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Gently Down the Stream:

How Exploding Steamboat Boilers in the 19th Century

Ignited Federal Public Welfare Regulation
REDACTED VERSION

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Abstract. Boiler explosions plagued the steamboat industry during the early years of its existence (1816-1852), costing thousands of lives and prompting the federal government to enact private welfare regulation for the first time. Congress faced many challenges in this task, including opposition from steamboat owners, disagreement as to the causes of explosions and how best to prevent them, and, most seriously, concerns about its authority to interfere with private property rights and the extent of its constitutional power to regulate commerce. Despite these obstacles, Congress succeeded in enacting two groundbreaking pieces of legislation—one in 1838 and the other in 1852—that tackled the steamboat issue head-on. Together, they established the first federal agency responsible for the regulation of a private industry, in large part due to the public's outcry over the explosions and its demand for government intervention. The resulting dual safeguards of boiler specifications and an administrative system of inspection transformed the steaming industry and dramatically reduced the number of annual steamboat boiler explosions and resulting fatalities in the United States. More importantly, these acts and this new empowerment of the federal government set the precedent for its future role in consumer protection through the regulation of private industry, paving the way for federal agencies like the Food and Drug Administration that today are taken for granted as the guardians of public welfare.

I

On May 21, 1824, *The Albany Argus* reported the following:

> About 12 past 7 o'clock on Saturday [May 15] evening, while the steam boat *Ætna*, Capt. Robinson, was on her passage from Washington, New Jersey, to this city,... the centre boiler exploded, with a loud and awful crash, the hot water and steam expanding in every direction with the velocity of lightning, instantaneously scalded to death several of the passengers, demolished the cabins, ripped up the deck, broke the machinery in pieces, fired the vessel with the scattered brands from the furnace, rendered the whole midships a complete wreck, and filled the minds of the survivors with indescribable horror and dismay.... It was supposed to be three or four minutes before the explosion spent its force, and nearly fifteen minutes before the steam had cleared away so as to admit of entering the cabin, where a scene of death & terror was presented which may be imagined, but cannot be described.[1]

The explosion of the boiler on board the *Ætna* was not the first of its kind, and it was far from the last. But what is remarkable about this tragedy is that it caught the attention of Congress and moved it to action in the first in what would become a long series of attempts by the federal government to regulate the relatively

new and increasingly deadly technology that was steam power. Congress faced many challenges in this task, including opposition from steamboat owners, disagreement as to the causes of explosions and how best to prevent them, and, most seriously, concerns about its authority to interfere with private property rights and the extent of its constitutional power to regulate commerce. Despite these obstacles, Congress succeeded in enacting two groundbreaking pieces of legislation—one in 1838 and the other in 1852—that tackled the steamboat issue head-on. Together they established the first federal agency responsible for the regulation of a private industry, in large part due to the public's outcry over the explosions and its demand for government intervention. The American people were outraged and horrified by the violence and magnitude of the losses of both human life and property at the hands of a technology that had once awed and seduced them. Put simply, they wanted these losses to cease, even if that meant beseeching Congress to place restrictions on their own rights, thereby establishing governmental powers that they had succeeded in escaping just a few generations before. The resulting dual safeguards of boiler specifications and an administrative system of inspection transformed the steamboat industry and dramatically reduced the number of annual steamboat boiler explosions and resulting fatalities in the United States. More importantly, these acts and this new empowerment of the federal government set the precedent for its future role in consumer protection through the regulation of private enterprise, paving the way for federal agencies like the Food and Drug Administration and the Interstate Commerce Commission that today are taken for granted as the guardians of public welfare.

II

Robert Fulton and his partner, Robert Livingston, began operating the first commercially successful steam-

boat (the *Clermont*) in 1807 on the Hudson River. While the steamboat was the product of the hard work and ingenuity of many men dating back to the mid-1700s, popular historians credit Fulton with its invention largely because of this achievement and his partnership's prescient acquisition of an exclusive license from the New York state legislature to run steamers on the Hudson.[2] However, Fulton really intended the steamboat for the rivers of the West, writing to Livingston just before the maiden voyage of the *Clermont*, "Whatever may be the fate of steamboats for the Hudson, everything is completely proved for the Mississippi, and the object is immense."[3] Having obtained another exclusive license from the Territory of Orleans (Louisiana after 1812), Fulton began operating the *New Orleans* out of the strategically-important port city of the same name in 1811, and his plans began to take shape.[4] Unfortunately for him (but perhaps for the benefit of the fledgling industry), Fulton was denied monopolies over the majority of the Mississippi River and the entirety of the Ohio River by the governing states and territories, decisions that allowed competitors to enter the market. One such competitor, Henry M. Shreve, battled the Louisiana monopoly both on the river and in court and defeated it in 1818, a victory that, in combination with his record-setting twenty-five-day trip from New Orleans to Louisville[5] and the general realization of the healthy profits to be made from steamboat operation, led to a boom in steamboat construction that served to cement the industry in the United States and would continue for the following four decades.[6] By 1838, there were 700 steamboats in operation in the United States, an impressive figure for thirty years of growth but one that would double in the following thirteen years.[7]

[2] *See* Louis C. Hunter, Steamboats on the Western Rivers 6 (1949).
[3] *Id.* at 8. "Western" rivers included the Mississippi, Missouri, Ohio, and Tennessee Rivers and their tributaries.
[4] *See id.* at 12.
[5] Keelboats and barges averaged three to four months for this journey. *See id.* at 22.
[6] *See id.* at 17, 20.
[7] *See* John Kennedy Brown, Limbs on the Levee: Steamboat Explosions and the Origins of Federal Public Welfare Regulation, 1817-1852 10-11 (1988).

The rapid adoption of the steamboat from 1820 to 1850 had a tremendous impact on the economic growth of the entire country and the expansion of the West. Freight rates for shipping were greatly reduced as the speed and carrying capacity of steamboats increased along with competition among operators.[8] This facilitated trade and the development of agriculture in the Ohio Valley, the cotton industry in the Mississippi Valley, and the coal industry in Pennsylvania.[9] Midwestern cities blossomed as the initial boons to transportation and trade led to the development of manufacturing centers.[10] The steamboat's ability to move rapidly upstream carried settlers farther west than they had ever been before. Yet in addition to its effect in spreading the nation out, the steamboat also brought it together, giving the republic "one national heart, and one national mind" by fostering the circulation of people as well as ideas.[11]

These benefits not only "advanced the career of national colonization and national production, at least a century," but their combined effect was to create a national "love affair" with the steamboat in the minds of the American people.[12] They were witnessing industrial technology on a grand scale—many for the first time—and they were captivated by the mysterious and mechanically-complex means by which it improved their lives and livelihoods. Schoolchildren dreamed about them, Walt Whitman elegized them, and even preachers sang the praises of the steamboat, as evidenced by one sermon given by Reverend James T. Austin in 1839:

> [The steamboat] is to bring mankind into a common brotherhood; annihilate space and time in the intercourse of human life; increase the social relations... multiply common benefits... and by a power of unknown kindness, give to reason and religion an empire which they have but nominally possessed in the conduct of mankind.[13]

Society placed steam technology so high upon a pedestal that it was nearly deemed infallible, even in the face

[8] *See* HUNTER, *supra* note 2, at 27.
[9] *See* BROWN, *supra* note 7, at 11.
[10] *See* HUNTER, *supra* note 2, at 31.
[11] *Id.*
[12] *Id.* at 27.

of the increasing incidence of explosions. The result was that Congress focused on the engineers rather than the boilers themselves when it finally adopted regulatory legislation in 1838, a mistake that would render the Act a failure and allow violent deaths on the nation's rivers to continue for fourteen more years.

III

When Fulton introduced the *Clermont* in 1807, it was powered by a low-pressure steam engine developed by the English team of Matthew Boulton and James Watt. Steam was developed in a large, cylindrical boiler to a pressure of about 7 to 10 pounds per square inch (psi) above atmospheric pressure. It then passed into a condenser where it was cooled by cold water, creating a partial vacuum that allowed the pressure of the atmosphere to bear down on the piston for the power stroke. Boilers of large diameter were required to produce sufficient power due to the low pressures involved, but what they lacked in compactness they made up for in safety. This was especially important given that boiler construction was in its infancy and more of an art than a science, with improvements coming slowly on the backs of minor adjustments made by mechanics and metalworkers on a cut-and-try basis.[14] One historian effectively summarized the state of the art:

> Shell thickness and diameter depended upon available material, which was often of inferior quality. In fabrication, no provision was made for the weakening of the shell occasioned by the rivet holes. The danger inherent in the employment of wrought-iron shells with cast-iron heads affixed because of the different coefficients of expansion was not recognized, and the design of internal stays was often inadequate. The openings in the safety valves were not properly proportioned to give sufficient relieving capacity.[15]

It was because of its low-pressure operation that the Boulton and Watt engine was able to remain relatively

[14] *See* HUNTER, *supra* note 2, at 121.

safe in spite of these apparent dangers and weaknesses. It is even likely that the natural course of scientific progress would have quickly outpaced the dangers facing the industry and the steamboat would have remained a safe means of transportation had the low-pressure engine remained the sole source of steam power.

Such was not the case, however, as an American engineer named Oliver Evans introduced the high-pressure, non-condensing steam engine around 1800. It differed from the Boulton and Watt engine in that it used steam directly to drive the piston, generating pressures of 40 to 60 psi in its early years and 150 psi by 1824.[16] This engine was in widespread use by 1817, competing with the low-pressure engine in the East while being used almost exclusively in the West. This was due not only to its general advantages of being cheaper and easier to make (due to the lack of a condenser) than the low-pressure engine,[17] but also because of several advantages it had specific to western rivers.[18] It was powerful enough to travel against strong currents, it was small and light (which was important due to the relative shallowness of western rivers), it lacked a condenser which would be clogged by the sediment permanently suspended in the Mississippi and Missouri Rivers and other rivers during floods, and it had enough reserve power to ascend rapids and avoid snags and other obstacles.[19] These were enough to overcome, in the minds of western steamboatmen, the less tangible benefits of safety and economy associated with low-pressure engines.[20] The high-pressure engine did in fact cast safety by the wayside, the pressures associated with it quickly proving to be too much for the shoddy boiler construction of the day. Explosions were frequent, prompting Charles Dickens to compare traveling aboard a high-pressure steamboat with living "on the first floor of a [gun] powder mill."[21]

In addition to boiler explosions, steamboats were prone to other types of accidents such as fire, collision, snagging on rocks and other river debris, and sinking. It was the explosions, however, that most readily

[16] *See* Brown, *supra* note 7, at 15.

[17] In one example, low-pressure and high-pressure steam engines of comparable power cost £10,000 and £4,000, respectively. *See* Hunter, *supra* note 2, at 130.

