

**THE AGE OF AQUARIA:  
THE AQUARIUM PURSUIT AND PERSONAL FISH-KEEPING, 1850-1920**

by  
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A thesis submitted to the Faculty of the University of Delaware in partial fulfillment of the requirements for the degree of Master of Arts in American Material Culture

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## **ABSTRACT**

The parlor aquarium, as defined by both a particular physical form, and by a specific set of human/non-human relationships, was an object unique to the era from 1850-1920. At the height of the aquarium pursuit, a strong fish-keeping community and industry developed around it. But just as the aquarium arose from a set of intertwined circumstances, its presence declined when such discussions and excitement waned. The brief manifestation of the aquarium pursuit, as reflected in the objects associated with it, illustrates the ways in which English and American cultures utilized fun, experience, and experiment as a didactical approach for developing moralistic notions of human and non-human welfare in the uneasy historical moment of the late nineteenth and early twentieth centuries. So often historians attribute conservatism and rigidity to the Victorian era, but the results of this study illustrate a vivacious, experimental, and even messy day-to-day experience.

In order to explore how personal aquaria straddled the realms of decorative adornments, natural history collections, and precious pets, this thesis utilizes material culture perspectives and historiographical frameworks previously applied to objects of a similar nature, including: pet supplies, cabinets of curiosities, and natural science museum displays. By employing these frameworks and by converging the print and visual culture which surrounded the aquarium pursuit with the extant objects – parlor aquaria, their outfitting, and the tools to manage them – this study revealed the ways in which seemingly unrelated aspects of Victorian life were deeply entangled. Additionally, the application of theories regarding the social lives of objects highlights

the logistical concerns of managing a life collection. By investigating the nature of the obstacles these objects presented and the ways in which these challenges were mitigated by networks of individuals, this study exposes the active role aquaria played in shaping day-to-day routines and even communities of people. As a result, the aquarium, and all it embodied, illustrates a Victorian life which was anything but dull and dismal. In fact, both were quite literally full of life.

## Chapter 1

### THE DAWNING OF THE AGE OF AQUARIA

“This extraordinary combination of science and art may be called the crowning glory of the spirit of discovery and characteristic of the 19<sup>th</sup> century...It opens to our inquisitive gaze the hidden chambers of the deep. If it does not actually place us where our foot-prints may be seen among the jeweled corridors, the many-pillared halls, the shining temples, the pebbled grottoes, the incomparable gardens where times’ ravages are unknown and eternity stamped on all that is matchless in its grandeur, it gives us, at least, a faithful copy, in little, of those enchanting scenes, for our leisurely perusal and admiration. [And] The graceful fish – the brilliant reptiles – the shining insects that people this rare world, whilom hermetically sealed up from our yearning view, are now displayed in the aquarium, sporting – feeding – slumbering – pursued and pursuing – leaping into life, and fading into dissolution – each in its natural haunts, and yet all “at home,” in these crystal palaces, to the enraptured eye of the most timid spectator.”

-Henry D. Butler, 1858<sup>1</sup>

Amongst a myriad of tin wares, birdcages, and other assorted objects in Winterthur’s “End Shop,” there hides a parlor aquarium. The aquarium is octagonal and composed of a tinned sheet iron frame and glass panels. At each of the corners,

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<sup>1</sup> Henry D. Butler, *The Family Aquarium, or Aqua Vivarium. A New Pleasure for the Domestic Circle: Being Familiar and Complete Instructor Upon the Subject of the Construction, Fitting Up, Stocking, and Maintenance of the fluvial and Marine Aquaria, or River and Ocean Gardens* (New York: Dick and Fitzgerald Publishers, 1858), 11-12.

above the rails, sit meticulously-detailed pheasants molded out of pewter.<sup>2</sup> An architectural structure rises from the floor of the center of the tank above the glass walls. The structure is elaborate, complete with Palladian windows outfitted with real silk draperies and doors adorned with ovular bosses—even a door with a hinge which opens and closes. The mansard roof contains four dormers with cobalt glass windows, a folded tin chimney inscribed with brick-pattern details, and a cupola featuring paper clocks reading twelve past seven (Fig. 1.1). The features of the structure are informed by both Neo-Palladian and American Second Empire vocabularies, ideas contemporary to the shape and materiality of the tank itself. Meanwhile, beneath the water line, the structure sits atop a sunken arcade of an Atlantean world. Galvanized metal piers with classically-inspired columns are naturally speckled and glittery in appearance. Between the underwater pavilion and the building structure above is a carnivalesque middle ground with copper spirals and bronze-powdered, pierced screens which hold trapezoidal mirrors to reflect the world below.<sup>3</sup>

The Winterthur aquarium is a masterpiece of sheet metal work, drawing extensively upon on the natural colors, textures, and material properties of the metals. Everything from its object-hood to the material and artistic choices which define it are steeped in the complex vernacular of natural philosophy's oldest debate: the tension

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<sup>2</sup> See Appendix A images A1 and A2 for the descriptive and element-based terminology used to describe aspects of the Winterthur aquarium.

