History and Statistics of the Steam Marine of the U.S.	Sec'y of the Treasury; Commerce Committee [Sen. John Davis, W-MA]	Senator John Davis cited extensively from this report when he introduced S. 223	S. 223 – Becomes law	— No



APPENDIX B (CONTINUED)

<i>Document(s) Produced</i>	<i>Congress: Session &amp; Date</i>	<i>Contents of Report or Document</i>	<i>Source(s) and/or Reference &amp; [Legislator]</i>	<i>Comments</i>	<i>Related Bill(s), Joint Resolution or Other Action</i>	<i>Number of Extra Copies Printed --- Was Printing Contested? (Yes/No)</i>
S. Misc. Doc. 32	32-1 (Feb. 6, 1852)	Memorial of engineer Alfred P. Guthrie on causes of explosions	Commerce Committee [John Davis, W-MA and James Shields, D-IL]	Guthrie evaluates the causes of explosions & explains and illustrates his inventions designed to prevent them	S. 223 – Becomes law	5,500 – 500 for Guthrie’s use and 5,000 for Senate use — Yes – a senator objected <sup>3</sup>
S. Misc. Doc. 84	32-1 (May 13, 1852)	Memorial of Benjamin Crawford on behalf of the Pittsburgh Association of Engineers in favor of S. 223		Crawford praises the provisions of S. 223 and asserts that Western steamboatmen favor it. Crawford consulted with Senator John Davis while Davis drafted the bill. <sup>4</sup>	S. 223 – Becomes law	— No

**Explanation of headings**

***Document(s) Produced:*** Indicates whether the document was printed by order of the House of Representatives or the Senate, if it was a document or a legislative committee report. Documents were often compiled by an executive department; though they were also sometimes letters or communications sent to Congress by private citizens, non-governmental organizations, or resolutions by state legislatures.

***Congress – Session and Date:*** Session of Congress and date the document was ordered printed. E.g., “18-2” means the 18<sup>th</sup> Congress, 2<sup>nd</sup> Session.

***Contents of Report or Document:*** Brief description of the document’s contents.

<sup>3</sup> John P. Hale of New Hampshire objected to printing the extra copies, but they were printed anyway. *CG*, 32<sup>nd</sup> Cong., 1<sup>st</sup> sess., 1852, 24, 487.

<sup>4</sup> Benjamin Crawford was later, under the 1852 Steamboat Act, appointed a supervising inspector at the port of Pittsburgh.

## APPENDIX B (CONTINUED)

**Source(s) or Reference [& Legislator]:** Name of the executive department or other group that did most of the work on the document and/or the name of the committees that generated it or to which it was referred. Name of the legislator or legislators most closely concerned with the document; usually, this was a member of the committee to which it was referred. When this section is blank, it usually means that the document was tabled. Documents were sometimes tabled because the House or Senate was engaged in other business when the document was received, because it was received at the end of a session, because the document duplicated information that was already available, or because the relevant committee had already completed its work on the subject.

**Comments:** Information about what was in the document.

**Related Bill(s), Joint Resolutions or Action:** Number of bill that accompanied the document or was produced by a congressional committee that was considering the question of steam vessel accidents. Indication of whether the bill was passed or not, or if other action was taken.

**Number of Extra Copies Printed – Printing Contested? (Yes/No):** Number of extra copies ordered of the document over and above the “usual number.” A “Yes” means there was some objection and debate about printing the document recorded in the House or Senate Journals or floor proceedings; a “No” means the proposed printing was agreed to without objection. Almost all of these documents were printed without objection.

### **The “Usual Number” of Documents**

The “usual number” of documents was how many copies of documents were printed when one chamber ordered a document printed but ordered no extra copies. Hundreds of copies of documents were routinely produced every time the Senate or House ordered a document to be printed. They were available for use by congressmen and some of them were sent out to executive departments, state legislatures and governors, libraries and historical societies. The usual number increased over the years. In the Senate, for example, the usual number was 600 copies of documents, 400 copies of bills and 3,000 copies of the President’s Annual Message during the 19<sup>th</sup> Congress (1825-1827). During the Second Session of the 28<sup>th</sup> Congress (1844-1845) the Senate’s usual number was 1214 documents, 770 copies of public bills and 554 copies of private bills.<sup>5</sup> In 1833 the House of Representative’s usual number was 1,000 copies of Documents and Reports, 485 copies of bills and 10,000 copies of the President’s Annual Message. In 1847 the usual number in the House was 1380 copies of documents and reports and 600 copies of bills.<sup>6</sup>

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<sup>5</sup> August A. Imholtz, Jr., “The Printing and Distribution of the Serial Set: A Preliminary Contribution to 19<sup>th</sup> Century Printing,” *DTTP: Documents to the People*, 31/1 (2003): 8-17.

