

## NOTES AND DOCUMENTS

### *The Phoenix Tower and the Struggling Centennial Exhibition of 1876: A Tale of What Might Have Been*

Scholars and general public alike seem to be ever-enamored with worlds fairs and international expositions. Such displays in the nineteenth and twentieth centuries heralded so much that was new, creative, innovative, and exciting. Cities, states, nations, businesses, and industries were free to engage in a lusty and unbridled celebration of self. New products for the domestic consumer and new products for the international market trumpeted the triumph of industrialism. Philadelphia, of course, hosted such a celebration in 1876—an international exposition to mark America's centennial.

At the time of America's bicentennial several luminaries from the Smithsonian Institution's National Museum of American History recaptured some of the excitement in a book edited by Robert Post entitled *1876: A Centennial Exhibition*. This magnificently illustrated publication chronicled the extraordinary buildings, the great Corliss engine, spectacular new machines, and a host of innovative products. The severity of all this technology and commerce was, arguably, humanized by displays featuring horticulture, agriculture, art, religion, and the accomplishments of women. Only a careful reading of the opening and concluding chapters provides readers with a sense of the endless struggles and financial difficulties surrounding the centennial.<sup>1</sup>

What has generally been subordinated in the story of the exposition are the complications associated with creating it, the extraordinary cost, the debt, the risk, and the loss to investors—all underscored by the fact that almost no one outside of Philadelphia seemed interested in sharing the risk. For example, when Congress created enabling legislation in 1871, they not only failed to provide funding but also renounced any liability for the under-

<sup>1</sup> Robert Post, ed., *1876: A Centennial Exhibition* (Washington, D.C., 1976).

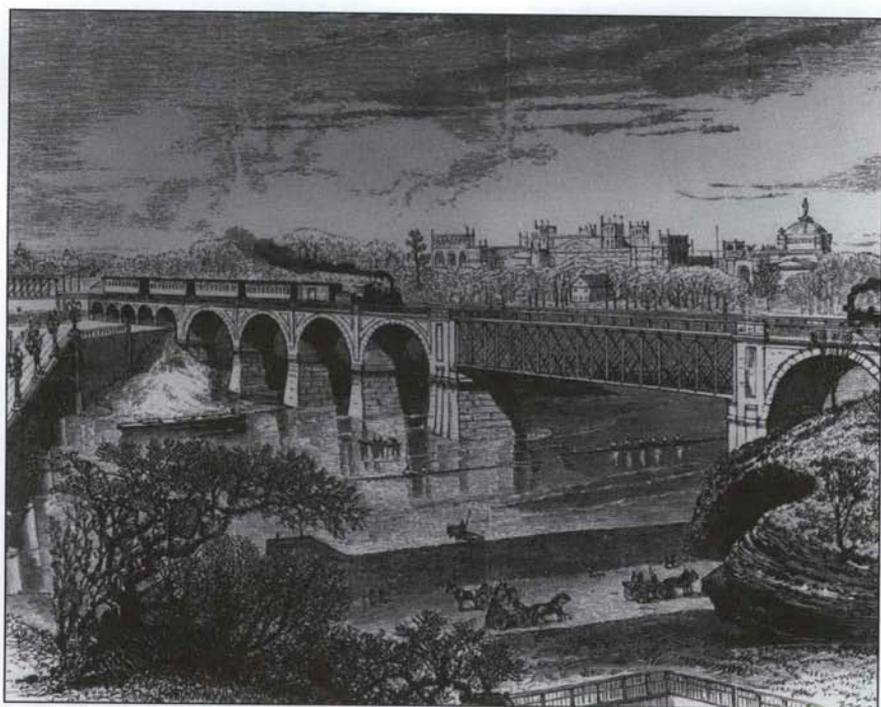


Fig. 1. The Girard Avenue Bridge, Philadelphia, ca. 1875. From *Frank Leslie's Illustrated Register of the United States Centennial Exposition, 1876* (New York, 1877), p. 97. (Photo, Historical Society of Pennsylvania).

taking. Southern states showed no interest in investing, the West apparently cared little,<sup>2</sup> and New York City flirted with the idea of launching its own competing celebration in Central Park.<sup>3</sup>

Both the Pennsylvania and Reading Railroads built lines to Fairmount Park and the appropriate stations, but steadfastly refused to lower their rates to enhance citizen participation. Sabbatarians blocked opening on Sundays—the one day that workingmen were free to attend.<sup>4</sup> The long-lived

<sup>2</sup> *New York Times*, Nov. 19, 1875.