[18] *See id.*

[19] *See id.* at 129-32.

[20] *See id.* at 132.

[21] Brockmann, *supra* note 13, at 22. Calculations would eventually show that a boiler at 150 psi has enough energy to launch it over two miles into the air. *See* Hunter, *supra* note 2, at 292.

captured the public's attention and imagination. They were the first hazard in America that could kill on a massive scale, accounting for one-half of the 7,000 steamboat-related deaths before the Act of 1852 was passed and two-thirds of the total casualties.[22] The suddenness with which they occurred and the ghastliness of the injuries they inflicted indiscriminately upon males and females, passengers and employees alike also caused them to overshadow other types of accidents in the public mind.[23]

Perhaps the greatest contribution to the aura surrounding boiler explosions, though, came from the uncertainty surrounding their causes and, consequently, their prevention. In addition to excessive pressure and low-quality boiler construction, there were several other technical problems. Steam engines were often salvaged and recycled—occasionally as many as four times—causing structural weaknesses from prolonged use and transfer as well as different methods of operation.[24] The boiler was supplied with water from the river, which often contained silt that accumulated at the bottom of the boiler and caused uneven heating and hence weakening of the shell. Water and steam pressure gauges did not become standard until around 1850. Before then, engineers were only alerted to excessive pressure by the lifting of the safety valve, which was easily tampered with and often tied or weighted down to generate more power. Stopcocks used to measure water levels inside the boiler were subject to misreading due to tilting of the steamboat and foaming of the heated water. Tilting in combination with a low water level often meant that the boiler plates were left exposed to the fire, causing them to become weakened. Such heating also caused the plates to become red-hot such that when the water once again came in contact with them, a large amount of steam was generated, causing a rapid increase in pressure. This was especially problematic when the boat stopped at a landing, as the pump supplying water to the boiler was powered by the engine. It was common practice to keep the fire stoked during short stops in order to get a quick start that could save time and impress the crowds of people

[22] *See* HUNTER, *supra* note 2, at 282-3.
[23] *See id.* at 271.
[24] *See* BROCKMANN, *supra* note 13, at 26-7.

on shore.[25] This combination of a dry boiler and a continual fire beneath it resulted in its overheating, with dire consequences when the water pump was restarted upon departure. In fact, fully two-thirds of all boiler explosions occurred as boats departed from landings, including the very first one aboard the *Washington* in 1816.[26]

Though these problems are easily identified and delineated in hindsight, nothing was clear-cut during this period and there was no single theory to explain all explosions. Boilers still exploded when full of water or operating at normal pressure. One theory held that explosions were caused by the combustion of hydrogen and oxygen gases formed in boilers as water decomposed upon heating. Though it was eventually proven wrong by the experiments of the Franklin Institute published in 1836, they did confirm the occasional formation of a small amount of gas inside the boiler, though not nearly enough to cause an explosion.[27] Nevertheless, this was ample evidence to allow some die-hard supporters of the theory to continue in its defense.[28]

The other major cause of explosions, non-technical in nature and immune to the limitations of scientific knowledge of the time, was the lack of competent engineers who were well-versed in the safe operation of steam engines. It was a new profession with no body of knowledge to learn from and no mentors to teach the untrained. The rapid growth of the industry meant that there was a constant shortage of trained personnel, and those that were trained sometimes fell victim to the dangers involved. However, engineers were not entirely to blame, as they had no authority to make repairs and could do little with respect to the condition of the boilers they operated.[29] Certainly, much responsibility must be heaped upon other members of the

[25] *See* HUNTER, *supra* note 2, at 296.
[26] *See id.* at 295.
[27] *See id.* at 292.
[28] *See id.* at 292-3.
[29] *See id.* at 297.

industry. Inventors like Oliver Evans advertised that engineers could be taught to operate their engines in only two weeks in order to boost sales.[30] Steamboat owners hired young men without experience as a cost-saving measure. Speed was also greatly desired in order to bolster business as well as egos, causing captains to demand heavier firing, water levels kept low to make steam more quickly, or, most often, the weighing down of the safety valve.[31] Even passengers, whether to save time or for mere diversion, encouraged high speeds and races against other boats.[32] Though racing was often pointed to as the cause of boiler explosions and the subject of much fanfare in the industry, press, and Congress, there are few well-documented examples of such a causal link and it is likely simply another facet of the sensationalism and hysteria surrounding these disasters.

Simply put, there was an overwhelming complexity of factors that contributed to boiler explosions, and the gradual understanding of them often left more questions than answers regarding how best to prevent future disasters. Yet the reality remained that steamboats were a comparatively safe mode of transportation. In 1838, the worst year for steamboat explosions (relative to the amount of tonnage in service), 342 people died in twelve explosions, a far cry from the more than 1,000 fatalities on American sailing vessels lost at sea in 1839.[33] This information was not generally available to assuage the public, nor would it have had it been widely published, according to one historian:

> What aroused public opinion and moved legislative bodies was less the cold calculation of total losses and relative risks than the shock of individual disasters which did not occur at an exotic distance, but frequently at one's very doorstep. Many were inclined to accept the view of the mid-century observer who declared: "The history of steam navigation [...] is a history of wholesale murder and unintentional suicide."[34]

And so it was that public cries and legislative movements for regulation of steamboats ebbed and flowed

[30] *See* Brockmann, *supra* note 13, at 31.
[31] *See* Hunter, *supra* note 2, at 300.
[32] *See id.* at 301.
[33] *See* Brown, *supra* note 7, at 20.

with the occurrence of disasters, beginning on the municipal level in 1817 and culminating successfully in 1852 with a second congressional act.

IV

Within months of the first boiler explosion on board the *Washington* in June of 1816, several other steamboats met the same fate, including the *Constitution* on the lower Mississippi River and the *Enterprise* near Charleston, South Carolina. Thirty-four people lost their lives in these three disasters, causing public alarm not only about the dangers of steamboats but about the retarding effect such disasters could have on the development of the promising industry.[35] This prompted the city council of Philadelphia to form a committee to launch the first official inquiry into the causes of steamboat explosions in 1817 in an effort to protect passengers on steamboats serving that city.[36] The resulting report, borrowing largely from the report of a select committee of the House of Commons in England following a steamboat explosion there the same year,[37] recommended that boilers be hydrostatically tested at twice their working pressure every month by competent inspectors.[38] Not ignorant of the operational aspect of boiler dangers, however, the investigating committee also suggested placing the safety valve in a locked box to prevent engineers from tampering with it. This report was never acted upon by the city due to the legitimate belief that the problem was too large (both logistically and jurisdictionally) for a municipal enactment to effectively regulate.[39] Although it was ultimately referred to the state legislature where it remained untouched, its provision for boiler testing (or

[35] *See id.* at 284.
[36] *See* Burke, *supra* note 15, at 5.
[37] This report can be found in H.R. Exec. Doc. No. 69, 18 Cong., 2 Sess., p. 19-21 (1825).
[38] Hydrostatic testing is a relatively safe means of checking a boiler for weaknesses whereby it is pumped full of water to a pressure well beyond its working pressure.
[39] *See* Burke, *supra* note 15, at 6.

the absence thereof) would play a pivotal role in the failure of Congress' Act of 1838.

Other states proved to be more proactive than Pennsylvania regarding the subject of steamboat safety, with Alabama passing the first regulatory act in the nation in 1826.[40] It called for the annual inspection and certification of steamboats by the harbormaster at Mobile to ensure that they were "river-worthy," and the burden of proof was placed on the carrier in all suits for civil damages.[41] This statute was later improved with penalties for accidents due to boiler explosions and a requirement that engineers be licensed.[42] In 1834, Louisiana passed a more extensive statute requiring hydrostatic testing of the boiler every three months by a state inspector, with the penalty being that, in the event of an explosion, uninspected boats were barred from insurance claims and their captains were subject to fines and imprisonment.[43] Captains were also to be adjudged guilty of manslaughter for any deaths resulting from explosions.[44] Kentucky and Missouri followed shortly thereafter with their own statutes.[45] Unfortunately, these state laws fared little better than the municipal attempts at regulation had previously. The court records of these states reveal remarkably few, if any, cases involving suits for civil damages resulting from boiler explosions despite the fact that they continued to occur.[46] This is likely the result of a combination of factors: simple lack of awareness of the laws by passengers, overly lenient inspectors, and the common law tenet that legal remedies in tort die with the victim.[47] But the real failure of state action on a systemic level was due to the states' lack of constitutional authority to regulate vessels involved in interstate commerce, an issue that was only fully resolved at the mid-century mark.[48] Given the national scope of the steamboat problem and the states'

[40] *See* 1826 Ala. Acts 5.
[41] *Id.*
[42] *See* HUNTER, *supra* note 2, at 523.
[43] *See* 1834 La. Acts 55.
[44] *See id.* at 57.
[45] *See* 1837 Ky. Acts ch. 476.; 1845 Mo. Laws 20.
[46] *See* BROWN, *supra* note 7, at 25-8.
[47] *See id.* at 30-1.
[48] This topic is discussed in full *infra*.

inability to effectively deal with it, the federal government became the regulator of last resort, though it too would struggle with the various issues and require several failed attempts before establishing the public's confidence in the industry and its new role in consumer protection.

V

Though Henry M. Shreve was able to break Fulton's monopoly on the Mississippi River through sheer will and determination, it took a decision of the Supreme Court in 1824 to defeat him in New York. The case was *Gibbons v. Ogden*,[49] and the Marshall court not only declared the New York monopoly invalid, but also delineated the extent of the federal government's power to regulate commerce. Aaron Ogden had been licensed by Fulton and Livingston to operate a ferry between New York City and Elizabethtown, New Jersey. His former partner, Thomas Gibbons, operated a competing service using steamboats licensed under a federal law authorizing him to engage in the coastal trade. Ogden obtained an injunction from a New York court preventing Gibbons from operating in New York waters, and Gibbons appealed,[50] claiming that Congress had an exclusive grant of power over commerce that prohibited any state from legislating on the subject.[51] Chief Justice John Marshall could have taken this extreme view and received a majority concurrence given the disfavor of the steamboat monopoly, but he instead seized upon the supremacy clause and decided that the state monopoly law was invalid because it conflicted with the federal law authorizing Gibbons to engage in the coastal trade.[52] However, in dicta he espoused the exclusivity of the federal commerce power, but he

[49] 22 U.S. 1 (1824).

[50] Gibbons was represented by Daniel Webster, who would soon become a senator and a strong advocate of steamboat regulation.

[51] This view advocates what is known as the "dormant" power of the commerce clause, meaning that, even in the absence of conflicting congressional legislation, the mere grant to Congress of power over interstate commerce by the Constitution acts as an implicit veto upon state commerce legislation. *See* Felix Frankfurter, The Commerce Clause 16 (1937).