<sup>3</sup> Haddon Dine, *Technical Examination of a Nineteenth Century Aquarium (1965.2192 A, B)*, unpublished technical analysis performed for Winterthur/University of Delaware Program in Art Conservation, December-May 2018, 18-31.



Figure 1.1 Winterthur Aquarium, 1870-1910, possibly New Jersey or New York. Tinned sheet iron, glass, iron, paint, silk, paper, iron wire, bronze powders, and plastic. Bequest of Henry Francis du Pont, Winterthur Museum, 1965.2192 A, B. Image Courtesy of Winterthur Museum.

between the natural and the artificial. In its heyday, the aquarium straddled an uneasy world. It was a decorative adornment carefully and artistically composed. It was a display of a natural science collection, intended to share a new and specialized form of knowledge. And it was intended to house precious, and sometimes very expensive pets. But how does one study an object which was once filled with water, plants, and animals in a museum setting?

### 1.1 **Aquaria and the Evolutionary Trajectory of Wunderkaben**

In 1736, Edme-Francois Gersaint, a Parisian fine arts dealer and eighteenth-century popularizer of *wunderkammen* in France, described his visit to the natural history collection of Levinus Vincent, a Harlem cloth manufacturer.

This cabinet is composed of more than seven hundred vials filled with reptiles and other rarer and bigger animals that one can preserve in the spirits of wine; a considerable number of the rarest shells; an impressive quantity of corals, marine plants, and minerals.<sup>4</sup>

Vincent's exquisite collection contained natural science specimens including insect, animal, vegetal, and mineral materials, as well as an extensive collection of exotic and interesting ethnographic materials ranging from porcelain and lacquerware to antique coins and archeological finds.<sup>5</sup> They were organized and mounted for public display in a grand vaulted gallery with Palladian fan windows and intricately

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<sup>4</sup> Frances Terpak, "Objects and Contexts," in Barbara Maria Stafford and Frances Terpak, eds., *Devices of Wonder: From the World in a Box to Images on a Screen* (Los Angeles: Getty Research Institute, 2001), 148.

<sup>5</sup> Ibid., 148-150.

carved rococo shelves, alcoves, niches, and cabinet drawers.<sup>6</sup> The cabinet was meant to resemble a small-scale version of the world in which Vincent lived—encapsulating both the human and non-human. His collection’s vastness paralleled the contemporary discussions surrounding the unexplored vastness of the world, and even of the universe. Yet, his ability to hold it and to possess it reflected a larger societal desire to maintain a human dominance over this seemingly unruly nature.

To collectors and their visitors, *wunderkabben* in the Age of Humanism, and later reinterpreted through the Enlightenment, offered an opportunity to explore what they had never seen and to make sense of the ways in which their world worked: dictated by the invisible hand of God, or operated by acts of science, or perhaps both, or neither. Museum theorist Krzysztof Pomian describes these cabinets as “a miniature version of the universe, containing specimens of every category of things and helping to render visible the totality of the universe, which otherwise remained hidden from human eyes.”<sup>7</sup> They operated within a liminal space “no longer controlled by theology and not yet controlled by science.”<sup>8</sup> They were spaces which straddled natural science didactic, ethnographic understandings, and artistic masterpieces. All the while, they expressed power, taste, and personality. Each aspect was carefully considered, from the menagerie of specimens to the carefully composed atmospheres in which they were displayed.

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<sup>6</sup> Ibid., 148-150.

<sup>7</sup> Krzysztof Pomian, *Collectors and Curiosities: Paris and Venice 1500-1800* (Cambridge, UK: Polity Press, 1990), 69.

<sup>8</sup> Ibid., 76-77.



Although collections like *wunderkabben* were still assembled in the late eighteenth century, the philosophy behind the cabinets and their associated collecting hobbies evolved into new forms, branching out into a wide variety of more specialized concentrations of knowledge. Rather than a full assemblage, the new cabinet of curiosity fit neatly into a recently reorganized framework of education, particularly in England, and as a result often came to represent individual disciplines of study: natural science or ethnography.