<sup>6</sup> *Ibid.*

## APPENDIX B (CONTINUED)

### **Popular Myths about Explosions<sup>7</sup>**

*Explosive element myth* – This was the belief that processes in the steam boiler caused an explosive element or compound to form. The most common version of this myth was that interaction with the metal caused water to decompose into oxygen and explosive hydrogen. While this myth was debunked numerous times, it was repeated for many decades in newspapers and other journals. It often was combined with the *Low water alone myth* to theorize that the hydrogen gas was formed when water suddenly contacted heated boiler metal.

*Low water alone myth* – This was the belief, especially persistent in the West, that low water in the boiler was the most important or only cause of explosions. There were two main versions: that when water became low in the boiler and was replaced too rapidly the contact with hot metal or superheated steam caused it to flash into highly expansive steam (*Water flashing into steam myth*) which would cause an explosion as too much pressure overcame the structure of the boiler. The second version was related to the *Explosive element myth*, with the belief that metal uncovered by water somehow interacted with other elements to produce an explosive force. Many inventors worked to devise mechanisms to assure an adequate water supply, provide effective ways to monitor the water level or give a warning when the water level was low. Low water in the boiler *did* contribute to explosions, but was not the exclusive or most likely cause. Low water caused problems mainly because overheated metal lost tensile strength (and was thus more vulnerable to failure) and also uneven heating of metal would cause fatigue or parts to separate as they expanded and contracted at different rates.

*Water flashing into steam myth* – There were two main versions of this belief. The first was more a case of misdirection than a myth. This was the belief that the primary or only cause of explosions was from exposing water to hot boiler metal which would suddenly produce a huge amount of expansive steam which would overload the boiler. The Franklin Institute investigation showed that steam could be generated in this way and it probably did cause some explosions. However, it was probably not as much of a danger as many observers believed, since red hot boilers did not generate as much steam when water contacted them as they did at an intermediate temperature. This belief also tended to distract steamboat operators into emphasizing maintaining adequate water levels rather than making sure the pressure was within acceptable limits and the boiler was clean and free of weakness. Another version was pushed especially by engineer Jacob Perkins, who claimed that overheated metal produced steam so saturated with heat that water added was instantly converted to expansive steam that could burst the boiler.<sup>8</sup> The experiments conducted by the Franklin Institute found evidence that Perkins's theory was incorrect and that injecting cold water into steam actually reduced the pressure.<sup>9</sup>

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<sup>7</sup> The best brief discussion of the causes of explosions and these popular myths can be found in Louis C. Hunter, *Steamboats on the Western Rivers: An Economic and Technological History* (New York, NY: Dover Publications, Inc., 1993), 289-304.

<sup>8</sup> Sinclair, *Philadelphia's Philosopher Mechanics*, 179.

<sup>9</sup> Letter of the Sec'y of the Treasury Transmitting a Report on the Subject of Steam Boilers (March 3, 1831), 21<sup>st</sup> Cong., 2<sup>nd</sup> sess., H. Doc.131,18-19, 21, 24.

## APPENDIX B (CONTINUED)

### **Note on the Report of the Board of Supervising Inspectors of Steamboats**

The 1852 Steamboat Act created this Board, which met and oversaw the act and issued annual reports beginning in 1853. These reports were attached to the Annual Report of the Secretary of the Treasury and printed along with it. From 1855-58, the Senate ordered 10,500 extra copies of the Secretary's Annual Report to be printed, with 500 for the use of the Treasury Department and 10,000 for use by the Senate.