[52] *See id.*

tempered it with recognition of the validity of state "police" regulations that, while not direct regulations of commerce, could have an effect on it.[53] Thus, while Marshall succeeded in appeasing advocates of states rights, asserting national supremacy, and preventing state fragmentation of commerce,[54] the real effect of his opinion was to assure members of Congress that the power to regulate interstate commerce was theirs.[55] But as time passed and the composition of the Court changed, the line separating subjects of interstate commerce regulation and state "police" regulation became blurred, leaving Congress with a paralyzing uncertainty as to its authority to pass regulation that would bring steamboat explosions to an end.

The federal law at issue in *Gibbons* was the Coastal Licensing Act of 1793, which superseded a similar law from 1789 and provided for the licensing and enrollment of ships and vessels of the United States.[56] Though it was not mandatory, licensing had several benefits that protected American trade interests, including exemption from some of the port fees that were charged to foreign vessels.[57] Another law passed in 1790 and directed at merchant vessels required, as a condition of licensing, that they carry a specified amount of provisions for every passenger on board,[58] and thus Congress was able to circuitously regulate ships to ensure the public's safety through the use of licensing requirements. Importantly, with the Act of 1838 that was to follow almost fifty years later, licensing—and hence compliance with government regulation of private property—would no longer be a matter of choice,[59] a leap that would give Congress pause when considering

[53] Such regulations included inspection laws, quarantine laws, health laws, and laws regulating intrastate commerce and ferries. *See Gibbons*, 22 U.S. at 72.

[54] *See* BROWN, *supra* note 7, at 35.

[55] Congress needed such assurance given that the commerce clause had never before been interpreted. The Court's implicit acknowledgment of exclusivity was "an audacious doctrine, which... would hardly have been publicly avowed in support of the adoption of the Constitution." FRANKFURTER, *supra* note 51, at 19. Underlying this point is the fact that there was a political and philosophical tug-of-war raging at this time over whether the United States was a nation or a federation of states, and Marshall effectively struck a balance between the two while implicitly endorsing the former.

[56] *See* Coastal Licensing Act, ch. 46, 1 Stat. 305 (1793).

[57] *See id.* at 308.

[58] *See* Act of July 20, 1790, ch. 29, 1 Stat. 131.

[59] *See* BROWN, *supra* note 7, at 36.

similar bills in the intervening years.

Following the Supreme Court's dismantling of Fulton's monopoly in 1824, the high-pressure steamboats that Fulton opposed quickly made their way to the Hudson River. One such boat was the *Ætna*, the explosion of which on May 15 killed twelve people and had Representative Samuel Vinton (Ohio) declaring from the floor of the House of Representatives just four days later, "A country agitated with terror and dismay looks to us for protection, and demands, at our hands, security for the future."[60] The Commerce Committee was then instructed to investigate the expediency of a law banning all high-pressure engines.[61] Though it acknowledged the relative dangers of such engines, the committee opposed banning them given the "vast amount of property" vested in high-pressure steamboats, especially in the West, and its aversion to discouraging technological progress.[62] Nevertheless, it made several recommendations to improve the safety of steamboats, copying nearly verbatim the same British select committee report relied on by the Philadelphia committee. It called for a requirement that all steamboats take out a coasting license, as provided for under the Coastal Licensing Act of 1793. With regard to boilers, it suggested that they all be composed of wrought iron or copper (which were stronger and more flexible than cast iron) and be inspected and tested by a skilled engineer. Additionally, they were to have two safety valves, one of which was to be made inaccessible to the engineer, with provision for a fine in the event of tampering. The bill was reported to the full House for a vote on May 24 but action on it was postponed due to the feeling that the House "was not prepared in its present state of information to legislate on a subject so extensive and important in its effects,"[63] emphasizing the point that a significant hurdle for Congress in finding a solution was gaining an understanding of the problem.[64]

In order to become more informed, the House resolved for the Secretary of the Treasury, William Crawford,

[60] Annals of Cong., 18^{th} Cong., 1^{st} Sess. 2671 (1824).
[61] *See id.* at 2672.
[62] H.R. Rep. No. 125, 18 Cong., 1 Sess., p. 1-4 (1824).
[63] Annals of Cong., 18^{th} Cong., 1^{st} Sess. 2708 (1824).
[64] Interestingly, no legislation followed the British report either. *See* Burke, *supra* note 15, at 6.

to inquire into the causes of steamboat disasters and their remedies and report his findings at the start of the next session.[65] Crawford sent circulars to steamboat captains and other experts soliciting their testimonials and recommendations and submitted his report to the House in January of 1825.[66] It was largely a collection of the responses he had received and included the British report of 1817. Blame for explosions was placed both with the technology and the engineers, as the correspondents asserted causes ranging from too much sediment or not enough water in the boiler to overloaded safety valves to the ignition of hydrogen gas resulting from the decomposition of water. Remedies included hydrostatic testing of the boiler, use of two safety valves and a water gauge, and the employment of engineers who were "skilful [sic], honest, sober, and attentive."[67] Unfortunately, Crawford sabotaged the prospect of the House passing the bill at hand—and perhaps considering any such legislation for several years to come—with his preface to the report:

> I am of opinion, that legislative enactments are calculated to do mischief, rather than prevent it, except such as 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.[68]

With such emphasis on the liability aspect of the problem and the complete dismissal of the technology element in the face of a bill that proposed to deal with both, Congress was left confounded as to the truth underlying steamboat explosions.[69] For this reason, as well as a lull in explosions and public pressure for government action, Congress did not seriously consider the issue again until 1830.[70]

There were fourteen explosions in 1830, most notably that of the *Helen McGregor* which killed over fifty people, and Congress was once again roused to action by the demands of a terrified public.[71] On May 4, 1830, Representative Charles Wickliffe (Kentucky) proposed a regulatory bill that received little attention

[65] Annals of Cong., 18^{th} Cong., 1^{st} Sess. 2765 (1824).
[66] *See* H.R. Exec. Doc. No. 69, 18 Cong., 2 Sess. (1825).
[67] *Id.* at 9.
[69] *See* Brockmann, *supra* note 13, at 16.
[70] Though reports conflict, one source states that there was an average of only three explosions per year from 1825 to 1829. *See* Brown, *supra* note 7, at 40.
[71] *See id.*

and was not passed, and the House again resolved to have the Secretary of the Treasury, now Samuel D. Ingham, investigate the causes of boiler explosions and their possible solutions. [72] He circulated a form containing twenty-three interrogatories to customs collectors, steam engine manufacturers, scientists, and other members of the industry who were familiar with such disasters. In an interim report submitted to the House in March of 1831, he expressed regret at having yet to arrive at a satisfactory explanation of the causes of explosions, attributing the failure to "the unwillingness of the owners and masters of boats to aid the inquiry, or even communicate any information on the subject."[73]

Within a year, though, Ingham's successor, Louis McLane, had collected a sufficient amount of information and sent it to a House Select Committee chaired by Wickliffe. The committee then submitted a report to Congress on May 18, 1832, that included many of the communications received by Ingham and McLane.[74] It was an impressive document of 192 pages featuring testimonials, charts, diagrams, and scientific data, yet it was made accessible by an introduction by the committee that decanted six causes of explosions: faulty boiler construction, defective materials, excessive and extended use, careless and unskilled engineers, excessive steam pressure, and deficiency in the supply of water.[75] With lack of information no longer the obstacle to legislation it had been just a few years earlier, the committee seized the opportunity and proposed a bill in its report. It called for mandatory licensing and inspection like the 1824 bill, as well as hydrostatic testing of the boiler every three months at three times its operating pressure. It forewent any regulations regarding safety valves that were contained in previous bills and instead required that the engine be kept running at landings in order to power the pump supplying water to the boiler. Additionally, provisions were made for a long boat, fire hose, and lights on every steamboat under the threat of penalty.

[72] *See* H.R. Jour., 21^{st} Cong., 1^{st} Sess. 604-5 (1830).
[73] H.R. Exec. Doc. No. 131, 21 Cong., 2 Sess., p. 1 (1831).
[74] *See* H.R. Rep. No. 478, 22 Cong., 1 Sess. (1832).
[75] *See id.*

However, much like Secretary Crawford had done in 1825, the committee derailed its own bill in the preface to its report by emphasizing yet another obstacle that had not yet been much contemplated—the extent of Congress' authority to regulate interstate commerce. It wrote:

> The committee have had more difficulty in determining the extent of the power of Congress to legislate over the subject, than to decide what would be the proper legislation by a sovereign possessing unlimited and unrestricted powers over persons and things. Whatever the power of legislation over this subject is vested in Congress,... the right of Congress to prescribe the mode, manner, or form of construction of the vehicles of conveyance to be used for the transportation of commodities, is not perceived or recognized by the committee.... It is better to leave the subject of the application of steam power to the propelling of boats, to the sound discretion of those concerned, and to the improvements of the age, than to attempt, by any legislation of ours, to prescribe the particular kind of machinery to be employed.[76]

Despite the previous licensing acts of the late 1700's, the bills being proposed at this time were more exacting and restrictive of the rights of individuals over their property than any previous legislation, with the added fact that they contemplated mandatory compliance through licensing. Furthermore, the country's political landscape was changing:

> [T]he confident nationalism of the 1820's was being eroded in the 1830's by the states rights positions of Jacksonian Democrats. The Supreme Court was also retreating from its earlier Federalist positions. *Gibbons* marked the nationalists' apogee; after 1825 the Court increasingly bowed to the advocates of state powers.[77]

In *Willson v. Black Bird Creek Marsh Company* (1829),[78] Marshall undermined the "dormant" power of the commerce clause intimated in *Gibbons* and upheld a state law affecting commerce because it did not conflict with any federal law on the subject. Eight years later, the Court sustained a New York statute that required interstate vessels arriving in New York City to provide reports on all of their passengers.[79] The Court found it to be a police regulation rather than one of commerce and thus passed on the question of federal exclusivity. These decisions left Congress' ability to regulate steamboats rather uncertain, with

[78] 27 U.S. 245 (1829).

[79] *Mayor of New York v. Miln*, 36 U.S. 102 (1837). Marshall died in 1835 and was succeeded by Robert Taney, a Jackson appointee who was strongly opposed to the dormant power of the commerce clause.

the entire issue centered around the tension between federalists and advocates of states rights. Though the Court made it clear that Congress would always have the power to regulate commerce, its retreat from the exclusivity doctrine meant that the states (through their police power) could do the same until and unless Congress chose to regulate upon the same subject. This placed Congress in the difficult position of having to choose between respecting the rights of the states to regulate steamboats when they were within their borders (which many believed the Constitution gave them the right to do regardless of what the Supreme Court decided) and negating such regulations outright (which many states rights congressmen refused to do).[80]

The end result was that this turmoil had a chilling effect on much of Congress, causing it to choose deference to scientific progress over interference with state autonomy and the rights of personal property. It was believed that the self-interest of steamboat owners would cause them to take all precautions necessary to ensure the public safety, and more effectively so than any legislation.[81] In fact, some considered legislation to be likely to cause engineers to neglect their responsibilities and use the government as a scapegoat.[82] Nevertheless, time was the true test, and as explosions continued and lives were lost year after year, such considerations faded away and the inevitability of government action became apparent.