Inspired by John Locke's *Some Thoughts Concerning Education*, English schools were encouraged to shift learning from an emphasis on the religious to the practical to better prepare children to be more productive members of society.<sup>9</sup> Locke's improvements in education, of course, were not actualized randomly, they developed and grew alongside changing definitions of childhood. Discussions surrounding children shifted towards a view of the child as "born pure," rather than an earlier assumption of "birth into sin." Childhood was increasingly considered an exploratory stage, rather than one to be constrained and swaddled into subservience.<sup>10</sup> Thus, the underlying themes of the new educational schema surrounded concepts of self-education and self-improvement. Theoretically, though perhaps not realistically, children were to be taught with benevolence, sympathy, and—when necessary—shame to encourage high moral character. A learned child, equipped with these tools, would be able to achieve gainful employment and an appreciation for arts and culture, thus finding themselves on the path of virtue.

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<sup>9</sup> Terpak, "Objects and Contexts," 169.

<sup>10</sup> J.H. Plumb, "The New World of Children in Eighteenth Century England," *Past and Present* 67 (1975): 67-70.

This new educational framework worked in tandem with Locke's suggestions to reshape childhood education to be socially, rather than religiously based. Moreover, it was proliferated both in pedagogical technique as well as in curriculum, which focused on disciplines such as modern languages, history, the arts, arithmetic, and natural science.<sup>11</sup> As educational disciplines increasingly focused on the earthly and the exploratory, educational toys and visual materials grew to become central didactic tools. Among these were jig-saw puzzles, dice games for learning geography, paper dolls, and specialty playing cards.<sup>12</sup> From 1800 to 1802, John Marshall, a leading children's publisher in London, printed at least seven sets of flash cards (insects, shells, fish, flowers, beasts, birds, and "various objects") to which he referred as miniature cabinets of curiosity or *infant's cabinets* (Fig. 1.2).<sup>13</sup> Each set consisted of a small wooden box containing approximately two dozen illustrated cards identifying various species and referencing further reading which could be found in the two miniature books included on the subject. The cards could be used to learn, study and memorize, or to rearrange, display, and play. They referenced the thought process and the physical actions of the cabinet of curiosity, drawing perhaps most greatly on the didactic quality, but not ignoring aesthetic quality or scientific interest.

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<sup>11</sup> Ibid., 67-70.

<sup>12</sup> Ibid., 87-89.

<sup>13</sup> Terpak, "Objects and Contexts," 170-171.



Figure 1.2 *A History of Fishes, or The Infant's Cabinet of Fishes*, John Marshall, London, 1801. Copperplate engraving, hand colored. Image Courtesy of Children's Book Collection, Library Special Collections, Charles E. Young Research Library, UCLA.

Additionally, early collecting schemes served as a logical inspiration for public museums, cycloramas, exhibitions, circuses, zoos, and menageries. Most simply, shifting educational values resulting in increased time with parents meant that families were expected to bring their children to experience these various collections.<sup>14</sup> However, not merely intended as didactic tools in the educational schema, but rooted deeply in social discussions, these experiences were intended to encourage play and learning, as well as to serve as scholarly centers. Most importantly they were intended to excite and inspire both children and adults. Likewise these experiences, too, were proliferated through toys and games such as trinket menageries and pop-up books (Fig. 1.3). It is this branch of the cabinet of curiosity evolutionary tree in which the aquarium most comfortably fits. Yet the proliferation of such complex objects is

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<sup>14</sup> Plumb, "The New World of Children," 85-87.

greatly owed to the development of the aquarium's cousin objects, the miniature flashcard games, natural science museums, and even artistic models of ocean life.

It is important to specify that the nineteenth century was not the only moment in which naturalistic design and a keen awareness of natural science permeated educational and aesthetical theory; however, the period does represent a height, particularly in the realm of the visual arts. Careful observation of and attention to aquatic anatomy represented a prolific category of design motifs throughout the nineteenth century across a broad range of media. In paint artists such as Frederic Church and Robert Chanler painted portraits and murals, respectively, inspired by their own collections of aquatic animals.<sup>15</sup> Meanwhile, in glass, Leopold and Rudolf Blaschka were modeling invertebrates and botanicals for museums and universities (ca. 1870) from public collections along the American east coast.<sup>16</sup> Louis C. Tiffany created a nautilus shell lamp, a fish shade, and even a full-sized stained-glass window with a fish globe in the center (1870), all inspired by the lively plant and possibly even fish collections held at Tiffany studios (Fig. 1.4).<sup>17</sup> In ceramics, Wedgwood released a line of aquatic themed dining wares including a lobster salad bowl and tongs (ca. 1880). In metal, Tiffany and Co. was producing an extensive series of flasks, coffee pots, bowls, and other vessels featuring aquatic and marine creatures (ca. 1890) from

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<sup>15</sup> Gina Woulters and Andrea Gollin, *Robert Winthrop Chanler: Discovering the Fantastic* (Vizcaya Museum and Gardens, Miami: The Monacelli Press, 2016).

