

# Articles

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## Time Balls: Marking Modern Times in Urban America, 1877–1922

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### Résumé

*Cet article décrit les ballons horaires, une technologie depuis longtemps oubliée qui a jadis servi à marquer l'heure. Il y est surtout question de la période de 1877 à 1922, alors que plusieurs dizaines de ballons horaires ont été installés aux États-Unis et que l'on en réclamait davantage. L'article présente aussi l'histoire des ballons horaires aux États-Unis, de leur apparition en 1845 à la chute du dernier en 1936. On y explique que les ballons horaires étaient principalement des monuments à la modernité, plutôt que des instruments de navigation ou des mécanismes permettant de donner l'heure juste au public.*

### Abstract

*This article describes time balls, a long forgotten technology for marking the time. It focusses on the period between 1877 and 1922, when several dozen time balls were erected around the United States and many more were requested. Additionally, the essay provides a history of time balls in the United States from their first appearance in 1845 to the final drop of one in 1936. It argues that time balls were primarily monuments to modernity, rather than navigational devices or instruments for public dissemination of the correct time.*

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*I respectfully suggest for your consideration the propriety of placing a time signal on top of the Washington Monument when it shall be completed. Several practicable plans suggest themselves by which a signal could be displayed; for example, a time ball to be dropped at noon by an electric current from the Naval Observatory... This signal would be useful as furnishing a reliable means of setting time pieces over an extended area, while such a use of the monument would seem to be in harmony with its time enduring grandure.*

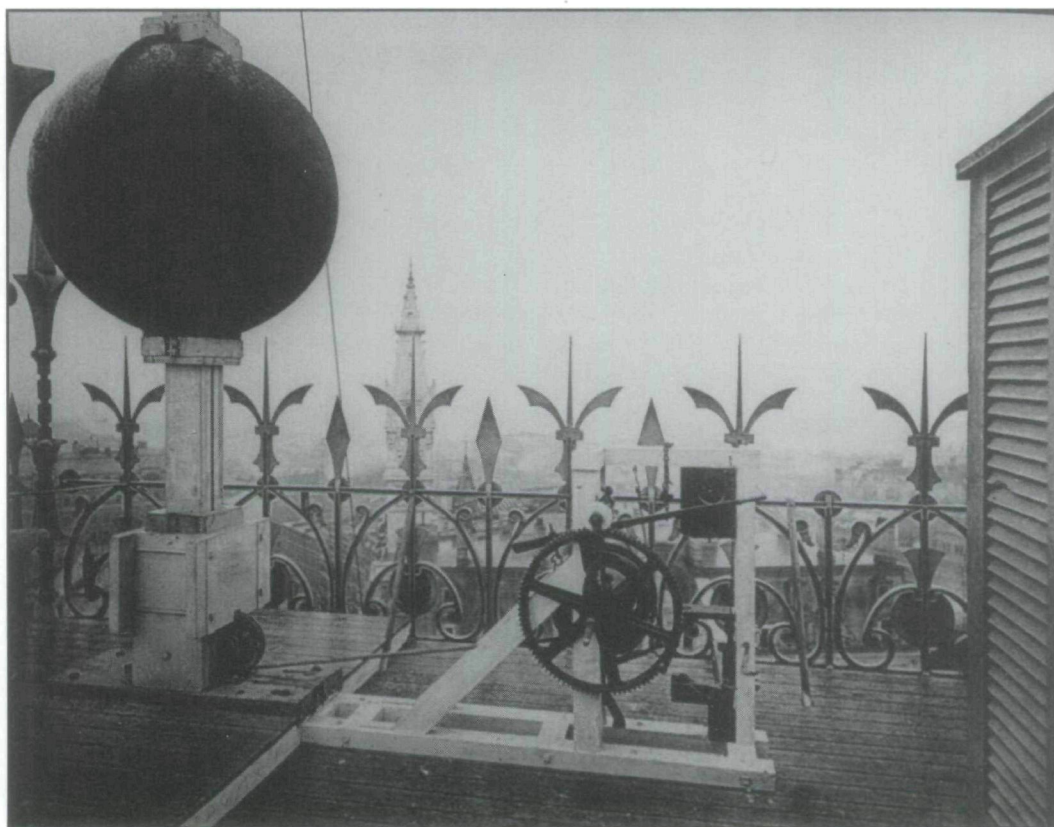
*— Unsigned letter sent to the  
United States Naval Observatory  
dated August, 1884*

During the decades after the Civil War time balls joined the array of newly erected monuments across the nation, many of which embodied the cultural, commercial, and political aspirations of Americans. Typically perched atop the highest point in the central part of a city, usually a tower, these globes with

metal ribs and canvas covers of various colours were rigged to an electric pulse, which caused them to drop at noon. The daily, except Sunday in most cases, dropping of the ball was a public event, and on occasion of error or failure to drop, notice was published in city papers. First built in England in 1829, arriving in the United States in the 1840s, but only proliferating in the 1880s and 1890s under the aegis of the United States Navy, time balls could easily be understood as one of the more minor, though intriguing, devices designed to disseminate time.<sup>1</sup> This article, however, seeks to call attention to time balls as symbols of civic modernity, arguing that their vogue arose out of their ability to indicate modern times, rather than the correct time.

This essay focusses on the years between 1877, when the nation's most prominent time ball first dropped, and 1922, when almost all time balls were decommissioned and requests for time balls ceased. This period coincides with the emergence of the historical period denoted by the term "modernity" and the

**Fig. 1**  
 Boston Time Ball, 1881.  
 (U. S. Department of  
 War, Army Signal Office,  
 "Information Relative  
 to the Construction and  
 Maintenance of Time  
 Balls," Professional  
 Papers of the Signal  
 Service 5 (Washington,  
 D.C.: Government  
 Printing Office, 1881))



rise of the artistic movement now known as "modernism." Theorists have imputed to modernity a "new consciousness, a fresh condition of the human mind," and have located its origins in the cataclysmic economic and technological changes of the late nineteenth century. Literary critic Northrop Frye observed that these events fostered "a type of consciousness frequent in the modern world," one that was "obsessed by a compulsion to keep up." Modernity also created "an awareness of contingency as a disaster in the world of time," and spread "a sense of disorientation and nightmare." Modernist literature and painting share a sense of urgency, which could be described as an orientation to the "now."<sup>2</sup> As modernity and modernism took shape, contemporaries identified the strong sense of contingency that permeated European and North American cities; the "vast agglomerations of people in widely contrasted roles and situations" made cities into "places of friction, change and new consciousness."<sup>3</sup> Time balls at once reflected and reinforced this new consciousness. Dropping only once a day, and otherwise standing as mute symbols of *the time*, they monumentalized the now, the present, the instant (Fig. 1).

The first time balls were dropped in Portsmouth, England, in 1829 and Greenwich in 1833 as maritime experiments. Knowing the correct time enabled the determination of longitude, which was central to efficient and safe navigation. But chronometers varied in their going-rate (how fast or slow they ran from day to day), and when in port captains were responsible for rating their timepieces, so that when at sea they could make the necessary corrections and thereby chart their course with certitude.<sup>4</sup> Other means of publicly disseminating the correct time included firing guns, on the presumption that both the report and the gun smoke would alert interested parties as to the time.<sup>5</sup> By 1844 the world's eleven time balls had developed into devices meant to aid ship captains and navigators in the deadly serious task of rating chronometers.