[80]Regulation of boiler manufacture and other aspects of steam technology was likely included under the state police power of inspection. In *Gibbons*, Marshall wrote:

The object of inspection laws, is to improve the quality of articles produced by the labour of a country; to fit them for exportation; or, it may be, for domestic use. They act upon the subject before it becomes an article of [commerce], and prepare it for that purpose. They form a portion of that immense mass of legislation, which embraces every thing within the territory of a State, not surrendered to the general government; all which can be most advantageously exercised by the States themselves. (*Gibbons*, 22 U.S. at 72.)

Regardless of the state-federal issue, some felt that no government had the right to regulate boilers directly as this would interfere with individuals' rights to do with their property as they pleased, regardless of the lives that could be saved. As Senator Robert Stockton (New Jersey) would later declare in arguing against the Act of 1852, "Life is transient and evanescent, but liberty and equal rights, I hope, will endure as long as truth shall endure." CONG. GLOBE, 32^{nd} Cong., 1^{st} Sess. 2427 (1852).

[81]*See* HUNTER, *supra* note 2, at 527.

[82]*See* H.R. EXEC. DOC. NO. 69, 18 Cong., 2 Sess., p. 17 (1825).

In 1833, the explosion of the *Lioness* brought the tragedy of steamboat explosions home to Washington, D.C., as it claimed the life of Senator Josiah Johnson (Louisiana) and thirteen others.[83] Democratic President Andrew Jackson, in his State of the Union address to Congress later that year, publicly spoke on the issue for the first time:

> The fact that the number of those disasters is constantly increasing, notwithstanding the great improvements which are everywhere made in the machinery employed,... show very clearly that they are in a great degree the result of criminal negligence on the part of those by whom the vessels are navigated.... That these evils may be greatly lessened, if not substantially removed, by means of precautionary and penal legislation, seems to be highly probable: so far, therefore, as the subject can be regarded as within the constitutional purview of Congress, I earnestly recommend it to your prompt and serious consideration.[84]

Jackson clearly rejected the view of scientific progress as a cure-all held by the Wickliffe committee the year before, yet he was not prepared to suggest direct regulation of steam technology itself as that would require him to dive headlong into the debate over the appropriate balance between Congress' power to regulate in the public interest and individual property rights. Instead, by assessing the problem as one of negligence on the part of engineers that could be remedied with fines and liability, he echoed the sentiments of Secretary Crawford in his 1825 report to the House and advocated a solution that would appease the public yet avoid political turmoil.

Daniel Webster shared Jackson's sentiment that the natural progression of technology was failing to prevent explosions, but, in the tradition of Vinton and Wickliffe, saw direct regulation of it as a remedy of equal import to that of liability for engineers.[85] In a show of bipartisan support (and perhaps political opportunism),[86] Webster, who was a Whig, proposed just weeks after Jackson's speech that the Committee on

[83] *See* Brockmann, *supra* note 13, at 43.

[85] Recall that the Wickliffe committee believed that boilers themselves needed to be regulated but doubted the power of Congress to do so. *See supra* note 76 and accompanying text.

[86] Brockmann suggests that, although Webster was legitimately concerned about the steamboat problem, his actions were part of a greater effort to ingratiate himself with Jackson and perhaps become his chosen successor. *See* Brockmann, *supra* note 13, at 45. More sincere bipartisanship was in evidence when the Act of 1852, sponsored by Whig Senator John Davis (Massachusetts), was passed by a Democratic Congress.

Naval Affairs look into a bill that would address both aspects.[87] With regard to civil liability for negligence, he suggested the immediate trial of engineers (with the burden of proof on them) in cases where lives were lost as the result of explosions, accompanied by forfeiture of the boat.[88] On the technology side, he reiterated previous proposals for testing boilers at three times their working pressure and requiring safety valves, but also added a new requirement for a pressure gauge to be displayed on the boat where the public could inspect it.[89] In an effort to overcome the Constitutional issues that had stymied the previous year's bill, Webster seized upon the precedents set by the licensing acts of the 1700's in his argument before the Senate:

> Of the power of Congress there can be no doubt. Steamboats are, generally, licensed vessels, and they engage extensively in the coastwise commerce of the country. They may be registered vessels also, and may engage in its foreign commerce. On the same ground that laws of Congress regulate the number of passengers in merchant vessels, and make it necessary that such vessels should have medicine chests for the preservation of the lives and health of persons on board, with divers other provisions for the same or similar objects, it is plainly in the power of Congress to adopt any regulation for the government of steam vessels, which security to life and property may appear to require. It is with Congress to make these regulations, or they cannot be effectually made at all.[90]

Much to his chagrin, the rest of the Senate was not as forward-thinking as Webster, with the prevailing attitude being summed up by Senator Thomas Benton (Missouri) who believed that "his acquaintance with the captains and owners of boats enabled him to speak of them as men generally of great skill and high character."[91] The belief that the self-interest of steamboat owners was the best remedy was still very much alive within the halls of Congress, and the bill was tabled.

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[87] *See* Cong. Globe, 23^{rd} Cong., 1^{st} Sess. 42 (1833).
[88] *See id.* at 49.
[89] *See id.*
[91] Cong. Globe, 23^{rd} Cong., 1^{st} Sess. 49 (1833).

VI

When asked by the House of Representatives to investigate the causes of boiler explosions in 1830, Secretary Ingham, in addition to circulating interrogatories that largely went unanswered, took the fortuitous step of committing $1500 to the newly-founded Franklin Institute in Philadelphia to help subsidize the cost of scientific experiments it was conducting on the problem. The results of this funding—the first-ever federal grant for scientific research—were six years of testing and a series of four reports.[92] These reports disproved some supposed causes of explosions, including that which asserted that water decomposed into hydrogen in the boiler, and demonstrated the results of groundbreaking tests of the strengths of various boiler materials. The last of these reports (the *General Report*) was submitted to the House in 1837 and ultimately became the definitive work on the subject given its simplified summary of complex scientific information and the inclusion of suggested regulatory provisions.[93] Such provisions included some from the bill proposed by the Committee on Naval Affairs three years earlier (hydrostatic testing by appointed inspectors, publicly-displayed pressure gauge), as well as a prohibition on licensing boats using unsafe boilers and penalties for explosions resulting from negligence or racing.[94] However, given the wealth of information contained in the reports and the limited scientific backgrounds of the senators and representatives (most of whom were lawyers), it was not until after the scientific community had accepted them as conclusive in 1845 that Congress gave them any serious consideration.[95] Such delay initially appeared benign as the movement for regulation had been nearly dormant since 1833 due to a dearth of major steamboat disasters. The situation

[92] For a detailed account of the Franklin Institute's work, *see* Bruce Sinclair, Philadelphia's Philosopher Mechanics: A History of the Franklin Institute 1824-1865 170-194 (1974).

[93] *See id.* at 189.

[94] *See* Burke, *supra* note 15, at 14; Sinclair, *supra* note 92, at 190.

[95] *See* Brockmann, *supra* note 13, at 61. Only 500 copies of the *General Report* were originally printed by the Secretary of the Treasury. When its authority became established, 10,000 copies were ordered printed by the Senate and Patent Office in 1848. *See* S. Exec. Doc. No. 18, 30 Cong., 2 Sess., p. 1 (1848).

quickly turned for the worse in 1837, though, most notably in May when a fire resulting from overheated boilers aboard the *Ben Sherrod* killed over 150 people on the Mississippi River, the worst disaster of its kind.[96] Seven months later, in the face of mounting tragedies, President Martin Van Buren took a page from his predecessor and called for action in his State of the Union address:

> The distressing casualties in steamboats, which have so frequently happened during the year, seem to evince the necessity of attempting to prevent them, by means of severe provisions connected with their custom-house papers. This subject... will doubtless receive that early and careful consideration which its pressing importance appears to require.[97]

Van Buren became the latest politician, in the face of the Court's confusing signals regarding the commerce clause, to rally behind the licensing power of Congress as a constitutional proxy for steamboat regulation. Despite his belief that "the less government interferes with private pursuits the better for the general prosperity,"[98] the safety of the public and, more significantly, his electorate, were under siege.[99] It is no coincidence, then, that his political ally, Senator Felix Grundy (Tennessee), opened the new session of Congress the very next day by proposing a piece of legislation entitled, "A bill to provide for the better security of the lives of passengers on board of vessels propelled in whole or in part by steam."[100] The bill contained thirteen provisions, six of which were identical to those in the 1833 bill advocated by Webster. [101] It called for mandatory licensing and the appointment of inspectors of hulls and machinery by district court judges. Boilers were to be hydrostatically tested at three times their working pressure. The engine was to be kept running and safety valves kept open at stops, and each boat was to have lifeboats, a fire hose, and lights. Monetary penalties supporting these provisions were to be recovered in federal court with half going to the

[96] *See* HUNTER, *supra* note 2, at 281-2.

[98] BROWN, *supra* note 7, at 47.

[99] In the midterm elections a few months prior to Van Buren's address, his Democratic party lost several congressional seats in the West, the area of the country most affected by boiler explosions. A successful movement for regulatory legislation led by him and his party was hoped to be a significant step toward winning back western voters. *See* BROCKMANN, *supra* note 13, at 95.

[100] *See* CONG. GLOBE, 25^{th} Cong., 2^{nd} Sess. 8-9 (1837).

[101] Grundy needed Webster's support in order to get the legislation passed, and he even included him on the select committee that amended it. *See* BROCKMANN, *supra* note 13, at 96-7.

informer, and misconduct, negligence, or inattention by the crew resulting in death was grounds for guilt of manslaughter.

When the select committee reported the bill out for consideration by the full Senate, it had removed several provisions, most notably those for hydrostatic testing and keeping the engine running when stopped.[102] The first of these was arguably the most important provision that could have been passed, having been recommended by the Franklin Institute as the most effective means of ensuring boiler quality and strength. The latter was also crucial as it seemingly would have prevented a majority of the explosions that had occurred up to that time.[103] Yet the committee saw fit to delete them, in large part due to the concerted protestations of steamboat owners that hydrostatic testing at three times working pressure would ruin low-pressure boilers and weaken those of high-pressure, and that it would be extremely difficult and impractical to stop at landings with the engine kept running.[104] With regard to the latter amendment, a requirement that the safety valve be kept open at stops to prevent the buildup of steam in the boiler was submitted in its place.

