

## **Framing Nature: The Formative Years of Natural History Museum Development in the United States<sup>1</sup>**

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By printing the then familiar phrase “book of nature” on his admission ticket (Fig. 1) for his Philadelphia Museum, Charles Willson Peale insisted that nature could be better understood by careful study of its artifacts arranged in coherent order. Eventually provided space in prominent public buildings, Peale found it a challenge to frame his displays so that they simultaneously intrigued and educated audiences by the familiar and not-so-familiar specimens that constituted his museum.<sup>2</sup> Linnaean nomenclature and narrative labels gave individual specimens particular significance even as their juxtaposition created opportunities for visitors to make discoveries about the relationships among them. In the early nineteenth-century, the objects were expected primarily to “speak for themselves”; or, as Steven Conn put it, the early natural history museums offered “naked eye” science to audiences presumed to be able interpret the objects before them.<sup>3</sup> A century later, museums would be more didactic in their presentations, selecting materials in carefully designed exhibits that showed greater self-consciousness about museum standards and with specific audiences in mind. Designing museum facilities, outside as well as inside, became part of the process of defining, indeed continuously redefining, museum identity as well. This account reveals that local influences were often paramount, even as an evident standardization of museum goals and functions reflected national and international influences as museums became ever more prominent civic and scientific facilities.



FIGURE 1. Charles Willson Peale designed the tickets and his son Ruben managed the business end of the transaction.

Only recently have scholars begun to investigate common themes, over time and in specific places, that constitute the phenomenon of modern museum development, particularly with regard to those institutions dedicated to natural history. Such research provides an essential backdrop for scholars and others who wish to understand particular institutions and to escape narrow, celebratory accounts that emphasize uniqueness and presumed “firsts.”<sup>4</sup> As historians of science turned their

attention to the history of museums just over two decades ago, they concentrated much of their attention on the scientific and cultural aspects of institution building, on the founders and administrators who articulated the purposes of the museums, and on the broad profile of collections acquired.<sup>5</sup> The physical location and facilities for early museums like Peale's were pragmatic choices, and, until recently, historians of science largely took these material settings for granted, with the exception of a recent book on Victorian museum building in Britain.<sup>6</sup>

Given the fact that the California Academy of Sciences is about to embark on a new building phase, this seemed an opportune time to look back historically, albeit briefly, at the ways museums framed their collections — quite literally in wood, brick, stone and mortar. This analysis is informed by the more detailed research that has been done on the architectural history of art museums whose history runs parallel to but is distinctive from those for natural history.<sup>7</sup> Certain questions motivated this research: How were practical necessities, symbolic virtues, and scientific ambitions balanced, especially as special-purpose buildings were designed as museums? What characteristics can we discern in museums built by early entrepreneurs and societies that continued into and through what many have called the “golden age” of museums, particularly the latter half of the nineteenth into the early twentieth centuries? To what extent were these fundamental elements in museum design self-consciously derived from an emerging architectural tradition and in what ways did local preferences and technical innovations play into museum design? This preliminary overview of museum architecture and planning can reveal something of the ideas that were in play and negotiated among patrons, architects, curators, and audiences. Ideas about museum design and construction were also deeply influenced by increasing leisure among the middle classes and reflect some of the cultural tendencies also found in botanical gardens, zoological parks, and intermittent expositions.

### ESTABLISHING EARLY AMERICAN MUSEUM ENTERPRISES

Peale's home on Lombard Street, like homes of many other artists, served as his art studio and display gallery in the 1780s. Large mastodon bones left in his studio garnered such attention that he began to add other natural objects and soon his incipient museum outgrew its space in his home.<sup>8</sup> Such domestic natural history had, as Paula Findlen's account of Italian museums points out, significant social and civic dimensions during the seventeenth and eighteenth centuries.<sup>9</sup> Wooden cabinets (Fig. 2) preserved valuable specimens and were integrated into larger rooms or wings of homes that could be shared with visitors as well as family. Naturalists and other collectors saved, described, and organized their materials in various symbolic and aesthetic ways for themselves and others who shared their inter-

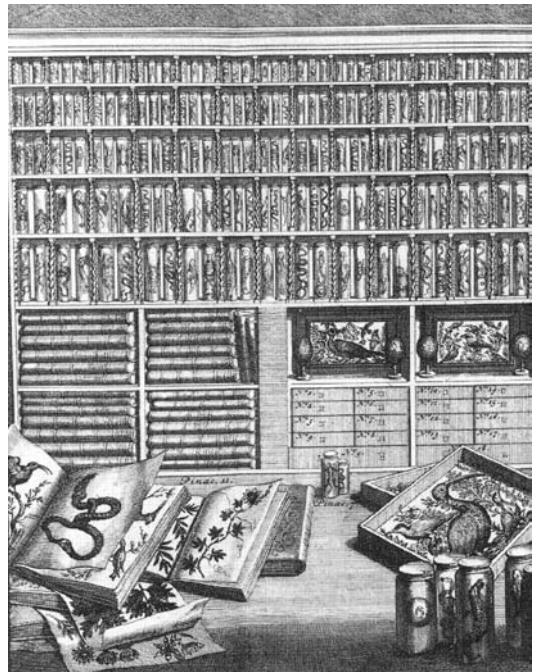


FIGURE 2. Wooden cabinets, with shelves and drawers that served to hold the collections of individuals whose specimens could thus be shared but also privately owned, remained a standard feature in natural history societies. These popular cabinets were steadily improved, with metal lining and other features that could protect the specimens from dirt and insects.

ests. These objects on display, however, also marked their owners' status, knowledge, and civic sensibility. As European intellectual practices and institutions were translated into colonial settings, small museum holdings became part of urban culture, and in some cases plantation culture, by the late eighteenth century in North America.<sup>10</sup>

Most outstanding was Charles Willson Peale's collection which was growing, as its proprietor hoped, to be a museum destination worthy of the new republic. In 1794, he rented space in Philosophical Hall (Fig. 3), which had been built just six years earlier. The American Philosophical Society was re-energized by Peale's genuine enthusiasm for science, and his collection acquired intellectual panache by affiliation with local and visiting foreign naturalists. In 1811 he was granted space in perhaps the most prestigious building in Philadelphia, now known as Independence Hall (Fig. 4), which had housed the Congress of the United States before the capitol was relocated to Washington, D.C.<sup>11</sup> The old State House, shown here on election day in 1816, was by then being used for city court and office business in side wings. Peale



FIGURE 3. The American Philosophical Society built a hall that served as its meeting place for members as well as its library and museum.



FIGURE 4. Philadelphia's Independence Hall had housed the first Congress of the United States before the capitol was relocated to Washington, D.C.



consistently argued, as in a public lecture published in 1800, that “Natural History is not only interesting to the individual, it ought to become a National Concern since it is a National Good.”<sup>12</sup> The collections themselves were thus symbolically accommodated in spaces designed for civic purposes in the young republic. Peale’s goals and experiences proved remarkably prescient about the public nature of science and the scientific role of natural objects.<sup>13</sup> In the early nineteenth century, the emphasis was on documenting the diversity of nature, putting newly discovered species into a taxonomy, and contemplating the pattern of an ordered universe. The mastodon was important for many reasons, not least of which were questions relating to extinction, to the nature of the Americas, and to its place in the natural order that might be discovered by comparison to the skeletons of living animals.<sup>14</sup> While the mere size certainly attracted the attention of many visitors, Peale encouraged the kind of intellectual curiosity that could be awakened by raising more scientific and philosophical questions.

When Peale began to develop a natural history collection, acquired by both chance and intentional acquisition, he was committed to making the materials in some way both reflect and invite participants into the new civic experiment.<sup>15</sup> Overhead costs of acquisition and maintenance required a relatively steep admission price (twenty-five cents) even as the entrepreneur needed to make his holdings as accessible as possible. The floor plans for Peale’s space (Fig. 5) reveal his use of a long central corridor and adjoining rooms on the second floor. Several centuries of private collecting had resulted in standardized wooden cabinets (increasingly glass-fronted as that technology improved over the century) with rows of shelves along high-ceiling walls; the central corridor housed additional cases and over-sized specimens, often large skeletons. The Long Room of the old State House fit such practical requirements admirably. Peale’s famous self-portrait (Fig. 6) with his most famous object, the mastodon, tantalizingly hidden just behind the curtain is undoubtedly

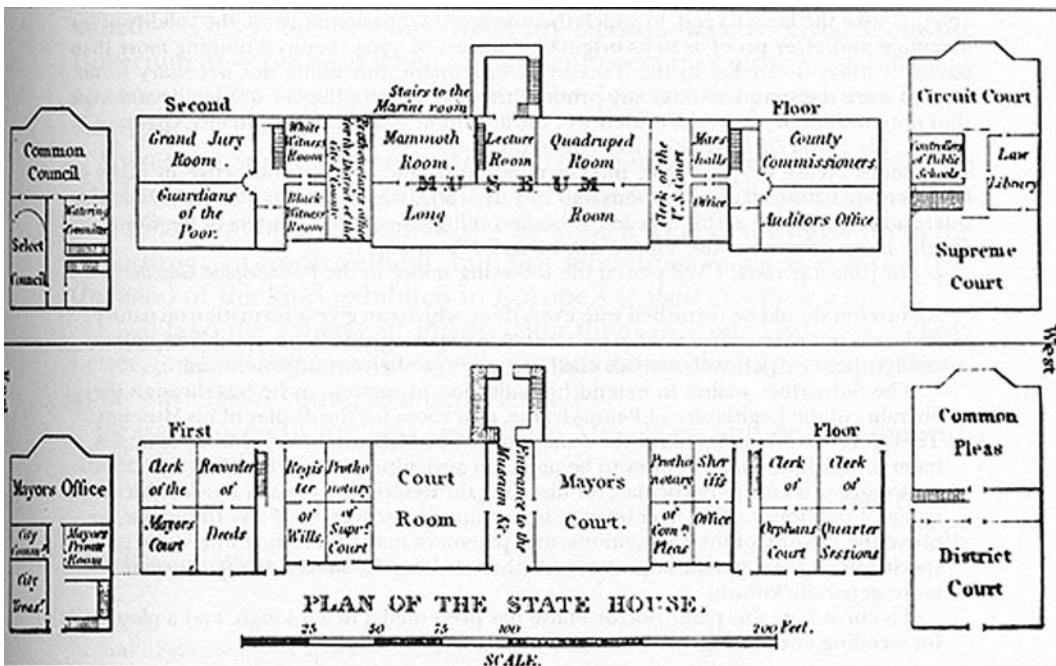


FIGURE 5. Charles Willson Peale was granted most of the second floor of Independence Hall, including the long central corridor, the lecture hall, and two side rooms, one of which housed specimens returned from the Lewis and Clark Expedition.



