



BENJAMIN LATROBE'S DESIGNS FOR A LIGHTHOUSE AT THE MOUTH OF THE MISSISSIPPI RIVER

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In this article I have considered four lighthouse designs by Benjamin Latrobe in an effort to recreate his design process. This examination provides insights into his thinking about structure and form and their interrelationship during the final phase of his career in and around New Orleans. A lighthouse was eventually constructed, but it collapsed. I argue that Latrobe, inspired by the work of his former employer, John Smeaton, developed structural innovations which should have guaranteed the stability of his tower, but that ignorance and faulty workmanship on the part of others led to its destabilization. The form of the tower can be viewed superficially in the context of French Neoclassical models. However, Latrobe did not draw directly upon such models; instead he developed a unique conception through a distinctive series of logical design decisions. The result was intended to be not only an aid to navigation but also a great symbol of the wresting of the Louisiana Territory from the French and of the emerging status of New Orleans as the primary port of entry in the United States.

Between 1818 and 1821 the United States government had a lighthouse constructed at the mouth of the Mississippi River according to designs by Benjamin Latrobe.¹ In 1816

the original appropriation for this tower was \$54,000; the contract was let for \$79,000; and the final cost exceeded \$85,000.² This sum was extraordinary. In the 20 years following its construction, some 30 American lighthouses were erected at an average cost of less than \$10,000.³ The explanation for this seeming extravagance must be sought in the attitude of the government toward the purchase of the Louisiana Territory from the French and the perceived potential for development of this vast land. A notice appearing in the 11 March 1818 issue of the *Louisiana Courier* described the attitude then current: "We have the satisfaction of stating that a contract has been entered into for erecting at the mouth of the Mississippi, a light house on a scale and in a style, commensurate with the magnitude of the trade of that river." Congress, in harmony with this feeling prevalent in New Orleans, had appropriated funds to erect the monument that would announce the elimination of the French from the Mississippi Valley and the arrival of immigrants and goods at the vastly expanded American continent.⁴

The procedures that Benjamin Latrobe followed in designing this lighthouse provide insights into his thinking about structure and form and their interrelationship during the final phase of his career in and around New

Orleans.⁵ In this project Latrobe exhibited an extraordinary technical expertise and a dexterity for manipulating architectural form which was unique in America at the time; he demonstrated as well a resistance to American contracting procedures. The result was a brilliant but ill-fated design.

In 1803, President Thomas Jefferson acquired the vast Louisiana Territory. Congress soon enacted legislation to set up a government in the new lands. This legislation included "an Act to erect a light-house at the mouth of the Mississippi River" which was signed by Jefferson on 26 March 1804, and responsibility for carrying it out was placed in the hands of the Secretary of the Treasury, Albert Gallatin.⁶ Gallatin immediately directed officials at New Orleans to recommend a site, with special concern being given to visibility and to the "firmness of the ground."⁷

He inquired whether there were local builders who might be interested in the project.⁸

There was at least one: a cartographer, architect, engineer, land speculator, New Orleans alderman, and sometime pirate, Barthelemy Lafon.⁹ In January of 1805, Lafon forwarded to Washington a lighthouse design based upon typical Louisiana building practices—a square wooden tower with an interlocking, truncated,

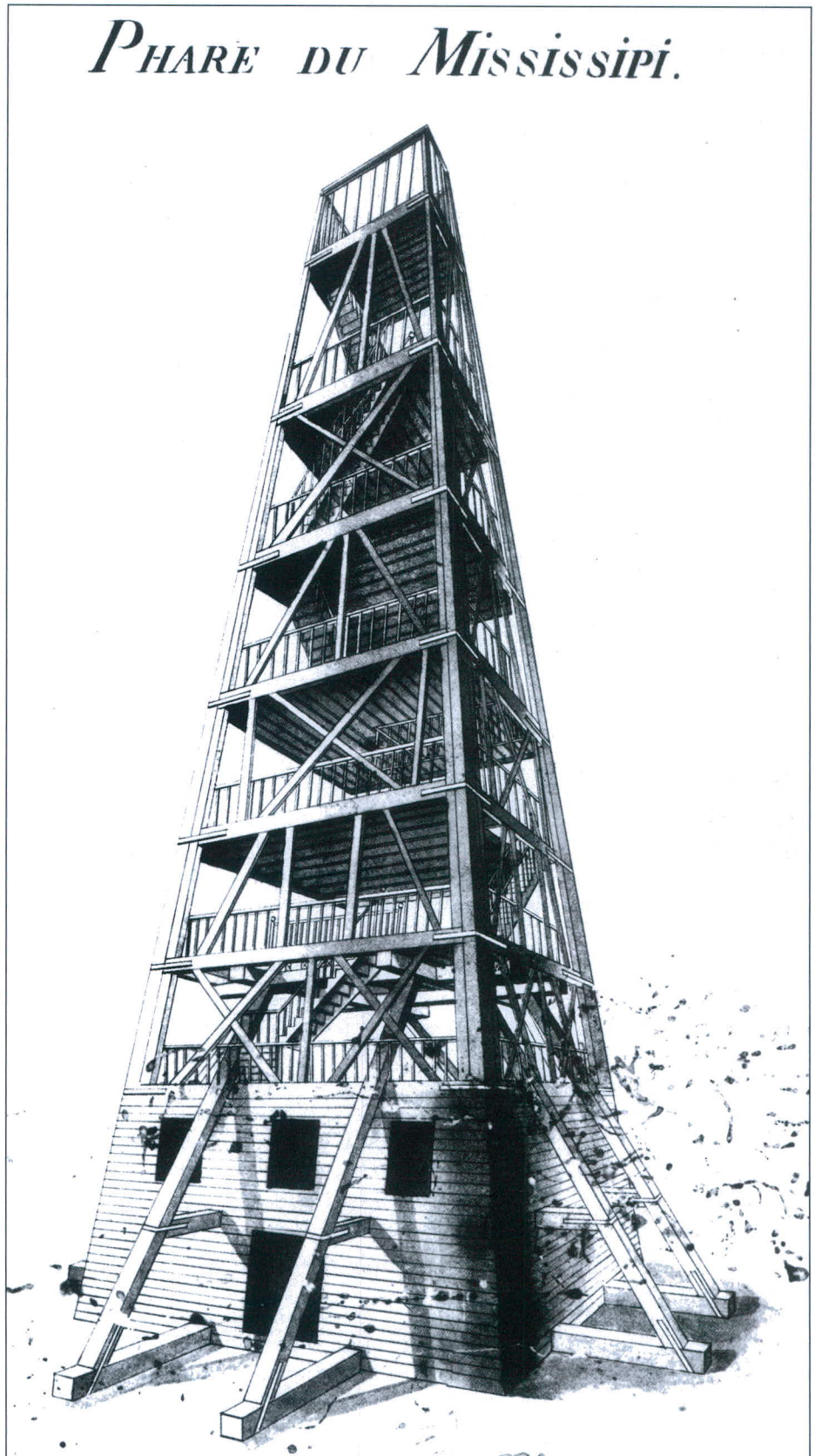
equilateral pyramid of timbers at its base which was intended to counteract the effects of gale-force winds.¹⁰ He apparently dismissed the possibility of constructing a masonry tower because of its great weight and recommended instead the use of local cypress for its strength and resistance to decay.¹¹

Gallatin was not convinced by Lafon's scheme. In March of 1805, the secretary sent the drawings to Benjamin Latrobe, then living in Iron Hill, Pennsylvania.¹² Upon examining Lafon's design, Latrobe found it to have little merit.¹³ He wrote to the secretary that a proper model for such a tower would be the stone lighthouses at Spurn Point and Eddystone, both designed by his former employer, the noted English engineer, John Smeaton;¹⁴ and he mentioned his own visit to Spurn Point as a student when he was sailing to Germany to continue his education.¹⁵

Albert Gallatin then chose Benjamin Latrobe as the architect for the project. Latrobe began work on a series of four lighthouse designs spanning the period from 1805 to 1817.

Latrobe's thinking began along the lines of the traditional, utilitarian towers then in existence on the New England and mid-Atlantic coasts. The earliest depiction of a lighthouse in any of his papers is a sketch of an octagonal stone tower in *An Essay on Landscape Explained in Tinted Drawings* by Benjamin Henry Latrobe Boneval, Engineer.¹⁶ This tower is similar to the lighthouse at Sandy Hook, New Jersey, which he mentioned in his early correspondence with Gallatin.¹⁷ Not surprisingly then, his first proposal for the Mississippi River lighthouse in July of 1805 called for a very plain, truncated cone, 80 feet high, which he described as a "single column including a spiral staircase."¹⁸ He intended this tower to rest on wooden friction piles supporting an inverted dome, a device that he had previously employed in the foundation construction at the Bank of Pennsylvania.¹⁹ The friction piles were to transfer the tower's weight to lower strata by frictional resistance along all of the wooden surfaces in contact with the soil. The inverted dome of the lighthouse, Latrobe said, would "spread the weight over the whole surface covered equally."²⁰

In other matters of structure Latrobe looked to Smeaton. Smeaton's problem at Eddystone had been the lateral forces applied by wave action. His tower was famous for its system of stone cubes, oak pins, and wedges employed