Shortly after moving into its first building on a bluff above the Potomac in 1845, officers at the United States Naval Observatory attached a large sphere to the flagstaff, and at the precise instant of noon (Washington, D.C., mean solar time) the ball was "thrown down by hand." The signal prompting the drop was either orally delivered or "made by hand from an assistant stationed in front of a mean time clock in the

Observatory." After the ball was released it landed on the Observatory's dome, and then rolled to the roof beneath, only to be hoisted up to the top of the pole the next day.<sup>6</sup> It was clearly almost useless to navigators, few of whom would have bothered to anchor so far inland along the Potomac. Perhaps not intentionally, but almost certainly in practice, the naval observatory's time ball fulfilled the same function as did monuments: it defined a public sphere of citizens, those in Georgetown and Washington, who could observe its descent. But rather than glorify a past moment, the time ball heralded the present.

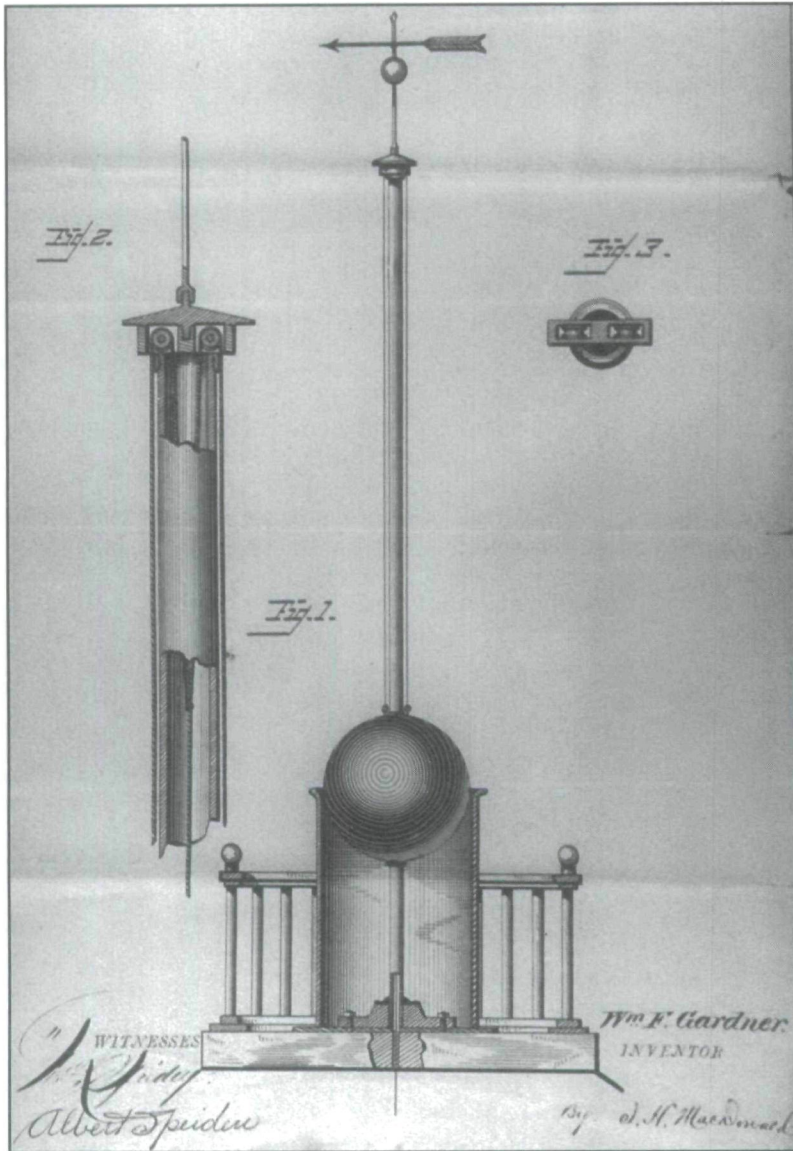
A year previous to the time ball's appearance in the nation's capitol, the introduction of telegraphy made possible the dissemination of accurate time (as determined in astronomical observatories through a variety of means). However, being able to telegraph time signals was not sufficient; some manner of publicly indicating the time once it was transmitted was necessary.<sup>7</sup> After mid century, daily time signals from either a master clock or an observatory were sent to newly established municipal fire alarm systems, and so city and church bells would ring at noon, providing an aural time signal.<sup>8</sup> Railroads also utilized the telegraph's capacity for time dissemination. Before telegraphy they designated a master clock along their routes. Train conductors would set their watch by this clock and carry the time to other depots. The extension of telegraph wires enabled the immediate and rapid transmission of time signals to railroad depots. Once a clerk received the time signal, he was expected to manually reset the straying hands of the clock. By the middle decades of the century, the time on the local railway depot's clock came to serve as the standard in most places. Depots with more than one railroad passing through tended to have more than one clock showing more than one time, such as the depot in Kansas City, Missouri, with its five railroad times and as many clocks.<sup>9</sup> Watch and clock makers in larger port cities were eager for telegraphic connection with observatories for their trade depended in large part on navigators, who insisted on having accurate chronometers. In many cases their proprietors were also officially recognized as municipal timekeepers. Clocks, and in two known instances a miniature time ball, prominently displayed in shop windows made the correct time visible to pedestrians.<sup>10</sup> With the development of automatic means of regulating and resetting clock hands between

the 1860s and 1880s, culminating with the success of the "Self-Winding Clock Company" in the 1890s, the problem of disseminating the correct time was solved.<sup>11</sup> Wireless transmission of time signals was the icing on the cake.

During the time when methods of time dissemination were maturing, few time balls were proposed or built in the United States, in large part because they were considered impractical. For instance, around mid century a prominent Boston chronometer maker pointed out that were a time ball placed on the cupola of the State House, only a small number of city inhabitants would see the ball drop. Furthermore, most navigators in port, if they could see the ball, could little "afford time to prepare and watch for the signal."<sup>12</sup> Consequently, the only two time balls erected between 1845 and 1860 were both on San Francisco's Telegraph Hill in 1852, each of which was a short-lived commercial venture.<sup>13</sup> During the 1860s four time balls were erected, all at the insistence of regional observatories seeking to highlight their ability to deliver accurate time.<sup>14</sup> But in the early 1870s officers of the United States Naval Observatory began to lobby for the erection of time balls in prominent places such as New York City's central business district and the Government Building at the Centennial Exhibition in Philadelphia.<sup>15</sup> It was not until 1877 that a time ball that might rival Washington's 1845, and still operational, device was erected, and this initiated not only a period of technological improvements for time balls, but also their emergence as monuments to modern times.