<sup>16</sup> Susan M. Rossi-Wilcox and David Whitehouse, *Drawing Upon Nature: Studies for the Blaschkas' Glass Models* (Corning, NY: Corning Museum of Glass, 2007).

<sup>17</sup> The Charles Hosmer Morse Museum of American Art, *Timeless Beauty: The Art of Louis Comfort Tiffany* (Atglen, PA: Schiffer Publishing, 2016).

fish to crustaceans to aquatic plants (Figs. 1.5, 1.6).<sup>18</sup> The natural world and the collection of it – represented through these created, realistic objects ranging from flashcards to dinner plates – was quite literally everywhere.



Figure 1.3 *The Aquarium*, Charles J. Howard and Maxine Maxson Waldron, ca. 1886. Published by McLoughlin Bros., New York. Collection of Rare Books and Trade Catalogs at the Winterthur Library. Image Courtesy of the Winterthur Library: Printed Book and Periodical Collection.

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<sup>18</sup> It is important to note that the companies listed here have been utilized as exemplars. In each of these material fields there were plenty more companies and individuals drawing inspiration from the aquatic and marine worlds.

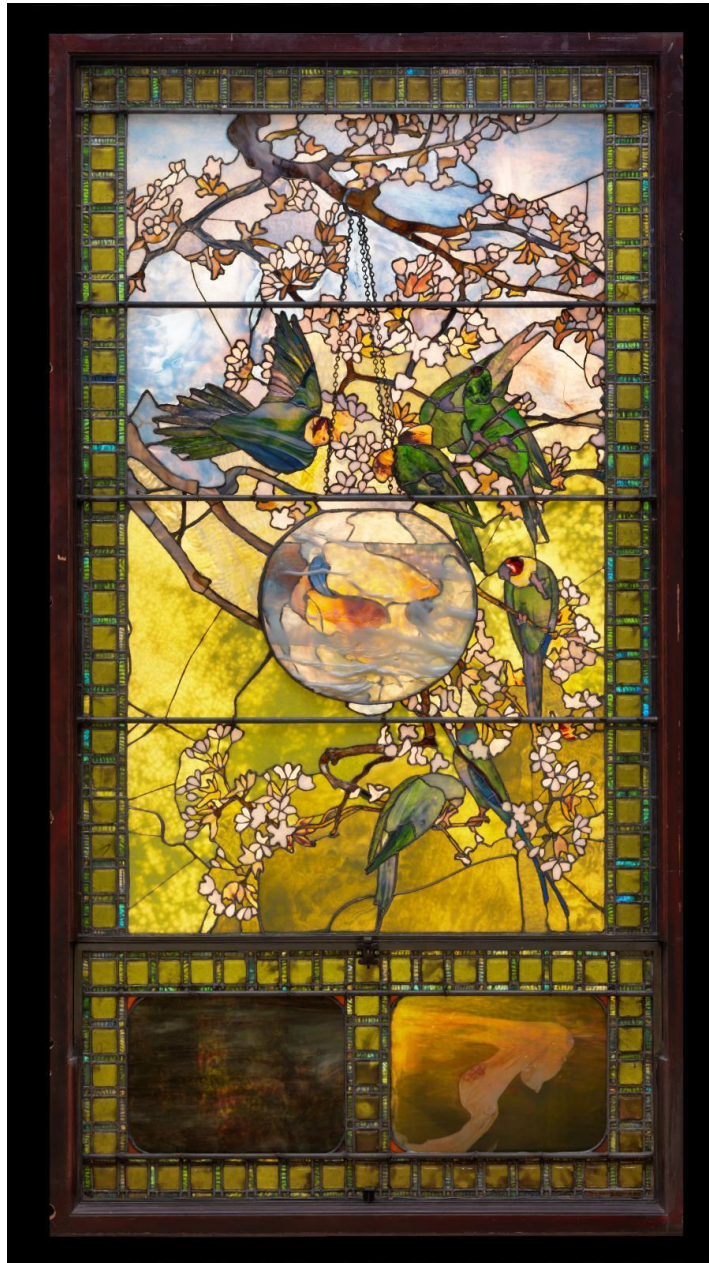


Figure 1.4 *Parakeets and Goldfish Bowl*, Designed by Louis Comfort Tiffany (1848-1933), Tiffany Glass Company (active 1885-1892), 1889, New York, NY. Glass, lead, bronze chain. 77" x 38 ½". Gift of Barbara L. and Theodore B. Alfond in honor of Malcolm Rogers, Museum of Fine Arts, Boston, 2008.1415. Image Courtesy of the Museum of Fine Arts, Boston.