FIGURE 6. Charles Willson Peale's self-portrait is an idealized look at the museum interior, with art displayed above the natural history cabinets. Courtesy of the Philadelphia Academy of Fine Arts.

idealized and thus shows his ambitious plans for integrating art and science. High or vaulted ceilings with windows and the capacity for skylights in a period when interior lighting could be expensive and dirty meant that upper-storied rooms were typically used for displays. Scale and features that changed with cultural taste shaped distinctively styles of monumental architecture used for civic buildings in the ancient world and for churches in the Middle Ages. In the nineteenth century, American architects would revive elements of these earlier eras and use them for such other public facilities as museums. Use of Independence Hall early reinforced the presumption that these

art and science materials held civic meaning, as did Thomas Jefferson's willingness to give Peale some of the zoological, geological and archeological specimens that came back with the Lewis and Clark Expedition.<sup>16</sup>

Leased facilities meant his design for the exhibits necessarily had to adapt to their assigned spaces. Perhaps for that reason, when Peale's son Rembrandt moved to Baltimore to establish his own museum, his was the first purpose-built museum in the young United States in 1814.<sup>17</sup> Designed by local architect Robert Carey Long, its "fashionable lounge" could accommodate daytime visitors and evening social events, particularly since another first was the use of experimental piped gas lighting (Fig. 7). The recently restored museum indicates something of a plain brick Federal style but with a hint of Colonial Revival in a style both more domestic and more modest than those of museum structures later in the century. Location mattered more than design, however, and when revenues were insufficient, Peale moved his museum materials nearer the commercial district on Baltimore Street, putting his museum and gallery of art above retail stores where traffic was constant. In an ironic twist, the city of Baltimore took over the original Baltimore Museum as its city hall during the economic depression of the late 1830s.<sup>18</sup> Museum development proved to be a risky business, and, although the Peales had several imitators, none lasted for more than a few years.<sup>19</sup>

The limited success of museum entrepreneurs elsewhere can be explained in part by the fact that Philadelphia was the most cosmopolitan of North American cities in the early nineteenth century. Equally important, however, was the fact that other museum founders did not or could not match the facilities, either in terms of a striking public building or in the specimens, cases, and other material resources that could attract and maintain public interest; most of them were housed in commercial rental spaces or in sections of their private homes. Some of the efforts were heroic, including the short-lived Western Museum in frontier Cincinnati, under Dr. Daniel Drake.<sup>20</sup>

More successful were the American naturalists who began to combine resources by establishing natural history societies, and later state academies of science, where curators and semi-public display space would better insure the maintenance and accessibility of collections. The struggles of proprietors and societies from Boston to St. Louis during the ante-bellum period made it clear that acquiring rare specimens was often less expensive than arranging to secure them against dirt, insect infestations, and theft. Collectively, the societies of naturalists in Charleston, Philadelphia, Boston, New York City, and elsewhere arranged to rent or purchase rooms or even a building where each member might put a cabinet on display. Indeed the successful Philadelphia Academy of Natural Sciences moved three times in sixty years. For decades its members met and held their specimens in a private space. When the collections grew too large and they decided to hold public lectures,

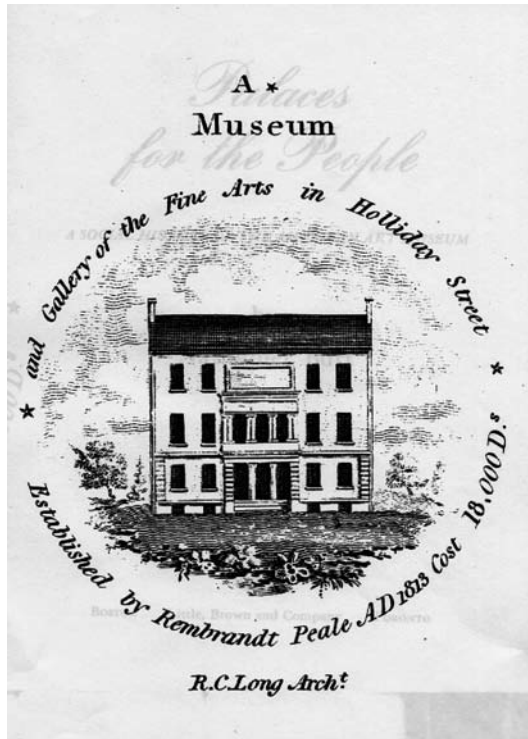


FIGURE 7. Rembrandt Peale's Baltimore Museum was the first purpose built museum in the United States.



they built a combined lecture and exhibit hall on Samson and Broad Streets in 1840 (Fig. 8).<sup>21</sup>

Less than four decades later they built their current facility in time for Philadelphia's Centennial Exposition, and the Academy became one of the anchor institutions in Philadelphia's cultural district (Fig. 9). The Academy had substantial collections in several areas. At mid-century, member Joseph Leidy became actively involved in excavating and then mounting the *Hadrosaurus* that had been uncovered in New Jersey.<sup>22</sup> It enabled him to write extensively about Hadrosaur morphology and to create a new enthusiasm at the Academy much as Peale had used the mastodon skeleton. Indeed subsequent museum administrators would continue to anchor their public exhibitions with large mounted specimens. Over the last half century, issues in paleontology were changing, as they were in other natural sciences, as questions about chronological and geographical range required larger numbers of even partial specimens,<sup>23</sup> problems that would require additional secure storage space and increasingly sophisticated laboratory facilities and equipment like microscopes.

The Academy's sister society, the Lyceum of Natural History in New York, raised subscriptions for a building in the 1830s, seeking a "safe receptacle for many scientific treasures" just before the Panic of 1837.<sup>24</sup> However, Lyceum members lost the building when they went bankrupt in 1844, another cautionary tale about the enormous expenses involved with building and maintaining a museum collection.<sup>25</sup> The Lyceum's subsequent search for space is a sad tale and, in 1866, after the collections had been destroyed by fire in a rented space, a member remarked, "What I once regarded as a crowning calamity, the destruction of Museum material, I now regard as a blessing. This may seem paradoxical, but I believe it to be true . . . [The] erection and maintenance of a Museum . . . now involves an enormous expenditure and never-ceasing labor, care, and anxiety. Happy are the students of nature who can enjoy the benefits of such a Museum without its costs and responsibility."<sup>26</sup> Nonetheless, the will to collect was strong and naturalists in moderately sized cities and on college campuses continued to create local museums.<sup>27</sup> Their specimens were



FIGURE 8. The Academy of Natural Sciences in Philadelphia built a museum and lecture hall in 1840 to house what was then the largest and most important natural history collection in the nation.



FIGURE 9. When the Academy of Natural Sciences built a new museum in 1876, it opened in time to gain attendance from visitors to the Centennial Exposition in Philadelphia.

critical to the taxonomic enterprise and were regularly referenced and displayed, in a way that paralleled similar experiences in British and European societies of the same period.<sup>28</sup> Society holdings were self-consciously differentiated from popular, typically transient displays of animals, fossils, minerals, and exotica at mid-century, undoubtedly in part in reaction to P. T. Barnum and others who promoted humbug alongside genuine natural history.<sup>29</sup> They particularly eschewed indiscriminate crowds and the kind of popular presentations that relied on sensation rather than serious natural history. Creating museums which stressed permanence through substantial, well-built facilities was a critical part of establishing the significance of museums.

By far the most specialized research museum at mid-century was that of Swiss émigré Louis Agassiz, namely the Museum of Comparative Zoology (Fig. 10), adjoining Harvard College, which was built in 1859 with monies provided by the Massachusetts's legislature as well as wealthy friends in Cambridge.<sup>30</sup> Agassiz articulated the benefits of scientific research but also the necessity of public funds, undoubtedly influenced by his knowledge of the sponsorship of important European museums in



FIGURE 10 The allocation of land for the building of the Museum of Comparative Zoology reflected the aspiration of Louis Agassiz to create a museum comparable to those he had used in Europe.

Munich, Paris, and London. The charismatic teacher and public speaker was, in fact, the catalyst for museum initiatives from Maine to Chicago to Charleston.<sup>31</sup>

His own MCZ was intended for serious study and destined for expansion. Its multi-storied facade announced its remarkably simple exterior and interior design. The MCZ plain style front façade faced the Harvard Divinity School across Divinity School Avenue, clearly intended to symbolize dialogue between science and religion. The museum's location at the edge of campus created potential for the ambitious expansion plans of Agassiz.<sup>32</sup> Although the MCZ initially had interior galleries around a central space in a configuration that was becoming standard in museums, this central space was soon floored over to make room for storing ever-growing collections. The elder Agassiz's concession to his local public was to commission a kind of stuffed petting zoo for young visitors, with farm animals like a cow and pig on display along with glass cases housing neat rows of specimens. Later, under Alexander Agassiz, would come the famous Blaschka glass models of plants.<sup>33</sup>

The specialized MCZ, with specimens organized taxonomically, was much like the European collections that were the domain of the botanical, geological, anatomical, or zoological societies. Few other highly focused research museums were attempted in the United States, and those on other college campuses were typically both smaller and more broadly inclusive, with a few exceptions, like the Museum of Vertebrate Zoology at the University of California at Berkeley, funded in the early twentieth century by Annie Alexander.<sup>34</sup> The emphasis on research functions would remain strong in such academic settings, but by the late 1850s, a movement to build larger civic facilities for music, art, and books found parallel expression among those promoting the possibilities for public education in zoology, geology, and related natural history subjects. The facilities, too, would look quite different and move toward very different arrangements of the displays.



Perhaps the most public museum of the mid-century, with goals similar to those of the earlier mechanics institutes and the Cooper Union for Art and Science in New York City, was the Wagner Free Institute of Science, founded by merchant and amateur naturalist William Wagner and built between 1859 and 1865. The building, designed by John McArthur, Jr., had the rather severe look of an abstracted classical temple, with arches and paired pilasters characteristic of public buildings at mid-century (Fig. 11). Inside were symmetrical galleries lit with skylights around a large central exhibition hall. Wagner intended his museum to be public, and indeed he himself gave public lectures on mineralogy in an auditorium modeled on that of the Smithsonian Institution that could hold fifteen hundred people. After his death in 1885 released additional funds, the museum underwent a renovation in which the glass-fronted display cases and collections were organized by Joseph Leidy into a systematic collection designed to portray earth's evolution. The cases were rearranged to show the course of the development of life from inorganic to organic matter and from simple organisms to the most complex.<sup>35</sup> By the time this project was complete, the arrangement was already out-of-date in terms of the trend toward habitat groups of particular species in settings that reflected their natural environment and limited the taxonomic descriptions found in the crowded cases of the Wagner.

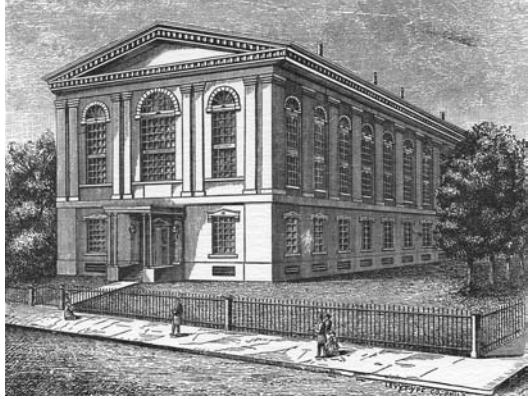


FIGURE 11. The Wagner Free Institute of Philadelphia, influenced by mechanics institutes, established a library and museum, and offered public lectures that were to benefit the entire public.