In 1877, the Western Union Telegraph Company garnered tremendous publicity when it erected a time ball on top of its New York City headquarters, and announced that daily, except Sundays, the ball would drop *precisely* at noon. A seeming wonder of modern technology, the Western Union time ball was connected through the wires to the clocks, transit telescopes, and scientific expertise housed in the nation's premiere observatory, that of the U.S. Navy.<sup>16</sup> When in 1885 the naval observatory's time ball was relocated to the State, War, and Navy Department Building (which was no accident of location, but a deliberate choice meant to communicate the nation's veneration of accurate time), the system for releasing the ball relied on the telegraph and electrical circuitry and thus appeared to be considerably more sophisticated than the earlier one, where the signal was gestural or oral and the ball manually released.<sup>17</sup> By this time large clock-dials, electrically

**Fig. 2**  
*Diagrams from William F. Gardner's Time Ball patent application, 1884, show the time ball pictured as a monument, complete with doric columns. Figure 3 in the diagram represents the releasing apparatus that used both a magnet and an electrical circuit to drop the ball when the noon signal was received via telegraphic circuit. (Boston file, in "Time Ball Reports," Records of the Hydrographic Office, United States Navy, National Archives Records Administration, Record Group 37, Entry 64)*



controlled or synchronized systems of “master” and “slave” clocks in multi-office buildings and factories, and church and fire-alarm bells also announced the time to the public.<sup>18</sup>

Just when other technologies for transmitting the time had developed sufficiently to ensure their feasibility and reliability, interest in time balls heightened. Between the first drop of Western Union’s time ball (1877) and that of the new Washington one (1885), the leading instrument-maker for the United States Naval Observatory, William F. Gardner, perfected the mechanism for releasing the ball when the telegraphic time signal was received, which was acknowledged as “the essential part of the apparatus.”<sup>19</sup> At its most basic, the ball, with a diameter between two and four feet, was

constructed out of a framework of wood, steel or iron and covered with canvas usually either black or red, and weighted sufficiently so that it would drop instantly fifteen to twenty-five feet.<sup>20</sup> Shortly before noon, the ball would be raised, usually by hand, up a staff secured to the top of a building or tower. A few seconds before noon, the releasing apparatus (which utilized a magnet and electrical circuits) was applied, and if all went well an automatic signal would then release the ball<sup>21</sup> (Fig. 2). With such a set-up it is easy to understand how things could go awry: wind or ice could prevent the ball from being hoisted, trouble with the wires could interfere with the signal, the releasing apparatus could be triggered accidentally.<sup>22</sup> More than one officer in charge of time balls made it his “custom to drop the ball by hand,” surely not a reliable way to transmit “accurate time.”<sup>23</sup> When the ball was released at the wrong time, most relied immediately on braking systems to “arrest the ball in its descent,” and later on the local press to notify the public that the ball was dropped in error.<sup>24</sup>

With only the most elementary understanding of the technology, one must wonder how much time balls assisted in the rating of chronometers. The active trade in chronometers in several leading American ports suggests that ship captains frequently rented chronometers (which usually were rated) for their voyages, and paid agents to rate their chronometers while they were in ports of call. To rate chronometers, watch and clock makers, such as William Bond & Son of Boston, received time signals in their shops, either via Western Union’s time service or over dedicated lines from local observatories.<sup>25</sup> As one 1859 circular promised, William Bond & Son “will loan chronometers for long and short voyages,” and the business’s daybooks show that it made good on the promise. Early in 1852 their business was active enough that they called in a lawyer to determine whether or not they were liable for chronometers left “in our charge for rating and repairing.”<sup>26</sup> A catalogue of timepieces to be sold in a public auction in 1876 included the entry: “Lot 5: 45 Second-hand chronometers of various makers. These chronometers are at sea, loaned out.”<sup>27</sup> In 1885 when branches of the Navy’s Hydrographic Office began to offer free rating of chronometers in its offices, Bond & Son and other chronometer merchants were outraged, for rating chronometers was a chief part of their business.<sup>28</sup>

Additionally, evidence gathered by the United States Hydrographic Offices in various ports reinforces this view that few ship captains relied on time balls to rate their chronometers. For instance, the officer in charge of Boston's Hydrographic Office found in 1886 that a prominent member of the Chamber of Commerce had never heard of the time ball, and those city officials who were "in the know" did not make use of it, since "bells are struck all over the city at noon by the Cambridge Observatory." He further reported that "prominent shipping people" assured him "that the ball is seldom if ever made use of by the captains of vessels for rating chronometers." Captains of ships themselves confirmed this report, stating "that they seldom see the ball, and never think of rating their chronometers by it."<sup>29</sup>

Furthermore, the process of using a time ball to rate a chronometer should be considered. Even if the time signal was transmitted without interruptions on the line, if the ball was hoisted without problem, if the battery, electrical circuitry, and magnets were working correctly, and the wind not blowing too terribly hard, so that the ball, therefore, floated down the pole at precisely noon of some known meridian, how would the officer in charge of rating the chronometer have been able to note the time ball's precise moment of release *and* exactly where the hands were on his chronometer, which usually would have been kept in a protected place? Even if an assistant rang a bell or hollered once the ball began its descent, would such an aural signal have been reliable enough to navigate ships with millions of dollars of goods, not to mention countless sailors, officers and passengers on board? If time balls were used to rate chronometers in any significant manner, which I doubt, they must be understood not simply as visual time signals, but as parts of networks of associated signals. More evidence is necessary before it can be proven, but it is plausible to argue, as I am doing here, that time balls were irregularly used to rate chronometers used in navigation.

If it was the case that time balls were impractical, then why did branches of the United States Navy devote significant energies and funds to the construction, maintenance, and operation of time balls after 1884? The answer lies in the monumental nature of the devices, for they were able to signal the presence of the United States Navy in ports where commissioned American ships were only infrequently sighted since the War of 1812.<sup>30</sup>

True, some people set their watches and clocks by the time ball, as did the stagehand at Ford's Theatre the day Lincoln was assassinated.<sup>31</sup> The Boston Hydrographic Officer quoted above concerning the disregard of the time ball in 1886, concluded his comments with the observation that the ball was "of use to hundreds of people who regulate their watches by it, and in all probability there would be much complaint were it removed."<sup>32</sup> The Naval Observatory and the Hydrographic Office, the two departments of the Navy that oversaw the construction, maintenance, and operation of time balls, did not purposefully engage in monument building. Their missions did not stipulate such activity; but in practice, the devices served little other than symbolic purposes. Time balls played a minor role in navigation, and a somewhat more pronounced part in the public dissemination of time. But naval officers, commercial elites, and local politicians supported their erection with a passion that does not match the device's limited utility. Time balls derived the critical portion of their desirability in the realm of the symbolic.

Western Union's New York City Time Ball heralded the short golden age of the time ball in American cities. In the spring of 1878 a Boston clock maker's daybook noted "The time ball on top of the building of the Equitable Life Insurance Co. corner of Milk and Devonshire St. was dropped for the first time today." Harvard College's Observatory sent the time signal *gratis*, the United States Army's Signal Service operated the mechanism each day, and Equitable Life Insurance paid for the apparatus.<sup>33</sup> Between the Boston ball's drop and 1883, eight time balls were established in cities as far west as Crete, Nebraska, as far north as St Paul, Minnesota, and as far east as New Haven and Hartford, Connecticut.<sup>34</sup> The most modern of enterprises in 1880, the Connecticut Telephone Company, paid to have a time ball dropped on the roof of its Hartford offices each day, perhaps already acknowledging the telephone's pivotal role in transforming practices associated with time co-ordination and synchronization.<sup>35</sup> Civic leaders hoped that the time ball standing 140 feet above street level in Kansas City, Missouri, which an appropriation from the city council paid for, would "be a prompter of punctuality."<sup>36</sup> Clearly the time ball was a harbinger of modernity, a tribute to instantaneousness and accuracy, an indication of the eagerness to memorialize forward-thinking.