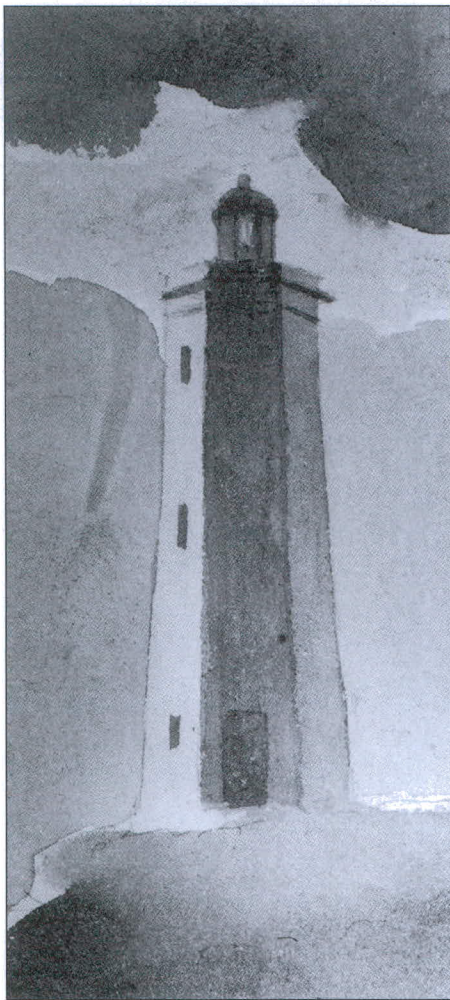


Barthelemy Lafon's tower design of 1805. Courtesy of the National Archives.

to connect the dressed stone tower to the live rock,²¹ and for its interlocking stone joinery which Smeaton called "dove-tailing."²²

Internally, Eddystone had a solid, masonry

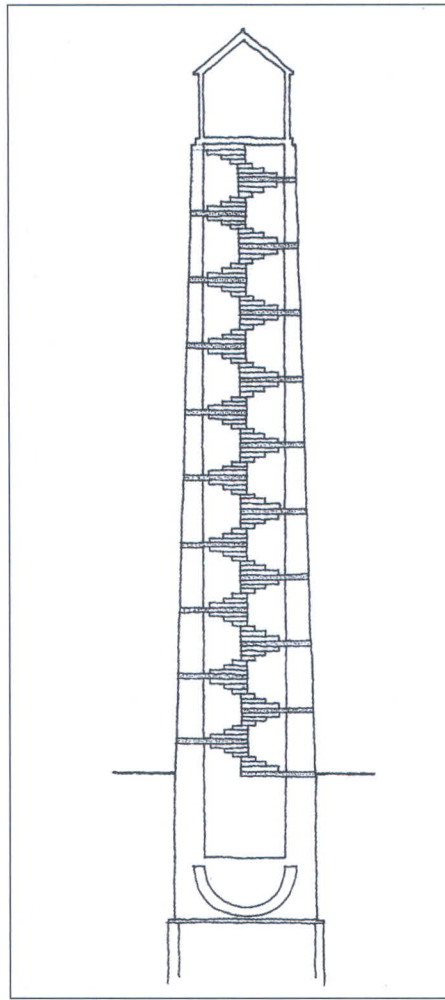
base supporting conventionally vaulted chambers, a spiral stairway structurally separated from the wall, and above the stairway simple wooden ladders. Latrobe was not building on



Latrobe's sketch of an octagonal stone tower from *An Essay on Landscape*. Courtesy of the Virginia State Library, Richmond.

live rock but on alluvial soil; his problem was weight. As he gradually developed his design, he reinterpreted Smeaton's achievement at Eddystone. His first structural innovation was to bond the courses of stone at intervals by means of the individual units of the spiral staircase, extended "thro' the wall from inside to outside."²³ Using this technique he could reduce the mass of the tower significantly, as the masonry cross-section at any level would act monolithically, and he could integrate internal spaces and structure into a single system.

By August of 1805 Latrobe was able to provide a preliminary cost estimate of \$20,000 for his building.²⁴ And he conveyed to Gallatin a more developed scheme, which he compared to the tower at Sandy Hook. For support he proposed that 104 individual piles be placed in concentric rings, with the outer ring driven side by side in order to act as a coffer dam should water ever inundate the site during storms; the source for this feature, Latrobe said, was Smeaton's Spurn Point. Latrobe calculated that his



Section reconstruction of Latrobe's first proposal, July 1805. Courtesy of the author.

foundation system had to support some two million pounds, and he said, "All our other light houses must weigh more."²⁵ In addition, Latrobe spoke for the first time of his plans for a keeper's house which was to be a free-standing structure, possibly with a basement. This house was to have one room 15 ft. x 12 ft. and another chamber 8 ft. x 12 ft. to be constructed of wood, or better yet stone, and possibly placed on the leeward side of the tower and connected with it for protection from gales.²⁶

No drawings of this project remain, or at least none by Benjamin Latrobe's hand. However, a partial plan, elevation, and section drawn by Benjamin's son Henry and sent to Washington, D.C. on 12 November 1816 are very similar to the description in form and detail. If we can accept the suggestion that this project reflects the elder Latrobe's thinking in 1805, one aspect of the scheme assumes particular significance. The keeper's house is depicted in elevation as a base for the

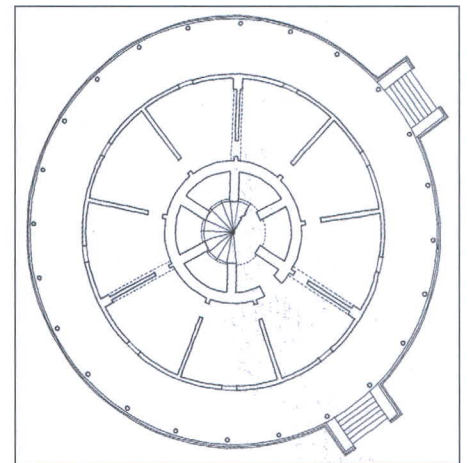
tower. This visual unification of the functional parts became extremely important in Latrobe's subsequent thinking on matters of lighthouse form.

Latrobe's design process was soon slowed by Congress which, joining Albert Gallatin in his concern about the alluvial soil, authorized a survey to determine a suitable site. Louis De Mun, a sometime employee in Latrobe's office, was chosen for the mission.²⁷ He explored three locations: Royal Island on the west side of the Southeast Pass of the Mississippi River was chosen; Frank's Island at the Northeast Pass was also deemed suitable; he found Wallis Island, near Frank's Island, to have salt springs below the surface.²⁸ De Mun made this determination by the visual inspection of core samples, but he was not able to subject them to laboratory analysis. Upon receiving De Mun's report, Latrobe wrote to Gallatin, "I like the ground of the island well.

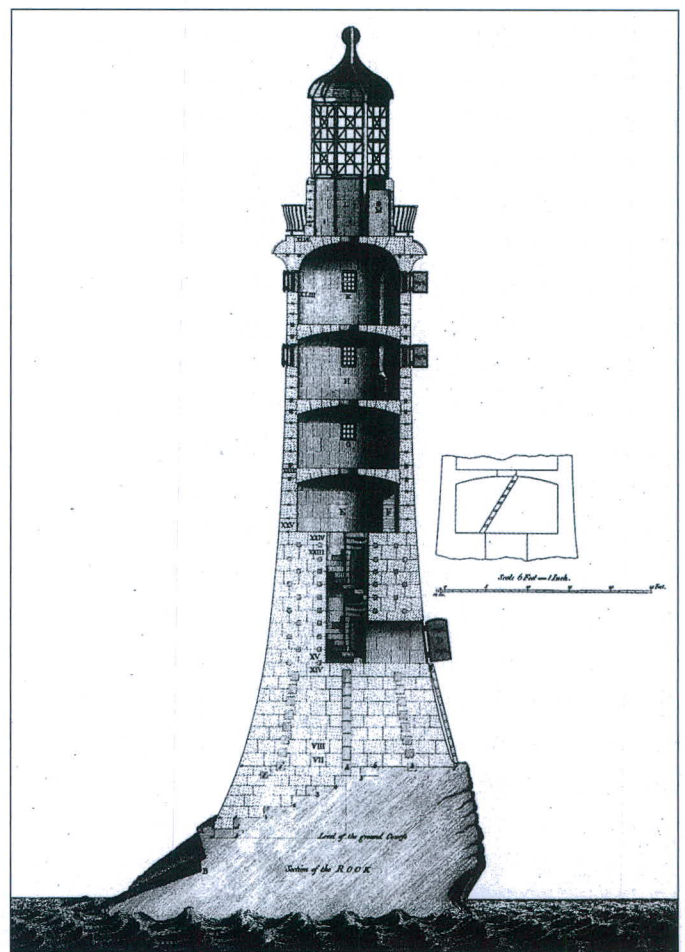
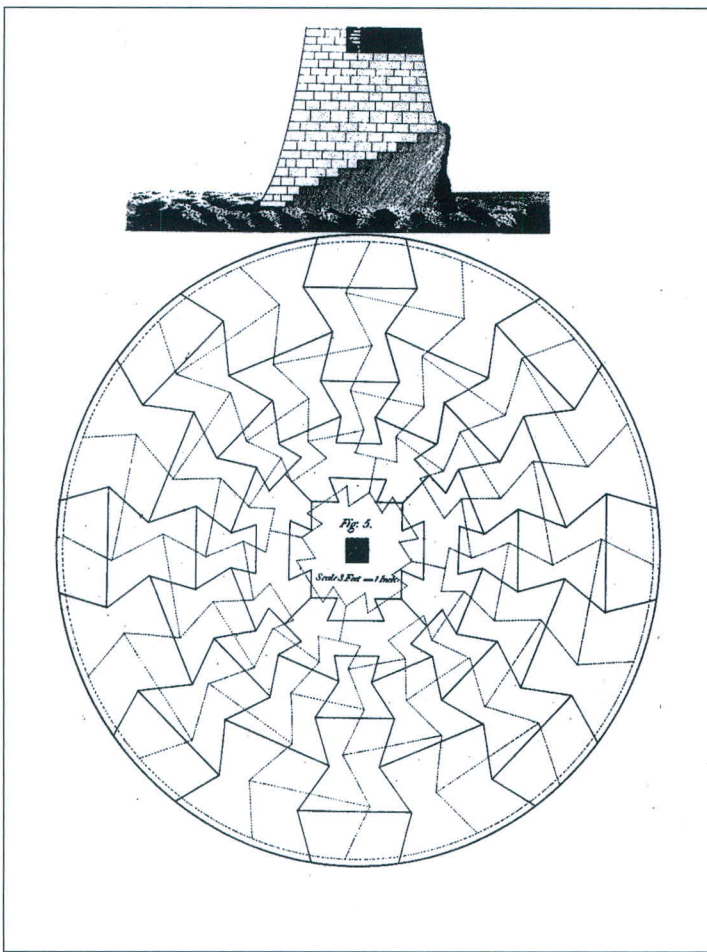
It will bear anything that can be put upon it. The alluvium of which it consists, blue clay, is the alluvium also of all our Atlantic Rivers, and like the clay on the Mississippi, the deeper you dig the harder it becomes. The foundation of a stone building may be laid deep, and yet put up on piles, for the clay is perfectly watertight."²⁹