Figure 1.5 Coffee Pot, Tiffany & Co., ca. 1880, New York, NY. Silver, gold. 7" tall. Collection of Silver Perfect. Image Courtesy of Silver Perfect, Chesterfield, MO.



Figure 1.6A Fish Flask, Tiffany & Co., ca. 1880, New York, NY. Silver, gold. 7  $\frac{3}{4}$ " x 3  $\frac{3}{4}$ " x 1  $\frac{1}{2}$ ". Collection of Silver Perfect. Image Courtesy of Silverperfect.com.

Figure 1.6B Detail of cap, Fish Flask, Tiffany & Co., ca. 1880, New York, NY. Silver, gold. 7  $\frac{3}{4}$ " x 3  $\frac{3}{4}$ " x 1  $\frac{1}{2}$ ". Collection of Silver Perfect. Image Courtesy of Silverperfect.com.

## 1.2 The Emergence of the Aquarium

The display of natural specimens in the Western world was stimulated by an interest in the cabinets of curiosities, and the practice seemed to have infiltrated nearly every aspect of life. However, Victorian advancements in glass construction and experimentation with the creation of microenvironments (miniature, self-sustaining inhabitations) allowed later nineteenth-century collectors to maintain an entirely new display of the aquatic world – one of living creatures.

Concurrent with the continued interest in natural curiosities, came a fall in the technological and economic barriers which had previously prevented the erection of large glass structures. Over the course of the nineteenth century, developments in plate glass production, ranging from the discovery of synthetic alkali to the automation of glass manufacturing processes, brought an increase both in the accessibility of plate glass and the diversity of glass products offered.<sup>19</sup> These new developments in technology and the increased pace of production meant manufacturers could specialize in the particular glass types and forms, thus increasing consumer choice. Moreover, the expulsion of the British glass excise tax in 1845 resulted in an unprecedented demand for glass products.<sup>20</sup>

The pinnacle of the new demand for glass was exemplified in London's 1851 Great Exhibition inside the Crystal Palace, a 990,000-square foot structure of iron and clear glass designed by Sir Joseph Paxton. Inside, more than six million visitors

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<sup>19</sup> Hentie Lowe, "Window Glass Making in Britain, c. 1660 – c.1860 and its Architectural Impact," *Construction History* 7 (1991): 53-60.

<sup>20</sup> *Ibid.*, 53-60.



explored the nearly 14,000 exhibits featuring modern technologies from steam engines to false teeth and from mechanical reapers to the aquarium.<sup>21</sup> The visual presence of the architectural feat was often referenced in the design of iron and glass fish tanks. Meanwhile, the discussions surrounding display, science, wonder, pedagogy, and more, embodied by the exhibitions themselves, were mimicked inside the tanks.

The popularity of aquarium collections was deeply rooted in a European tradition of curiosity cabinets, and the material actualization was owed to the increased availability of plate glass. However, the obsession with fish as inhabitants was shaped by another equally important phenomenon: shifting global interactions in response to the re-opening of East Asia to the West. Notions of generalized isolationism and careful external interaction characterized much of the early Qing Dynasty (1644-1911) in China and the Tokugawa Shogunate (1600-1868) in Japan. Neither China nor Japan severed all interaction with Western Europe, but both carefully managed how that interaction took place. Both established particular port cities (Guangzhou province in China and Nagasaki in Japan) on the out-skirts of less culturally influential regions where approved foreign merchants could exchange goods.<sup>22</sup> Access to local individuals was fairly limited and appointments with governmental officers were largely prohibited. As a result, though export goods were transported between East

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<sup>21</sup> George Wagstaffe Yapp and Robert Ellis, *Official Catalogue of the Great Exhibition of the Works of Industries of All Nations, 1851* (London: Spicer Brothers, 1851);

Louise Purbrick, ed., *The Great Exhibition of 1851: New Interdisciplinary Studies* (Manchester, UK: Manchester University Press, 2001).

<sup>22</sup> R. Keith Schoppa, *Revolution and its Past: Identities and Change in Modern Chinese History* (New York: Prentice Hall, 2011).

and West, interactions regarding culture and lifestyle were greatly limited. Understandings of East Asia were relegated to a mysterious, exoticized “other” interpreted through the lens of carefully selected and approved merchants and objects.