Time balls were among the first material representations of the federal government outside of the District of Columbia. They sprouted up in cities during the same decades that soldiers' homes were spreading across the nation, monuments to American presidents were being dedicated, and federal courthouses were being built in each federal jurisdiction. By 1884 the Navy had secured its long-held right to erect and operate time balls, overcoming a legislative challenge posed by the Army's Signal Service. As it became obvious that uniform and correct time would have to be disseminated across the nation for the worthwhile comparison of geophysical observations, the Signal Service became more and more frustrated with the piecemeal, haphazard manner of time-keeping. So it proposed to erect time balls at fifty-five of its signal service stations (including ones in Bismark, Dakota Territory; Leavenworth, Texas; and Santa Fe, New Mexico Territory) and to cooperate in the maintenance of "public Standard Time Balls" elsewhere. The Navy presented its own plan, which involved placing time balls on the custom houses at ports of entry and in other cities of more than fifteen-thousand residents. Neither of these plans received the kind of political support necessary, most likely since appropriations would have had to amount to more than \$25 000 during a time when the federal budget covered little more than military pensions, and these only for veterans of the Grand Army of the Republic.<sup>37</sup>

So, by 1884, when the prominent time balls in New York City, Boston, and Washington, D.C, and those in upstart places like Kansas City and Crete, Nebraska, dropped, they denoted both dominance and aspiration in scientific, financial, and cultural arenas. They also signalled willingness to lead Americans into disposing of local time in favour of the standard time of time zones, an innovation that railroads had introduced on Sunday, 18 November 1883. Time balls signified connection to accurate and standard time, and represented the knitting together of a nation previously living as if on islands of local time, based on a multitude of meridians, rather than only that of the 75th, 90th, 105th, and 120th. City boosters sought time balls of their own as part of their larger quest for status. However, the prohibitive expense of the equipment and of the telegraphic connections to a reliable source of time prevented most from erecting their very own monuments to modernity.<sup>38</sup>

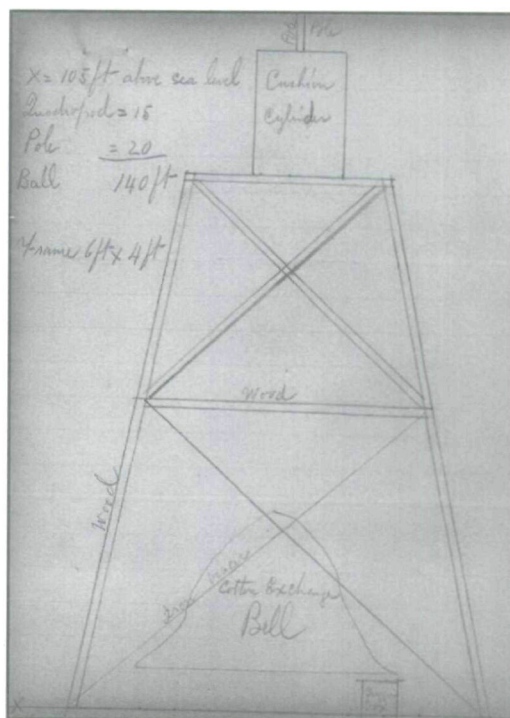
The desire of some places to adorn their newly developing skylines (for it was in this period that skyscrapers made their debut) with symbols of accurate time coincided with the expanded means of the Navy's Hydrographic Office. In 1884 California's Mare Island Navy Yard Observatory began to send signals to a time ball in San Francisco, and in 1885 the Hydrographic Office there took over responsibilities for its maintenance and operation.<sup>39</sup> Soon other cities with branches of the hydrographic service, including Philadelphia, Baltimore, New Orleans, and Portland, Oregon, had time balls of their own.<sup>40</sup> By 1886, authority for Boston's time ball had shifted from the Signal Service to the Hydrographic Office, civic authorities in Akron, Ohio, paid to have a time ball rigged in their city, and under a variety of federal auspices time balls in Savannah (Georgia) and New Orleans joined others in Woods Hole (Massachusetts), Newport (Rhode Island), and Hampton Roads (Virginia).<sup>41</sup> A vogue for time balls had taken hold, despite their limited sphere of usefulness.

Over the next two decades time balls were erected in a variety of prominent sites. The wife of former United States President Polk opened the 1888 Centennial Exposition of the Ohio Valley and Central States, held in Cincinnati, Ohio, on 4 July when a time signal received from Nashville dropped a time ball and triggered the ringing of gongs. The officer in charge of the time ball at the exhibit tried "to do all the missionary work" he could, for Cincinnati was one of the few places in the nation that vociferously refused standard time.<sup>42</sup> A few years later a time ball was placed on the United States Government Building at the Colombian World's Fair, held in Chicago. It was part of the naval observatory's exhibit, which included a master/slave clock exhibit and a display of "chronometers of historical interest and specimens of the best of American manufacture."<sup>43</sup> Between 1899 and 1907, just as wireless transmission of time signals was perfected, the Hydrographic Office initiated time ball service in Baltimore, Chicago, Cleveland, Philadelphia, Sault Saint Marie (Michigan), Buffalo, Galveston, Duluth, Norfolk (Virginia), Key West, and at Cavite Naval Station in the Philippines.<sup>44</sup> In each instance, excluding the last, local commercial organizations materially assisted in the enterprise, mainly by providing permission to use the roof of a prominent building for the apparatus.

A closer look at the history of New Orleans' time ball highlights the monumental nature of the devices. In 1884, the astronomer in charge of Washington University at St Louis's observatory oversaw a time ball exhibit on "the central tower of the Main Building" at the Cotton States Exposition in New Orleans. In addition to releasing the time ball every day at noon, the time signal also regulated "a great many clocks," and was responsible for "a Torpedo exploded in the lake [on exposition grounds]."<sup>45</sup> As it neared when the exhibition would be dismantled, several proposals for erecting a permanent time ball appeared in local papers, with justifications focussing on "the advantage of uniform and accurate time... To banks, courts and railroads the value of precisely correct standard time is a matter of practical moment."<sup>46</sup> The Hydrographic Office prevailed over the Signal Service, and was placed in charge of the time ball service. In June 1885 a fifteen-foot tower with a twenty-foot pole, placing the ball one-hundred-and-forty feet above sea level, was in working order on the roof of the Cotton Exchange, "the highest building in the city except those having steeples." The ball could "be seen from the balconies, upper windows, or roofs of nearly all houses in the city and from nearly all parts of the river front, either from the decks or riggings of ships..."<sup>47</sup> Beneath the ball was the Cotton Exchange's enormous bell, which was struck twelve times each day at noon (Fig. 3).