In the meantime, Latrobe had dramatically changed his thinking about the image of a new lighthouse for the mouth of the Mississippi River. He abandoned the simple, typically American tower model in favor of a much more architecturally sophisticated scheme with an entirely different lineage. No drawings for this third project are known; however, a detailed proposal calling for bids was published in newspapers in May of 1807.³⁰

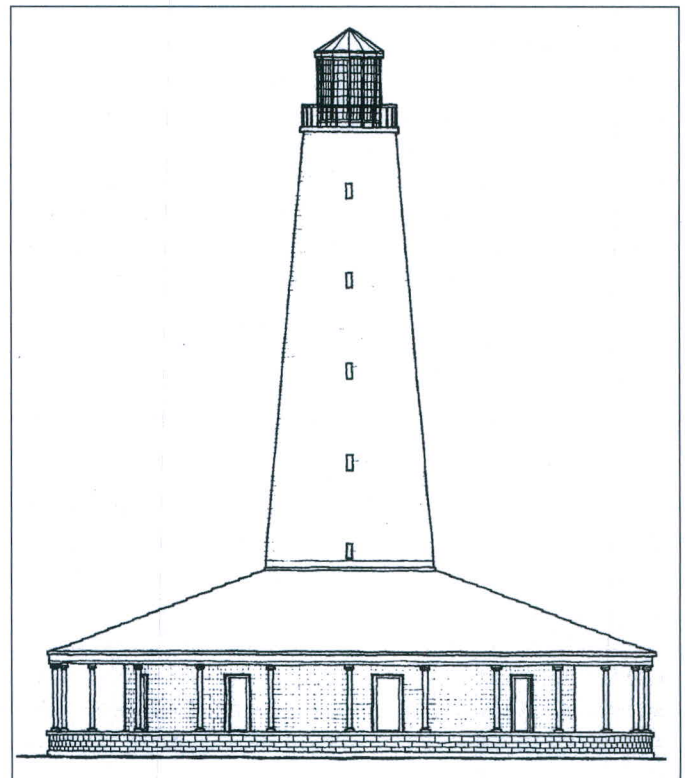
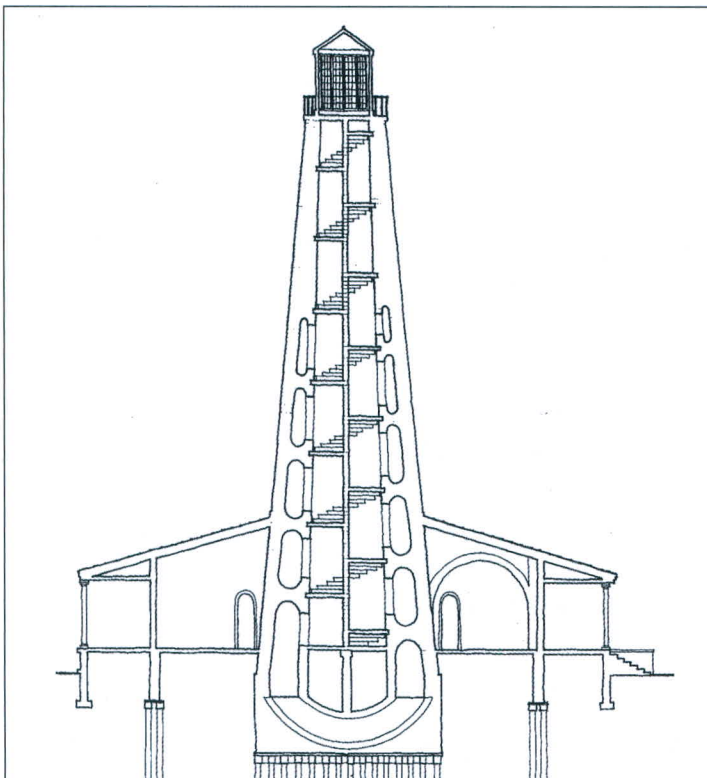
This tower design, shown here in recon-

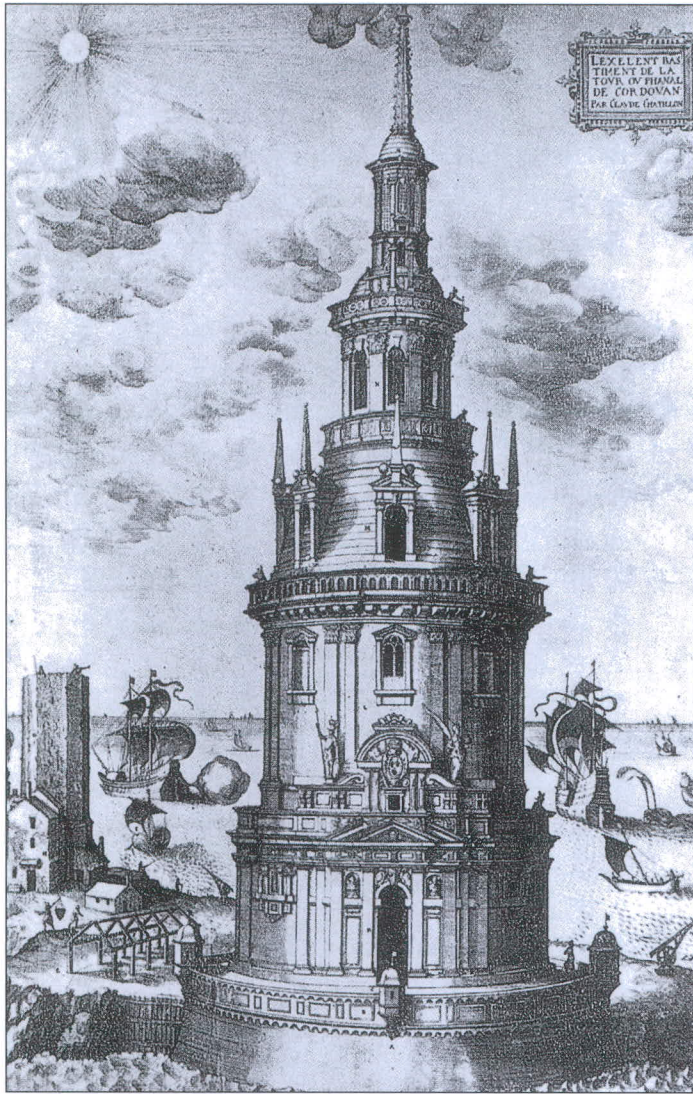


Reconstruction plan of Latrobe's Lighthouse project, May 1807. Courtesy of the author.

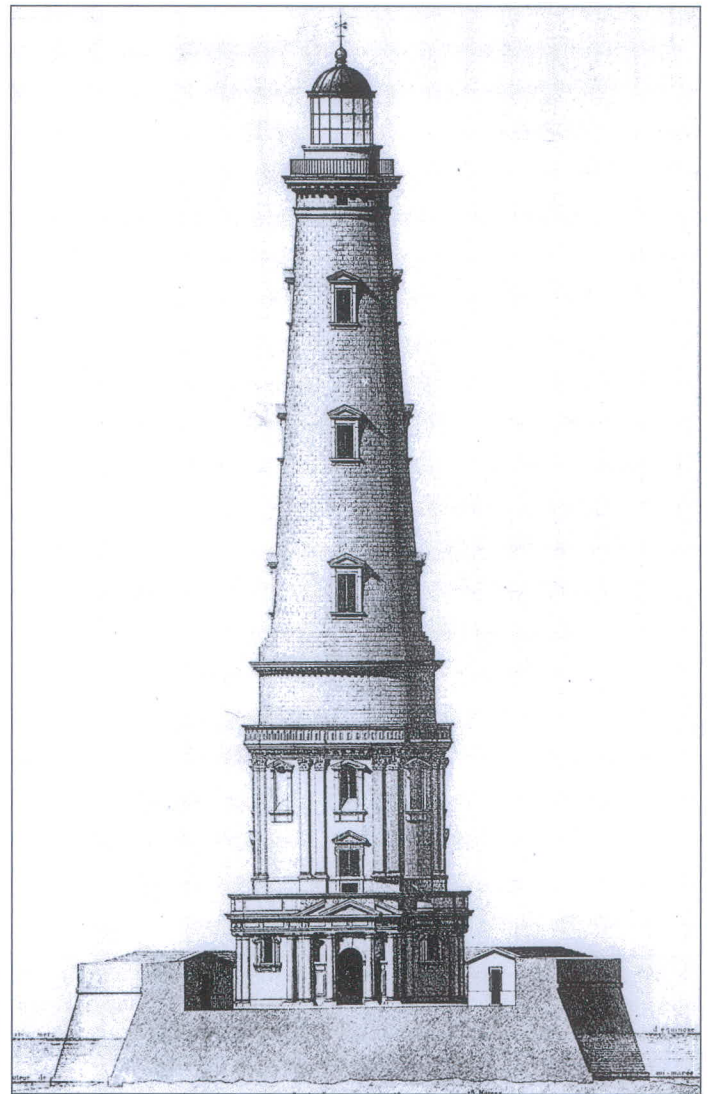


Above: Left – Plan at base of Eddystone Lighthouse tower showing interlocking stone joinery. Right – Section drawing of the tower. Both drawings from John Smeaton's *A Narrative on Building*, courtesy of History of Science Collection, Cornell University Libraries.
Below: Left – Reconstruction section of Latrobe's Lighthouse project, May 1807. Right – Reconstruction elevation of Latrobe's Lighthouse project, May 1807. Both drawings courtesy of the author.