Senate debate of the bill focused on the issues of racing and engineer skill and competence. Though Grundy believed that racing was included under "misconduct, negligence, or inattention" by the crew in the last section of the bill, Senator Oliver Smith (Indiana) proposed a stronger provision that addressed racing directly and punished it whether lives were lost or not, the object being to "punish the incipient offences before the final catastrophe occurred."[105] The amendment failed due to the anticipated difficulty of determining when boats were racing. As for engineers, Grundy said that the committee had considered a provision that would require them to be examined and licensed but decided that it would be too difficult to implement despite its desirability. Nevertheless, Senator John Niles (Connecticut) proposed an amendment requiring the employ-

[102] *See* Cong. Globe, 25^{th} Cong., 2^{nd} Sess. 124 (1838).

[103] Recall that 2/3 of boiler explosions occurred as boats departed from landings. *See supra* text accompanying note 26.

[104] *See* H.R. Exec. Doc. No. 284, 25 Cong., 2 Sess. (1838). Various ownership interests sent a form letter demanding amendments to both houses of Congress throughout their consideration of the bill. *See also* Brockmann, *supra* note 13, at 114.

[105] This description of the debate is drawn from Cong. Globe, 25^{th} Cong., 2^{nd} Sess. 124-5 (1838).

ment on every steamboat of at least one skillful and experienced engineer. It was passed despite Grundy's objection that so many such engineers could not be found. The amended bill was passed on January 24, 1838, and proceeded to the House of Representatives for its consideration in June.

Before the House could fully debate the bill, however, three of the deadliest explosions on record occurred. The *Oronoko* and *Moselle* exploded in the West within a week of each other in April, killing approximately 250 people.[106] These were followed two months later by the explosion of the *Pulaski* in the East, killing 100 people and causing a public outcry along the Atlantic seaboard for government intervention.[107] This disaster occurred during the week the House was debating the bill, leaving it little choice but to give it complete support. In fact, the House ultimately strengthened the legislation by adding a $5000 fine for steamboat owners for any deadly explosion occurring within fifteen minutes following a boat's departure from a landing, and by rejecting an amendment proposed to exempt purely intrastate steamboats from regulation.[108] The bill was then passed and returned to the Senate where Senator Thomas Clayton (Ohio) objected to the fine for owners, arguing that it would constitute an unfair penalty if an explosion occurred despite the owner's compliance with the other provisions.[109] Webster, citing the high incidence of criminal negligence resulting in explosions, proposed a compromise amendment that would make explosions *prima facie* evidence of negligence with the burden of proof on the defendant in civil suits.[110] The Senate approved the amendment and passed the bill on July 5 and the House agreed the next day.[111] On July 7, 1838, President Van Buren signed the bill into law,[112] and the first federal regulation of private industry was finally poised to take effect

[106] *See* HUNTER, *supra* note 2, at 284.
[107] *See id.* at 285.
[108] *See* H.R. JOUR., 25^{th} Cong., 2^{nd} Sess. 1134 (1838); CONG. GLOBE, 25^{th} Cong., 2^{nd} Sess. 455 (1838). Several senators argued that regulation of intrastate steamboats was beyond the federal government's constitutional purview and interfered with the rights of states. Others countered by citing current federal licensing power and regulation of coasting navigation, as well as *Gibbons v. Ogden*. *See* CONG. GLOBE, 25^{th} Cong., 2^{nd} Sess. 455 (1838). This was an erroneous assertion, however, for in spite of Marshall's advocacy of the exclusivity of the federal commerce power, he specifically carved out regulation of intrastate commerce as a power remaining with the states.
[109] *See* BROWN, *supra* note 7, at 51.
[110] *See id.*
[111] *See* S. JOUR., 25^{th} Cong., 2^{nd} Sess. 528 (1838); H.R. JOUR., 25^{th} Cong., 2^{nd} Sess. 1252 (1838).
[112] *See* Act of July 7, 1838, ch. 191, 5 Stat. 304.

and put an end to steamboat disasters.

The successful passage of the Act of 1838 following so many failures was the result of a combination of factors. As was the case in the years of the three previous attempts at legislation, explosions—and the public's demand that something be done to stop them—were on the rise in 1838 (Figure 1). It was well on its way to becoming the deadliest year on record by the time the bill came up for a final vote in Congress, and the timely explosion of the *Pulaski* certainly amplified the urgency of regulation. The political climate was also ripe for the passage of such constitutionally questionable and unprecedented legislation. Van Buren was suffering politically in the West and needed to regain favor there, while Webster was making a push for the upcoming Whig presidential nomination.[113] Moreover, states rights advocates were beginning to realize that state action in this area was doomed to failure and that only national regulation was capable of saving lives.[114] They were thus willing to accept the notion touted by Webster and Van Buren that this Act was nothing more than a derivative of the federal licensing power, despite the fact that it was indeed a commerce statute mandating the licensing and regulatory compliance of an entire class of ships.[115] The organization of the enforcement system as a loose combination of inspectors and the judiciary rather than a federal administration comforted them as well.

[REDACTED]

Figure 1. Casualties from boiler explosions (1816-1838) with corresponding legislative initiatives.[116]

[113] *See* Brockmann, *supra* note 13, at 96.
[114] *See* Brown, *supra* note 7, at 53.
[115] *See id.*
[116] Brockmann, *supra* note 13, at 52.

Concerns about undue interference with individual property rights were also allayed by this Act with its emphasis on liability for the owners and crew rather than regulation of the boilers themselves. This is epitomized by its two most notable amendments—the removal of the boiler testing provision and the addition of that making explosions *prima facie* evidence of negligence.[117] The view that technological progress would take care of itself and the legislature need worry only about negligent operators was still shared by many in Congress, especially since the import of the Franklin Institute's reports had yet to be realized. The legislation was thus less about prescribing "the mode, manner, or form of construction" of the boilers to which the Wickliffe committee had earlier objected and more about being a surrogate for the owners' self-interest which was not doing enough to ensure passenger safety. Unfortunately, the Act would fare little better.

VII

Not surprisingly, the very same characteristics of the Act that made it acceptable to champions of states and individual rights also made it impotent in terms of its ability to carry out its stated purpose of providing for "the better security of the lives of passengers" aboard steamboats. While the regulation showed immediate results as the numbers of explosions and resulting fatalities decreased from 1838 to 1839, such improvement was less than many expected and likely due to the weather and the economy rather than the Act itself.[118] The Panic of 1837 and a drought in 1839 resulted in a short-term decline in passengers traveling by steamboat as well as decreased competition within the industry.[119] Indeed, the long-term performance of the

[117] *See id.*
[118] *See id.* at 57.
[119] *See id.* Not only was the number of steamboats in operation reduced during this period, but the resulting decrease in competition meant less racing and other conditions that fostered the use of excessive steam pressure. *See id.*

Act proved it to be a dismal failure. In the ten-year period following its enactment, the number of explosions remained about the same, injuries and property loss increased, and only fatalities decreased as compared with the same period preceding it.[120]

The inspection system, in the words of one inspector appointed under the Act, was "a mockery."[121] Federal district judges were designated to appoint inspectors despite their lack of expertise in the industry and consequent inability to judge the qualifications of applicants.[122] Those who were appointed were responsible for inspecting both steamboat boilers and hulls even though these assignments called for markedly different qualifications.[123] Boiler inspections were mere formalities not only because they were done visually without hydrostatic testing, but also because, at six-month intervals, they did not occur frequently enough to detect potentially disastrous boiler weaknesses that could develop over the course of a single trip.[124] Moreover, the inspectors operated without any administrative structure to coordinate and supervise their work, leaving them free to apply their own individualized standards with only their oaths of office obliging them to perform their jobs faithfully.[125] Such honor was rare in the profession for two reasons. First, inspectorships were life-term offices, resulting in diminished accountability for the quality of job performance.[126] Second, inspectors were dependent on their five-dollar inspection fees rather than government salaries as their sole sources of income.[127] Consequently, only incompetent men were attracted to the position and they competed with one another to perform inspections, inducing them to certify boats that should otherwise have failed for fear of developing a reputation of strictness and being avoided by captains in the future.[128] Almost weekly, boats

[120] *See id.* at 58.
[121] S. Exec. Doc. No. 18, 30 Cong., 2 Sess., p. 78 (1848).
[122] *See id.* at 26.
[123] *See id.* Boat builders were believed to have the best qualifications for inspecting hulls while practical engineers were better suited for inspecting boilers.
[124] *See id.* at 28.
[125] *See* Hunter, *supra* note 2, at 534.
[126] *See* S. Exec. Doc. No. 18, 30 Cong., 2 Sess., p. 78 (1848).
[127] *See* Hunter, *supra* note 2, at 534.
[128] *See id.* There were several inspectors assigned to each port and captains often picked and chose among them and even

that had been recently inspected and certified by inspectors under the Act were condemned as unseaworthy by insurance company inspectors.[129]

As an additional means of enforcing the Act, the judicial system fared little better than its inspection counterpart. Seven provisions carried penalties for noncompliance (no license, lights, etc.) but they had to be sued for and recovered in federal court. Despite the prospect for inspectors of receiving half of the fine, this was a laborious process that required them to take time off of work and travel to the district court if it was located outside of their ports, providing them with an additional incentive not to inspect steamboats with a critical eye.[130] It is therefore not surprising that during the fourteen-year period that the Act was in effect there were only twenty-five prosecutions for noncompliance with its provisions.[131] Not only were convictions obtained in fewer than half of these cases, but those judges that exculpated the steamboat interests occasionally did so on constitutional grounds, again bringing into question whether regulation of such a nature was truly feasible.[132]

Noncompliance prosecutions seem almost plentiful when compared with the number of those pursued under the criminal and civil liability provisions of the Act. Though hundreds of people were killed and injured every year aboard steamboats, the first criminal prosecution did not go to trial until 1848,[133] with the first civil case following three years later.[134] Section thirteen of the Act placed the burden on the defendant steamboat operators of proving they were not negligent in civil actions for injuries resulting from explosions. The doctrine of an accident serving as *prima facie* evidence of negligence on the part of the operator had its origins in the common law governing stagecoaches, and Congress readily adopted it as it struggled to

among different ports. The tragic result was that some explosions occurred immediately following inspections.

[129] *See* S. Exec. Doc. No. 18, 30 Cong., 2 Sess., p. 70 (1848).

[130] *See* Brown, *supra* note 7, at 60.

[131] *See id.* at 61.

[132] *See id.* Brown cites five cases, including three decided by Supreme Court justices traveling on the circuit, that found that intrastate—and even interstate—ferries were not included under the Act because they were beyond the reach of the federal commerce power. *See id.*

[133] *United States v. Warner*, 28 F. Cas. 404 (C.C.D. Ohio 1848).