New Orleans' tribute to modern times attracted crowds. Without any notice in papers, "a very large crowd gathered on the streets to witness" the first noon drop of the time ball.<sup>48</sup> The next day "an immense crowd on the streets" again waited "to see the Ball drop." But it did not, due to trouble with the telegraphic signal.<sup>49</sup> The monthly reports documenting the erratic performance of New Orleans' time ball that span several years throw into doubt the New Orleans Maritime Association's assurances, stated in a letter to the Chief of the Hydrographic Office, that "all the principal jewelers, chronometer makers etc. take advantage of its [the time ball's] indisputable accuracy." Nor is it possible to take as a fact the association's additional endorsement that "many strangers and residents compare their timepieces daily upon the dropping ball."<sup>50</sup>

Until 1909, when "the Time Ball was carried away during the gale of September 20," a hydrographic officer, or someone he dispatched, would hoist the Cotton Exchange's time ball.<sup>51</sup>



**Fig. 3**  
New Orleans Time Ball on the Cotton Exchange Building, 1885. The Cotton Exchange Bell draws attention to the central role bells played in communicating the time throughout urban areas even as time balls were erected at great cost. (Letter from New Orleans Branch Hydrographic Office to Hydrographic Office, dated 25 June 1885, in "Time Ball Reports," Records of the Hydrographic Office, United States Navy, National Archives Records Administration, Record Group 37, Entry 64)

Sometimes it would drop at noon, other times it would not. That anyone set his or her timepiece by it is unlikely; that it imputed to the once thriving port a semblance of efficiency and punctuality is likely, though the descriptions of visitors to the city during this period need be consulted for confirmation. Over the next four years letters were exchanged, meetings held, and surveys commissioned in order to determine where the new time ball should be erected. New tall buildings overshadowed the Cotton Exchange, and the Navy wanted to ensure navigational use of the time ball by moving it to a site visible from all docks, which was almost impossible given the city's location on a crescent-shaped bend in the Mississippi River. But the time ball had never served as a navigational device, and with the introduction of wireless transmission of time signals a few years earlier, the effort to impute navigational value was hopeless. In 1910 the mast and ball on the Cotton Exchange were dismantled; and in 1913 it was clear that the time ball had vanished permanently from the cityscape.<sup>52</sup> New Orleans no longer had the political or commercial will to maintain a time ball, in part because a host of monuments enshrining the "Old South" and the "Lost Cause" recast the city as a site of tradition and history rather than of the future, let alone "the now."

Just as New Orleans' time ball landed on the junk heap, other younger cities replaced

theirs with bigger, more elaborate versions, placed atop the tallest of the new skyscrapers that now crowded downtown districts. By the 1910s many ships were outfitted with wireless receivers that picked up time signals sent from several points, including Paris' Eiffel Tower. That urban Americans watched for the drop of the ball is documented, what exactly they were looking for is not. The hydrographic officer in Portland, Oregon, noted in 1909 that he saw many people "standing in the park, on the corners, etc. etc. at noon waiting for the ball to move," which he surmised showed "the close watch people keep on the ball and the value of its existence here."<sup>53</sup> The only navigational direction the balls provided was to avid participants in the consumer culture, for they were sited in the most prominent commercial buildings. In 1909 the hydrographic service sponsored the construction of a time ball on the roof of San Francisco's Fairmont Hotel; in 1910 it installed a time ball on the floor of the Philadelphia Bourse; and in 1911 it agreed to fund the erection of a new ball on top of the Maryland Casualty Company Tower, which when completed in 1912 would be Baltimore's tallest building, and one of the taller buildings in the nation.<sup>54</sup>

Around the same time, considerable speculation circulated about where to move New York City's time ball, since the one on the Western Union building was no longer visible. The hydrographic officer stationed in New York City observed that "a visible noon time signal is thought to be desirable solely for the sentimental reason that this great port should not be without one." He explained that "Observatory Time clocks are to be found in nearly every office in this City; that wireless noon signals can be used by almost every steamer; that nautical firms, not only take charge of and rate chronometers, but also when requested send Agents to ships to correct

chronometers." He added that "the most conspicuous and best known location in the City," the Metropolitan Life Tower, had a "thoroughly admiral night signal."<sup>55</sup> In the end a new ball was erected on the Seaman's Church Institute Building in 1913, and the Western Union Time Ball was discontinued the following year. New York City had enough monuments to modernity; it no longer needed a prominent time ball.

During the same period the chambers of commerce, leading businessmen, and city councils of smaller cities seeking distinction petitioned various branches of the navy for time balls. In 1891 the Fall River (Massachusetts) Yacht Club enthused that a time ball would "be a great card for us." Others seeking time balls for advertising purposes between 1905 and 1924 included a large wholesale and retail business in Rochester (New York), the Knoxville Tennessee Bank and Trust, Pensacola Florida's Chamber of Commerce, the Honolulu Photo Supply Service, Jacksonville's (Florida) Board of Trade, a Salt Lake City investment company, Tampa's (Florida) Board of Public Works, a congressman from Alexandria (Virginia), the mayor of San Diego, and a Lynn (Massachusetts) newspaper.<sup>56</sup> The Navy did not build time balls for any of these applicants, and the record does not show if private concerns filled the breach. During the First World War the hydrographic office dismantled most of its time balls; by 1922 only a few were in service; and in 1936 the naval observatory's time ball was "decommissioned." Today the few time balls that remain are on display somewhere along San Francisco's and New York City's waterfronts. These outdated, curious monuments continue to serve as registers of a modernity long since past, even if they will never again be dropped daily, except Sundays, at noon.

#### NOTES

I wish to acknowledge with gratitude the assistance of Shirley Teresa Wajda, Tom Knock, Marta Braun, the journal's anonymous reader, and Adam Herring. I also wish to thank the National Endowment for the Humanities and Southern Methodist University's Research Council who each provided research funding during the 1999–2000 academic year.

1. The epigram is from an unsigned letter in volume 5, Miscellaneous letters received, United States Naval Observatory (USNO), National Archives Records Administration (NARA) Record Group (RG)

78, Entry 13, Volume 5. Notations in two different hands at the beginning and end of the letter suggest the author could have been "W. T. Sampson," or "Lieutenant Casey." It may be that Sampson was the letter's author; he was the Superintendent of the USNO for a few months in 1882 and attended the Washington Meridian Conference in 1884. For the purposes of this article, it was not necessary to determine who wrote the letter.