<sup>3</sup> *Ibid.*

<sup>4</sup> *Post*, 1873, 13.

depression of 1873 cast its pall, as did the brutally hot and humid Delaware Valley summer. (Ice water provided by the Women's Christian Temperance Union hardly solved the problem.) Not surprisingly, the Centennial never garnered the paid attendance it sought. *The New York Times* for May 12, 1875, observed that if the Paris Exposition of 1867 attracted roughly 9,000,000 paying visitors, it was reasonable for the City of Brotherly Love to draw 10,000,000 a decade later.<sup>5</sup> Philadelphia did attract almost 10,000,000; alas only 8,004,325 paid. Stockholders lost about \$1,900,000 on their investment.<sup>6</sup>

Ideally, all the aforementioned serves as a helpful correction to the romantic notion, readily derived from a publication such as *Scientific American*, that the glorious Centennial of 1876 was a magnificent celebration of American industrial and technological prowess that everyone was free to wallow in mindlessly. A grand success story.<sup>7</sup>

Having made this correction, it is fascinating to consider the role that Clarke, Reeves (also known as the Phoenixville Bridge Works), played in the exposition together with the role that might have been played. For Clarke, Reeves made a great contribution in completing the magnificent Girard Avenue Bridge in 1874 (fig. 1) and contributing to the erection of a monorail.<sup>8</sup> The company came close to creating a one-thousand-foot tower which, had it been realized, would have anticipated the Eiffel Tower by a decade and a half—a development that might have altered the fate of the Centennial by creating the one object that every American “just had to see.” Furthermore, it is reasonable to contend that the creation of the Phoenix Tower would have made a Parisian tower infinitely more difficult to justify. Put more bluntly, the Phoenix Tower might have preempted the Eiffel Tower!

The front page of *Scientific American* for January 24, 1874, displayed the spectacular drawing of a one-thousand-foot tower to be erected with Phoenix columns in Fairmount Park as part of the upcoming Exposition (fig. 2).<sup>9</sup> Unlike the later tower completed by Gustave Eiffel in 1889, the Phoenix

<sup>5</sup> *New York Times*, May 12, 1875.

<sup>6</sup> Richard R. Nicolai, *Centennial Philadelphia* (Bryn Mawr, Pa., 1976), 84.

<sup>7</sup> *Scientific American* for the years 1874 through 1876 provided what seem like endless full page drawings of the many spectacular buildings erected for the Exposition.

<sup>8</sup> For a sketch of the monorails see Nicolai, *Centennial Philadelphia*, 52.

<sup>9</sup> *Scientific American*, Jan. 24, 1874, 1.

Tower would have had a very narrow base and a central cylinder for housing four elevators. (The Phoenix Tower's base would have measured fifty yards in diameter with a circumference of 157.08 yards.<sup>10</sup> The Eiffel Tower was required to be 125 meters square at the base, which could be expressed as a rectangular base with a perimeter of 546.8 yards.)<sup>11</sup> Another major difference was that Eiffel considered a central cylinder grotesque and thus required his elevators to rise from the four corners on an angle, an engineering challenge that proved problematic for Otis and the two French elevator producers involved.<sup>12</sup> In any event, there is every reason to believe that the firm in Phoenixville had, or would have created, the technological know-how to erect the tower. Indeed, Clarke, Reeves claimed they could erect it in a year at a cost of \$1,000,000.<sup>13</sup> The firm seemed to understand intuitively that while it made its living fabricating hundreds of modest and obscure wrought iron truss bridges for railroads, it would make its reputation from far more spectacular projects, such as a variety of major bridges, elevated lines in Brooklyn, or the Kinzua Viaducts in western Pennsylvania.

Because the firm's proposal was made in the wake of the wonderfully triumphant erection of the Girard Avenue Bridge, the firm had solid credibility. Yet in 1874 the next highest man-made monument was the spire of the cathedral in Cologne, Germany, that measured only 501 feet. The dome of St. Peter's in Rome measures only 457 feet, while the tallest church spire in Philadelphia was St. Marks at 150 feet.<sup>14</sup> Was Clarke, Reeves really ready to do this, or was this simply a wonderful publicity stunt?