Chatillon's drawing of the Cordouan Lighthouse project, c. 1612. From Stevenson's *The World's Lighthouses Before 1820*.



The Cordouan Lighthouse in the 18th century. From M. Léonce Reynaud's *Memoir Upon the Illumination and Beaconage of the Coasts of France*.

struction drawings based upon the newspaper description, was still a truncated cone, now resting on two inverted semidomes, one supporting the wall surrounding the stair and the other supporting the outer walls of the cone, all of this construction resting on friction piles.

There were two logical but highly innovative developments in this third scheme. First, the mass of the tower had now been more dramatically carved away by means of radial arches and concentric, spiraling vaults, both of which were bonded to the stair construction and were braced by radial walls which provided lateral stability. Such an intricate, cellular, compressive system had no precedent in American or European lighthouse design. The second profound modification was the addition of a concentric, vaulted keeper's house divided into 12 equal sections by radial partition walls and by what Latrobe called "carriage arches" which he used to combine the volumes of adjacent segments. This keep-

er's house was enclosed, in turn, by a concentric piazza supported by cast iron columns; both areas were covered by a sloping roof.³¹ Latrobe based his structural innovations on Smeaton's themes but, designing for a radically different context, he transcended the work of his onetime employer. And the form of Latrobe's tower was as original as its structural system.

Besides Smeaton's towers, the only lighthouse design that Latrobe ever praised in any of his writings was the Cordouan tower, located at the mouth of the Gironde River, which he singled out for its "magnificence and size."³² But would he have drawn upon a French model to celebrate the wresting of the Louisiana Territory from France? Furthermore, was Latrobe aware that the purpose of the Cordouan lighthouse was similar to that of his project, a French tower built as a symbol of the maritime power and prestige of the French nation? The Cordouan lighthouse had been constructed in 1584 by Louis de Foix and sub-

sequently modified substantially by the engineer Teulere. While the design, as depicted by Claude Chatillon in c. 1612, might have been too highly articulated for Latrobe's taste, the tower's form in the 18th century had been distilled to a simple, battered base, an initial (and original) tower stage with classically inspired ornamentation, and a relatively plain, truncated cone above.³³

In 1740, in the midst of a controversy over new lighthouse construction, the French Admiralty declared Cordouan to be an architectural standard. Lighthouses, they contended, had to "serve posterity" and therefore "should reflect the genius of the period and accord better with the dignity of the monarch who authorized their erection, thus continuing the national propensity to decoration that had been demonstrated at Cordouan."³⁴ This attitude heavily influenced the French architectural community. An example was the work of Pierre Paneron who designed several lighthouses for the Seine estuary.³⁵ And

not only can Latrobe's schemes be interpreted in the context of Cordouan, but they can also be compared to the work of his contemporary in France, Claude-Nicolas Ledoux, and slightly later to such designers as C.-P.-J. Normand and C.-J. Toussant.³⁶

While none of Latrobe's writings indicates an awareness of any of this work or even of Cordouan's legacy, this omission, rather than suggesting that he was uninformed about European precedents, reveals the unique vision of his design. It had not appeared full blown, as though coldly drawn from existing models. It had evolved in Latrobe's mind and on paper as a dialogue between structure and form, the respective interests of Smeaton and the French Neoclassicists. Latrobe's first scheme was an isolated shaft whose plain exterior concealed the beginnings of structural innovation. Next came the visual merging of the tower and the keeper's house. And, finally, the tower and keeper's house were completely interrelated, both structurally and formally. The result was unique and unified. Latrobe had drawn upon his experience with Smeatonesque structure and the spirit of 18th century French models. But his design transcended both European practice and theory.

Unfortunately, Latrobe's remarkable tower was not constructed. The architect was determined to avoid awarding a contract to other than a hand-picked contractor, and his contrivances toward this end worked only too well. No one applied to build the entire structure although many persons offered to fabricate parts.³⁷ Furthermore, events surrounding the War of 1812 caused work on the project to cease, and a significant change subsequently occurred in the administration of the lighthouse establishment which had a profound effect on the course of events. In 1813, responsibility for aids to navigation was given to the Commissioner of Revenue; then in 1820 the Treasury Department assumed these duties again, this time through the office of the Fifth Auditor. As a result, Stephen Pleasanton, a narrow-minded civil servant, assumed control of all lighthouse construction and management. An accountant, Pleasanton was not well informed about nautical matters which caused him to rely heavily on his field representatives, especially a Massachusetts sea captain by the name of Winslow Lewis. Eventually controversy would sweep Pleasanton from power as a result of extensive investigations of his administration, but not before he and Lewis had determined the final form of the lighthouse at the mouth of the Mississippi River.³⁸

By May of 1813, the project had been reactivated as a joint venture between Benjamin Latrobe and his son Henry, who was living in New Orleans in order to work on that city's water system.³⁹ Barthelemy Lafon was still in the picture; undoubtedly remembering his rejected lighthouse design, he had discredited the soil-test findings of De Mun, by then an outdated, five-year-old report. Albert Gallatin, in the final months of his responsibility for aids to navigation, directed once again that the ground be examined. Consequently, three commissioners were chosen to select a new site for the lighthouse at the mouth of the Mississippi River: Henry Latrobe, Commodore Daniel Patterson, and Pierre Le Barbier Duplessis, Collector of the Customs at New Orleans.⁴⁰ This group chose Frank's Island at the Northeast Pass.⁴¹

Although both Latrobes were now involved in the lighthouse project, the exact contributions of each cannot be absolutely determined. No interim drawings remain, and no related correspondence exists for the period between late 1812 and mid-1816, although during this time there must have been considerable give and take between father and son. In June of 1817, Henry Latrobe's drawings of a new and final scheme reached his father who responded, "Your drawings came and were submitted to me. They do you infinite credit. . . . Smeaton himself could have designed nothing of better construction and could not have designed a thing of such good taste."⁴²

Could Henry have produced this design working on his own? He had received his architectural training in his father's office. Then he worked in the field, first as a superintendent along a portion of the National Road and later in New Orleans where he was sent by his father in 1810.⁴³ He was apparently a capable organizer, contractor, and inspector of the works, but the extent of his talent as a designer remains uncertain. Samuel Wilson, Jr., has made the only investigation of Henry Latrobe's career, suggesting that, "in the few years of his residence in New Orleans he . . . achieved successes which promised to give him a position to rival or even exceed that of his father."⁴⁴ However, the remnants of Henry's work found in New Orleans and its environs, while tantalizing, simply do not provide conclusive evidence.⁴⁵

Regardless of the authorship, the fourth lighthouse design was certainly a logical descendant of the three schemes which preceded it.⁴⁶ The conception was still that of a shaft rising from a con-

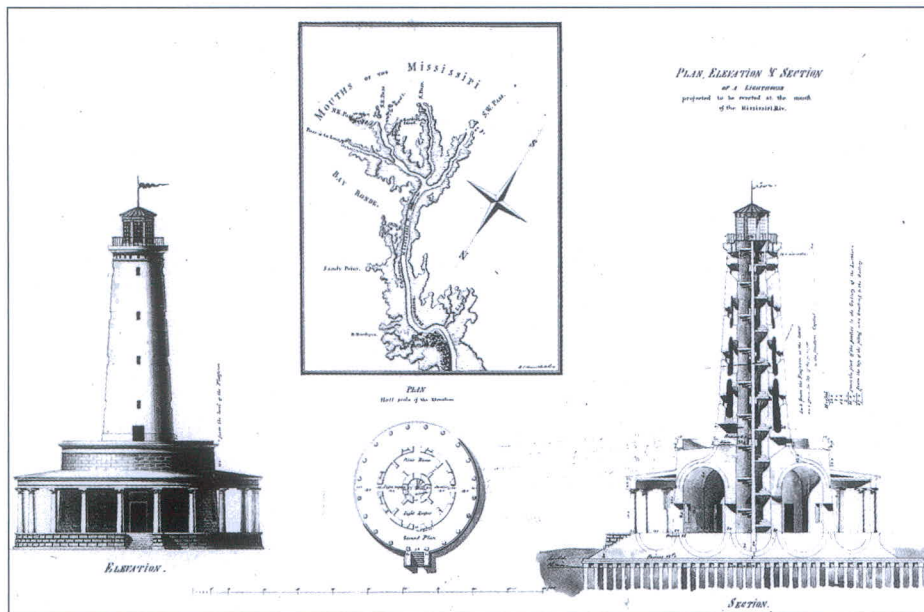
centric base. However, its exterior form had been completely unified and structural devices had been developed even further. Atop the piles now, instead of two inverted hemispheres, one inside the other, there was to be a central inverted hemisphere carrying the stair tower, surrounded by two inverted, concentric barrel vaults, one supporting the central tower as well as the outer walls of the keeper's dwelling and the piazza columns, and the other carrying the remaining weight of the piazza!⁴⁷ The tower was now to be constructed of a double shell of masonry supported not only by the stair wall, but also by reverse quadrant arches at the top of the keeper's dwelling which carried part of the weight above to the outside walls of the concentric dwelling house. The centralized weight of the tower was to be distributed over the full diameter of the keeper's house, thereby reducing the load on the central piles. John Smeaton's technique of interlocking wood and stone units had gradually been developed by the Latrobes into an integrated system of interlocking arches, vaults, and cellular walls which would assure the stability of the shaft of the tower on the alluvial soil of Frank's Island.