[134] *The Steamboat New World v. King*, 57 U.S. 469 (1851).

formulate standards of liability for steamboat explosions.[135] What Congress failed to recognize, however, given its continuing denial of the role of technological shortcomings in causing explosions, was the degree to which this standard was suited only for pre-industrial technologies. Stagecoaches, for instance, were fairly simple to operate and there was relatively little that could go wrong to cause an accident, making assignment of liability a straightforward matter. Steamboats, on the other hand, were incredibly complex and there were many problems with the technology that could cause explosions yet were beyond the control of engineers. Proving a negative was a nearly impossible task, however, and the result was that section thirteen was poised to overdeter steamboat operators by holding them civilly liable for disasters when in fact the cause lied with the machinery and not their conduct. Fortunately for them, they were rarely sued under this section for two reasons, both of which were also problems with the state regulations in this area. First, there was no provision for the relatives of those killed by explosions to sue under the Act, leaving only the injured (who were fewer in number) any right of action. Second, there may have been a general lack of public awareness of the provision. It is perhaps no coincidence that the plaintiff in *New World* was a former steamboat employee riding as a passenger on the ill-fated boat.

As difficult as it was for steamboat operators to defend themselves in civil suits (when they were actually brought), so too was the prosecution's task of securing manslaughter convictions under section twelve of the Act. The burden of proving negligence was on the government's shoulders under this provision, and it quickly discovered that the complexity of the technology made causation too uncertain for juries to condemn a man to hard labor. This, in addition to the facts that witnesses were hard to find and contributory negligence on the part of the passengers could be employed as a defense, convinced U.S. District Attorneys on many occasions not to bring cases.[136]

Such an embrace of the technological component of the problem by the judicial system in the face of Congress'

[135]This discussion is based on BROWN, *supra* note 7, at 55-6. This doctrine is better known as *res ipsa loquitur*, or "the thing speaks for itself."

[136]*See* Burke, *supra* note 15, at 18.

failure to address it in the regulation completed the trifecta with regard to the impotence of the Act. The provisions for inspection failed to prevent explosions, and the criminal and civil liability provisions failed to deter and punish those who contributed to them. As the 1840s came to a close with no end to the epidemic of steamboat disasters in sight, Congress was faced with the realization that technology was a legitimate problem and that liability alone was thus not an effective solution. Stronger preventative measures were needed that would go beyond superficial inspections and regulate the boilers and their construction. Whether such regulation was beyond its constitutional authority under the commerce clause, however, would remain to be seen.

VIII

A decade was, in fact, far longer than the public or Congress needed to realize that the Act of 1838 was doomed to be a failure. Memorials and petitions from individuals, scientists, citizens groups, and associations of engineers and owners began pouring into Congress immediately upon its enactment and continued through the 1840s. Most called for even stronger regulation of steamboats, demanding the inclusion of additional provisions and pointing out the weaknesses of those that existed.[137] Examination and licensing of engineers was still deemed the most effective way to prevent negligence despite Grundy's belief that it was impractical to implement, and in its absence the force of the Act's requirement that owners employ skillful engineers was questioned. Hydrostatic testing of boilers and specifications as to their materials and construction were believed capable of curing the technological ills, along with water and pressure gauges and "doctors."[138] It

[137]This discussion is drawn from numerous congressional documents of the period.

[138]The appropriately named "doctor" was a separate engine that powered the pump supplying water to the boiler, thus preventing the water level from dropping too low when the boat was stopped.

was suggested that inspectors be paid government salaries to attract better-qualified individuals and promote more faithful service, while heavy damages for the injured and relatives of the dead following explosions were championed as the most powerful incentive for owners to employ the best equipment and people on their steamboats. As could be expected, owners objected most vehemently to the presumption of negligence placed upon them in civil cases, prompting one group to take the extreme view that it would rather have steamboats banned altogether than be subjected to such a standard.[139]

Congress did not turn a deaf ear to the demands of the public but, just as it had previously, set out on a fourteen-year course of committee investigations and bill proposals that would end in 1852 with a comprehensive overhaul of the Act of 1838 and the establishment of the first federal regulatory agency, the Steamboat Inspection Service. In June of 1838, even before the regulation of that year had been signed into law, the House of Representatives resolved for a third time to have the Secretary of the Treasury, now Levi Woodbury, collect information on steam engines and the incidence and causes of accidents involving them.[140] Woodbury again sent circulars to customs collectors to be distributed to those involved in the steamboat industry and submitted his report to the House that December.[141] While the causes of boiler explosions were found to be the same as those reported by the Wickliffe committee in 1832, the remedies proposed were radically different. Woodbury departed from the *laissez faire* attitude and constitutional concerns that marked the reports of Crawford and Wickliffe and noted that, in addition to the inspection and liability provisions already in the Act, specific requirements regarding the construction of boilers and their accessories were necessary if all of the known causes of explosions were to be guarded against.[142] Such acknowledgement of the need to regulate steam technology directly, especially given the countervailing congressional view up to that time

[139] *See* S. Exec. Doc. No. 309, 26 Cong., 1 Sess., p. 2 (1840).
[140] *See* Cong. Globe, 25^{th} Cong., 2^{nd} Sess. 485 (1838).
[141] *See* H.R. Exec. Doc. No. 21, 25 Cong., 3 Sess. (1838).
[142] *See id.* at 6. Woodbury made reference to the Franklin Institute reports to back up his claim, but did not describe them in detail since they had been previously submitted to Congress and printed. In reality, another nine years would pass before Congress would take note of the reports. *See supra* note 95 and accompanying text.

and the naïve hope that the new regulation would be effective, set the tone for future legislative attempts and anticipated a definitive resolution by the Supreme Court of the extent of the constitutional power of Congress to regulate commerce.

One week after Woodbury submitted his report to the House and a mere three months after the regulation went into effect, the Senate called for an inquiry into the expediency of amending the Act.[143] The Commerce Committee, headed by Senator John Ruggles (Maine), responded in March of 1840 with a lengthy report containing a summary of a proposed bill intended to supersede the Act.[144] While the liability standards were the same as those of the Act, the bill called for a more rigorous inspection system and annual examination and licensing of engineers. Using the successful regulatory code of France as an indication of their effectiveness, several provisions from the failed bill of the Committee on Naval Affairs from 1833 were recycled, including those for hydrostatic testing of boilers, publicly-displayed water and pressure gauges, and two safety valves per boiler.[145] However, as had been the case previously, Congress was unsure whether it had the constitutional authority to enact this kind of regulation as it concerned both boiler manufacture and commerce.[146] As a precedent, the Act of 1838 was not determinative since it contained inspection, liability, and general safety provisions that only grazed the issue of individual property rights, and even then it had passed largely due to emphasis on its licensing aspects. A proposal such as this that would amend the weaknesses of the Act and tackle steam technology head-on posed more of a challenge than Congress was yet prepared to deal with given the then-defined extent of its powers, and the bill was tabled.

It was the House's turn again in 1843, and it succeeded in passing legislation that made some minor amendments relaxing the Act, chief among them a negation of the requirement that iron rods or chains be used in the steering mechanism instead of hemp ropes (which could burn in an accident).[147] The original draft of

[143] *See* Cong. Globe, 25^{th} Cong., 3^{rd} Sess. 51 (1838).
[144] *See* S. Rep. No. 241, 26 Cong., 1 Sess. (1840).
[145] *See id.* at 11-13.
[146] *See* Brown, *supra* note 7, at 72.
[147] *See* Act of March 3, 1843, ch. 94, 5 Stat. 626.

this Act contained provisions for the examination and licensing of engineers, but they were eliminated during debate.[148] One important provision did survive, however, calling for the Secretary of the Navy to appoint a board of examiners to make three determinations: the relative strengths of copper and iron boilers, whether hydrostatic testing was the best test of boiler strength that could be prescribed by law, and the proper limits on steam pressure that should be established by law to prevent explosions.[149] Though the Franklin Institute had already conducted these investigations, the authority of their reports had yet to be established. Regardless, Congress was taking a step in the right direction, finally acknowledging the technological aspect of the problem and doing what it could within the confines of the Constitution to put itself in a better position to deal with it.[150]

That same year, the Cincinnati Association of Steamboat Engineers was formed, becoming one of a growing number of such associations in the port cities of the West that had as their goals the promotion of professional engineering standards and the passage of new legislation that would protect their interests rather than subject them to the excessive liability for explosions called for in the Act of 1838.[151] To this end, the Cincinnati association submitted a petition to the House in 1844 with a list of its complaints and a summary of a proposed bill.[152] It disputed some of the findings of the Franklin Institute and pointed to the injustice of holding engineers liable for explosions the causes of which were so uncertain. While it admitted that there were many incompetent men practicing as engineers, it contended that those of skill in the profession were just as concerned about this "system of fraud and quackery" as the government and public were.[153] Thus it urged licensing for engineers, a result it likely believed would bring the profession respect and increased pay.[154] Captains were also blamed for buying their positions as well as overriding the discretion of engineers

[148] *See* HUNTER, *supra* note 2, at 535.
[149] *See* Act of March 3, 1843, ch. 94, 5 Stat. 626.
[150] *See* BROWN, *supra* note 7, at 74.
[151] *See id.* at 75.
[152] *See* H.R. EXEC. DOC. NO. 68, 28 Cong., 1 Sess. (1844).
[153] *Id.* at 7.
[154] *See* S. EXEC. DOC. NO. 18, 30 Cong., 2 Sess., p. 26-7 (1848).

in decisions regarding boiler operation. Representative John Tibbatts (Kentucky) proposed a bill at about the same time that championed the engineers' cause and adopted many of their suggestions.[155] In addition to the licensing of engineers, the bill called for hydrostatic testing of boilers, certain specifications regarding boiler construction, repeal of section thirteen of the Act of 1838 (regarding civil liability), and appropriation of $6500 for boiler experiments to be conducted by engineers chosen by the Cincinnati association. Not surprisingly, this self-serving piece of legislation died in committee.

Little progress was made in the following three years, and the steamboat crisis reached its nadir in 1847. The Act of 1838 had been in effect for nine years, yet steamboat explosions continued to claim lives at an alarming rate, especially in the West. Disputes as to the causes of explosions that had permeated and undermined the movement for regulation since it had begun in 1824 continued to play out in the halls of Congress and the public forum. Steam technology was still regarded as a beacon of social progress by many in Congress, and they blamed explosions on those using it rather than the machinery itself. This illusion was made easier to accept by the fact that regulating boilers outright would arguably have interfered with private property rights, something that these self-respecting champions of individual liberties were unwilling to do. Furthermore, the Supreme Court continued to cast doubt. Though the Act of 1838 did have the benefit of establishing a principle of public welfare regulation that the steamboat industry, Congress, and the public could begin to accept, the push for even stronger standards made advocates of states rights balk at the notion of giving the federal government such power to the exclusion of the states. This concern was compounded by the Court's decision that year in *The License Cases*,[156] in which it upheld several state laws requiring licenses for the sale of liquor, including that imported from other states. In his opinion, Chief Justice Taney wrote:

[155] A copy of this bill can be found in H.R. Exec. Doc. No. 25, 29 Cong., 1 Sess., p. 22-28 (1845).
[156] 46 U.S. 504 (1847).