They planned to use the Phoenix column which did indeed become world famous and was quite the rage in construction and engineering circles during the Gilded Age. To this day the Phoenix column is cited and described in every dictionary and encyclopedia. It is a wrought iron column constructed from six vertical curved pieces—each with flanges on the sides. When these sections are riveted together, the result is a column of extraordinary strength.<sup>15</sup> With or without the association with a world famous one-

<sup>10</sup> Ibid., 50.

<sup>11</sup> Henri Loyrette, *Gustave Eiffel* (New York, 1985), 116.

<sup>12</sup> Ibid., 149.

<sup>13</sup> *Scientific American*, January 24, 1874, 50.

<sup>14</sup> Ibid.

<sup>15</sup> For a discussion of the Phoenix column together with multiple illustrations see Thomas R. Winpenny, *Without Fitting, Filing, or Chipping: An Illustrated History of the Phoenix Bridge Company* (Easton, Pa., 1996).

# SCIENTIFIC AMERICAN

A WEEKLY JOURNAL OF PRACTICAL INFORMATION, ART, SCIENCE, MECHANICS, CHEMISTRY, AND MANUFACTURES.

Vol. XXX.—No. 4.]

NEW YORK, JANUARY 24, 1874.

[55 per ANNUM  
IN ADVANCE.]

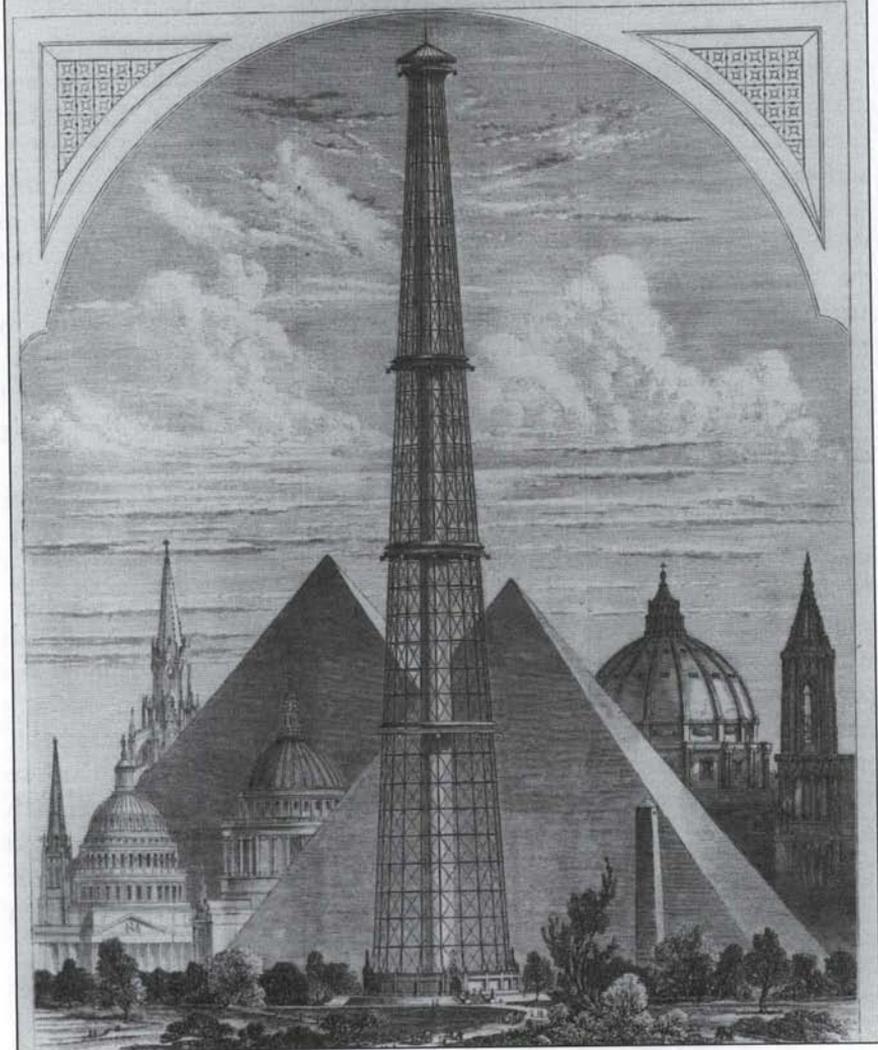


Fig. 2. "The Centennial Tower One Thousand Feet High," from *Scientific American*, Jan. 24, 1874. (Photo, Hagley Museum and Library.)

thousand-foot tower, it is clear that the Phoenix column would have made its mark in the history of engineering. Of course, the tower would have enhanced the fame and popularity of the column.