These policies protected both nations from foreign influence at the height of cultural imperialism, but also encouraged unrest. By the mid-nineteenth century, French, English, and American warships arrived in China and Japan. Mounting internal and external pressures resulted in an East Asian defeat, a series of unequal treaties, and even the collapse of the Tokugawa Shogunate in Japan. For Western Europe and the United States, the treaties following the Opium Wars (1848-1850) and the expeditions of Commodore Matthew C. Perry (1853) provided unparalleled access to various aspects of East Asian court culture. Perhaps the most voraciously consumed objects were Japanese woodblock prints of *bijin-ga*, or beautiful women. Often the courtesans were illustrated with their full cherry lips, half-moon eyes, and elegant, graceful limbs, participating in courtly activities ranging from strolls in the garden, to playing games of go (*weiqi*), to caring for their goldfish (Figs. 1.7, 1.8).

The cultivation of goldfish had long been practiced in both Chinese and Japanese courts (Fig. 1.9). Though silver carp were bred for millennia in China, natural mutations resulting in red, orange, and yellow coloring were first recorded in the third century. Admired for their golden yellow “imperial” hue, the Tang Dynasty (618-907) court began intentionally raising what we now refer to as “goldfish” in ornamental ponds. The large-scale domestic breeding of this fish was standardized in the Song Dynasty (1368-1644) and introduced to Japan in the early seventeenth

century.<sup>23</sup> Although this already hyper-bred variation of goldfish (*Carassius auratus*) was introduced to Western Europe by way of Japanese-Portuguese relations in the mid-seventeenth century, the new degree of cultural proximity created in the mid-nineteenth century brought westward a deeper interest in the culture of cultivation and breeding.<sup>24</sup>

While Europeans had managed goldfish in fish bowls in the past, the aquarium as a separate entity emerged when the culture of breeding was introduced in the late nineteenth century. Uniquely, the aquarium combined Western European histories of natural specimen display with Enlightenment educational theory and interest in East Asia, all within the walls of a glass tank made possible by the latest glass manufacturing technologies.

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<sup>23</sup> Hugo Mulertt, *The Goldfish and its Systematic Culture with a View to Profit. A Practical Treatise on the Fish, Its Propagation, Enemies, Diseases, and Care of the Fish in Captivity, Together with Hints on the Construction of Ponds, etc.* (Cincinnati, Hugo Mulertt, 1883), 5-13.

<sup>24</sup> George B. Sowerby, *Popular History of the Aquarium of Marine and Freshwater Animals and Plants* (London: Lovell Reeve, 1857).



Figure 1.7 *Kingyo [Goldfish]*, Utamaro Kitagwa (1753?-1806), ca. 1793-ca. 1804, Japan. Published by Uemura Yohei. Woodblock print, ink and color on paper. The Miriam and Ira D. Wallach Division of Art, Prints, and Photographs: Print Collection, the New York Public Library. Image Courtesy of the New York Public Library.





Figure 1.8 *Women Playing with Goldfish*, Kitagawa Utamaro (early 1750s-1806), ca. 1800, Japan. Published by Omiya Gonkuro. Woodblock print, ink and color on paper. 15 ½" x 10 ¼". William Sturgis Bigelow Collection, Museum of Fine Arts, Boston, 11.14230. Image Courtesy of the Museum of Fine Arts, Boston.



Figure 1.9A *Fish Bowl*, ca. 1796-ca.1820, China. Porcelain with overglaze enamel decoration, gilt wood pedestal. 16" x 24 ½". Gift of Julia G. Fahrenstock in memory of her husband, William Fahrenstock, 1940, Collection of the Philadelphia Museum of Art, 1940-17-21a, b. Image Courtesy of the Philadelphia Museum of Art.



Figure 1.9B Detail, *Fish Bowl*, ca. 1796-ca.1820, China. Porcelain with overglaze enamel decoration, gilt wood pedestal. 16" x 24 ½". Gift of Julia G. Fahrenstock in memory of her husband, William Fahrenstock, 1940, Collection of the Philadelphia Museum of Art, 1940-17-21a, b. Image Courtesy of the Philadelphia Museum of Art.

### 1.3 Defining Nature

In the twenty-first century, our conceptions of nature are constantly in flux. They are dependent upon individual predilections regarding self, spirituality, and the non-human elements which make up our world. We are beleaguered with a set of complicated questions. Are humans part of the natural world? If so, are the implications of human presence natural? If the wasp's nest is a natural element because it is made by a living creature, are our human abodes, communities, towns, political boundaries natural? What about a creature which exists naturally, but has been selectively bred by humans, and thus is occurring in a particular form in increased numbers? Where does the natural end and non-natural begin?