On the origins of the time ball see Ian R. Bartky and Steven J. Dick, "The First Time Balls,"



- Journal for the History of Astronomy* 12 (1981): 155–164; P. S. Laurie, “The Greenwich Time Ball,” *The Observatory* 77 (1958): 113–115; and “The Time-Ball at Greenwich,” *Nautical Magazine* IV (1835): 584–586. About the first time ball in North America see Ian R. Bartky and Steven J. Dick, “The First North American Time Ball,” *Journal for the History of Astronomy* 13 (1982): 50–54, reprinted in the National Association of Watch and Clock Collectors (NAWCC) *Bulletin* 41 (1999): 741–744. The same issue of the NAWCC’s *Bulletin* describes the United States Naval Observatory’s co-ordination of a round-the-world time ball drop at twenty sites on six continents to help usher in the year 2000.
2. Malcolm Bradbury and James McFarlane, “The Name and Nature of Modernism,” in *Modernism, 1890–1930*, ed. Malcolm Bradbury and James McFarlane (New York: Penguin Books, 1976), 22, 27, 26. Frye is quoted from *The Modern Century* (1967) in Bradbury and McFarlane, “The Name and Nature of Modernism,” 22. Bradbury and McFarlane observe that the sense of urgency is one of the elements that unites the great variety of modernist works, 50.
  3. Malcolm Bradbury, “The Cities of Modernism,” in *Modernism, 1890–1930*, 98. See also Eric Homberger, “Chicago and New York: Two Versions of American Modernism,” in *Modernism, 1890–1930*, 151–161.
  4. On the relationship between time keeping, longitude and navigation the following are the most helpful sources: Dava Sobel and William J. H. Andrewes, *The Illustrated Longitude* (New York: Walker, 1998); William J. H. Andrewes, ed., *The Quest for Longitude* (Cambridge: Harvard University Press, 1996); Dava Sobel, *Longitude* (New York: Walker, 1995); J. E. D. Williams, *From Sails to Satellites: The Origin and Development of Navigational Science* (New York: Oxford University Press, 1992).
  5. Bartky and Dick, “The First Time Balls,” 156. When considering erecting a time ball for the port of New Orleans, the New Orleans Branch Hydrographic Officer suggested that “in case a pole could not be erected, it would be an easy matter to run wires to a cup or container projecting two or three feet from the wall at the upper window [of the Shot Tower] and explode a small quantity of powder. The smoke would probably show more plainly than a ball and could be as correct in time.” Letter dated December 26, 1884, in “Time Ball Reports,” Records of the Hydrographic Office (HO), United States Navy, NARA, RG 37, Entry 64.
  6. The account of the time ball being released manually is quoted in Bartky and Dick, “The First North American Time Ball,” 51 and in Ian Bartky, *Selling the True Time: Nineteenth-Century Timekeeping in America* (Stanford: Stanford University Press, forthcoming), 48. (This citation and all subsequent ones are based on uncorrected page proofs provided by the press and in the author’s possession.) The other quotation and description are from H. S. Pritchett, “The Kansas City Electric Time Ball,” *Kansas City Review of Science* 4 (April 1881): 720.
  7. At the outset the meaning of accurate time (or “true time”) needs to be made clear. Mean solar time was determined through a series of astronomical observations based on the position of the stars in relation to the observer’s exact geographical location, usually expressed in terms of meridian. Knowledge of the correct time at a known meridian and of the correct time at an unknown meridian enabled the determination of longitude, and thus location. For uses other than navigation, the accuracy of the time measurement was not vital. What mattered was that communities of people who sought to synchronize their activities were using the same time. So, for decades most Americans found local time emanating from one standard clock or bell sufficient; the source, which could have been incorrect from an astronomer’s point of view, still ably served the community. When I use “accurate time” and “true time” I mean time as determined through astronomical observations. For a more detailed explanation concerning “true time,” see Bartky, *Selling the True Time*.  
 In 1883 the railroads, at the prompting of the scientific community, successfully introduced “Standard Railway Time,” or what I will call “Standard Time,” which provided five geographical zones with a common time based on the 60th, 75th, 90th, 105th, and 120th meridians. This brilliant plan for standardizing time separated each zone by an hour, and silenced the cacophony of local times, which had been interfering with train scheduling, geophysical observations, and time dissemination. After this point, most time that was disseminated was accurate according to uniform meridians, rather than according to the sun. So noon by the clock might not have been noon by the sun in any given place. About the introduction of standard time see: Carlene E. Stephens, *Inventing Standard Time* (Washington, D.C.: Smithsonian Institution, 1983); Stephens, “‘The Most Reliable Time’: William Bond, the New England Railroads, and Time Awareness in Nineteenth-Century America,” *Technology and Culture* 30 (1989): 1–24; Ian R. Bartky, “The Adoption of Standard Time,” *Technology and Culture* 30 (1989): 25–56; Michael O’Malley, *Keeping Watch: A History of American Time* (New York: Penguin, 1991), Chapters 2 and 3.
  8. Bartky, *Selling the True Time*, 50–58. Bartky has found that by 1900 more than 750 cities had municipal fire alarm systems, and since attaching a time service to these alarms was a relatively inexpensive operation, we can assume that many of them were used to publicly disseminate civic time.
  9. Bartky, *Selling the True Time*, 19–30. Bartky shows that before the 1850s railroads often used local time and took their time from whatever was known as the reliable source in the area. After the 1850s they began to seek accurate time, and thus to use the telegraph to get it from observatories. In 1852 a railroad that also owned a telegraph line — New York & Erie Railroad — synchronized its clocks via telegraphed time signals (and also moved trains using the telegraph) starting in 1852 (Bartky, *Selling the True Time*, 60).
  10. Bartky, *Selling the True Time*, 8, 50, 78–79. A miniature time ball in an Albany jewellery shop

window and connected to the Dudley Observatory was the city's public time signal from 1861 until 1867 (Bartky, *Selling the True Time*, 72). Between 1863 and 1867 the Detroit Observatory, which received time signals from the University of Michigan, Ann Arbor, sent a signal to a miniature time ball in a jeweller's window in Detroit (Bartky, *Selling the True Time*, Appendix).