### FRAMING PUBLIC MUSEUM COLLECTIONS

Particularly important as a model for a still Anglophile nation was the new British Museum (Natural History), designed with much fanfare in the 1860s, although not finally completed in London's South Kensington neighborhood until 1880 (Fig. 12).<sup>36</sup> This massive structure was

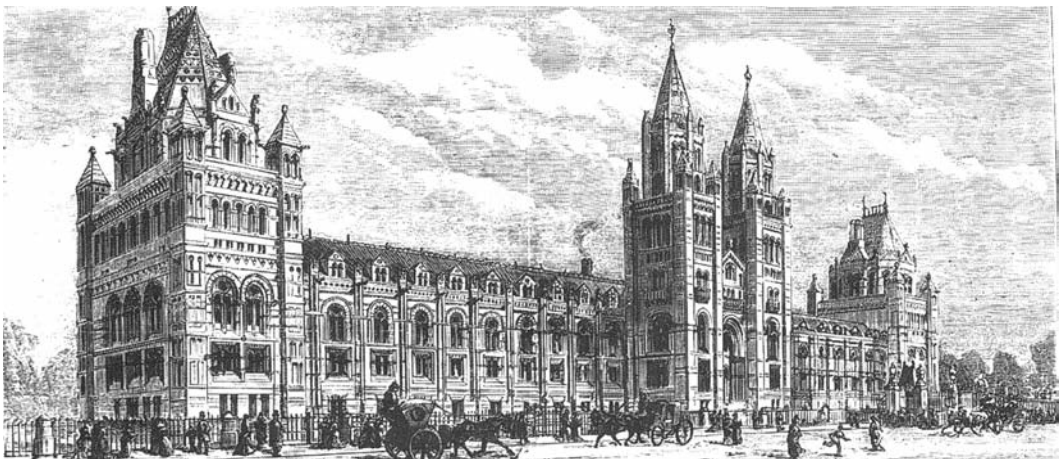


FIGURE 12. The British Museum (Natural History) opened in 1880 and was designed to have both substantial research and storage facilities as well as elegant public display space.

designed as a deliberate contrast with the popular and dramatic but commercial and ephemeral Crystal Palace of 1851.<sup>37</sup> In the meantime, the United States government's national collections of natural history, growing under the steady influx of specimens from expeditions, had begun to be housed at the Smithsonian Institution despite the caution of its Secretary, Joseph Henry, and under the direction of Assistant Secretary Spencer F. Baird (Fig. 13; also see the article by Pamela Henson in this volume).<sup>38</sup>

The Smithsonian castle of the 1850s, with its Norman gothic design and multiple turrets was not the modest building that Henry and other scientists had hoped might be built. Henry would have preferred economizing on the building and using the Smithson funds to support research. However, the building did not function badly as a museum. The towers allowed for staircases and ventilation shafts, leaving the interior spaces unencumbered and useful for public displays. Moreover, the medieval style allowed for numerous and large windows that supplied natural light for the displays arranged along the great hall, although less than that provided by the Wagner's skylights. While travelers to the United States commented with enthusiasm on the public display of extensive holdings, curators spent most of their time in the upper towers and the basement working with specimens and writing publications.<sup>39</sup>

It would be nearly three decades, in 1881, before the natural history collections of the Smithsonian Institution would move into a bold and eclectic Victorian building (Fig. 14) specifically designed for display under the auspices of the new Secretary, Spencer F. Baird, and his assistant George Brown Goode.<sup>40</sup> The United States National Museum (which is now named the Arts and Industries Building) was designed by Adolph Cluss and built under the civil engineer and former general Montgomery C. Meigs, who had visited European museums in anticipation of its con-

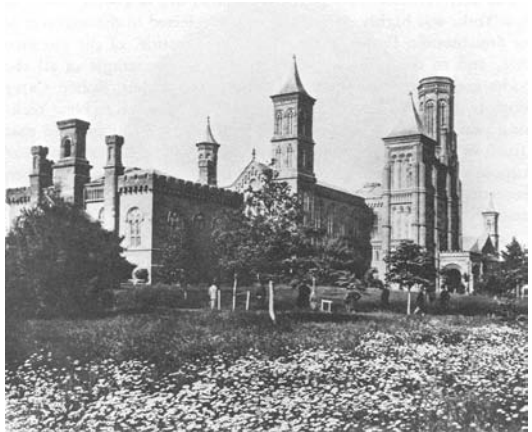


FIGURE 13. The Smithsonian Institution's distinctive façade on the mall reflected congressional aspirations to make its growing capital into a cultural center.

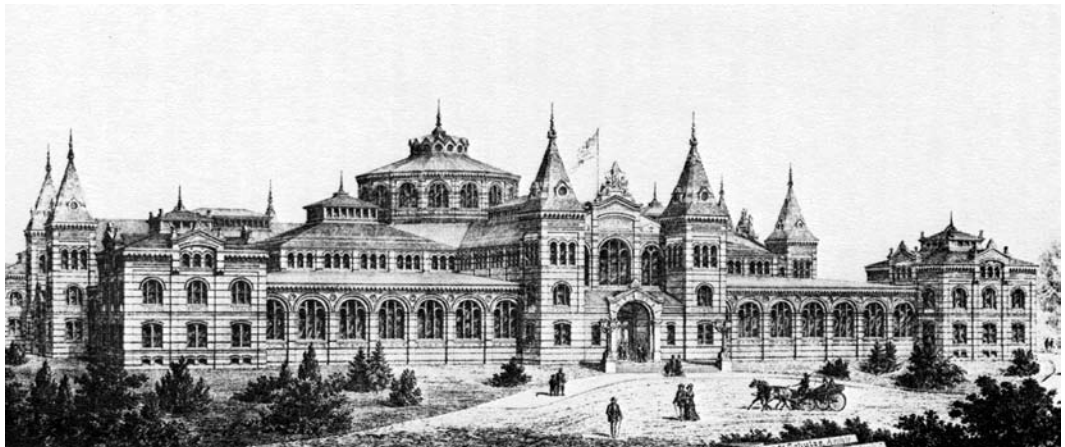


FIGURE 14. The National Museum of the Smithsonian Institution, opened in 1881, was designed for exhibition of not only natural history but also other art and history objects.

struction. It was intended to hold much of the material returned from the Philadelphia Centennial Exposition and, as Pam Henson has shown, was constructed remarkably cheaply but also with careful attention to technical matters, including fire safety.<sup>41</sup>

The interior organization (Fig. 15) built on increasingly common elements in museum design. Assistant director Goode, who had also spent considerable time in Europe visiting international expositions and museums, was very influential in creating the internal organization of the new museum. His published plans for this museum and his other writing made him America's foremost museum theorist at the end of the nineteenth century. Although there is no evidence of direct influence, the National Museum's interior organization seems to show at least familiarity with the plans of French architectural theorist Jean-Nicolas-Louis Durand on museum interiors (Fig. 16), perhaps because his formulation of space had already become common in European museums in the nine-

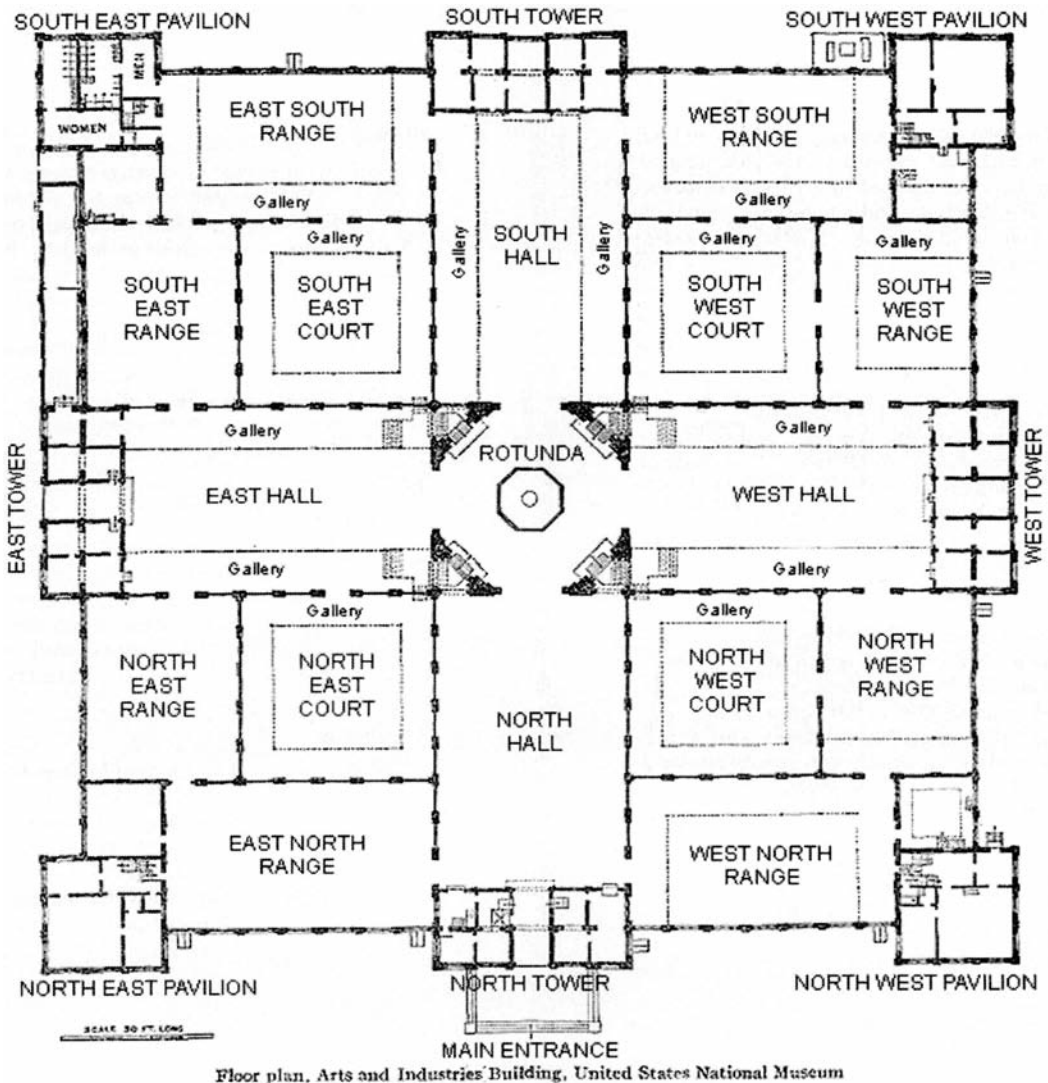


FIGURE 15. The National Museum's interior, with corridors, vestibules, and interior courtyards, was designed to provide maximum and effective display space.



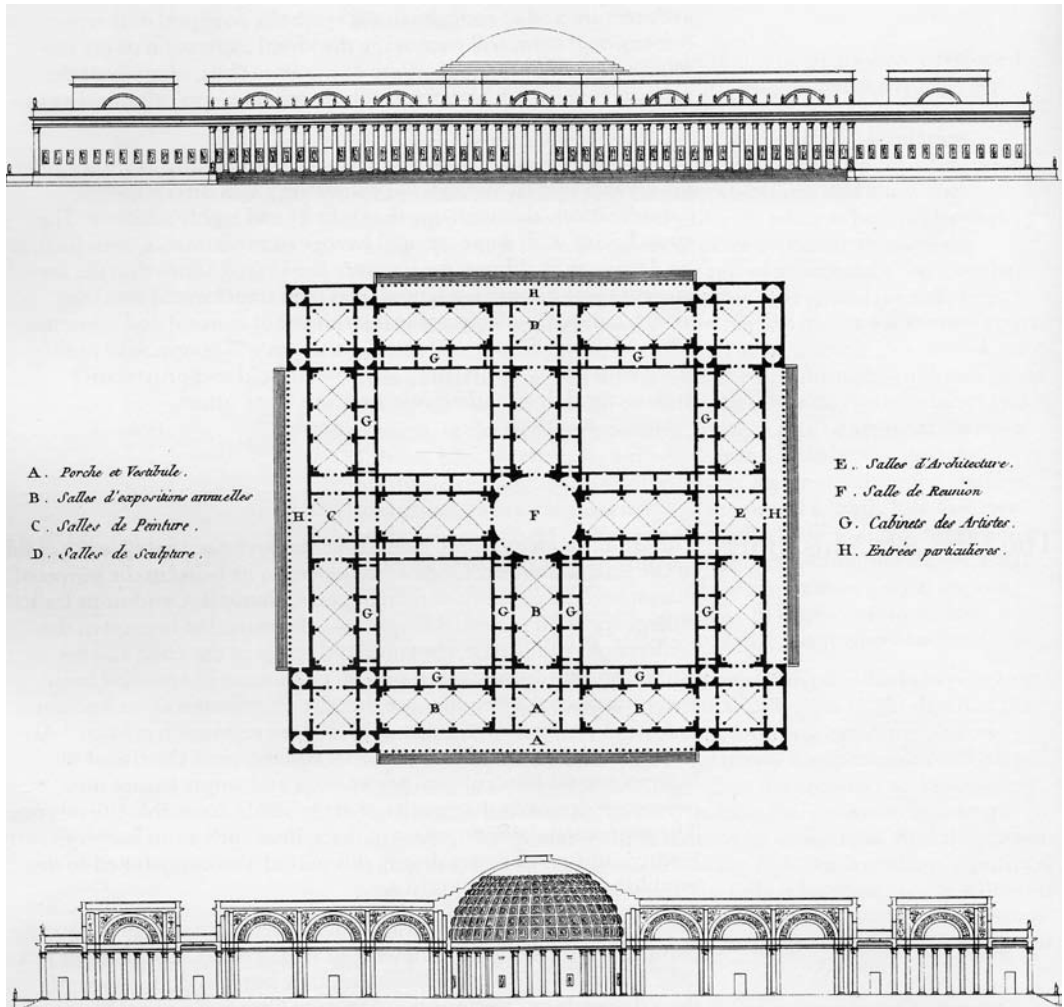
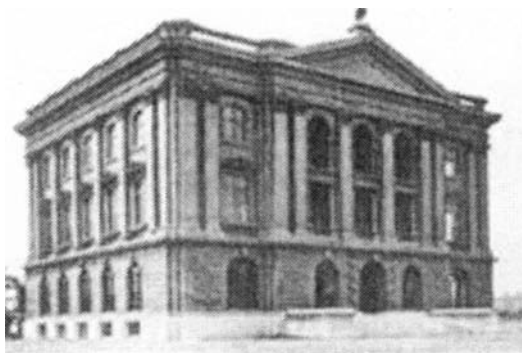