David Reeves and Thomas Curtis Clarke could make no grand claims for originality in proposing the Centennial tower. The concept had roots in the Biblical story of the Tower of Babel that was reported to be 156 feet high. Distinguished British engineer Richard Trevithic proposed a one-thousand-foot tower to celebrate Parliament's passage of the Reform Bill of 1832, and the Washington Monument, started in 1848, might have been that tall had engineering problems not intervened.<sup>16</sup> Even the Phoenix proposal of 1874 and the Eiffel Tower project of the 1880s failed to satiate the ongoing appetite for height. For example, Robert Jay has chronicled Sir Edward Watkin's unsuccessful attempt to create his Wembley Park Tower following the London tower competition of 1890 that attracted twenty serious proposals.<sup>17</sup> The same author recounts a comparable story in Chicago in which the aforementioned Phoenix Bridge Company offered to build the W. L. Judson Tower for \$2,500,000 in time for the Columbian Exposition of 1893.<sup>18</sup> Obviously, the passion to construct an architectural and engineering marvel that would serve as a multifaceted statement was widespread.

It is clear from the later Parisian experience that erecting a great tower can raise many issues that go beyond engineering and finance. Yet, there is little reason to believe that Clarke, Reeves would have encountered many of the same problems that made Gustave Eiffel's job so difficult. For example, French artists and writers mounted a strenuous protest against the Parisian monument in the 1880s. They obviously objected to having a dominant symbolic structure hovering over Paris that elevated French engineering genius over the rest of Parisian culture.<sup>19</sup> It is doubtful that a comparable protest would have been launched in Philadelphia. In addition, Gustave Eiffel had a serious competitor in Paris who promised to build a tower with far more serious functions. The French engineering firm of Bourdais and Sebillot proposed a one-thousand-foot tower with an electric furnace, great lamps, and reflectors or parabolic mirrors that would turn the darkness of a

<sup>16</sup> Loyette, *Gustave Eiffel*, 109.

<sup>17</sup> Robert Jay, "Taller than Eiffel's Tower: The London and Chicago Tower Projects, 1889-1894," *Journal of the Society of Architectural Historians* 46 (1887), 147-48.

<sup>18</sup> *Ibid.*, 149-56.

<sup>19</sup> Loyette, *Gustave Eiffel*.

Paris evening into daylight. In essence, they were proposing a gigantic lighthouse.<sup>20</sup> For even greater functionality, at the top of this lighthouse there would be a hospital providing "aerotherapy." (As late as 1889 it was believed that the air at one-thousand feet had great therapeutic value.)<sup>21</sup> By contrast, it might be argued, Eiffel was engaged in "engineering for the sake of engineering." In Philadelphia in 1874 there were no serious competitors to upstage the Clarke, Reeves effort.

Eiffel faced an additional burden from his workers. Apparently a loyal band of 200 that had worked with him on the Garabit Viaduct (spanning the Truyère River in the Massif Central region of France), they nevertheless struck for higher wages. The heavy-handed boss rejected their request and demanded they return to work. Eiffel offered them a bonus for finishing and had each of their names painted on a lower girder in full public view. It worked.<sup>22</sup> By contrast, Clarke, Reeves had a history of completely dominating their workers, and it is reasonable to assume they would have continued to do so.<sup>23</sup>

On the other hand, judging from what is known of both projects, the Phoenixville engineers would have had greater difficulty dealing with city government. The histories of Eiffel's Tower make no official mention of corruption or people to be paid off, which of course does not mean that this did not happen. Clarke, Reeves, however, unquestionably got an education in political graft on the Girard Avenue Bridge project when Thomas Curtis Clarke found it necessary to "grease the wheels of commerce" with at least \$70,000. He then requested his colleagues in Phoenixville to refrain from asking what happened to the money.<sup>24</sup>

The one barrier that appeared too great to overcome in the mid 1870s was financing. The Panic of 1873 was still making its presence felt throughout the Delaware Valley. Clarke, Reeves, a wholly owned subsidiary of the Phoenix Iron Company, suffered through difficult years in 1872, 1873, 1874, and 1875 that required both layoffs and wage cuts.<sup>25</sup> The

<sup>20</sup> Ibid., 110.

<sup>21</sup> Ibid., 111.

<sup>22</sup> Joseph Harris, *The Tallest Tower: Eiffel and the Belle Époque* (Boston, 1975), 85.