These discussions are not at all new, but they reached a tumultuous height in the late nineteenth century when zoologists, botanists, and geologists, challenged the very threads with which human conceptions of the natural world were woven.<sup>25</sup> Of course, among these scientists whom greatly challenged their contemporary world was Charles Darwin and his publication of theories regarding species variation, natural selection, and ultimately evolution. The impact of the release and wide-spread discussion of *Origin of Species*, particularly regarding the ways in which it re-shaped human-non-human relationships, cannot be overstated.<sup>26</sup>

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<sup>25</sup> Carla Yanni, *Nature's Museums: Victorian Science and the Architecture of Display* (Baltimore, MD: Johns Hopkins University, 1999), 4-6.

<sup>26</sup> It is important to clarify here that Darwin was not alone in his theory or impact, but that he was part of a larger moment within scientific study and natural philosophy, which his name now best embodies.

It is imperative to clarify that it is not necessarily a tension between creationism and evolutionary theory which caused an anxiety surrounding the natural world. It is easy to suspect this case from the modern perspective. As Roger Smith, modern scholar of late-nineteenth-century biology, suggests, “It is valuable to look for the continued... belief in a middle ground, instead of seeing a sharp division between scientific and religious or value-laden thought [when considering late nineteenth century natural philosophy].”<sup>27</sup> In reality, most Victorians were comfortable with maintaining that theology and science were not at odds, but rather their study offered opportunities to better make sense of one in light of the other. Thus, an understating of Darwin’s proposed theories offered a sense of closeness to an omnipotent god’s master plan. However, this is not to say Darwin’s work did not redefine notions of morality and philosophy, it is to clarify that the point which caused angst and discussion was actually deeply rooted in conceptions of permanency and progress.<sup>28</sup>

Early twentieth century philosopher, John Dewey interpreted Darwin’s most significant impact on philosophy not to be the theories themselves, but the implications of those theories. Dewey surmised:

In laying hands upon the sacred ark of absolute permanency, in treating the forms that have been regarded as types of fixity and perfection, as originating and passing away, ‘Origin of Species,’ introduced a mode

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<sup>27</sup> Roger Smith, “The Human Significance of Biology: Carpenter, Darwin, and the *Vera Causa*,” In U.N. Knoepfelmacher and G.B. Tennyson, ed., *Nature and the Victorian Imagination* (Berkeley, CA: University of California, 1977).

<sup>28</sup> Ibid., 215-230.



of thinking that in the end was bound to transform the logic of knowledge and hence the treatment of morals, politics, and religion.<sup>29</sup>

If the evolutionary theory were to hold, it would mean that all of nature and therefore all knowledge of natural philosophy was in constant flux, ever progressing, but never reaching a final form. Survival necessitated change, and thus, all non-human and human natural occurrences were constantly in discussion with one other, reinterpreting the role of one another in order to ensure survival. And while Dewey would apply this method of thinking to his own conceptions of politics and education, there is no doubt that the roots of what Dewey was making sense of were recognized as hazardous to the prior Western European conception of a world which could be wholly mastered through education and management of encyclopedic collections.

Of course, prevailing rationalist theory, perpetuated by those such as William B. Carpenter, a biologist contemporary to Darwin and the center of many discussions surrounding science, suggested that although the natural world may be continually progressing, its changes and shifts only exist so long as they are perceived by the human forces studying them.<sup>30</sup> It is the human category which renders these changes intelligible. Debate ensued surrounding the very *nature of nature* as Victorians attempted to articulate at what point natural philosophy was in fact simply a human and perhaps unnatural invention.

The intersectionality of these religious, educational, and imperial discussions in conjunction with changing notions of aesthetics was expressed through a number of

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<sup>29</sup> John Dewey, *The Influence of Darwin on Philosophy and Other Essays in Contemporary Thought* (New York: Henry Holt and Company, 1910), 2.

<sup>30</sup> Smith, "The Human Significance," 215-230.

Victorian habits. Among these was the development of new rhetoric surrounding animal cruelty and even early environmentalism. The reality of experiencing “exotic” people, animals, and plants regularly through the lens of the new “earthly” education complicated traditional human networks and relationships, particularly in tandem with the challenges Darwin and others brought to the theological table regarding a survival instinct amidst an ever-changing world. In terms of relationships with non-human, living, macroscopic entities, there was a clear ideological shift towards considering the mindfulness of these creatures. Perhaps a projection of anxieties surrounding the treatment of colonized peoples at the height of nineteenth century, Victorians imparted personalities, civilizations, and reason upon their non-human counterparts.<sup>31</sup> The result was a sense of concern for the well-being of said creatures, particularly if one sought salvation in the eyes of God. For these simple creatures who needed the care of their humans could also simultaneously impart a knowledge of the natural world on to man and bring one closer to understanding God’s plan.<sup>32</sup> Through the invisible hand, they could teach virtue and enact one’s own sense of nostalgic order, in the face of world now suspected to operate in a constant progression.<sup>33</sup>

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<sup>31</sup> J.F.M. Clark, *Bugs and the Victorians* (New Haven, CT: Yale University Press, 2009);

Takashi Ito, *London Zoo and the Victorians* (London: Boydell & Brewer, 2014).