APPENDIX C – ROLL CALL VOTES

<i>Bill or Resolution &amp; Congress – Session</i>	<i>Chamber &amp; Date of Vote</i>	<i>Numbers in Chamber and Party Distribution as of Election</i>	<i>Brief Name/ Description of Legislation &amp; Nature of Roll Call</i>	<i>Ayes</i>	<i>Nays</i>	<i>Outcome and Comments</i>
S. 1 25-2 Became Law July 7, 1838 5 Stat. L. 304	Senate  Jan. 22, 1838	52 Senate Seats  D: 35 (67.3%) W: 17 (32.7%)	Better Security of Passengers in Steam Vessels (The 1838 steamboat act) – An attempt to amend the bill was defeated in a roll call vote	15 (41.7%)  D: 9 of 26 (34.6%) W: 4 of 6 (66.7%) Anti-Jackson: 2 of 3 (66.7%)  F: 8 of 18 (44.4%) S: 7 of 18 (38.9%)	21 (58.3%)  D: 17 of 26 (65.4%) W: 2 of 6 (33.3%) Jacksonian: 1 of 1 (100%)  F: 10 of 18 (55.6%) S: 11 of 18 (61.1%)	The Senate defeated an amendment to forbid racing that was proposed by Whig Senator Oliver Smith of Indiana; the Senate then approved the bill without a roll call vote on the question of passage.
S. 1 (The 1838 steamboat act) 25-2 Became Law July 7, 1838 5 Stat. L. 304	House  June 16, 1838	242 House Seats  D: 128 (52.9%) W: 100 (41.3%) Anti-Mason: 7 (2.9%) Independent: 1 (.4%) Nullifier: 6 (2.5%)	Better Security of Passengers in Steam Vessels - A motion to suspend the rules in order to consider the bill was successful in a roll call vote	121 (68.4%)  D: 56 of 87 (64.4%) W: 59 of 81 (72.8%) Anti-Mason: 4 of 6 (66.7%) Nullifier: 2 of 3 (66.7%)  F: 79 of 109 (72.5%) S: 42 of 68 (61.8%)	56 (31.6%)  D: 31 of 87 (35.6%) W: 22 of 81 (27.2%) Anti-Mason: 2 of 6 (33.3%) Nullifier: 1 of 3 (33.3%)  F: 30 of 109 (27.5%) S: 26 of 68 (38.2%)	The House voted by the necessary 2/3 majority to suspend the rules in order to consider S. 1, along with S. 73, out of the regular order. Both the House and the Senate later approved the bill without roll call votes on the question of passage.

APPENDIX C (CONTINUED)

<i>Bill or Resolution &amp; Congress – Session</i>	<i>Chamber &amp; Date of Vote</i>	<i>Numbers in Chamber and Party Distribution as of Election</i>	<i>Brief Name/ Description of Legislation &amp; Nature of Roll Call</i>	<i>Ayes</i>	<i>Nays</i>	<i>Outcome and Comments</i>
S. 73 25-2 Became Law June 28, 1838 5 Stat. L. 252	House  June 16, 1838	242 House Seats  D: 128 (52.9%) W: 100 (41.3%) Anti-Mason: 7 (2.9%) Independent: 1 (.4%) Nullifier: 6 (2.5%)	Test Inventions to Prevent Boiler Explosions - A motion to suspend the rules in order to consider the bill was successful in a roll call vote	121 (68.4%)  D: 56 of 87 (64.4%) W: 59 of 81 (72.8%) Anti-Mason: 4 of 6 (66.7%) Nullifier: 2 of 3 (66.7%)  F: 79 of 109 (72.5%) S: 42 of 68 (61.8%)	56 (31.6%)  D: 31 of 87 (35.6%) W: 22 of 81 (27.2%) Anti-Mason: 2 of 6 (33.3%) Nullifier: 1 of 3 (33.3%)  F: 30 of 109 (27.5%) S: 26 of 68 (38.2%)	The House voted by the necessary 2/3 majority to suspend the rules in order to consider this bill, together with S.1, out of the regular order. Both the House and the Senate later approved S. 73 without roll call votes on passage.
HJR 19 27-2 Became Law Aug. 31, 1842 5 Stat. L. 584	House  Aug. 25, 1842	242 House Seats D: 98 (40.5%) W: 142 (58.7%) 1 Independent (.4%) 1 Independent Democrat (.4%)	Joint Resolution to Test Colt's Submarine Battery and Test Boiler Safety Devices - The House voted to pass the joint resolution	110 (68.3%)  D: 34 of 59 (57.6%) W: 75 of 101 (74.3%) Ind. Dem: 1 of 1 (100%)  F: 63 of 91 (69.2%) S: 47 of 70 (67.1%)	51 (31.7%)  D: 25 of 59 (42.4%) W: 26 of 101 (25.7%)  F: 28 of 91 (30.8%) S: 23 of 70 (32.9%)	The House passed the joint resolution with a large majority in favor. The Senate approved it without a roll call vote on passage.