<sup>23</sup> For a discussion of labor relations in Phoenixville see Winpenny, *Without Fitting, Filing, or Chipping*, chap. 5.

<sup>24</sup> See Correspondence of Samuel J. Reeves, 1872-1878, Phoenix Bridge Collection, Hagley Library and Archives, Geenville, Delaware. Thomas Curtis Clarke to Samuel J. Reeves, December 7, 1872.

<sup>25</sup> Ibid.

Centennial Exposition itself was seriously underfunded and could not be counted on to help. Probably, there were only two possibilities for funding the tower: (1) forming a corporation and selling stock—putting the tower in direct competition with the larger exposition's sale of stock, or (2) turning to the many close personal ties that the Reeves family had cultivated since at least the early 1800s throughout the Philadelphia area.

In 1874 the Reeves family owned a nail works in Bridgeton (New Jersey); Phoenix Iron and Steel, and Clarke, Reeves in Phoenixville (Chester County); and a rolling mill in Safe Harbor (Lancaster County). They also held a major block of stock and at least one board seat (sometimes two) in Cambria Iron in Johnstown. They maintained a business office in center city Philadelphia at 410 Walnut, and residences in center city and Phoenixville. By moving "downtown" they strengthened their social position. Of course, they could hardly afford to overlook politics. Through Samuel Reeve's (David's father) tireless work with the American Iron and Steel Association on behalf of tariff protection, they were closely allied with the Delaware Valley's leading iron families, such as the Sellarses and the Lukenses, who, logically, should have been grateful to Samuel for his success in Washington, D.C.<sup>26</sup> If the financing were to come from anywhere, it probably would have to come from this Philadelphia network.

A major caveat in this consideration is the fact that no one in 1874 was undertaking major engineering feats for the sake of display or symbolic statement.<sup>27</sup> No one was accustomed to showing engineering prowess for its own sake. Grand engineering efforts had a readily identifiable practical purpose: bridges allowed people and locomotives to cross rivers, viaducts allowed traffic to cross ravines, and elevated lines permitted mass transit to move through densely packed urban neighborhoods. With so much remaining to be built, particularly outside of the Northeast quadrant of the United States, it might have easily seemed wrong-headed or perhaps almost criminal to devote \$1,000,000 and some of our best engineering talent to a tapered cylindrical agglomeration of Phoenix columns "united by diagonal tie bars and horizontal struts"<sup>28</sup> in Fairmount Park.

<sup>26</sup> The iron and steel industry essentially got the tariff protection they sought, and Samuel Reeves had a major role in achieving it. See Winpenny, *Without Fitting, Filing, or Chipping*.

<sup>27</sup> This timely reminder came from David Schuyler, professor of American Studies, Franklin and Marshall College.

<sup>28</sup> *Scientific American*, Jan. 24, 1874, 50.

The failure to erect a one-thousand-foot tower did not deter Clarke, Reeves from bidding on other structures for the Centennial. Over two years later, in April of 1876, the firm produced an extensive proposal to build two 215-foot observation towers. The roughly twenty-page proposal, currently housed in the Hagley Library, contains eleven pages of detailed lists of the particular forging and foundry work necessary to complete these towers. The towers would have housed elevators and provided observation decks on the fifth, ninth, and tenth landings.<sup>29</sup> No drawings have been found, and no price has been identified, but the bridge engineers in Phoenixville apparently could not stop thinking about turning a dollar at the exposition.

Perhaps the Centennial in Fairmount Park in 1876 perhaps will always be romanticized as one marvelous piece of Americana. It allowed the citizenry to appreciate "a democracy in things" prior to the advent of the Sears and Roebuck catalogue. It encouraged a rapidly growing industrial nation to celebrate itself. Yet, all of this took place in the shadow of the Panic of 1873, with the lion's share of the cost and risk heaped on the shoulders of Philadelphians. Investors lost money, and many Americans were free to ignore the entire episode. Consider the possibilities had the Phoenix Tower been built by Clarke, Reeves. A one-thousand-foot tower might have spurred on the Centennial to greater popularity and financial success, and it could have changed history by preempting the Eiffel Tower.

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<sup>29</sup> See "Description of the 215' Observatory Tower designed and Erected by The Phoenix Bridge Company of Phoenixville, PA," in Phoenix Bridge Collection, Hagley Archives.

Faint, illegible text, possibly bleed-through from the reverse side of the page. The text is arranged in several paragraphs, but the characters are too light and blurry to be transcribed accurately.