11. Bartky, *Selling the True Time*, 183–193.
12. William F. Bond quoted in Bartky, *Selling the True Time*, 53–54.
13. Bartky and Dick, "The First North American Time Ball," 53.
14. The Dudley Observatory in Albany, New York sent signals to two time balls in Albany — one was on the roof of the capitol building (1860–1861) and the other in a jewellery shop window (1861–1867) — and to a time ball in New York City (1860). The Detroit Observatory, part of the University of Michigan, Ann Arbor, began sending signals to a jeweller's time ball in Detroit in 1863, and did so until 1885. Bartky, *Selling the True Time*, 71–72, 235, and Appendix.
15. Bartky, *Selling the True Time*, 79, 105, 245. The United States Naval Observatory's *Annual Report* for 1872 proposed building a time ball in New York City that would daily receive signals from the Washington observatory. In 1875 or 1876 the Superintendent of the Naval Observatory was disappointed when his request for appropriations for a time ball for the Centennial Exposition was denied.
16. O'Malley, *Keeping Watch*, 88; Bartky, *Selling the True Time*, 108–110; "Standard Time: the New Western Union Time Ball in Operation," *Journal of the Telegraph* 10 (October 1877): 289–290; Edward S. Holden, "On the Distribution of Standard Time in the United States," *Popular Science Monthly* 11 (1877): 175–182; *Scientific American* 39 (November 1877): 335, 337.
17. An 1885 letter from the Navy's Chief of the Bureau of Navigation instructed the Superintendent of the Naval Observatory: "A time-ball having been placed on the central pavilion of the Navy department building you will be pleased to discontinue dropping one from the Naval Observatory." Letter dated 28 September 1885, Letters Received, USNO, NARA, RG 78, Entry 8, Box 2.
18. Ian R. Bartky's monograph, *Selling the True Time*, which is about timekeeping in the United States during the nineteenth century carefully details each of these means of distributing the time to the public.
19. U. S. Department of War, Army Signal Office, "Information Relative to the Construction and Maintenance of Time Balls," *Professional Papers of the Signal Service* 5 (Washington, D.C.: Government Printing Office (GPO), 1881), 11.
20. Two other kinds of balls were possible: one was made out of thin sheets of metal, so "that the visual effect of a solid ball is secured," and the other utilized rolled-plate copper, about one-eighth of an inch thick. The former ball weighed considerably less than the latter, of which Boston's 400-pound time ball was the only existing example. "Information Relative to the Construction and Maintenance of Time Balls," 11. Reports from Branch Hydrographic Offices (BHO) between 1885 and 1925 provide various descriptions of balls, most of which were variations on the covered frame type. See "Time Ball Reports," HO, NARA, RG 37, Entry 64 and Correspondence of the U.S. Hydrographic Office, 1908–1927, HO, NARA, Entry 41, Boxes 49–51.
21. It seems that most time balls were black, including the first ball on the naval observatory, which was made of black India rubber, but the Boston one was copper, and some others were red. A few proposals bemoaned the ball's poor visibility on cloudy days. For instance, the Branch Hydrographic Officer in Portland, Oregon, reported in 1908: "I have approached several navigating officers upon the subject of painting the time-ball itself a different color. One that will make it a more noticeable and distinct object. It is now black. The tank and stand are also black. For half of the year the sky in this locality is heavily overcast and rain falls quite steadily. With the ball painted bright red with a wide white horizontal stripe around its equator it would offer a much better object from which to make observations. The officers all thought this an improvement and I am of the same opinion." (Letter dated 23 July 1908, Correspondence of the U.S. Hydrographic Office, 1908–1927, HO, NARA, RG 37, Entry 41, Boxes 49–51). On the other hand, the Branch Hydrographic Officer in Chicago wanted to paint the red ball he was in charge of black in the effort to improve its visibility in cloudy weather. (Letter dated 12 July 1909, Correspondence of the U.S. Hydrographic Office, 1908–1927, HO, NARA, RG 37, Entry 41, Boxes 49–51). Neither of these proposals undermine the thesis that the devices functioned primarily as monuments: keepers of monuments often express concern about visibility as well as about the viewing process itself.
21. "Information Relative to the Construction and Maintenance of Time Balls," 11. For a clear description of the time ball apparatus and how it worked, see also "Time Balls," a chart dated 19 October 1886 in USNO letters received, USNO, NARA, RG 78 Entry 8, Box 4.
22. Monthly time ball reports from the Branch Hydrographic Offices that maintained time balls detail the numerous incidents that prevented the dropping of the ball. (Correspondence of the U.S. Hydrographic Office, 1908–1927, HO, NARA, RG 37, Entry 41, Boxes 49–51 and "Time Ball Reports," HO, NARA, RG 37, Entry 64). The USNO's records contain reports from time balls that it was responsible for, primarily the ball at the Mare Island Naval Station and the ball at Torpedo Station on Rhode Island's coast. (USNO, NARA, RG 78 Entries 5–13).
23. Quotation from letter from Portland, Oregon BHO to HO, dated 18 February 1911, Correspondence of the U.S. Hydrographic Office, 1908–1927, HO, NARA, RG 37 Entry 41, Boxes 49–51. In this letter the officer goes to great pains to make it clear that he "can drop the ball EXACTLY at NOON" (emphasis in the original).
24. "Information Relative to the Construction and Maintenance of Time Balls," 11. The time ball reports referred to in note 22 often note if the press was informed of an error, and whether the officer

- sought through visual signals, such as lowering the ball slowly, to warn the public concerning the signals' unreliability.
25. Bartky, *Selling the True Time*, Chapter 3. William Bond & Son began receiving telegraphic time signals from Harvard Observatory 13 May 1852. Entry dated 13 May 1852 in Daybook 1852–1857, Box 15, Records of William Bond & Son, 1763–1921, Harvard Historical Scientific Instruments Collection, Harvard University.
  26. Circular dated Boston, 1 July 1859, in Box 3, Business Records, 1808–1931, Records of William Bond & Son. Entries dated 31 March 1852, 26 October 1853, and “List of Chronometers for Sale and on Loan, 1852” in Daybook 1852–1857, Box 15, Records of William Bond & Son.
  27. “Catalogue of Chronometers, Watches, Clocks, etc.,” Folder 1, Box 3, Business Records, Records of William Bond & Son. The auction's first three lots included 29 new chronometers, and the sixth lot included 66 “old chronometers, mostly not in order.”
  28. William Bond & Son's daybook entry for 8 April 1885 reads “This [the free rating of chronometers by the Hydrographic Office] was commenced a few months ago, and having now become a serious evil and injury to the business, we today sent a protest to Commander J. G. Walker, Chief of Bureau of Navigation. It was signed by ourselves, Jas. Munroe & Son, Wm. E. Haddock & Co. and thirty merchants & ship owners.” Daybooks 1857–1903, Box 15, Records of William Bond & Son.
  29. Letter from Boston BHO to HO dated 9 July 1886. HO, NARA RG 37 Entry 64.
  30. In the 1830s the Navy's fleet had all of twenty-one ships. By the 1850s it had grown very little; its six squadrons of about five ships each was, according to one of the Navy's leading historians, “not an impressive array of fire power by European standard.” Lack of funding would keep the fleet small, but naval officers and politicians committed to fostering American naval power were intent on demonstrating the superiority of the United States in contrast with Europe, so they turned to less expensive activities than ship-building, and promoted a variety of scientific enterprises. After the Civil War, sentiments were strongly in favour of keeping the navy small, but as European powers moved closer and closer in, the Pacific and the Caribbean sentiments shifted toward favouring growth. The first significant move in that direction was in 1883, when Congress approved a bill appropriating funds for four warships to be built of American steel. After 1885 four more ships were added to the fleet, and in the 1890s the United States became a naval power. Still, in 1889 the United States Navy had forty-four ships in service or under construction, which placed it twelfth among the “naval powers,” behind Turkey, Portugal, and of course Great Britain, with her fleet of 367 ships. Kenneth J. Hagan, *This People's Navy: The Making of American Sea Power*, (New York: Free Press, 1991), 106, 145, 157, 177–178, 187, 195, 197.
  31. “I fixed the clock in the vestibule by the ball today, and it is right by that.” (James Gifford, stage carpenter at Ford's Theatre, 14 April, 1865). *Trial of John H. Surratt in the Criminal Court for the District of Columbia*, vol. 1 (Washington, D.C.: GPO, 1867), 571, Quoted in Bartky, *Selling the True Time*, 47.
  32. Letter from Boston BHO to HO dated 9 July 1886. HO, NARA RG 37 Entry 64.
  33. Entry dated 8 May 1878, Daybooks 1857–1903, Box 15, Records of William Bond & Son. See also O'Malley, *Keeping Watch*, 87; Bartky, *Selling the True Time*, 110.
  34. Bartky, *Selling the True Time*, Appendix.
  35. Bartky, *Selling the True Time*, 159.
  36. H. S. Pritchett, “The Kansas City Electric Time Ball,” 721, 723.
  37. About the efforts of the Navy and the Signal Service to enact favourable time-ball legislation, see Bartky, *Selling the True Time*, 120–127; O'Malley, *Keeping Watch*, 93–94. Bartky's and O'Malley's accounts differ. For facts, Bartky's should be consulted; for context and analysis, O'Malley's is useful. The first piece of time-ball legislation was H. R. 3769 (1880); in the next session of congress H. R. 594 (1881) was introduced. See also, U.S. Congress, House of Representatives, Committee on Commerce, 47th Congress, 1st session, “Meridian Time and Time Balls on Custom-Houses,” 1882 (House Report 681). About the Signal Service's plans see *Conditions on Which the Chief Signal Officer Co-Operates With Others in the Maintenance of a Public Standard Time Ball and Stations at Which the Signal Service Can, At Present, Maintain Time Balls*, memorandums each dated 1881 in William F. Allen Papers, New York Public Library, Box 2, Folder 4.
  38. In 1881 it was estimated that the simplest time ball apparatus would cost between \$100 and \$150, and clock signals (or the instruments to obtain the correct time) would cost considerably more. But typically, the time ball apparatus cost anywhere from \$600 to \$2000. A memo from 1914 gives the cost of Boston's time ball and its erection in 1903 as being \$1481; Philadelphia's in 1904 as being \$1410; Baltimore's in 1905 as being \$493 and Portland, Oregon's, in 1906 as being \$260. See “Information Relative to the Construction and Maintenance of Time Balls,” and “Cost of Time Balls,” Correspondence of the U.S. Hydrographic Office, 1908–1927, HO, NARA RG 37 Entry 41 Boxes 49–51.
  39. Bartky, *Selling the True Time*, n. 29, 266–267.
  40. Letter to Edward Pickering from HO dated 5 May 1885, “Fair Copies of Letters Sent Feb. – Sept. 1885,” HO, NARA RG 37 Entry 15; Memo to Superintendent USNO from HO dated 12 August 1913, Correspondence of the U.S. Hydrographic Office, 1908–1927, HO, NARA, RG 37, Entry 41, Boxes 49–51.
  41. “Time Balls,” chart dated 19 October 1886 in USNO letters received, USNO, NARA, RG 78, Entry 8, Box 4. This chart is very useful in that it identifies the exact location of the time ball, its geographical position, its dimensions, how far the ball drops, and how far it is above sea- and ground-level. An 1887 circular titled “Programme of Work to be Pursued at the Naval Observatory, Washington, During the Year 1877,” indicates that the Fish Commission sponsored the Woods Hole time ball; the Torpedo