APPENDIX C (CONTINUED)

<i>Bill or Resolution &amp; Congress – Session</i>	<i>Chamber &amp; Date of Vote</i>	<i>Numbers in Chamber and Party Distribution as of Election</i>	<i>Brief Name/ Description of Legislation &amp; Nature of Roll Call</i>	<i>Ayes</i>	<i>Nays</i>	<i>Outcome and Comments</i>
H.R. 637 29-2 Became Law Feb. 22, 1847 9 Stat. L. 127	House  Feb. 1, 1847	228 House Seats  D: 142(62.3%) W: 79 (34.6%) American: 6 (2.6%) Vacant: 1 (.5%)	Carriage of Passengers in Merchant Vessels – limits number of passengers in relation to deck space – the House voted to pass the bill	94 (66.2%)  D: 94 of 97 (96.9%) W: 0 (0%)  F: 50 of 83 (60.2%) S: 43 of 58 (74.1%)	48 (33.8%)  D: 3 of 97 (3.1%) W: 40 of 40 (100%) American: 4 of 4 (100%) Undeclared: 1 of 1 (100%)  F: 33 of 83 (39.8%) S: 15 of 58 (25.9%)	There was extensive partisan polarization in this House roll call vote, which was taken in the midst of the Mexican War. The Senate, by contrast, approved the measure without a roll call
S. 223 “The Steamboat Act” 32-1 Became Law August 30, 1852 10 Stat. L. 61	House  Aug. 23, 1852	233 House Seats  D: 127 (54.5%) W: 85 (36.5%) Unionists: 10 (4.3%) Free Soil: 4 (1.7%) States Rights: 3 (1.3%) Ind. Dem: 3 (1.3%) Ind. Whig: 1 (.4%)	Amend the 1838 Act for the Better Security of Passengers on Steam Vessels - The House voted on a procedural question on how to consider the bill	54 (30.7%)  D: 28 of 101 (27.7%) W: 22 of 67 (32.8%) Unionist: 3 of 4 (75%) Ind. Dem: 1 of 1 (100%)  F: 29 of 111 (26.1%) S: 25 of 65 (38.5%)	122 (69.3%)  D: 73 of 101 (72.3%) W: 45 of 67 (67.2%) States Rights: 2 of 2 (100%) Unionist: 1 of 4 (25%) Free Soil: 1 of 1 (100%)  F: 82 of 111 (73.9%) S: 40 of 65 (61.5%)	The House defeated a motion to consider the bill in the Committee of the Whole, which might have delayed it. The next day the House passed the bill by an even larger margin than in this procedural vote.

APPENDIX C (CONTINUED)

<i>Bill or Resolution &amp; Congress – Session</i>	<i>Chamber &amp; Date of Vote</i>	<i>Numbers in Chamber and Party Distribution as of Election</i>	<i>Brief Name/ Description of Legislation &amp; Nature of Roll Call</i>	<i>Ayes</i>	<i>Nays</i>	<i>Outcome and Comments</i>
S. 223 “The Steamboat Act” 32-1 Became Law August 30, 1852 10 Stat. L. 61	House  Aug. 25, 1852	233 House Seats  D: 127 (54.5%) W: 85 (36.5%) Unionists: 10 (4.3%) Free Soil: 4 (1.7%) States Rights: 3 (1.3%) Ind. Dem: 3 (1.3%) Ind. Whig: 1 (.4%)	Amend the Act for the Better Security of Passengers on Steam Vessels - the House voted on passing the bill	147 (84.5%)  D: 76 of 97 (78.4%) W: 62 of 66 (93.9%) Unionist: 3 of 5 (60%) Free Soil: 2 of 2 (100%) States Rights: 2 of 2 (100%) Independent Dem: 2 of 2 (100%)  F: 100 of 108 (92.6%) S: 47 of 66 (71.2%)	27 (15.5%)  D: 21 of 97 (21.6%) W: 4 of 66 (6.1%) Unionist: 2 of 5 (40%)  F: 8 of 108 (7.4%) S: 19 of 66 (28.8%)	The House voted to pass S. 223 by a huge margin after amending the version sent to it by the Senate