The exterior effect of the design was now that of a single, articulate Neoclassical structure. From a rusticated base, Doric columns around the piazza rose to support an entablature and sloping roof. Inside this armature stood the slightly battered masonry walls of the keeper's house, forming a plinth for the shaft of the lighthouse. This shaft had now fulfilled Benjamin Latrobe's earliest description of its form; like the Roman *columna cochlis*, it was a giant, hollowed-out column.

In June of 1817 the Latrobes' project was advertised for bids.⁴⁸ Then, suddenly, just as construction was finally to commence after 12 years of effort, Henry Latrobe died in New Orleans of yellow fever, devastating his father and leaving no one to supervise construction of the city's waterworks or the lighthouse.⁴⁹

By July of 1818 Winslow Lewis, living in Boston, had been awarded the lighthouse contract and had sent his agent, Benjamin Beal, to the site. Along with Beal went Capt. Edward Gardner, an inspector of the customs stationed at the Balize who, upon driving a test pile, declared that he had "no doubt that a permanent building may be erected with perfect safety."⁵⁰ Beal returned to Boston to confer with Lewis who, like Albert Gallatin before him, had reservations about placing a massive, masonry structure on the island. Furthermore, he was skeptical about professional architects, preferring to work instead with tradesmen.⁵¹

Construction had begun by 1819, but it did not go smoothly. Lewis apparently had never before



The Latrobes' lighthouse design, June 1817. Courtesy of the National Archives.



Frank's Island Lighthouse by Winslow Lewis in 1989. Courtesy of the National Archives.

undertaken lighthouse construction. Moreover, he remained in Boston. Beal almost immediately began requesting changes in both the materials and the construction methods specified by the Latrobes.⁵² At the same time, the architect was on his way by ship to New Orleans, his primary objective being the completion of the city waterworks.⁵³ When Benjamin Latrobe arrived in Louisiana, he became aware of more problems on Frank's Island. Erosion was eating away the ground, and an on-site supervisor with appropriate qualifications, and whom Winslow Lewis later claimed he had required for undertaking the project, had not yet been found.⁵⁴

Finally, in April of 1819, Latrobe made what may have been his only inspection visit to Frank's Island.⁵⁵ The result of this visit was a formal report, dated 7 May 1819, on the extent of the work, and a sketch showing the wharf, temporary buildings, the circle of the lighthouse foundation walls, and what appears to be the inverted cupola. As for the work itself, he wrote: "On the inspection of the work performed by the contractor I find that it is faithfully executed, & of good materials. In one instance there has been a disappointment, as to their procuring the hard materials which abound to the westward, & was supposed to exist here also, namely oyster shells, & the reversed arches must be filled up with other hard materials. The bricks and stone provided by the contractor & now on the spot, are solid & agreeable to the terms of the contract. In such parts of the work itself as required further explanation and correction, I have given it, & the construction is going on agreeably thereto."⁵⁶ Latrobe apparently did not make any attempt to determine whether the piles had been installed cor-

rectly, and his comment about the lack of appropriate backfill materials proved to be prophetic. In July of 1819 a hurricane ravaged the site. And by September the tower, now almost completed, had begun to settle vertically.⁵⁷ Latrobe mentioned no inspector on the site during his visit in April; however, such a person was present by September, a certain Edward Hearsey. The first reference to him by Latrobe is found in annotations to a report which Hearsey submitted. A portion of Hearsey's comments read as follows.

"Mr. Edward Hearsey superintendent at the lighthouse reports that the tower of the lighthouse has settled perpendicularly, without crack or deviation from a perpendicular line – 16 inches about below the level of the outer wall on which the columns are to be placed –

That the circular wall bounding the rooms has also settled perpendicularly without crack or deviation from its original batter or inclination, about 10 inches.

That there does not appear to have been any settlement in the wall of the columns, but rather, if anything a rise."⁵⁸

Latrobe noted that "The report was received, & strictly inquired into immediately on Mr. Hearsey's return from the lighthouse. It has since been confirmed by other evidence, as also that the lighthouse has not since settled, & that the settlement does not exceed the measure of the rise of the center piles, by forcing down those of the exterior circle." But he never made comments about any of the structural problems based upon a personal site visit.

Lighthouse officials called in outside experts to inspect the damage, beginning with Maj.

Joseph Jenkins who was constructing the New Orleans Customs House.⁵⁹ Stephen Pleasanton, in his first months of responsibility for aids to navigation, reported the bad news to Congress in March of 1820, saying that a detailed survey of the circumstances was to be made as soon as possible.⁶⁰ By early April the contractor of record, now a man named Duncan Thaxter, had abandoned the island, and Beverley Chew, the Collector of the Customs in New Orleans, had called in two New Orleans architects, Nicholas Sinnott and Tobias Bickle, to investigate the situation and to make suggestions for securing the work.⁶¹ Another inspector, a Mr. Wilson (or Williams) reported that he did not believe that the tower would fall.⁶² Wilson remained on the site and once again expressed optimism; he said that the tower would "stand for centuries" and that the entire work might yet be completed with proper direction from Latrobe.⁶³ However, this was not to be; Benjamin Henry Boneval Latrobe died 3 September 1820; he, like his son Henry, succumbed to yellow fever, to be buried in a now unmarked grave in the Protestant Cemetery in New Orleans.⁶⁴

Without Latrobe's guidance, any hope for salvaging the project was lost. Maj. Jenkins described the portico and keeper's house in ruins and the tower as listing severely. He concluded that new construction would be more economical than repairs.⁶⁵ The longstanding concerns about the stability of the soil seemed to have been justified. However, one more engineer examined the work very carefully and presented quite contradictory evidence. His comments are

significant because he alone made a subsurface investigation. This man, identified only as Mr. Ruddock,^{65a} arrived in Louisiana from “Carolina,” visited the site on an unofficial basis, was clearly impressed and almost amazed by what he saw, and wrote a lengthy report in which he reached some remarkable conclusions. He found the ground solid enough. The tower, he reported, exhibited superior materials and workmanship. Therefore, he set out to determine “if possible, what was the cause of the sinking of the tower, in so solid a strata. . . [O]n breaking up the brick floor of the portico, I found a layer of mud, two feet thick all under the area of the same, and within the wall of the foundation, and it was evidently thrown in, by the workmen, for the purpose of saving about 59,000 bricks which by the contract should occupy the place which the mud does-under this mud, I found a layer of one foot thick, of stones and sand and some oyster shells – I thus came to the planking on the top of the timbers; and found nothing but soft mud and water, among the heads of the piles; although the contract said, the heads of the piles, among the timbers should be filled with shells or solid materials – yet none were to be found here; I then thrust a pole two inches in diameter, down among the pilings, ten feet deep with the greatest ease; and drew the same out again – this was done in the presence of several gentlemen who stood by and saw the whole; the water, immediately rose to within two inches, of the top of the ground, being four feet above high water. Therefore to ascertain whether this water came from below the foundation, or whether it was lodged there by rains; I excavated a hole two feet square and 6 feet deep, in the virgin strata, at about 8 inches on the outside from where the pilings were driven and at that depth I found no water; what I dug out, was a solid blue clay strata, that weighed 95 lbs. to the cubic foot. . . . It therefore appears that this water was one cause of the tower sinking – another cause, of the sinking of the building, was, the workmen having removed the scaffold poles too soon, before the work had got properly dry, and consolidated together. The falling of the walls of the rooms, and of the parapet, and of the 20 stone pillars; was in consequence of bad work, and bad mortar – the arches were not sprung, in a proper manner; as the walls were carried up too high, before they laid off the arches – the consequence of this was, the walls at the height; were not sufficiently solid, and weighty to stand as buttments; of the semi-arches, and when the weight of the parapet pressed upon the arches

after the poles were removed, the walls split, and gave way, and consequently the whole work fell to the ground.”⁶⁶

Ruddock concluded by saying, “Had I not have seen the necessity of interfering in this business; never should I have run myself into the trouble, expense, and hazards, that I, on this account have done, But from seeing my country fleeced of its resources; without an equivalent; by men who appear to be destitute of every moral and virtuous tie, that binds human society in union, I have felt it my duty; and therefore, shall not shrink from the Task.”