> The controlling and supreme power over commerce with foreign nations and the several States is undoubtedly conferred upon Congress. Yet, in my judgment, the State may nevertheless, for the safety or convenience of trade, or for the protection of the health of its citizens, make regulations of commerce for its own ports and harbours, and for its own territory; and such regulations are valid unless they come in conflict with a law of Congress.[157]

Thus was destroyed the artificial distinction between the police powers of the states and the commerce power of Congress that Marshall had created in *Gibbons*,[158] leaving Congress to wonder where exactly the line was to be drawn. Barring overlapping federal regulation, did the states have the power to regulate interstate steamboats within their borders (as was held in *New York v. Miln*)? Did Congress have the power to regulate intrastate steamboats? Boilers? The more power the states could conceivably have over commerce, the less willing Congress was to take steps to usurp that power and upset the uneasy dual existence of the United States as a nation and a federation. These questions and all of the issues that had thus far crippled attempts to prevent steamboat explosions would be resolved in the ensuing five years, culminating in 1852 with the passage of another federal law and the end of a tragic era.

IX

By 1847, there were several states that had passed their own legislation regulating steamboats. Most had done so prior to the federal enactment in 1838 and without any clear understanding of their power to regulate commerce given the Supreme Court's conflicting opinions on the subject. However, with the passage of the Act of 1838 and the growing presumption that regulation of interstate commerce in this area was therefore beyond the constitutional authority of the states, their regulations remained largely unenforced. The commerce question was especially problematic for the states with regard to steamboats given the nature

[158] *See* FRANKFURTER, *supra* note 51, at 52-3.

of the industry. The majority of steamboats were interstate vessels, with few making trips that kept them in one state. Additionally, many rivers, especially in the West, formed the borders between states and thus posed jurisdictional issues. The Louisiana legislature, knowing that the location of its state at the mouth of the Mississippi River catered almost exclusively to steamboats on interstate voyages, attempted to circumvent the problem by providing in its statute that copies of it should be distributed to the governors of all other states and territories bordering the river so that they too could adopt it.[159] They never did, however, and a federal court declared the effective demise of the Louisiana law in 1847 in *Halderman v. Beckwith*.[160] In that case, the defendant steamboat operator claimed as a defense that he had been complying with the Louisiana law when his vessel collided with another. In rendering the Louisiana law void with regard to interstate trips and thus confirming what many had long suspected, Supreme Court Justice John McLean explained the crux of the problem:

> [H]ow is the steamboat conductor to ascertain when he passes out of one jurisdiction into another? The jurisdiction of each state extends to the middle of the river, and how is a pilot to know, in descending or ascending, to which shore he is the nearest? A stroke of the wheel takes him from one jurisdiction to another. Could any one imagine a system more impracticable than this? If any one were to devise a means for the destruction of commerce, nothing would better secure such an object than this system. Even the steamboat captains are better constitutional lawyers, I fear, than some of our jurists, as they say uniformly, on being asked the question, that they disregarded the Louisiana law, believing the state had no power to pass it. And, gentlemen of the jury, they have no such power.[161]

States still presumably had jurisdiction over intrastate steamboats, though even this was uncertain given their inclusion in the Act of 1838 and subsequent judicial decisions refuting Congress' authority to do so.[162] In any event, the issue of who—as between the states and the federal government—could and *should* regulate steamboats of whatever classification was ultimately settled in 1851 in two Supreme Court decisions, putting to rest Congress' constitutional quandary and paving the way for further federal regulation the following

[159] *See* 1834 La. Acts at 59.
[160] 11 F. Cas. 172 (C.C.D. Ohio 1847).
[162] *See supra* note 132.

year.

One of these cases was *Cooley v. Board of Wardens*,[163] which involved a challenge to a Pennsylvania law requiring ships entering or leaving the port of Philadelphia to receive a local pilot as a guide or pay a penalty of half the pilotage fee. Aaron Cooley owned a schooner and refused to do either, arguing that his federal coasting license exempted him from the fee.[164] Justice Benjamin Curtis wrote the majority opinion and, consistent with the Court's decisions in *Miln* and *The License Cases*, reaffirmed the states' concurrent power over commerce and upheld the law. However, Curtis did not stop there but also brought new life to the federal exclusivity doctrine advocated by Marshall:

> Now the power to regulate commerce embraces a vast field, containing not only many, but exceedingly various subjects, quite unlike in their nature; some imperatively demanding a single uniform rule, operating equally on the commerce of the United States in every port.... Whatever subjects of this power are in their nature national, or admit only of one uniform system, or plan or regulation, may justly be said to be of such a nature as to require exclusive legislation by Congress.[165]

This doctrine, sometimes referred to as "selective exclusiveness," was precisely the tacit call to action that Congress had been waiting for. Not only was a national (albeit ineffective) steamboat regulation already in place, but the interstate nature of the industry had proved more than capable of confounding regulatory attempts by the states. Additionally, the national scope of the epidemic of explosions and the urgent search for a solution begged a strong, decisive, and singular governmental response. Therefore, although Curtis did not elaborate on what subjects of commerce demanded a uniform rule, Congress was ready and willing to assume that the steamboat was such a subject.

The other case the Court decided that term was *Genesee Chief v. Fitzhugh*,[166] which centered around a collision between a schooner and a steamboat on Lake Ontario. In addressing the jurisdictional issues of the case, Chief Justice Taney upheld as constitutional an 1845 act of Congress that extended the admiralty

[163] 53 U.S. 299 (1851).
[164] *See* Brown, *supra* note 7, at 77.
[166] 53 U.S. 443 (1851).

jurisdiction of the federal courts beyond the traditional tide-waters to the lakes and navigable waters of the United States.[167] Though Taney made clear that such an extension would apply only to maritime tort and contract matters involving steamboats and other vessels engaged in interstate commerce,[168]

> the Court almost immediately disregarded Taney's limitation of admiralty to interstate cases. In [*New World*], the Supreme Court applied section thirteen [of the Act of 1838] to a vessel on an intrastate voyage. In this and later cases, admiralty jurisdiction was utilized to allow an intrastate reach for steamboat regulation. *Genessee* [sic] *Chief* also had more immediate implications. This national extension of a federal jurisdiction and form of proceeding over all navigable waters was analogous to *Cooley's* "single uniform rule." And since the federal judiciary was to exercise national jurisdiction over maritime torts after they had occurred, Congress may have been emboldened by this decision to apply national prospective measures to prevent such torts.[169]

By resolving any lingering constitutional uncertainty surrounding steamboat regulation, the Supreme Court in *Cooley* and *Genesee Chief* put the issue in its proper perspective for nationalists and states rights advocates alike, signaling to them that it was now strictly a matter of saving lives, not allocating power. This message was made all the clearer to the Thirty-second Congress as it opened a new session in 1852 by a series of explosions in the preceding years that were reminiscent of the *Moselle, Oronoko*, and *Pulaski* disasters of 1838. Explosions aboard the *Louisiana* (1849), *Anglo-Norman* (1850), and *Saluda* (1852) averaged over 100 fatalities each, serving as timely ignitions of a push for new legislation.[170] Additionally, Great Britain, to which Congress had previously looked for legislative guidance, had recently joined France in passing steamboat regulations.[171] Congress was also finally coming to terms with the fact that the problem stretched beyond elements within the control of engineers and was rooted in the steam technology itself. In his report to the Senate in 1848 regarding the prevention of boiler explosions, Commissioner of Patents Edmund Burke excerpted much of the Franklin Institute's *General Report*.[172] Many in Congress had never seen it when it

[167] *See* Act of February 26, 1845, ch. 20, 5 Stat. 726.
[168] *See Genesee Chief*, 53 U.S. at 451.
[170] *See* HUNTER, *supra* note 2, at 288.
[171] *See* Burke, *supra* note 15, at 19. Parliament passed acts in 1846 and 1851 that authorized semi-annual inspections, certificates of adequacy, and investigations of steamboat accidents. *See id.*
[172] *See* S. EXEC. DOC. NO. 18, 30 Cong., 2 Sess. (1848).

was first submitted in 1837, and only since then had it been accepted as definitive by the scientific community. As causation, urgency, and the lessons of the Act of 1838 all came into focus and converged in 1852, the law that would effectively regulate steamboats once and for all was just months away.

Senator John Davis (Massachusetts) was the driving force behind the new legislation in 1852. He had been working on bills to amend the Act of 1838 for over two years without success, but with the timing finally right he reported a new bill out of the Commerce Committee in February.[173] Public support of the legislation was immediate and widespread, with Congress receiving memorials and petitions urging its passage from interests including chambers of commerce, associations of engineers, and insurance companies looking to reduce their risk.[174] Only steamboat owners protested the bill, especially those in the East who felt they were being unfairly punished for the recklessness of western operators.[175] Support was equally prevalent within Congress, and debate of the bill commenced on the floor of the Senate in July. Objections centered around the belief that inspectors, as agents of the government, were corruptible and would wield too much power that was subject to abuse.[176] Senator Stephen Mallory (Florida) additionally relied upon the standard opposition argument that owners' self-interest was means enough to prevent disasters and thus advocated a system of strict liability for all losses due to boiler explosions.[177] In sharp response, Davis said, "He seems not to know that the law of discretion has been the law long enough, and that all these mischiefs have come up under it. If a simple liability were sufficient, why, does he not know that that has always existed... And has it proved enough?"[178] History and votes were on Davis' side, and the bill was passed the next day.