APPENDIX C (CONTINUED)

<i>Bill or Resolution &amp; Congress – Session</i>	<i>Chamber &amp; Date of Vote</i>	<i>Numbers in Chamber and Party Distribution as of Election</i>	<i>Brief Name/ Description of Legislation &amp; Nature of Roll Call</i>	<i>Ayes</i>	<i>Nays</i>	<i>Outcome and Comments</i>
S. 223 “The Steamboat Act” 32-1 Became Law August 30, 1852 10 Stat. L. 61	Senate  Aug. 25, 1852  Senate	62 Senate Seats  D: 36 (58.1%) W: 23 (37.1%) Free Soil: 3 (4.8%)	Amend the Act for the Better Security of Passengers on Steam Vessels - the Senate voted on a motion to delay consideration of the bill	8 (15.7%)  D: 6 of 30 (20%) W: 1 of 17 (5.9%) Free Soil: 1 of 4 (25%)  F: 3 of 27 (11.1%) S: 5 of 24 (20.8%)	43 (84.3%)  D: 24 of 30 (80%) W: 16 of 17 (94.1%) Free Soil: 3 of 4 (75%)  F: 24 of 27 (88.9%) S: 19 of 24 (79.2%)	The Senate had previously passed S. 223 without a roll call vote. The House passed an amended version. The Senate voted on tabling the House’s version, which might have delayed it until the next session. The Senate subsequently approved the House version without a roll call vote
S.J.R. 79 32-2 Enacted March 3, 1853 10 Stat. L. 262	Senate  Feb. 22, 1853	62 Senate Seats  D: 36 (58.1%) W: 23 (37.1%) Free Soil: 3 (4.8%)	Amend an earlier Senate Joint Resolution (SJR 67) to allow the steamboat inspectors the discretion to give owners additional time to comply with the Steamboat Act	14 (28.6%)  D: 10 of 27 (37%) W: 3 of 19 (15.8%) Free Soil: 1 of 3 (33.3%)  F: 6 of 25 (24%) S: 8 of 24 (33.3%)	35 (71.4%)  D: 17 of 27 (63%) W: 16 of 19 (84.2%) Free Soil: 2 of 3 (66.7%)  F: 19 of 25 (76%) S: 16 of 24 (66.7%)	The Senate defeated this effort to amend the joint resolution. The amendment would have allowed inspectors the option to permit vessel owners an additional 4 more months to comply with the Steamboat Act. The Senate then passed the resolution without a roll call vote, as did the House.

APPENDIX C (CONTINUED)

<i>Bill or Resolution &amp; Congress – Session</i>	<i>Chamber &amp; Date of Vote</i>	<i>Numbers in Chamber and Party Distribution as of Election</i>	<i>Brief Name/ Description of Legislation &amp; Nature of Roll Call</i>	<i>Ayes</i>	<i>Nays</i>	<i>Outcome and Comments</i>
H.R. 114 36-1 Passed House, not Senate	House May 18, 1860	238 House Seats D: 83 (34.9%) R: 116 (48.7%) Opposition: 19 (8%) Anti-Lecompton Dem: 8 (3.4%) Ind. Dem: 7 (2.9%) Americans: 5 (2.1%)	Further Safety of Steam Vessel Passengers -- bring steam towboats and freight boats under the authority of the 1852 act	55 (36.2%) D: 22 of 49 (44.9%) R: 21 of 76 (27.6%) Opposition: 8 of 14 (57.1%) Anti-Lecompton Dem: 3 of 5 (60%) Ind. Dem: 1 of 3 (33.3%)  F: 27 of 96 (28.1%) S: 28 of 56 (50%)	97 (63.8%) D: 27 of 49 (55.1%) R: 55 of 76 (72.4%) Opposition: 6 of 14 (42.9%) Anti-Lecompton Dem: 2 of 5 (40%) Ind. Dem: 2 of 3 (66.7%) American: 3 of 3 (100%) Free Soil: 1 of 1 (100%) Unionist: 1 of 1 (100%)  F: 69 of 96 (71.9%) S: 28 of 56 (50%)	The House defeated a motion to recommit the bill to the Commerce Committee
H.R. 114 36-1 Passed House, not Senate	House May 18, 1860	238 House Seats D: 83 (34.9%) R: 116 (48.7%) Opposition: 19 (8%) Anti-Lecompton Dem: 8 (3.4%)	Further Safety of Steam Vessel Passengers -- bring steam towboats and freight boats under the authority of the 1852 act	87 (54%) D: 21 of 59 (35.6%) R: 53 of 74 (71.6%) Opposition: 4 of 14 (28.6%) Anti-Lecompton Dem: 4 of 6 (66.7%) American: 3 of 3 (100%)	74 (46%) D: 38 of 59 (64.4%) R: 21 of 74 (20.3%) Opposition: 10 of 14 (71.4%) Anti-Lecompton Dem: 2 of 6 (33.3%) Ind. Dem: 3 of 3 (100%)	Similar versions of this bill had been introduced since 1854. The House voted to pass the bill. There was significant partisan and sectional polarization. The Senate did not pass H.R. 114, so it did not become law