This report was treated casually, almost with disdain by lighthouse officials. In his cover letter, Chew wrote to Pleasanton, “Although I have thought it my duty to forward the report of Mr. Ruddock, I am . . . sure that the sinking of the building cannot be attributed to the causes assigned in his report. The foundation [but not the piles] was inspected by Mr. Latrobe and pronounced to be faithfully executed, and of good materials [But Latrobe had commented that backfill material was lacking for the platform of the inverted cupolas in his report of 7 May 1819.] and Mr. R. admits the Tower is finished in a workmanlike and masterly manner and its standing is proof of its workmanship. The fault was probably in the original plan.”⁶⁷ A pencil note on the report said, “To be submitted to the perusal and examination of the Secretary of the Treasury.” Whether the secretary or anyone else in the government ever saw the document cannot be determined.

Based upon all extant evidence, then, a scenario for the destabilization of the tower can be proposed. A cylindrical hole for the tower base was excavated; the piles were driven, but apparently not overlaid with a plank cap as Latrobe had specified and as is shown in the section drawing; and the foundations were begun. It was at this point that Latrobe made his unfortunately superficial inspection. Subsequently, typically heavy, late spring rains swept the island, flooding the site. Instead of having pumped the water from the foundation work, having properly completed the inverted dome and vaults, and having carried out the backfilling with appropriate porous materials – stones, sand, and oyster shells – inferior masonry substructures were constructed while refuse and clay were thrown into the cavity with the water, producing mud. Latrobe had planned for the piles to act as a coffer dam after the tower's construction, keeping water from seeping underneath it in the event the island became inundated.

But now, before the tower's construction, the piles acted in reverse, forming a watertight reservoir. The keeper's house and its piazza were also improperly constructed, so that they did not act monolithically with the arches and vaults of the tower and the inverted domes and vaults of the foundations to distribute evenly the weight of the entire structure to all of the piles. The tower, structurally separated from the keeper's house and piazza, acted like a cork floating on the viscous material beneath it. As the moisture, trapped amidst the piles and foundations, seeped downward, the inner circle of friction piles under the tower lost its ability to provide adequate support; the tower sank, pushing up the keeper's house and the piazza around it as the mud was displaced beneath. Finally, as the scaffold poles were removed asymmetrically, some piles gave way more than others and the entire structure listed.

The lighthouse at the mouth of the Mississippi River should not have collapsed. The Latrobes' synthesis of form and structure should have produced the intended great, new symbol of entry into the vastly expanded American continent. The Latrobes' tower was done in by improper construction methods if not by outright dishonesty.⁶⁸

Equally startling is the fact that Winslow Lewis was hired to dismantle the tower and rebuild a lighthouse on Frank's Island. Instructed to reuse existing material as much as possible, Lewis created his own design and, at a cost of \$9,750, build a rude, truncated cone, devoid of architectural quality.⁶⁹ Its light was first lit on 20 March 1823. The tower still stands, though abandoned, but Frank's Island has long been submerged.

Subsequently, Lewis became the most prolific lighthouse builder in the United States, developing a set of five stark, conical prototypical towers which he built of rubble masonry and which were used in many, still surviving, Atlantic Coast installations.⁷⁰ And it was Only Yesterday. . .

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In 2006, Dr. Michael Fazio, with co-author Patrick Snadon, published *The Domestic Architecture of Benjamin Henry Latrobe* (Johns Hopkins University Press). Dr. Fazio is currently completing a book on architecture in Birmingham, AL to be published by the University of Tennessee Press.