FIGURE 16. The elements emphasized by architect Jean-Nicolas-Louis Durand early in the nineteenth century became more evident in American museums after the Civil War.



*The original building*

teenth century. Durand's rationalist scheme for an art museum was sufficiently flexible that elements (including long corridors, impressive vestibules, interior courtyards with clerestories or other lighting) could be adopted and adapted for other kinds of public display.<sup>42</sup>

In the meantime, the Boston Society of Natural History built a distinctive museum on the western edge of the newly filled Back Bay (Fig. 17). Designed by William G. Preston, this

FIGURE 17. The Boston Society of Natural History built a distinctive public museum in 1864.

French academic style “temple of learning” was completed in 1864 and, although initially rather isolated from potential visitors, actually helped establish the area surrounding Commonwealth Avenue as an important residential and commercial district.<sup>43</sup>

The Society and its museum gained new momentum under the leadership of neo-Lamarckian Alpheus Hyatt, who became director in 1871. Hyatt had been part of the student “Salem secession” out of Agassiz’s museum in the 1860s and worked in the Peabody Museum in Salem during the intervening years. His plan of 1871 (Fig. 18) clearly presented a public museum where essentially all the holdings were still to be on display or in neighboring drawers. The Society encouraged the students of Massachusetts Institute of Technology, who were then studying in a neighboring build-

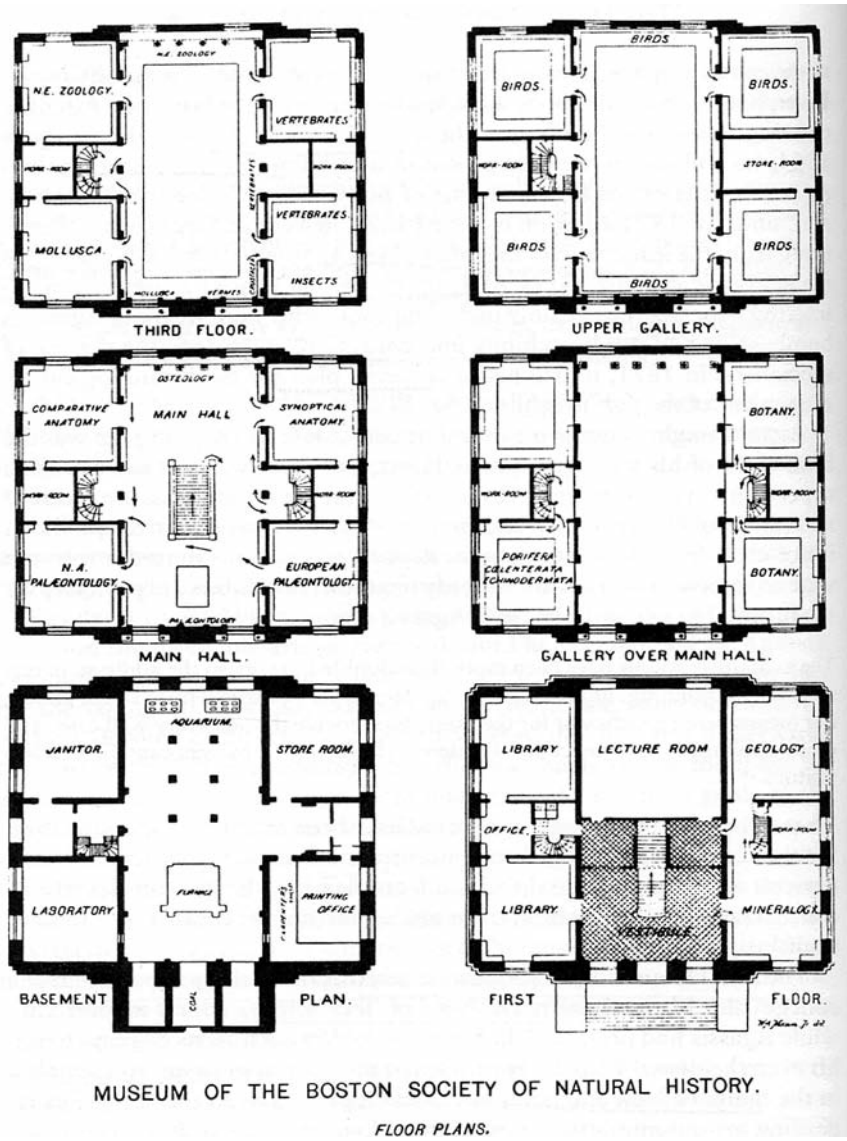


FIGURE 18. Alpheus Hyatt designed a plan for the Boston Society of Natural History that maintained the tradition of having the entire collection accessible.

ing, to use their specimens for study as well. During the 1870s the Society's curators encouraged participation of Boston area teachers and their students by designing displays for education as well as research. Like other mid-century collections, the Society featured large specimens in the central section of a high-ceilinged room, the largest sometimes suspended in space, with glass and wood cases arrayed along the walls and on surrounding mezzanines (Fig. 19).

As museums took on public functions, they attracted progressive civic leaders, like the German socialists in Milwaukee, who may have been the first to levy a mileage tax to support their public museum and library.<sup>44</sup> After viewing the submission of more than seventy architects, the trustees chose that of George Bowman Ferry and Alfred C. Clas (Fig. 20). The Milwaukee Public Museum and Library, featuring a central dome and a symmetrical, colonnaded front, opened in 1899. In other aspiring urban centers, like Pittsburgh, a major donor could provide the material means to create public facilities for natural science, art, and other purposes.<sup>45</sup> The palatial Carnegie Museum (Fig. 21) was an eclectic mix of architectural styles, dominated by elements of the Richardsonian Romanesque and classical styles that had become popular in the last quarter of the nineteenth century. Its interior, however, emphasized the interest of its patron and used a series of inter-connected rooms, the

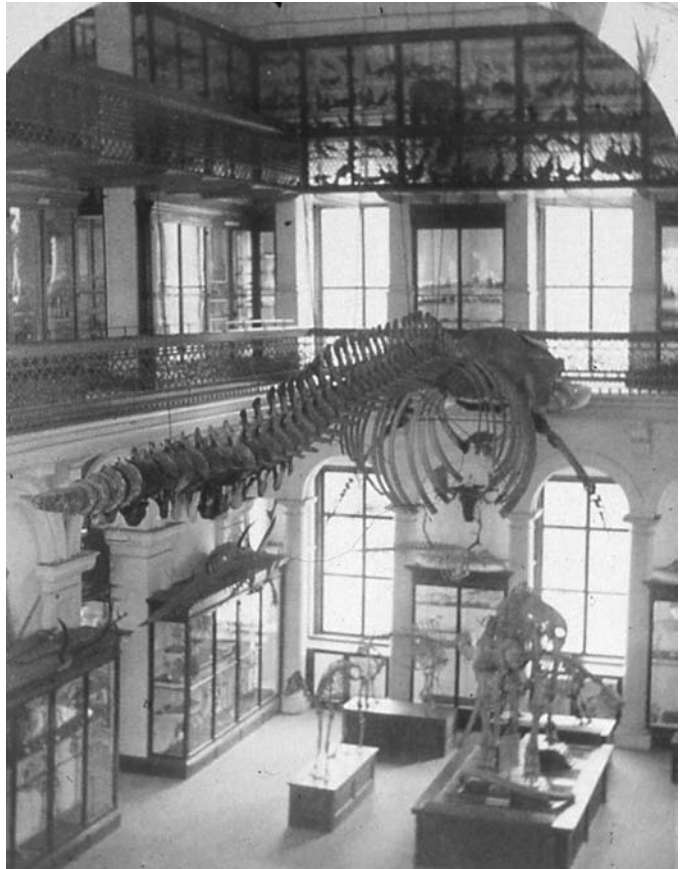


FIGURE 19. Large skeletons and other specimens were typically placed in the central section of museums, with the first floor and mezzanines used for glass fronted cabinets.

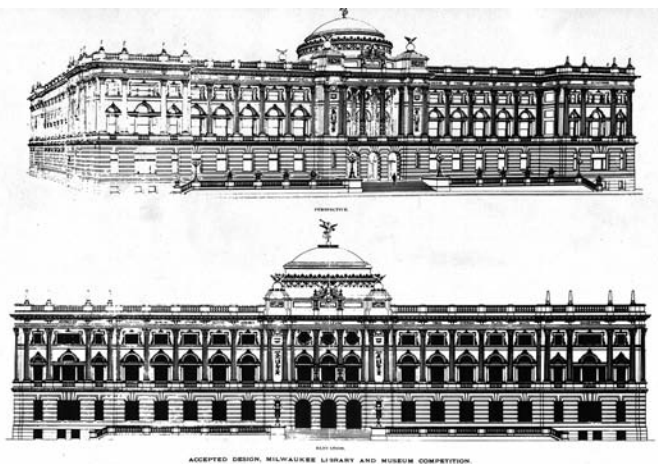


FIGURE 20. The Milwaukee Public Museum and Library presented the neo-classical style popular for public buildings at the turn of the century.



largest of which was devoted to dinosaurs (Fig. 22).<sup>46</sup>

By the late nineteenth century, there were building standards for museums that took into account lighting, ventilation, fire safety, and multiple entrances which all had some impact on design. North Americans were innovative in terms of both interior displays and functionality of building spaces, characteristics commented upon by European museum administrators who came in increasing numbers at the turn of the century.<sup>47</sup> They came, as well, to see the increasingly sophisticated presentation of natural history for public audiences, including habitat group displays and well-mounted paleontological specimens. Added to the museums as well were spaces for educational activity, some quite formal and connected to nature study programs in elementary schools or to graduate programs at nearby universities. Increasingly, museums provided informal education through printed brochures and trained volunteer museum guides to discuss the displays with visitors. These educational tasks meant that museums dedicated more space to classrooms, public lecture halls, and storage of educational materials to be sent on loan to public schools.<sup>48</sup>



FIGURE 21. Andrew Carnegie built an institution that was intended as an art gallery, a library, a natural history museum, and a public lecture hall.