[173] *See* Brown, *supra* note 7, at 75-6, 81.
[174] *See id.* at 82-6.
[175] *See id.* at 86.
[176] *See* Cong. Globe, 32^{nd} Cong., 1^{st} Sess. 1742 (1852).
[177] *See id.*
[178] *Id.*

The full House of Representatives took up consideration of the bill in August after the Senate version emerged from the Commerce Committee with over 150 amendments. Opposition was fairly limited and, after Representative David Seymour (New York) put forward as his strongest argument for the bill the fact that over 700 people had been killed in steamboat accidents while it worked its way through Congress, it was passed by a vote of 147-27 on August 25.[179] In considering the House amendments in the following days, Senator Davis remarked that he felt they weakened the bill significantly and were a concession to eastern ownership interests.[180] Senator Robert Stockton (New Jersey) was nevertheless strongly opposed to the legislation, feeling it allowed the federal government to go too far in interfering with private enterprise and personal property rights.[181] In an attempt to further this argument and spread the blame for explosions beyond steamboat owners, he asked:

> If a man will go on board a steamboat that is not fit to carry him, because he can go for a quarter of a dollar less than by some other conveyance, are we to destroy, or in any way interfere with the proper rights of other citizens in order to serve him? It must not be forgotten that travelers themselves are not altogether free from just reproach and responsibility in this matter.... They have been the principal cause of the mischief by encouraging the construction of light cheap boats.[182]

Unfortunately for Stockton and other owners, few congressmen were concerned any longer with the sanctity of private enterprise and property given the uncontrolled loss of life aboard steamboats.[183] Senator Soloman Downs (Louisiana), countering the question of his colleague from New Jersey, considered the only question regarding the bill to be, "Whether [Congress] shall permit a legalized, unquestioned, unchecked, and peculiar class in the community, to go on committing murder at will, or whether [Congress] shall make such enactments as will compel them to pay some attention to the value of life?"[184] Furthermore, the "uniform rule" of *Cooley* had implicitly given Congress the authority to regulate all aspects of the steamboat indus-

[179] *See id.* at 2345.
[180] *See id.* at 2425.
[181] Interestingly, Stockton was not only a senator, but also a steamboat owner. *See* Brown, *supra* note 7, at 89.
[183] *See* Burke, *supra* note 15, at 21.
[184] Cong. Globe, 32^{nd} Cong., 1^{st} Sess. 2427 (1852).

try, and thus it could assume the regulation of boilers and their manufacture that was once included under Marshall's state police power.[185] Regardless, there was nothing more that could stand in the way of the federal government acting to protect the lives of its citizens, and the Senate overwhelmingly approved the House amendments. On August 30, 1852, President Millard Fillmore signed the bill into law, and so began the second great experiment in federal regulation of private industry.[186]

More accurately, the Act of 1852 was a continuation of the first experiment as it amended rather than replaced the Act of 1838. It applied to all passenger steamboats except ferries which, along with boats that carried only freight, were exempted from the Act.[187] The new provisions of the law were remarkable for their scope as well as their detail. Whereas the old law consisted of thirteen sections covering three pages, the new one had forty-four sections and spanned fourteen pages. With regard to boilers, the Act called for annual hydrostatic testing at one and one-half times their working pressure, which was not to exceed 110 psi in any circumstance. There were requirements for two safety valves—one of which was to be locked up and neither of which was to be overloaded—as well as water and pressure gauges, fusible plugs to release excess steam, and "doctors" to ensure that the water level in the boiler never dropped to less than four inches above the flue. Boiler plates were to be at least one-quarter of an inch thick, made of high-quality iron, and stamped by their manufacturers in a place visible to inspectors after they were worked into the boilers. There were various other safety provisions as well, including requirements for lifeboats, life preservers, water pumps with which to fight fires, and licenses to carry hazardous materials such as gunpowder and flammable liquids.

Equally important to these equipment requirements was the system of inspection put in place to enforce them. At the bottom of the hierarchy were the inspectors, of which there were two per major port. One was the Inspector of Hulls who was to have practical knowledge of shipbuilding, and the other was the Inspector

[185] *See supra* note 80 and accompanying text.

[186] *See* Act of August 30, 1852, ch. 106, 10 Stat. 61.

[187] Ferries had already been exempted from the Act of 1838 by some courts, and they had an exemplary safety record due to the short, slow nature of their trips. *See* BROWN, *supra* note 7, at 90-1. Freight boats continued to be regulated under the Act of 1838.

of Boilers who was to be experienced with steam engines and their operation. They were paid salaries by the government and, in addition to their annual inspections, they were authorized to board boats in their ports at any time to make sure the vessels were safe and in compliance with the law. These inspectors were appointed by a committee consisting of the customs collector, district court judge, and supervising inspector associated with the relevant port. The local inspectors, acting as a board, were responsible for examining and licensing engineers and pilots as well as hearing appeals of steamboat operators from citations issued for violations of the law. In this capacity the board was like a court, having the power to summon and examine witnesses and suspend and revoke licenses. There were nine supervising inspectors appointed by the President and each controlled a district that included several ports. In addition to overseeing the various boards of inspectors in their districts, they met annually to coordinate the entire inspectorate and establish rules and regulations governing its operation. Supervising inspectors had the further duty of continuously collecting information on steamboats and their machinery, the causes of accidents, and possible remedies. They submitted their findings to the Secretary of the Treasury who was then responsible for reporting to Congress and making recommendations for the improvement of the law.

As was the case under the Act of 1838, most of the requirements of the new law were backed by monetary penalties and occasionally prison sentences. While the manslaughter provision from the prior Act survived, the much-maligned civil liability provision was amended such that passengers could sue for personal injuries or damage to their property that resulted from any neglect to comply with the provisions of the law or known defects in the steam machinery or hull. This was little relief for steamboat owners, however, for though boiler explosions were no longer *prima facie* evidence of negligence, subsequent court decisions made clear that strict compliance with the law was not a sufficient defense to an allegation of negligence.[188] Steamboat operators were not alone, as inspectors too were subject to liability under the Act. Supervising inspectors were

[188] *See* Burke, *supra* note 15, at 21.

responsible for ensuring that their charges were faithful in executing their duties and reporting delinquents to the Secretary of the Treasury for investigation and possible removal. Additionally, bribery and issuance of false certificates of inspection were punishable by a $500 fine and imprisonment up to six months.

X

The new regulation went into effect on January 1, 1853, and had an immediate impact. The Steamboat Inspection Service, as the revamped inspection system came to be known, operated precisely as Congress had envisioned it:

> The inspectors... did not leave rivermen long in doubt as to their ability and determination to enforce the provisions of the law. Notices soon began to appear in the newspapers of the suspension and revocation of officers' licenses, of trials of the officers involved in accidents, and of the refusal to grant licenses to steamboats. Engineers found themselves with licenses revoked for sleeping on duty or suspended for neglecting in one way or another the careful performance of their duties. Rival pilots who had been wont to jockey for position in the river... had ample time to reconsider their ways while cooling their heels on the levee for ninety days or more.... The familiar formula of "nobody to blame" with which so many accidents had been glossed over in the old days quickly dropped out of use.... In most cases it was found that somebody *was* to blame, and... if their actions or negligence brought them within the criminal provisions of the acts their names were turned over to a United States attorney.[189]

Indeed, between 1860 and 1875, over 750 engineer and pilot licenses were revoked throughout the United States.[190] More important, however, was the drastic reduction in the number of fatalities resulting from boiler explosions and other types of accidents following the law's enactment. In 1853 there were only forty-

[190] *See id.* at 540.

five such fatalities, more than twenty times fewer than the 1,038 that had occurred in 1851.[191] Such an effect was less dramatic yet still significant over time, with 33% fewer deaths occurring in the first eight years under the new regulation than in the same period prior to its enactment.[192]

The Act of 1852 was not the perfect solution; no law addressing so complex a problem could be. Proving the point that laws are only as effective as the system enforcing them, the Civil War—the conditions of which fostered disregard for the regulation—was a particularly dismal period for steamboat accidents, and it was punctuated in April of 1865 by the explosion of the *Sultana* which killed over 1,500 Union Army prisoners as they returned home.[193] Excepting the war years, though, the Act was remarkably effective in reducing the carnage that had plagued the steamboat industry and the public for more than thirty years. Congress did not become complacent in the wake of its success, however, and, much as it had since Representative Vinton first rashly demanded that high-pressure boilers be banned in 1824, it continued to investigate accidents and propose bills and pass amendments to strengthen the regulation. In 1864, the law was extended to apply to ferries and tugboats,[194] and freight boats were similarly included two years later.[195] In 1871, a supervising inspector-general position was created to head the Steamboat Inspection Service and report to the Secretary of the Treasury.[196] All of these improvements helped to further the steady decrease in fatalities into the late 1880's, when the steamboat reached its twilight and gave way to the dominance of its land-bound relative—the railroad.

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[191] *See* BROWN, *supra* note 7, at 94.
[192] *See id.* at 94-5. Such statistical comparisons must be qualified by the fact that fatality figures for accidents prior to 1853 are largely based on newspaper accounts (as opposed to reports by inspectors) that tended to exaggerate the numbers by as much as 100%. *See* HUNTER, *supra* note 2, at 542.
[193] *See* HUNTER, *supra* note 2, at 543.
[194] *See* Act of June 8, 1864, ch. 113, 13 Stat. 120.
[195] *See* Act of July 25, 1866, ch. 234, 14 Stat. 227.
[196] *See* Act of February 28, 1871, ch. 100, 16 Stat. 440.

XI

Despite its relatively fleeting existence as the lifeblood of transportation and commerce in the United States, the steamboat transformed the nation geographically, economically, and politically, with regulation of it making an impact that continues to manifest itself today. In an 1870 case upholding the applicability of the Act of 1852 to intrastate steamboats,[197] the Supreme Court relied on *Genesee Chief* in reasoning that any steamboat that carried interstate goods required a federal license, and the "stream of commerce" doctrine was born.[198] More significantly, the acts of 1838 and 1852 set a precedent for the right and duty of the federal government to interfere with private enterprise and regulate it for the public welfare. Nowhere was this more apparent than in the Windom Committee report of 1874 that referred to them in supporting regulation of the railroad industry and ultimately led to the creation of the Interstate Commerce Commission.[199] As deadly as the steamboat was, its dangers turned out to be blessings as they forced Congress and an outraged and fearful public to change their conception of the role of government in private affairs. The result was that Congress came to terms with the realities of technological progress and worked through the various constitutional and other issues associated with government regulation, laying the foundation for the current network of administrative agencies that protect the welfare of Americans. And so it is that every time someone buys a candy bar or takes an aspirin or purchases stock or flies in an airplane, there is a federal regulatory agency behind the scenes ensuring the safety and welfare of that individual. In 1855, a report to the Secretary of the Treasury on the operation of the Steamboat Inspection System stated:

[197] The *Daniel Ball*, 77 U.S. 557 (1870).
[198] *See* Brown, *supra* note 7, at 98.
[199] *See* Burke, *supra* note 15, at 23.

> In most matters of buying and selling, and of negotiation between man and man, the interference of government must necessarily do harm; the watchfulness of self-interest is a much better guard against fraud and wrong, than any protection that can be afforded by the public authorities, in all cases where the purchasers are judges of the quality of commodities. But, whether the steamboats in which they take passage have or have not suitable equipments, and those in good order, is but what few are capable of judging of. So far as they are concerned, they trust their lives to blind chance.[200]

It is because of the efforts to prevent steamboat boiler explosions in the nineteenth century that individuals today no longer entrust their lives to chance, but to the federal government.