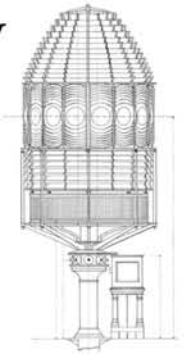
FOOTNOTES

1. I wish to express my thanks to Pamela Scort who brought Latrobe's lighthouse to my attention and whose insights into American public architecture in the 18th and 19th centuries provided me with both a breadth of vision and focus for my research.
2. *Letters from Lighthouse Superintendents, New Orleans, LA, 1817-1845*, Smith to Secretary of the Treasury, 17 January 1817; *Lighthouse Deeds and Contracts*, vol. C, 1815-1822, 205; and U.S. Congress, House Reports, 27th Congress, 2d session, vol. 410, doc. 811, 90.
3. Printed speech in the *National Intelligencer*, 28 April 1842, entitled "On the Appropriation for Lighthouse Repairs"; see especially the list of American lighthouse projects.
4. The belief that New Orleans would become the greatest American port was a common one in the 19th century. See A. MacKay, *The Western World; or, Travels in the United States in 1846-47*, 2 vols., Philadelphia, 1849, II, 91; and *DeBow's Review*, III (1 Feb. 1847), 100; and III (January 1847), 39. For a discussion of the city's economic development during the years leading up to the Civil War, see D. D. North and R. P. Thomas, eds., *The Growth of the American Economy to 1860*, New York, 1968, 196-205.
5. For a summary of Latrobe's work in New Orleans and its environs, see S. Wilson, Jr., *Impressions Respecting New Orleans by Benjamin Henry Boneval Latrobe: Diary & Sketches, 1818-1820*, New York 1951, xiii if.
6. *Annals of Congress*, vol. 1, 8th Congress, 1st session, 1803-1804, in *The Debates and Proceedings of the Congress of the U.S.*, Washington, D.C., 1852, 1305-1306.
7. U.S. National Archives, Washington, D.C., U.S. Treasury Department, Bureau of Lighthouses, "Lighthouse Letters," III, 1 October 1802 to 2 September 1809, 171-172, Albert Gallatin to Collector of the Customs, New Orleans, 16 April 1804.
8. "Lighthouse Letters," Gallatin to Collector of the Customs, New Orleans, 16 April 1804.
9. For the life of Lafon, see H. P. Bos, "Barthelemy Lafon," M.A. thesis, Tulane University, 1977. For his cartographic work, including a map of the Balize, see especially pages 85ff; many of his maps are now in the Historic New Orleans Collection.
10. Lafon's presentation document is now in the U.S. National Archives, Washington, D.C., Record Group 26, 8-7M-7. It includes a plan, elevation, and perspective view, a written description entitled "Observations sur le Phare d'Orleans," and a cost analysis. The description reflects attitudes prevalent in 18th- and early 19th-century French architectural theory, such as that of Jacques-Francois Blondel and Abbe Marc Antoine Laugier. Lafon describes economy and solidity as the first two obligations of the architect. These particular emphases directly parallel the convenience and economy stressed by J. N. L. Durand in his *Precis des lecons don nee a l'Ecole Poly technique* of 1802-1809. Lafon combined this French theory with his own predilection for meteorology and exploration as reflected in the contents of his library which are itemized in his will (Notarial Acts of Philippe Pedeclaux, Acts no. 13, U-12L, 15 March-10 April 1820, Civil Courts Building, New Orleans, LA.). He wrote at length in the text that accompanied his design about the environmental forces to which his tower would be subjected and about the significance of such an aid to navigation in making the Mississippi River accessible to international commerce.
11. The type of wooden tower which Lafon might have used as a model can be seen in H. Lewis, *The Valley of the Mississippi Illustrated*, St. Paul, Minn., 1967, p. 78.
12. The standard biographical source on Latrobe is Talbot Hamlin's *Benjamin Henry Latrobe*, New York, 1955. A summary of more recent Latrobe related publications appears in the preface to J. C. Van Horne and L. W. Formwalt, eds., *The Correspondence and Miscellaneous Papers of Benjamin Latrobe*, Volume 1, 1784-1804, *The Papers of Benjamin Henry Latrobe*, New Haven, 1984.
13. E. C. Carter, editor in chief, and T. E. Jeffrey, microfiche editor, *The Papers of Benjamin Henry Latrobe*, The Microtext Edition, Clifton, N.J., 1976 (hereafter simply abbreviated Papers), BHL to Gallatin, 23 March 1805, and BHL to Gallatin, 13 May 1805. Gallatin eventually suggested Lafon as a superintendent for the lighthouse construction, a suggestion which Latrobe discouraged because he thought that Lafon "would not reside on the spot probably" (Papers, BHL to Gallatin, 13 August 1805). Latrobe did come to know and correspond with Lafon, complaining of his "bad French and bad spelling" (Papers, BHL to Henry Latrobe, 23 November 1812). According to Samuel Wilson, Jr., Lafon visited Latrobe in Washington in 1812 (Wilson, *Impressions*, 107, n. 26).
14. The Smeaton connection is significant. According to Talbot Hamlin, "Family tradition has it that he [Latrobe] received instruction from and worked with the famous engineer. . . who was a friend of the family." (Latrobe, 27). Hamlin was generally unsuccessful, however, in verifying Latrobe's professional experiences in England. A much more comprehensive discussion can be found in L. W. Formwalt, "Benjamin Henry Latrobe and the Development of Internal Improvements in the New Republic, 1796-1820," Ph.D. diss. Catholic University, 1977, which deals with Latrobe's training under both Smeaton and S. P. Cockerell, among others. See also the introduction to D. H. Stapleton, ed., *The Engineering Drawings of Benjamin Henry Latrobe, The Papers of Benjamin Henry Latrobe*, New Haven, 1980.
15. Papers, BHL to Gallatin, 13 May 1805. In this letter Latrobe mentioned Smeaton's book on the Eddystone Lighthouse which also included the Spurn Point tower. Latrobe was apparently quite familiar with the book and may have owned a copy, lost with the other contents of his library during his passage to America in 1795-1796 (Hamlin, Latrobe, 53). In a small, undated, technical notebook recently discovered in the Manuscripts Division of the Library of Congress, Latrobe made careful note of the procedure employed in setting the bolts in the Eddystone Lighthouse built by John Ruyder. This structure preceded Smeaton's tower and survived for better than half a century (A. D. Stevenson, *The World's Lighthouses Before 1820*, London, 1959, 117121). Edward Carter 2d, *Benjamin Henry Latrobe and Public Works: Professionalism, Private Interest, and Public Policy in the Age of Jefferson*, Washington, D.C., 1976, 6, incorrectly identifies these notes as relating to Smeaton's work at Eddystone. The reference in the notebook to "Smeaton p21" alludes to the Smeaton volume on his Eddystone tower.
16. Richmond, VA., 1798,1. This "Essay" included two volumes of sketches which Latrobe prepared for a female acquaintance (Hamlin, Latrobe, 83; and E. C. Carter, ed. in chief, *The Virginia Journals of Benjamin Henry Latrobe, 1795-1798, The Papers of Benjamin Henry Latrobe*, New Haven, 1977,471). For a discussion of Latrobe's other lighthouse projects, see Formwalt, *Benjamin Henry Latrobe*, 279.
17. Papers, BHL to Gallatin, 13 August 1805. The Sandy Hook Lighthouse was constructed by Isaac Conro in 1764, making it the oldest tower in the United States (F. Holland, *American Lighthouses, Their Illustrated History Since 1716*, Brattleboro, Vt., 1972, 75).
18. Papers, BHL to Thomas Vickers, 24 July 1805.
19. Hamlin, Latrobe, 156.
20. Papers, BHL to Vickers, 24 July 1805.
21. Stevenson, *World's Lighthouses*, 122.
22. See John Smeaton, *A Narrative on the Building and a Description of the Construction of the Eddystone Lighthouse with Stone: to which is subjoined, an Appendix, giving some account of the Lighthouse on the Spurnpoint, built upon sand, London, 1791*. See especially fig. 17 and associated text.
23. Papers, BHL to Gallatin, 13 August 1805.
24. Papers, BHL to Gallatin, 3 August 1805.
25. Papers, BHL to Gallatin, 13 August 1805.
26. Ibid.
27. Papers, BHL to De Mun, 29 April 1806. De Mun also wandered into the political difficulties in Louisiana which surrounded the Burr conspiracy and narrowly escaped arrest (Hamlin, Latrobe, 215).
28. Papers, "Report on the Lighthouse at Frank's Island & on the Balize, May 8th, 1819, by B. H. B. Latrobe, Esq."
29. Papers, BHL to Gallatin, 24 December 1806.
30. Papers, "Proposal. . . for building a lighthouse," 1 May 1807. Both a draft copy by Latrobe and a newspaper clipping of the final version of the proposal can be found here. That the published version was correct, except for "trifling alterations", was acknowledged by Latrobe (Papers, BHL to Gallatin, 9 May 1807). The proposal is exacting to the point of confusion, a condition which requires some explanation. Concerned that neither suitable stone nor suitable artisans and tradesmen could be found in Louisiana, Latrobe envisioned, from the beginning, separate contracts for the production in the East of the numerous subcomponents of his tower and only their assembly on the site. He had in mind in particular Cheshire stone from the Delaware quarries cut by Thomas Vickers, a stonemason who had worked on the Philadelphia Waterworks, and James Traquair, a Philadelphia marbleworker (Papers, BHL to Vickers, 24 July 1805, and BHL to Traquair, 25 July 1805). Only work below ground was to be placed under contract to New Orleans workmen (Papers, BHL to Vickers, 30 August 1805). However, upon reviewing the enabling legislation, Gallatin realized that he, as Secretary of the Treasury, could enter into only a single contract for construction of the lighthouse, one obtained through an open bidding procedure. Latrobe argued that due to "the very nature of the work" he doubted that a single contractor could be found for "the preparation of the stone, the transportation, the piling, the erection, the lantern [lantern]" (Papers, BHL to Gallatin, 30 September 1805). He suggested a contractual arrangement whereby John Haydock, a man who had worked for him at the U.S. Capitol, would agree to erect the tower, while the pilings would still need to be contracted for in New Orleans, possibly under the direction of Lafon, and the lantern would be fabricated in Philadelphia. Pressed further about advertising for bids, Latrobe amplified his fears to Gallatin, saying, "It is objectionable, and for this very obvious reason which is still stronger in all other cases that the lowest bidder, will probably be the most ignorant, or the least responsible, or the least conscientious of the bidders, and that therefore the chance of disappointment, will be exactly at the same ratio of the cheapness of the contract. And indeed experience proves that the bait of public contracts has drawn up more rogues of the first magnitude than have appeared in any other branch of public service" (Papers, BHL to Gallatin, 30 September 1805). Therefore, to circumvent the required bidding process, Latrobe made the published proposal as complex and intimidating as possible in order to assure that only the mechanics he had chosen personally would be willing and able to offer a bid. He wrote to Gallatin, "It [the proposal] is however a most crabbed production, and I doubt whether any man besides you, I and Lenthall [Latrobe's clerk of the works at the Capitol] will have the slightest comprehension of the mode of construction from the description, altho I must acknowledge that to me it is most perfectly intelligible and clear" (Papers, BHL to Gallatin, 4 May 1807). Latrobe finally proposed three model contracts, one of which he hoped might prove to be an acceptable compromise. The first variation involved five separate contracts: (1) placing pilings in New Orleans, (2) preparing the masonry in Philadelphia, (3) transportation to the Gulf Coast, (4) manufacture and delivery of the lantern, and (5) erection of all the parts. The second variation included three contracts: (1) placing the pilings in New Orleans; (2) preparing the masonry in Philadelphia (with the idea of uniting Traquair, Vickers, Haydock, and others under one contract), erecting the tower, and providing and erecting the lantern; and (3) transportation to the Gulf Coast. The third variation involved a single contract for all the work except the pilings (Papers, BHL to Gallatin, 30 September 1805).
31. This may have represented the first attempt in America to use cast iron columns as an external architectural feature. Latrobe employed cast iron columns on the interior of his Gothic Christ Church in Washington, D.C., in 1808 (Hamlin, Latrobe, 347). Cast iron had been similarly used before this date in England, as in St. Anne's Church, Liverpool (1770-1772); Watt and Boulton's famous cotton mill in Salford was constructed in 1801.
32. Wilson, *Impressions*, 124.