FIGURE 22. The Carnegie Institution in Pittsburgh was designed for display and did not show much architectural innovation.

### BUILDING URBAN MONUMENTS

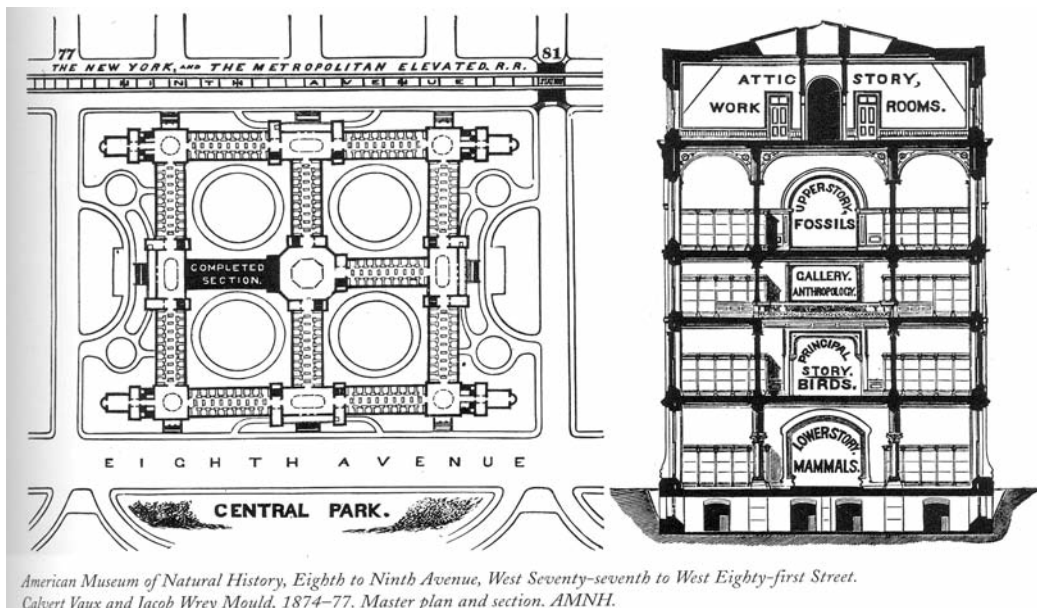
In the last quarter of the nineteenth century, natural history museum building in America benefited from the explosive growth of private wealth and the rise of cultural philanthropy, much of it aimed toward rapidly growing cities.<sup>49</sup> While in the sixty years following Peale's Baltimore Museum only seven more natural history museums had been constructed, in the period from 1875 to 1900, seventeen would be built. (See Appendix A.) Wealthy individuals like Andrew Carnegie and Marshall Field, uncomfortable with charges of money but no taste, or wealth without culture, donated vast sums of money to establish natural history museums in the cities where they made their fortunes. These institutions were intended as a permanent testament to the philanthropists' wealth and generosity.<sup>50</sup>

Many were designed to be large, lavish and fashionable. Public museums were also intended to serve the larger community as an agent in educating and civilizing laborers, especially immi-

grants. An imposing exterior style and scale that inspired respect, and a lavish interior that reflected the rewards of New World civilization became the norm. With respect to museum design, new issues like central location and appropriate size and style became paramount. Two outstanding examples of urban natural history museums from the so-called golden age of museum building are the American Museum of Natural History, established in New York City in 1869, and the Field Museum, founded in Chicago in 1893.<sup>51</sup> Built in the two largest cities in the country by leading philanthropists with strong civic goals, these museums reflected the cultural pressures to provide entertainment, education, and research simultaneously.<sup>52</sup>

New York City had not had a highly visible or successful natural history enterprise and the Lyceum was in no position to provide leadership. Instead, it was Agassiz student Albert Bickmore who persuaded a number of prominent New Yorkers to envision an important natural history museum as part of the development of Central Park. Indeed, he persuaded an impressive list of moneyed locals to contribute to a museum project befitting the growing commercial city.<sup>53</sup> Teaming with the Metropolitan Museum of Art, American Museum officials successfully petitioned the state for land and funding for a fireproof building in 1871. The city council granted a remote, squalid 23-acre tract adjacent to Central Park. As pictured here (Fig. 23), the building was to be 850 feet long by 650 feet wide and included 18 acres of floor space — an area two thirds larger than the British Museum. Architect Calvert Vaux, who had collaborated with Frederick Law Olmsted on the design of Central Park, partnered with Jacob Wrey Mould for the initial design. They drafted a grand Victorian plan on a vast scale, with four quadrangles enclosed by twelve intersecting galleries and nine towering pavilions — the central one capped by a 120-foot diameter dome. But the first section built in 1877 was relatively modest (Fig. 24). As it turned out, the American Museum would be constructed with the help of government appropriations or individual donors, one section at a time.<sup>54</sup>

Much pomp and ceremony attended the beginning of construction on the first gallery in 1874. Joseph Henry in his dedication speech called the museum a “temple of nature” rightly constructed



*American Museum of Natural History, Eighth to Ninth Avenue, West Seventy-seventh to West Eighty-first Street.  
Calvert Vaux and Jacob Wrey Mould, 1874–77. Master plan and section. AMNH.*

FIGURE 23. The building planned by the aspiring founders of the American Museum of Natural History intended to surpass the British Museum in size.

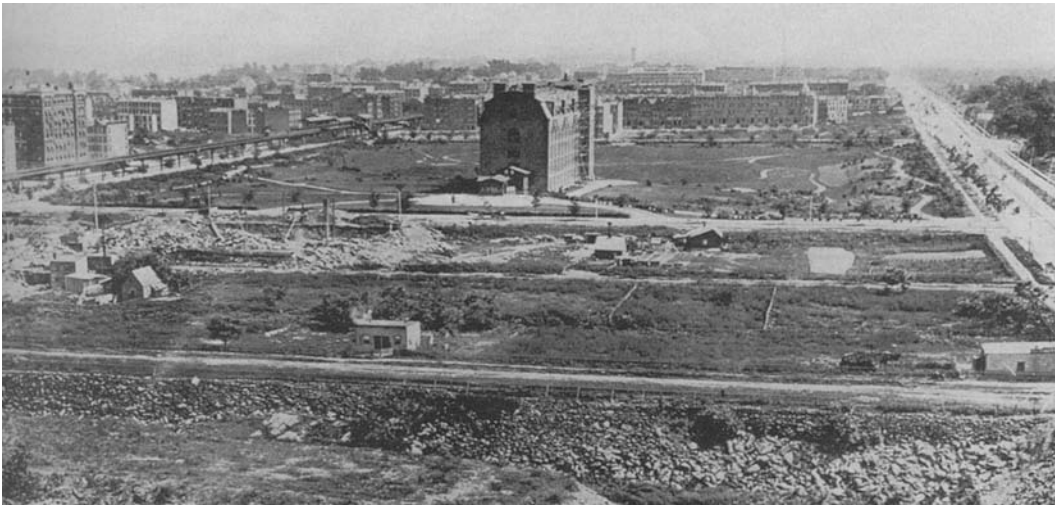


FIGURE 24. The section of the American Museum of Natural History that opened in 1877 quickly proved inadequate for the growing collections purchased by trustees.

to edify the urban masses. He also complained bitterly (and inappropriately) that a very large portion of the James Smithson bequest had been wrongly spent on the construction of a costly edifice in Washington.<sup>55</sup> Three years later, in December 1877, President Rutherford B. Hayes attended the opening of the first gallery, a gala affair for a cultivated audience.<sup>56</sup>

At the time, the museum's west side neighborhood was still underdeveloped, and the museum suffered for its remoteness. But a steady accumulation of collections, urban expansion, slowly increasing visitorship, and the determination of a handful of New York elites kept the museum going, and growing. Although Bickmore's vision of a museum that would invite the public was frustrated by its early isolation, the transit lines gradually extended to 79th Street, state subsidies allowed the museum to open one day a week with no admission fee, and teachers were allowed to borrow boxes of materials to use in their classrooms in addition to bringing an occasional class to the museum. Simultaneously, of course, the curators were adding to their collections. The demand for space meant that new wings and stories were required to accommodate large public audiences, dramatic exhibits, as well as storage and work space. In 1888, an appropriation was made to finance construction of the principal entrance pavilion on 77th Street. By then, Vaux and Mould had dissolved their partnership, and the trustees called for a revised master plan. The winning submission by J. Cleaveland Cady called for an imposing red granite Richardsonian Romanesque design — an architectural style then in vogue for large civic buildings (Fig. 25).<sup>57</sup> The Museum would continue to grow over in a similarly eclectic way through the next century, gradually filling in the massive block of land allocated to it in the 1870s.

In 1893, the success of the World's Columbian Exposition, whose "White City" would have a significant architectural impact well beyond Chicago, inspired local civic leaders to establish a permanent museum with exhibits acquired from the fair.<sup>58</sup> Museum advocates acquired the former Fine Arts Palace when the exposition closed in 1893 (Fig. 26).<sup>59</sup> A neoclassical masterpiece designed by Charles Atwood, the Palace was well-suited for exhibition purposes and was a favorite among Chicago fair goers. The fair had gained new status for the Windy City, previously better known for cattle than for culture. As the museum was originally intended to be a memorial of the fair — not just a natural history museum — the former Fine Arts Palace brought a certain nostal-



gic appropriateness to the museum enterprise. With its brick understructure, it offered somewhat better fire protection than the other, less substantial buildings of the fair. It was conveniently located on the fairgrounds, close to the source of most of the museum's early acquisitions. Best of all was the price, as the abandoned Palace was given freely to museum developers.<sup>60</sup>

But as a permanent museum, the Palace had little to offer, and Field Museum founders were soon beset by problems. The Jackson Park location was quite distant from the city center. The building also had to be retrofitted for heat, which was never made adequate for Chicago winters.<sup>61</sup> The building's exterior details, cast in plaster and straw to look like stone, were extremely vulnerable to bad weather. Large sections of the decorative cornices and roof line would occasionally break free and fall, endangering visitors and specimens alike. Worst of all, museum developers, scarcely one generation removed from the Great Chicago Fire of 1871, lived in constant fear of conflagration. Lack of a permanent institutional home hampered the development of some sci-

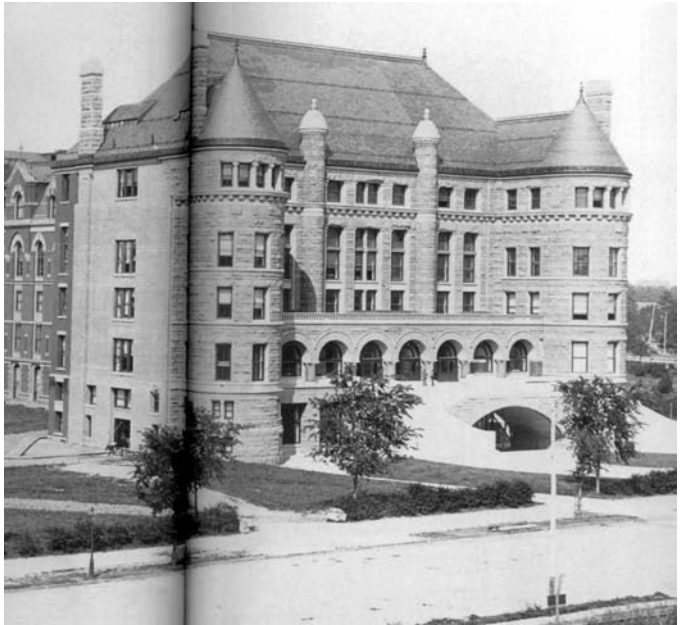


FIGURE 25. The trustees chose to place the grand entrance to the American Museum facing 77th Street rather than New York's Central Park.