- Station sponsored the Newport, Rhode Island one; the Hydrographic Office sponsored the time balls in Philadelphia, Baltimore, New Orleans, and on San Francisco's Telegraph Hill; and that the naval observatory sponsored the time balls in Washington, D.C., Hampton Roads, and Savannah. (USNO, NARA, RG 78, Entry 8, Box 5). Bartky points out that a time ball was established in Akron, Ohio (*Selling the True Time*, Appendix).
42. Quotation from letter from A. B. Clements to USNO Superintendent, R. L. Pythian, dated 4 August 1888, USNO, NARA, RG 78, Entry 9, Box 1. See also letters dated 29 June 1888 and 17 July 1888, USNO, NARA, RG 78, Entry 9, Box 1. A telegram dated 4 July 1888 sent to USNO Superintendent Pythian from A. B. Clements read: "Mrs Ex prest Polk opened the exposition by signal from Nashville on Obsy time gong. Noon signal rec and clock connected." (USNO, NARA, "Telegrams Received 1886-1906," RG 78 Entry 15.)
  43. "Report of the State of the Naval Observatory Exhibit," submitted 31 May 1893, USNO, NARA, "General Correspondence of the USNO, 1892-1908," RG 78, Entry 11, Box 3.
  44. Chicago and Cleveland's service began in 1899; Sault Saint Marie's in 1900; Buffalo and Galveston's in 1901; Duluth's in 1902; Norfolk, Virginia's in 1904; and Key West's in 1907. Memo dated 12 August 1913 to USNO Superintendent Jayne, Correspondence of the U.S. Hydrographic Office, 1908-1927, HO, NARA, RG 37, Entry 41, Boxes 49-51; letter from Key West BHO to HO dated 22 August 1907, Correspondence of the U.S. Hydrographic Office, 1908-1927, HO, NARA, RG 37, Entry 41, Boxes 49-51; "Asiatic Fleet General Order No. 19" dated 6 January 1908, Correspondence of the U.S. Hydrographic Office, 1908-1927, HO, NARA, RG 37, Entry 41, Boxes 49-51.
  45. "Time Ball," *New Orleans Times Democrat*, 24 February 1885.
  46. "Suggestions as to the Time Ball," Letter to the Editor from S. Waterhouse, *New Orleans Times Democrat*, 21 February 1885.
  47. Letter from W. P. Ray, New Orleans BHO, to Charles E. Black, President of New Orleans Cotton Exchange, dated 8 June 1885, "Time Ball Reports," HO, NARA, RG 37, Entry 64; letter from Ray to HO dated 9 June 1885, "Time Ball Reports," HO, NARA, RG 37, Entry 64; letter from Ray to HO dated 25 June 1885, "Time Ball Reports," HO, NARA, RG 37, Entry 64.
  48. Letter from Ray to HO dated 25 June 1885.
  49. Letter from New Orleans BHO to HO dated 26 June 1885, "Time Ball Reports," HO, NARA, RG 37, Entry 64.
  50. Letter from the President of the New Orleans Maritime Association to HO dated 19 June 1886, "Time Ball Reports," HO, NARA, RG 37, Entry 64. Extant time ball reports from New Orleans span the periods between October 1885 and December 1887 and February and July 1888. After July 1888 it appears that time ball reports were no longer kept.
  51. Letter from BHO to HO dated 21 September 1909, Correspondence of the U.S. Hydrographic Office, 1908-1927, HO, NARA, RG 37, Entry 41, Boxes 49-51.
  52. See letters, memos, and maps in New Orleans file, Correspondence of the U.S. Hydrographic Office, 1908-1927, HO, NARA, RG 37, Entry 41, Boxes 49-51. The last letter on the subject is dated 17 February 1913.
  53. Letter from Portland, Oregon BHO dated 27 December 1909, Correspondence of the U.S. Hydrographic Office, 1908-1927, HO, NARA, RG 37, Entry 41 Boxes 49-51.
  54. See the files on Philadelphia, Baltimore, and San Francisco in Correspondence of the U.S. Hydrographic Office, 1908-1927, HO, NARA, RG 37, Entry 41, Boxes 49-51. See also J. C. Burnett, "'Tis Noon When the Time Ball Drops on the Fairmont Roof," *San Francisco Sunday Call*, 23 May 1909. The story behind the Maryland Casualty Company's success in getting the time ball on its building bears more research. The letters on file from owners of other buildings in Baltimore seeking the same privilege suggest that the housing of the time ball was a plum prize.
  55. Letter from New York City BHO to HO dated 6 April 1911, HO, NARA, RG 37, Entry 41, Boxes 49-51.
  56. Letter from C. S. Randall to USNO Superintendent dated 12 April 1891, USNO, NARA, RG 78, Entry 9, Box 7. Fall River, Massachusetts, was one of the first places to publicly disseminate time in the nation. The requests for time balls can all be found under each cities' name in Correspondence of the U.S. Hydrographic Office, 1908-1927, HO, NARA, RG 37, Entry 41, Boxes 49-51.