33. See Rene Faille, *Les Trois Plus Anciens Phares de France: Cordouan, Le Balémes, Chasseron*, Paris, 1974, and M. Leonce Reynaud, *Memoir Upon the Illumination and Beaconage of the Coasts of France*, trans. Peter C. Hains, Washington, D.C., 1876.
34. As quoted in Stevenson, *World's Lighthouses*, 188-189.
35. Panseron's designs of c. 1770 were published in his *Ouvrage d'Architecture des Sieurs Desprez et Panseron*. See also E. Kaufmann, *Architecture in the Age of Reason*, Cambridge, Mass., 1955, 160.
36. Kaufmann describes and illustrates Ledoux's project for a barriere, where he placed a rostral column atop his toll house, in *Three Revolutionary Architects: Boullée, Ledoux, and LeQueu*, Philadelphia, 1952, 504 and fig. 122. For Normand's tower, a column standing on a multistoried, rusticated base, see Kaufmann, *Architecture*, 198 and p. 208; Toussaint's phare [lighthouse] is described as a cylindrical shaft atop a truncated cone with a truncated pyramid below; Kaufmann also mentions, but does not illustrate, Bourjot's design for a phare using a rostral column (Kaufmann, *Architecture*, 198).
37. Papers, BHL to Gallatin, 20 May 1807. See also n. 30 above.
38. Holland, *America's Lighthouses*, 26-28. Two other general sources for the history of the lighthouse establishment in the United States are G. R. Putnam, *Lighthouses and Lightships of the United States*, Boston, 1917, 31-54; and G. Weiss, *The Lighthouse Service; Its History, Activities and Organization*, Institute for Government Research, Service Monographs of the United States Government, No. 40, Baltimore, 1926, 114. Winslow Lewis's career is examined in greatest detail by R. W. Updike in *Winslow Lewis and the Lighthouses*, *American Neptune*, XXVIII, 1968, 31-48, wherein Lewis is depicted as a controversial and perhaps misunderstood figure in his relationship with the American lighthouse establishment. Holland, in *America's Lighthouses*, 14-21, is less generous. Also, see Stevenson, *The World's Lighthouses Before 1820*, 295-296, for another negative opinion of some of Lewis's activities.
39. Papers, BHL to Henry Latrobe, 31 May 1812.
40. Wilson, *Impressions*, 124.
41. The choice of the lighthouse site was necessarily a function of the accessibility of the various passes which led through the quixotic alluvium of the Mississippi River delta. For a record of these changes, see D. J. Morgan, *The Mississippi River Delta; Legal-Geomorphic Evolution of Historic Shoreline Changes*, *Geoscience and Man*, No. 16, Baton Rouge, 1977, 74-75. Of the three major passes—the East Pass, the South Pass, and the Southwest Pass—the latter two were the most stable, allowing for continuous passage, with few subchannels opening and closing from them. However, the East Pass remained in an almost constant state of flux. During the early 18th century, the Balize Bayou was the most heavily traveled eastern route, giving way to the East Pass around 1750. The Southeast Pass grew popular for a short period at the beginning of the 19th century, but was soon superseded by the Northeast Pass. Lafon's maps of 1806, covering Louisiana and Florida, and of 1813 describing the delta, are the primary documents showing these areas before the 1838 Talcott Chart. Lafon chose the Balize as his site because he knew the area and because of the existing settlement there. Latrobe and the United States government, after their thorough study, selected Royal Island on the west side of the Southeast Pass, at a time when this channel was carrying maximum traffic. The Royal Island location was then changed to Frank's Island at the Northeast Pass which was to be the most popular channel until the 1840s. After 1838 the Northeast Pass began to experience a decline of water and traffic flow which led to its gradual abandonment as a major route (Morgan, *The Mississippi River Delta*, 84). For this reason the use of the Frank's Island lighthouse was discontinued in 1852.
42. Papers, Henry Latrobe to BHL, 4 June 1817. At issue during this period was, once again, the question of how a contractor was to be chosen. Like his father some 10 years earlier, Henry Latrobe reacted negatively to the federal requirement for a bidding procedure, and this time Benjamin Latrobe became the apologist. He explained to his son that he had visited Sam Garrison Smith, the Commissioner of the Revenue and a friend, who had assured him that the bidding process could not be circumvented. So the elder Latrobe intended to apply his previous strategy; he wrote to Henry "to tell you the truth altho, I have drawn the description so as to frighten the people who understand nothing but the common routine of work, I fear some Yankee will be lowest. All this you will see in the papers which Mr. Smith... has sent on. I need thereby to get you appointed to see the Contract well executed, which I think will not be difficult" (Papers, BHL to Henry Latrobe, 19 December 1816; BHL to Henry Latrobe, 4 June 1817; and BHL to Henry Latrobe, 7 August 1817). In other correspondence Benjamin Latrobe suggested that he was less mendacious in writing the description (Papers, BHL to Henry Latrobe, 7 August 1817) saying, "Having made the drawings [copies as requested by the collector], I then drew a description so particular and detailed as to point out not only the manner of building the work but all its difficulties, so as to prevent the offer of a hasty and inadequate proposal—All this you will see in the proposal in the hands of the Collector." It was also placed in the *New Orleans Gazette*.
43. Hamlin, Latrobe, 602 and 355.
44. Wilson, *Impressions*, 1.
45. According to Wilson (*Impressions*, xxi-xxii and 97, n. 5), Henry first associated in New Orleans with Lacarriere Lator, and probably built a house for Jean Baptiste Thierry which exhibits a Benjamin Latrobe-like porch with low segmental arches atop Greek Doric columns. Henry also is given credit by Wilson for the Charity Hospital and the Davis Ballroom; two houses for Bernard Marigny (demolished); houses for Honore Landreaux, Richard Butler, Mr. Mossy, Madame Chabaud, and Duncan Kenner; Christ Church at the corner of Bourbon and Canal Streets (The latter structure has long been destroyed, but it was described by Joseph Holt Ingraham in *The Southwest*, New York, 1835, 1,145-146); and, with some reservations, the wings for the Ormond Plantation.
46. The drawings are now located in the U.S. National Archives, Washington, D.C., in Record Group 26, District 8, No. 27, 8-7M-12.
47. This final inverted vault, which Latrobe called inverted arches, represented an error on Henry's part. Latrobe wrote to his son that he felt it necessary to modify "the external inverted arches running up under the columns instead of terminated in quadrants; for the weight of the columns is nothing, but the horizontal resistance of the foundation mass is much" (Papers, BHL to Henry Latrobe, 7 August 1817). Latrobe also mentioned the addition of an iron hoop or chain, and included a sketch, saying that it should "be buried in the wall at or a little above the springing of the vault of the lodging rooms which, in fact, carry great part of the weight of the tower, and by its pressure may be forced outward toward the convexity of the circle.—The hoop is necessary at first, when all is consolidated it will have nothing to do." The addition of this hoop was also noted by Latrobe in pencil on his son's drawings.
48. Beverley Chew to Samuel Smith, 14 June 1817.
49. Hamlin, Latrobe, 473.
50. *Letters from Lighthouse Superintendents*, Chew to Smith, 25 July 1818. The contract can be found in *Lighthouse Deeds and Contracts*, vol. C, 1815-1822, 205.
51. See Winslow Lewis's letter to Congress published in U.S. Congress, House Reports, 27th Congress, 2d session, vol. 410, doc. 811, 106.
52. Papers, BHL to Chew, 13 January 1819, and *Letters from Lighthouse Superintendents*, Chew to Smith, 21 January 1819.
53. Hamlin, Latrobe, 505-518; the entire Latrobe family moved to New Orleans in 1820 (Hamlin, Latrobe, 521ff.).
54. *Letters from Lighthouse Superintendents*, Chew to Smith, 21 January 1819.
55. Samuel Wilson, Jr., suggests that Latrobe made a second trip. See Wilson, *Impressions*, 139, n. 18.
56. Papers, Journal Entry, 11 April 1819, and Report on the *Lighthouse at Frank's Island & on the Balize*, May 8th, 1819, by B. H. B. Latrobe, Esq. See also *Letters from Lighthouse Superintendents*, Chew to Smith, 20 May 1819, and Wilson, *Impressions*, 139, n. 18.
57. *Letters from Lighthouse Superintendents*, Chew to Smith, 6 August 1819.
58. *Letters from Lighthouse Superintendents*, Chew to Smith, 20 September 1819; and Papers, "Comments on report of Edward Hearsey, resident superintendent of the lighthouse on Frank's Island," sent to Benjamin Chew on 20 September 1819.
59. *Letters from Lighthouse Superintendents*, Chew to Smith, 23 December 1819. Latrobe had designed a customs house for New Orleans in 1807 which was completed in 1809 but demolished in 1819 due to poor foundations. S. Wilson, Jr., "Latrobe's Customs House, New Orleans, 1807-1809," *JSAH*, XIV, 1955, 30-31. Jenkins was building a replacement for Latrobe's structure to a design by Benjamin Buisson (Hamlin, Latrobe, 295-296).
60. U.S. Congress, House Documents, 16th Congress, 1st session, vol. 37, doc. 97, 4.
61. *Letters from Lighthouse Superintendents*, Chew to Pleasanton, 7 April 1820. The Sinnott/Bickle report was enclosed with this letter.
62. *Letters from Lighthouse Superintendents*, Chew to Smith, 14 April 1820.
63. *Letters from Lighthouse Superintendents*, Chew to Pleasanton, 5 July 1820. The Williams report was enclosed with this letter.
64. Hamlin, Latrobe, 528. Ironically, Barthelemy Lafon died on 29 September 1820 (Bos, "Lafon," ii).
65. *Letters from Lighthouse Superintendents*, Chew to Pleasanton, 13 December 1820; Chew to Pleasanton, 23 December 1820; and Chew to Pleasanton, 9 March 1821. The Jenkins report was enclosed with the last.
- 65a. This Mr. Ruddock may have been an engineer aboard the *Aurora Borealis*, a lightship stationed at the Northeast Pass during the construction of the second Mississippi River lighthouse. Ruddock's name appears in Edmund M. Blunt's *The American Coast Pilot*; Tenth Edition, 1822, 289.
66. *Letters from Lighthouse Superintendents*, Chew to Pleasanton, 26 May 1821. The Ruddock report was enclosed with this letter.
67. *Letters from Lighthouse Superintendents*, Chew to Pleasanton, 26 May 1821.
68. Based upon a set of logical assumptions, structural calculations can be carried out to verify the stability of Latrobe's lighthouse design. His complex system of inverted vaults and domes and the plank and log platform on which they rested must be assumed capable of acting monolithically if properly constructed. Piles driven as close together as he directed (1-ft. diameter and 2 ft. on centers) would produce the so-called group effect; that is, they would act not individually but as a mat. The so-called pressure bulb for the outside piles would extend some 6 ft. outward adding some 12 ft. to the 96-ft. diameter of the circle of piles, yielding a diameter of 108 ft. in all. The area of a 108-ft. diameter circle is 9156 sq. ft. A reasonable pile-mat bearing capacity for the blue clay soil would be about 1500 pounds per square foot; therefore 9156 sq. ft. times 1500 lbs. per sq. ft. equals 13,734,360 pounds, the allowable load that the pile-mat should have supported. The volume of the truncated cone of the tower and the battered cylinder of the keeper's dwelling and the portico is approximately 60,000 cubic feet. Latrobe had, of course, done everything possible to carve out the masonry in order to lighten the structure. If it is assumed that the structure was 60 percent solid, then the volume of masonry was some 36,000 cubic feet. If an average weight for the brick and stone masonry is assumed to be 150 pounds per cubic foot, then the total weight of the lighthouse was 36,000 cu. ft. times 150 lbs. per cu. ft. equals 5,400,000 pounds—well below the allowable load. Ruddock, in his report, said that the tower had a masonry volume of 24,667 cu. ft. and weighed 3,154,625 pounds. Winslow Lewis, in his letter to the Committee on Commerce, claimed that it weighed 16 million pounds, a fantastic figure.
69. *Letters from Lighthouse Superintendents*, Chew to Pleasanton, 23 July 1822 and "Lighthouse Letters," Pleasanton to Dearborn, 20 May 1822. The contract for the Lewis tower can be found in *Lighthouse Deeds and Contracts*, vol. D, 1822-1827.
70. Updike, *Winslow Lewis*, 43-44.



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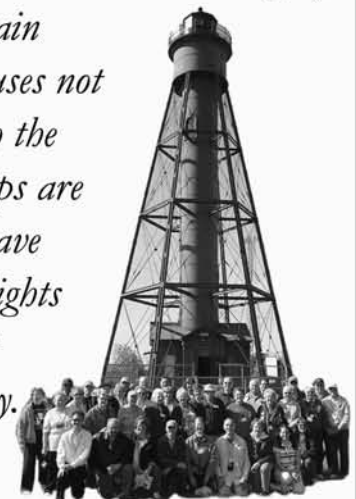
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