FIGURE 26. The Palace of Fine Art had been a favorite among visitors to the Columbian Exposition in Chicago in 1893, but had not been designed for year-round use.

entific departments and was a constant cause of concern and lost time for museum staff and administrators.

In fact, the solution to this problem was under discussion even before the museum first opened its doors in June 1894. Marshall Field, the museum's namesake and chief benefactor, requested Ernest R. Graham to prepare a detailed estimate of the cost of re-making the Palace into a solid, permanent and incombustible building.<sup>62</sup> But the high cost of rebuilding, as well as the ongoing debate about the advisability of remaining in Jackson Park, delayed the effort. When Field died in 1906, he left money to finance a new structure. By this time, the museum had outgrown the original building, and a much larger one was commissioned under Daniel Burnham, chief architect of the fair. Burnham's plan called for an enormous neo-classical structure modeled closely on Atwood's design for the Fine Arts Palace, which Field apparently favored. Burnham's plan included a very large central pavilion, four large annexes, and a tall central dome.<sup>63</sup> Burnham believed the Grant Park location, and the dome, were both essential in making the Field Museum the most beautiful building in the world. But museum president Harlow Higinbotham passionately believed he was carrying out Marshall Field's mandate, and he argued that the building, without the dome, was more than adequate to the institution's needs. His feeling was that the dome would glorify the architect, but that the museum should be Field's monument, not Burnham's.

Also at issue was the museum's ultimate location. Would it go ideally in the center of Grant Park, near downtown, as most museum officials wanted? Would it be compelled to remain in its distant Jackson Park location? Or would some alternative site be found? Ultimately, the issue was over control of the institution after Marshall Field's death. By 1909, Higinbotham, former museum president Edward Ayer, the trustees, Burnham, Montgomery Ward, and members of the Field family were all involved in the controversy. Ayer wanted Stanley Field to replace Higinbotham as executive committee president — he thought that with Stanley Field as president, more money could be had from the Field family, thus enabling the museum to build the annexes and keep the dome. Higinbotham thought a regime change would jeopardize the museum's litigation with Ward over the proposed Grant Park location. Ward, who had made his fortune as a mail-order retailer, claimed that the museum would make Grant Park into a playground for millionaires, rather than ordinary citizens.<sup>64</sup>

In the end, Stanley Field was made museum president. The museum lost its court battle with Ward, but was given a compromise site on landfill added to the south end of Grant Park. Field's bequest was not enough to build the entire building, so Burnham's dome and the annexes were



FIGURE 27. When the new Field Museum opened in Chicago in 1921, it anchored a public park along Lake Michigan.

scuttled. The result was a symmetrical, marble-clad, neo-classical museum that became a focal point along Lake Shore Drive (Fig. 27).<sup>65</sup> Designed to accommodate anticipated growth, the museum was built on a scale that could be almost overwhelming, even exhausting for visitors and staff. Two entire floors were designated for exhibit space. The floor plan was arranged around a great central hall, 300 feet long, 70 feet wide, and 75 feet tall, named for Stanley Field. Long exhibit corridors intersected the main hall and extended out to exterior halls that run parallel to the main hall, to which visitors necessarily returned.<sup>66</sup>

The California Academy of Sciences, discussed elsewhere in this volume, represented a distinctive way of establishing a museum in the late nineteenth century. Founded as a society in 1853 in San Francisco, the Academy gained a commercial property from James Lick in the 1870s and its accruing rental income allowed Academy members to build their own facility in 1891.<sup>67</sup> Its façade was distinguished business on Market Street (Fig. 28), and the museum was in a building immediately behind it, again allowing rental revenues to recover at least some museum costs.



FIGURE 28. The California Academy of Sciences collections were held in a museum facility behind this specially constructed commercial building from which the Academy was able to derive sustaining income. Courtesy Archives, California Academy of Sciences.



Unfortunately, this building was destroyed by the 1906 earthquake and its replacement was wholly commercial in an effort to rebuild its capital. The Academy moved to Golden Gate Park, where it eventually built a modern museum facility.

## CONCLUSION

The imposing natural history museum structures and their often dramatic interior displays were a product of nineteenth-century enthusiasm for natural history. Indeed, many of them acquired “great swaths of land” beyond immediate building needs and required of their sponsors significant “leaps of imagination” about the scale of the final institution – and it would take decades for some to fulfill the promissory notes of public service.<sup>68</sup> Natural history museums had become at once a location for pursuing research and an expression of the civic virtues assigned to education about the natural world.<sup>69</sup>

National rivalries with respect to Europe, urban competition with respect to other cities, and increasingly progressive notions about the significance of knowledge and opportunity were common notes played in celebratory speeches when each new museum opened. Monumental buildings with massive exteriors and grand interiors seemed to imply civic significance. After the Columbian Exposition of 1893, the neo-classic became the fashionable style of natural history museums, as shown by the “new” United States National Museum of 1911 (Fig. 29).



FIGURE 29. The National Museum of Natural History of the Smithsonian Institution was designed to accommodate large crowds of visitors on its main floors while sequestering the basement and upper floors for storage, laboratories, and curatorial offices.

What of the questions about architecture and design posed at the beginning of this essay? There turns out to be no simple pattern or progression in museum design — but instead we have found considerable heterogeneity in their interlocking, repeating, and culturally situated features. Nonetheless, a certain formula began to signal the importance of these public museums with their imposing facades (often with turrets and domes) and their park-like locations. Changing styles that had taken museums’ rather domestic or multi-purpose space to dramatic Romanesque and classical facades mirrored changing cultural trends, but personal tastes of patrons and political leaders meant that there was no simple or universal pattern. Infrastructure changes were less visible but equally important. The danger of fire, dramatically demonstrated by a disastrous one at the Smithsonian Institution in 1865 and others mentioned throughout this paper, made administrators determined to take advantages of important engineering advances that could limit such risks and take advantage of stronger materials, better lighting, and central heating. Attention to these kinds of detail was more possible as civic support supplanted the entrepreneurial motives and philanthropic contributions that had created the earliest natural history museums. It was possible not only to build larger structures but also to place them in public spaces intended for cultural activities rather than commercial districts. Here the audience, too, was a broader one, intended to encompass

the “mechanic, the factory operator, the day laborer, the salesman, and the clerk, as much as those of the professional man and the man of leisure.” Such audiences, in a “busy critical, and skeptical age,” observed Goode in 1896, relied on visual information that could be conveyed by objects on display.<sup>70</sup>

Internal spaces of museums also changed during the long nineteenth century, reaching back to an architectural tradition of extended corridors and of open vestibules, even as museums took advantage of better and larger glass for cabinetry, experimented with lighting and traffic flow, and considered what would capture the imagination and more successfully teach an ever broader public audience. The demand for safe facilities in terms of fire, ventilation for clean air, and structural strength was important both for public audiences and for the rich and often unique collections. Physical holdings continued to grow rapidly at the turn of the century, fueled by the enthusiasms of sportsmen like Theodore Roosevelt and his friends at the Boone and Crockett Club as well as by the more complex kinds of research questions that required large collections.<sup>71</sup>

The museums built in the nineteenth century and its early twentieth-century shadow before World War I were, on the surface, strikingly different from the metallic and glass institutions being built in the late twentieth and early twenty-first centuries. Nonetheless many familiar design elements in the early twenty-first century that encourage curators to educate, store research materials, and display items that reveal current ecological concerns in science reflect the priorities that were established more than a century ago. While considerably different in detail, the museums of the nineteenth century established distinctive and significant facilities that framed nature for civic purposes.

## NOTES

<sup>1</sup> The authors would like to thank Michele Aldrich, Ronald Rainger, Alan Leviton, and Pamela Henson for their thoughtful comments on an earlier version of this paper.

<sup>2</sup> Peale’s diary (volume 5 of *Selected Papers of Charles Willson Peale and His Family*), in five volumes, ed. Lillian B. Miller, vol. 2 (New Haven: Yale University Press, 1981–2001; hereafter *Papers of CWP*), makes clear his initiatives: “Although Peale has so much labour to go through in preparing subjects for filling up the several classes of Animals in his Museum, yet his disposition was such, that if an Idea struck his fancy on any kind of improvement, which he conceived had a chance of becoming advantageous to the Public...he instantly went to work on such invention (p. 235).” There is a rich scholarship on Charles Willson Peale as artist and museum developer (see n. 8 below).

<sup>3</sup> Steven Conn, *Museums and American Intellectual Life, 1876–1926* (Chicago: University of Chicago Press, 1998), chapter 2.

<sup>4</sup> There is considerably more work on art museums, and see especially Helen Searing, *New American Art Museums* (New York: Whitney Museum of American Art, 1982).

<sup>5</sup> For an overview of the growing literature on natural history museums see review essays by Ronald Rainger, “Recent Books on the History of Museums,” *Biology and Philosophy* 10 (1995): 235–248; and Sally Gregory Kohlstedt, “Museums: Revisiting Sites in the History of the Natural Sciences,” *Journal of the History of Biology* 28 (1995): 151–166. Other useful sources on museum history include Charlotte M. Porter, “The Natural History Museum,” in *The Museum: A Reference Guide*, Michael Steven Shapiro, ed. (Westport, Connecticut: Greenwood Press, 1990), pp. 1–29; and Tony Bennett, *Birth of the Museum: History, Theory, Politics* (London: Routledge, 1995); also see Edward P. Alexander, *Museums in Motion: An Introduction to the History and Functions of Museums* (Nashville, Tenn.: American Association for State and Local History, 1941).

<sup>6</sup> For a recent discussion of museum spaces specifically, see Carla Yanni, *Nature’s Museums: Victorian Science and the Architecture of Display* (Baltimore: Johns Hopkins University Press, 1999); there is also close attention to the building of the Museum of Comparative Zoology in Mary P. Winsor, “Agassiz’s Notion of a Museum: The Vision and the Myth,” in *Cultures and Institutions of Natural History: Essays in the History and Philosophy of Science*, Michael T. Ghiselin and Alan E. Leviton, eds. (San Francisco: California Academy of Sciences, 2000), 249–272.

<sup>7</sup> Jay Cantor, “Temples of the Arts: Museum Architecture in Nineteenth-Century,” *Metropolitan Museum of Art Bulletin* 28 (April, 1970): 331–354, and the classic by Nathaniel Burt, *Palaces of the People: A Social History of the American Art Museum* (Boston: Little, Brown, and Co., 1977).

<sup>8</sup> The standard biography remains Charles Coleman Sellers, *Mr. Peale's Museum: Charles Willson Peale and the First Popular Museum of Natural Science and Art* (New York: W.W. Norton, 1980); also useful is the illustrated volume based on an exhibition at the National Portrait Gallery by Edgar Richardson, Brooke Hindle and Lillian R. Miller, *Charles Willson Peale and His World* (New York: Henry N. Abrams, 1982).

<sup>9</sup> Paula Findlen, *Possessing Nature: Museums, Collecting, and Scientific Culture in Early Modern Italy* (Berkeley: University of California Press, 1994); and "Masculine Prerogatives: Gender, Space, and Knowledge in the Early Museum," in *The Architecture of Science*, Peter Galison and Emily Thompson, eds. (Cambridge: MIT Press, 1999), pp. 29–58. Another important discussion of the meaning of objects in the 17<sup>th</sup> and 18<sup>th</sup> centuries is Lorraine Daston and Katherine Park, *Wonders and the Order of Nature* (New York: Zone Books, 1998).