APPENDIX C (CONTINUED)

<i>Bill or Resolution &amp; Congress – Session</i>	<i>Chamber &amp; Date of Vote</i>	<i>Numbers in Chamber and Party Distribution as of Election</i>	<i>Brief Name/ Description of Legislation &amp; Nature of Roll Call</i>	<i>Ayes</i>	<i>Nays</i>	<i>Outcome and Comments</i>
H.R. 114		Ind. Dem.: 7 (2.9%) American: 5 (2.1%)		Free Soil: 1 of 1 (100%) Unionist: 1 of 1 (100%)  F: 72 of 102 (70.6%) S: 15 of 59 (25.4%)	F: 30 of 102 (29.4%) S: 44 of 59 (74.6%)	

D= Democratic Party

F= Free State Representatives and Senators

R= Republican Party

S= Slave State Representatives and Senators

W= Whig Party

American = Supporter of the Nativist/ Anti-Immigrant Party

Anti-Jackson = Opponent of Andrew Jackson

Anti-Lecompton Dem = Northern Democrats who opposed the 1857 Kansas state constitution that would permit slavery

Anti-Mason = Opponent of the Masonic Order and other secret societies

Free Soil = Northern opponent of slavery extension

Ind. Dem. = Independent Democrat

Jacksonian = Supporter of Andrew Jackson

Nullifier = South Carolina supporter of the doctrine of nullification

Opposition = Upper South opponent of the Democratic Party

States Rights = Southern supporter of slavery extension

Unionist = Southern supporter of maintaining the Union

Rows in **bold type** indicate bills that were enacted into law.

The outcomes of the roll call votes are from the *Journals of the House* and *Senate* for the relevant Congress and Session.

## APPENDIX C (CONTINUED)

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Partisan affiliations are taken from the Biographical Directory of the U.S. Congress, 1774-Present, <http://bioguide.congress.gov/biosearch/biosearch.asp> (Accessed August 1-15, 2009.) or Kenneth C. Martis, *The Historical Atlas of Political Parties in the United States Congress, 1789-1989*, (NY: Macmillan & Co., 1989).

Most of the bills cited are available online at the Library of Congress, American Memory, Lawmaking Home, Bills and Resolutions. <http://memory.loc.gov/ammem/amlaw/lwhbsb.html> (accessed August 1-15, 2009).

Information on the partisan distribution for the 36<sup>th</sup> Congress is from the Office of the Clerk, U.S. House of Representatives, House History, and Party Divisions of the House of Representatives. [http://clerk.house.gov/art\\_history/house\\_history/partyDiv.html](http://clerk.house.gov/art_history/house_history/partyDiv.html) (Accessed March 15, 2010)

Information on the partisan distribution of the Senate is taken from U.S. Senate, Art & History, Statistics and Lists, Political Parties and Leadership, Party Division, 1789-Present, [http://www.senate.gov/pagelayout/history/one\\_item\\_and\\_teasers/partydiv.htm](http://www.senate.gov/pagelayout/history/one_item_and_teasers/partydiv.htm) (Accessed March 15, 2010)

Considering the number of bills introduced regarding vessel safety, there were relatively few roll call votes on the legislation. Like most legislation, much of it died in committee or was never taken up by Congress after it was introduced. However, when these laws were passed, most often they were passed by consensus and without either the House or the Senate conducting a vote. As we can see in the above votes, when roll call votes were taken, there were generally large majorities that favored the legislation. Partisan differences were sometimes evident, but overall the more noticeable feature is that majorities from both parties, and from both slave and free states, generally supported this legislation during roll call votes.

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