<sup>10</sup> On the naturalist tradition in this period see Raymond P. Stearns, *Science in the British Colonies of North America* (Urbana: University of Illinois Press, 1970); John C. Greene, *American Science in the Age of Jefferson* (Ames: University of Iowa Press, 1984); and Charlotte Porter, *The Eagle's Nest: Natural History and American Ideas, 1812–1842* (Tuscaloosa: University of Alabama Press, 1986).

<sup>11</sup> This use of public space for projects presumed to have public benefits had precedent in Europe and even in the colonies. The old State House in Charleston was given to the Library Society for their books and specimens as early as 1773 and has led some scholar to thus suggest it is North America's first public museum, as in Albert E. Sanders, *Natural History Investigations in South Carolina from Colonial Times to the Present* (Columbia: University of South Carolina Press, 1999); see *Charleston Library Society Journal*, 7 and 12 July, Charleston Library Society, South Carolina. Gardiner Baker had been granted free space in the City Hall by New York City's Common Council in 1793; see Robert M. McClung and Gale S. McClung, "Tammany's Remarkable Gardiner Baker," *New York Historical Society* 42 (1958):143–169.

<sup>12</sup> Charles W. Peale, *Introduction to a Course of Lectures on Natural History* (Philadelphia, 1800), p. 12.

<sup>13</sup> David Brigham, *Public Culture in the Early Republic: Peale's Museum and Its Audience* (Washington: Smithsonian Institution Press, 1995) discusses the importance of the museum for particular locals and for national visibility.

<sup>14</sup> Peale was fascinated by Georges Cuvier's research on comparative anatomy and particularly on the mastodon, encouraging Rembrandt to visit Cuvier and produce a portrait for the Philadelphia museum. See Miller, *Charles Willson Peale*, 2:1189–1191.

<sup>15</sup> George Brown Goode emphasizes this chance development of early museums in his "Museum-History and Museums of History" reprinted in Sally Gregory Kohlstedt, ed., *The Origins of Natural Science in America: The Essays of George Brown Goode* (Washington: Smithsonian Institution Press, 1991), pp. 297–321.

<sup>16</sup> Greene, *American Science*, pp. 195–217.

<sup>17</sup> Peale's Baltimore Museum was reconstituted in the 1990s as an historical exemplar of these early museums and aspects of their history are found in William T. Alderson, ed., *Mermaids, Mummies and Mastodons: The Emergence of the American Museum* (Washington: Association of American Museums, 1992). In London, the Museum of Practical Geology was among the first to be deliberately didactic in both its own construction and its holdings; see Sophie Forgan, "Bricks and Bones: Architecture and Science in Victorian Britain," in Galison and Thompson, *Architecture*, pp. 193–200. There is little to indicate how the interior was organized, and the younger Peale was most concerned to have a studio where he might attract art students.

<sup>18</sup> Wilbur Harvey Hunter, Jr., *The Story of America's Oldest Museum Building* (Baltimore: The Peale Museum, 1952).

<sup>19</sup> The building housed a cabinet of curiosities, a two-story gallery of art in the rear, a lecture hall, and a third floor space that Rembrandt Peale intended as a teaching studio. The Baltimore Museum building was transferred in the early 1820s to Rubens, who added more music, panoramas, and evening entertainment while Rembrandt returned to full-time painting. Later, Rubens moved to New York City where he opened his New York Museum on July 4, 1825, the same day as the official opening of the Erie Canal.

<sup>20</sup> Henry D. Shapiro, "The Western Academy of Natural Sciences of Cincinnati and the Structure of Science in the Ohio Valley, 1810–1850," in *The Pursuit of Knowledge in the Early American Republic: American Scientific and Learned Societies from Colonial Times to the Civil War*, Alexandra Oleson and Sanborn C. Brown, eds. (Baltimore: Johns Hopkins Press, 1976), pp. 219–247. On Drake see the biographical sketch in Charles D. Aring, *Daniel Drake: Frontiersman of the Mind* (Cincinnati: Crossroads Books, 1985). For a useful overview of the museums enterprises of this period see Joel Orosz, *Curators and Culture: The Museum Movement in America, 1740–1870* (Tuscaloosa: University of Alabama Press, 1990).

<sup>21</sup> The best overview is Patsy A. Gerstner, "The Academy of Natural Sciences of Philadelphia, 1812–1850," in Oleson and Brown, *Pursuit of Knowledge*, pp. 174–193. Records of the Academy, founded in 1912, are available on microfilm and summarized in *Minutes and Correspondence of the Academy of Natural Sciences of Philadelphia, 1812–1924* (Philadelphia: Academy of Natural Sciences, 1967). The Academy figures throughout the discussions of natural science in Philadelphia in Porter, *Eagle's Nest*.

<sup>22</sup> Leonard Warren, Joseph Leidy: *The Last Man Who Knew Everything* (New Haven, CT: Yale University Press, 1998).



<sup>23</sup> See Juan Ilerbaig, "Pride in Place: Fieldwork, Geography, and American Field Zoology, 1850–1920" (Ph.D. diss., University of Minnesota, 2002).

<sup>24</sup> See undated pamphlet simply entitled *Lyceum of Natural History*, p. 3, that had evidently been self-published as part of an appeal for funds.

<sup>25</sup> Evidence that the Panic of 1837 left many subscribers unable to meet their commitments is evident in the account book; for the bankruptcy see *Minute Book*, February 26, 1844, New York Academy of Sciences Library. Also see Simon Baatz, *Knowledge, Culture and Science in the Metropolis: The New York Academy of Sciences, 1817–1970*, published as *NYA Annals*, vol. 584 (New York: Academy of Sciences, 1990), and H.L. Fairchild, *A History of the New York Academy of Sciences* (New York: The Academy, 1887), p.

<sup>26</sup> Quoted in Fairchild, *History of the Academy*, p. 81.

<sup>27</sup> Sally Gregory Kohlstedt, "Museums on Campus: A Tradition of Inquiry and Teaching," in Ronald Rainger, Keith Benson, and Jane Maienschein, eds., *The American Development of Biology* (Philadelphia: University of Pennsylvania Press, 1988): 15–47.

<sup>28</sup> See, for examples, N. Jardine, J.A. Secord, and E.C. Spary, eds., *Cultures of Natural History* (Cambridge: Cambridge University Press, 1996); and Andreas W. Daum, *Wissenschafts-popularisierung im 19. Jahrhundert: Bürgerliche Kultur, naturwissenschaftliche Bildung und die deutsche Öffentlichkeit, 1848–1914* (Munich: Oldenbourg Verlag, 1998).

<sup>29</sup> Various accounts of a mermaid (apparently constructed from a monkey and a fish) suggest that Barnum deliberately tweaked the naturalists, most particularly Neil Harris's *Humbug: The Art of P.T. Barnum* (Boston: Little, Brown, and Co., 1973).

<sup>30</sup> Winsor, "Agassiz's Notion of a Museum," pp. 249–272.

<sup>31</sup> Edward Lurie, *Louis Agassiz, a Life in Science* (Baltimore: Johns Hopkins Press, 1988 [1960]).

<sup>32</sup> Mary P. Winsor, *Reading the Shape of Nature: Comparative Zoology at the Agassiz Museum* (Chicago: University of Chicago Press, 1991), esp. pp. 174–176.

<sup>33</sup> Sally Gregory Kohlstedt, "Henry A. Ward: The Merchant Naturalist and American Museum Development," *Journal of the Society for the Bibliography of Natural History*, 9 (1980): 647–661 discusses the limits of Agassiz's interest in public display. On the glass models, see R.E. Shultes and W.A. Davis, *The Glass Flowers at Harvard* (New York: E.P. Dutton, 1982).

<sup>34</sup> Barbara R. Stein, *On Her Own Terms: Annie Montague Alexander and the Rise of Science in the American West* (California: University of California Press, 2001).

<sup>35</sup> Lynn Dewald of the Wagner Free Institute kindly provided a copy of their National Register of Historic Places and National Landmark registration forms, compiled by Eugene Bolt and Susan Glassman, with its detailed discussion of architecture and history. On William Wagner's own assessment of the work that included 476 free lectures, a library of 7000 volumes, and chemical laboratory, and a cabinet of geology, mineralogy and conchology as well as his goals, see his letter to Spencer F. Baird at the Smithsonian Institution, n.d. [c. 1856], Baird Incoming Correspondence, Smithsonian Institution Archives.

<sup>36</sup> Coleman makes the provocative suggestion that abandoned castles were being converted into museums in Europe and that may have influenced Renaissance styles that became popular at mid-century; Laurence Vail Coleman, *The Museum in America: A Critical Study* (Washington: Association of American Museums, 1939), p. 199.

<sup>37</sup> Yanni, *Nature's Museums*, p. 111. The contrasts were deliberate on both sides; see Henry R. Hitchcock, *The Crystal Palace: The Structure, Its Antecedents, and Its Immediate Progeny* (Northampton, Massachusetts, 1951).

<sup>38</sup> For a particularly close look at the architectural decisions involved see Kenneth Hafertepe, *America's Castle: The Evolution of the Smithsonian Building, 1840–1878* (Washington: Smithsonian Institution, 1984). A number of architectural plans were submitted and, including two, one Gothic and the other the winning Norman style by the young James Renwick. Henry fretted that it would be "impossible for me to prevent a large expenditure in the way of a building" (p. 56) without arousing an already skittish Congress. Alexander Dallas Bache found a compromise by putting a cap at \$100,000 and suggesting that only interest be used for the building itself.

<sup>39</sup> Despite or perhaps because there is an extensive correspondence of Baird at the Smithsonian Institution, there is still no definitive biography of this leading naturalist who orchestrated much of the collecting and publication at the Smithsonian for more than three decades; the best account of one aspect of his life and career is Dean C. Allard Jr., "Spencer F. Baird and the United States Fish Commission" (Ph.D. diss., George Washington University, 1972).

<sup>40</sup> The ornate Victorian red brick structure with polychromatic trim was nonetheless built with attention to public spaces that needed to be fireproof and well ventilated. In 2003 there is serious discussion about taking down this building, which is now in poor condition.

<sup>41</sup> Pamela M. Henson, "Spencer Baird's Dream: A U. S. National Museum," in Ghiselin and Leviton, *Cultures and Institutions*, pp. 101–126.

<sup>42</sup> Helen Sterling suggests that the French teacher and author Jean-Nicolas-Louis Durand, who also had produced generalized plans for churches and other public buildings, found his inspiration for this museum design from Roman baths. See Sterling, *Art Museums*, pp. 14–20.

<sup>43</sup> [Percy R. Creed, ed.], *The Boston Society of Natural History, 1830–1930* (Boston: The Society, 1930).

<sup>44</sup> The museum was built together with a public library, see Nancy Oestreich Lurie, *A Special Style: The Milwaukee Public Museum, 1882–1982* (Milwaukee: Milwaukee Public Museum, 1983). Also see Sally Gregory Kohlstedt, “German Ideas and Practice in American Natural History Museums,” in Henry Geitz, Jurgen Heideking, and Jurgen Herbst, eds., *German Influences on Education in the United States to 1917* (Cambridge: Cambridge University Press, 1995), pp. 103–114.

<sup>45</sup> On the design competition see Ingrid A. Steffensen-Bruce, *Marble Palaces, Temples of Art: Art Museums, Architecture, and American Culture, 1890–1930* (Lewisburg: Bucknell University Press, 1998), pp. 168–176.

<sup>46</sup> A pictorial retrospective is found in James D. Van Trump, *An American Palace of Culture: The Carnegie Institute and Carnegie Library of Pittsburgh* (Pittsburgh: Carnegie Institute, 1970). The architects were Longfellow, Alden and Harlow, who had a firm in Boston and in Pittsburgh; Alden had worked with Richardson before going to Pittsburgh in 1885.

<sup>47</sup> Sally Gregory Kohlstedt, “International Exchange and National Style: A View of Natural History Museums in the United States, 1850–1900,” in Nathan Reingold and Marc Rothenberg, eds., *Scientific Colonialism: A Cross-Cultural Comparison* (Washington: Smithsonian Institution Press, 1987), pp. 167–190.

<sup>48</sup> Kohlstedt, “Museums on Campus,” 15–47.

<sup>49</sup> Museum philanthropy in this period has not received focused attention, but on early philanthropy see Howard S. Miller, *Dollars for Research: Science and Its Patrons in Nineteenth-Century America* (Seattle: University of Washington Press, 1970) and, although it sidesteps museums, also see Robert E. Kohler, *Partners in Science, Foundations and the Natural Scientists, 1900–1945* (Chicago: University of Chicago Press, 1991).

<sup>50</sup> Kathleen D. McCarty, *Noblesse Oblige: Charity and Cultural Philanthropy in Chicago, 1849–1929* (Chicago and London, University of Chicago Press, 1982); and Helen Lefkowitz Horowitz, *Cultural Philanthropy in Chicago from the 1880s to 1917* (Lexington: University of Kentucky Press, 1976), pp. 107–125, *passim*.

<sup>51</sup> In both instances, the founding date was to create a formal institutional base, although the actual facilities were in acknowledged temporary quarters, with the American Museum in the New York Armory and the Field Museum on the Columbian Exposition site.

<sup>52</sup> These multiple goals were articulated by Alexander Winchell, a geologist who had established the museum at the University of Minnesota and had hopes of creating a larger public museum in St. Paul, Minnesota in “Museums and their Purposes” in *Science*, n.s. 18 (July 24, 1891):40–46.

<sup>53</sup> John M. Kennedy, “Philanthropy and Science in New York City: The American Museum of Natural History, 1868–1968” (Ph.D. diss., Yale University, 1968).

<sup>54</sup> Robert A. M. Stern, Thomas Mellins, and David Fishman, *New York, 1880: Architecture and Urbanism in the Gilded Age* (New York: Monacelli Press, 1999), pp. 182–189. The master plan was violated subsequently by the building of an immense, temple-like memorial to Theodore Roosevelt on the eastern facade in 1936, by the Hayden Planetarium addition, and more recently by the building of the Rose Center, which has been described as a “cosmic cathedral.” See also Geoffrey Hellman, *Bankers, Bones and Beetles: The First Century of the American Museum of Natural History* (Garden City, New York: The Natural History Press, 1969), pp. 1–3 and 9–23; and Douglas J. Preston, *Dinosaurs in the Attic: An Excursion into the American Museum of Natural History* (New York: St. Martin’s Press, 1994 [1986]), pp. 13–20.

<sup>55</sup> While scores of dignitaries and displaced squatters looked on, President Ulysses S. Grant laid the cornerstone with a silver trowel supplied by Tiffany’s – and later stolen. Several prominent speakers, including New York Governor John A. Dix, alluded to the civic virtue and accomplishment implied by the building of a great cultural institution. See Hellman, *Bankers*, pp. 24–25.

<sup>56</sup> Karen Wonders, *Habitat Dioramas: Illustrations of Wilderness in Museums of Natural History* (Uppsala: Almqvist and Wiksell, 1993).

<sup>57</sup> Stern, Mellins, and Fishman, *New York 1880*, p. 186. The present structure departs widely from the original plan, and the final result is somewhat ambiguous. Architecturally disharmonious on the exterior, and hopelessly confusing on the interior, the museum building nevertheless suits its purposes as a place for the accumulation and display of specimens. More importantly, the museum is loved by millions of New Yorkers and international visitors who come to marvel at the objects it houses.

<sup>58</sup> For a detailed discussion of the influence of international fairs on architecture see Steffensen-Bruce, *Marble Palaces*, chapter 2: “The Art Museum as Fair Spectacle”

<sup>59</sup> As in New York, the Chicago leaders completely ignored the expertise of less prominent local men who had a serious interest in natural history. The Chicago Academy of Sciences had struggled over the years to recreate its collections and was itself building a facility further north in the early 1890s, and near the lakeshore in Lincoln Park. Edward Timothy

Klunk, "The Chicago Academy of Sciences: The Development and Method of Educational Work in Natural History" (Ph.D. diss., Loyola University, Chicago, 1996)

<sup>60</sup> No book-length, comprehensive, scholarly history of the Field Museum has ever been published. Essential data about its establishment can be found in [Frederick J.V. Skiff], "An Historical and Descriptive Account of the Field Columbian Museum" *Field Columbian Museum Publications, Historical Series*, 1 (1) (December, 1894): 1–91. There are also two incomplete manuscripts on the history of the museum housed in the Field Museum Archives (FMA), one by Frederick J.V. Skiff written in 1916, and one by J. Christian Bay written in 1929.

<sup>61</sup> Lighted naturally through abundant skylights, the museum could be dim on cloudy days and had to keep limited hours during the shortest days of winter. Water closets had to be added. So did offices and laboratory spaces. The wood floors sagged and warped. Infestations and mysterious smells were frequent complaints. The glass skylights threatened to break. The roof leaked, and sections of tin used to repair the leaks would blow away in the stiff Chicago wind. Detailed information about the troubles museum administrators had with the Fine Arts Palace can be found in dozens of letters in the Director's Correspondence, FMA.

<sup>62</sup> Letter (copy), O.F. Aldis to M. Field, 10 May 1894, FMA; [E.R. Graham] document entitled: "Estimates of Cost of Rebuilding the Field Columbian Museum, in Jackson Park" (copy) 7 May 1894, FMA.

<sup>63</sup> Burnham envisioned the museum as a key element in his grand Plan of Chicago, second in the urban hierarchy only to the main Civic Center, which would have an even higher dome. See Sally A. Kitt Chappel, *Architecture and Planning of Graham, Anderson, Probst and White, 1912–1936* (Chicago: University of Chicago Press, 1922), p. 3.

<sup>64</sup> See Letter (copy), H.N. Higinbotham to E. Walker, 30 December 1908, FMA; Lois Wille, *Forever Open, Clear and Free* (Chicago, Henry Regnery Company, 1972), pp. 77–81.

<sup>65</sup> Chappel, *Architecture and Planning*, pp. 86–88.

<sup>66</sup> By this time essentially all major museums followed the advice of George Brown Goode and kept most of their materials in storage and maintained separate office, lab and library space. The Field Museum put these facilities on the third floor. New storage space has been created by filling in lightwells and commandeering exhibit space. The museum is currently building new storage space underground.

<sup>67</sup> Michele Aldrich and Alan E. Leviton, "West and East: The California Academy of Sciences and the Smithsonian Institution, 1852–1906," in Ghiselin and Leviton, *Cultures and Institutions*, pp. 183–202; and *Theodore Henry Hittell's, The California Academy of Science: A Narrative History, 1853–1906*, Alan E. Leviton and Michele L. Aldrich, eds. (San Francisco: The Academy, 1997).

<sup>68</sup> See Steffensen-Bruce, *Marble Palaces*, p. 176.

<sup>69</sup> For a discussion of "civic science" on an international level, see Lynn Nyhart and Thomas Broman, eds., *Science and Civil Society* (Chicago: University of Chicago Press, 2002).

<sup>70</sup> He observed that "The eye is used more and more, the ear less and less, and in the use of the dye, descriptive writing is set aside for picture, and pictures are in turn replaced by actual objects. In the schoolroom the diagram, the blackboard, and the object lesson, unknown thirty years ago, are universally employed. . . Amid such tendencies the museum if would seem, should find congenial place, or it is the most powerful and useful auxiliary of all systems of teaching by means of object lessons." Quoted in "The Museums of the Future," *Writings of George Brown Goode*, p. 321.

<sup>71</sup> Not only did questions of variation and population have an effect on the size of collections, but the systematic attention to relatively new areas of study, particularly anthropology, also expanded the scope of museums. See, for example, Curtis M. Hinsley, Jr., *Savages and Scientists: The Smithsonian Institution and the Development of American Anthropology, 1846–1910* (Washington: Smithsonian Institution Press, 1981).

<sup>72</sup> This list, which contains only public natural history museums and not those of colleges, is based in large part on Appendix Y, a list of all museums with their own buildings, found in Coleman, *The Museum in America: A Critical Study*, n. p., 1939.



## Appendix A: List of Natural History Museum Buildings, Not Including Those on College Campuses, to 1930<sup>72</sup>

### To 1870

- 1814 Peale's Museum, Baltimore (1814–1830)  
 1840 Academy of Natural Sciences, Philadelphia (2<sup>nd</sup> story added in 1847; new bldg. 1876)  
 1855 Smithsonian Institution, Washington, D.C.

### 1860s

- 1860 Museum of Comparative Zoology, Cambridge (additions in 1889, 1902)  
 1864 Boston Society of Natural History  
 1864 Wagner Free Institute of Science, Philadelphia  
 1868 Chicago Academy of Sciences (destroyed by fire in 1871)

### 1870s

- 1874 California Academy of Sciences, San Francisco (relocated to new building in 1891)  
 1876 Academy of Natural Sciences, Philadelphia  
 1877 American Museum of Natural History, New York  
 1878 Davenport Public Museum (additions 1879, 1930)  
 1879 Portland Society of Natural History

### 1880s

- 1881 United States National Museum, Washington, D.C.  
 1885 Academy Hall, Peabody Academy of Science

### 1890s

- 1891 Fairbanks Museum of Natural Science, St. Johnsbury, Vermont  
 1891 California Academy of Sciences, San Francisco (destroyed by earthquake and fire in 1906)  
 1893 Field Museum of Natural History takes over Fine Arts Building, Chicago (new building 1921)  
 1893 Wistar Institute of Anatomy and Biology, Philadelphia  
 1895 Brooklyn Museum, Brooklyn Institute of Arts and Sciences (additions, 1905, 1907, 1927)  
 1895 Carnegie Institute, Pittsburgh  
 1898 Milwaukee Public Museum  
 1899 Museum of Natural History, Springfield, Massachusetts  
 1899 Barnum Institute, Bridgeport Scientific and Historical Society, Connecticut

### 1900s

- 1906 Colorado Museum of Natural History, Denver  
 1908 Everhart Museum of Natural History, Science and Art (addition 1929)

### 1910s

- 1911 United States National Museum (new building), Washington, D.C.  
 1913 Los Angeles County Museum of History, Science and Art (additions 1926, 1929)  
 1915 Natural History Museum, San Diego Society of Natural History  
 1916 California Academy of Sciences, San Francisco (new buildings; completed in 1913 but not opened to the public until 1916; addition 1923)  
 1916 New York State Museum, Albany  
 1918 Public Museum, Staten Island Institute of Arts and Sciences, New York

### 1920s

- 1920 Buffalo Society of Natural History (new building 1929)  
 1920 Knox Museum, Knox Academy of Arts and Sciences, Thomaston, Maine (addition 1929)  
 1921 Field Museum of Natural History, Chicago  
 1922 Santa Barbara Museum of Natural History (additions 1926, 1927, 1929), California  
 1923 Illinois State Museum, Springfield  
 1924 Reading Public Museum and Art Gallery, Reading, Pennsylvania  
 1924 Webb Memorial Library and Museum, St. Augustine, Florida  
 1926 Newark Museum, New Jersey  
 1929 Buffalo Museum of Science