<sup>32</sup> J.F.M. Clark, *Bugs and the Victorians* (New Haven, CT: Yale University Press, 2009).

<sup>33</sup> Though today the phrase “invisible hand” is most commonly associated with Adam Smith and economic theory, the phrase was actually applied broadly across enlightenment theory and was considered a prevailing pedagogical technique for encouraging without enforcing virtue through education.

J.E. Taylor, nineteenth-century aquarist, drew these connections directly in *The Aquarium: Its Inhabitants, Structure, and Management*. He wrote:

The ‘hunting instinct’ is strong in most boys, and a love of natural history might direct this so that it would benefit man and beast alike: not unfrequently [sic] it assumes the character of unconscious cruelty, and the possession of *might* soon passes into the belief that its exertion is *right*. The thoughtlessness with which children often torture flies, worms, &c., must undoubtedly be the means of partially developing a nature that ultimately finds a pleasure in inflicting pain, or inn [sic] causing death... Anything which can neutralise this tendency to cruelty, or develop a more tender regard for the lower organised of our fellow creatures, becomes a means of moral education. This, we contend, might easily be brought about by keeping an aquarium, and interesting children in the funny ways of its inhabitants.<sup>34</sup>

In respect to aquatic life, these changing human/non-human relationships resulted in a revived interest in goldfish, a surge in their importation from Asia, and a characteristic shift in their care. Ink paintings and woodblock prints of East Asian court goldfish—carefully bred to particular aesthetic interests—stimulated an interest in goldfish promulgation. This new “aquarianism,” operated as an art which required care, attention to detail, and an understanding of bio-ecology. This meant that goldfish were no longer simple adornments for the punch bowl or fish globe, nor were they just pets. The management of them, as well as a nearly infinite list of other aquatic and marine species, emerged as a full-fledged pursuit, which distinctly embodied a plethora of impending social, economic, imperialistic, artistic, and spiritual discussions. It was this complex set of interactions which reached a zenith in the late nineteenth century and gave rise to a new and totally unique form, the aquarium.

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<sup>34</sup> J.E. Taylor, *The Aquarium: Its Inhabitants, Structure, and Management* (London: Hardwicke & Bogue, 1876), 24-25.

## 1.4 The Small-Scale Aquarium Outside the Home

The greatest number of individuals likely experienced the aquarium for the first time out in public spaces. Of course, there were large-scale public aquaria which housed hundreds of tanks of freshwater and marine species. But there were also a number of curated experiences of small-scale aquaria that were far more akin to the personal aquarium than the public one.

Exhibitions of small, and even personal aquaria were common towards the end of the nineteenth century and throughout the early twentieth. Major fairs and expositions including the Centennial (1876) and the Columbian Exposition (1892) featured extensive displays of aquaria and even hosted aquarium design competitions.<sup>35</sup> After the age of regular expositions, aquarists continued to curate aquarium shows. Publisher and aquarium enthusiast, William T. Innes, organized these for the Philadelphia Aquarium Society in Horticultural Hall from the early twentieth century through the 1930s. The shows annually displayed noteworthy amateur aquarists' personal tanks for the public.<sup>36</sup> The objective of these exhibitions was to encourage the public's interest and involvement with aquaria through both education and aesthetic grace.

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<sup>35</sup> James D. McCabe, *The Illustrated History of the Centennial Exhibition Held in Commemoration of the One Hundredth Anniversary of American Independence with a Full Description of The Great Buildings and All the Objects of Interest Within Them, Embracing Also A Concise History of the Origin and Success of the Exhibition, and Biographies of the Leading Members of the Centennial Commission* (Philadelphia, PA: Jones Brothers Co., 1876), 570-571.

<sup>36</sup> William T. Innes, *Goldfish Varieties and Tropical Fishes* (Philadelphia, PA: Innes Publishing, 1916), 40-46.

Additionally, professional aquarists organized the travel of small-scale aquarium exhibitions to nearby edifices of education. In 1908, the New York Public Library featured an exhibition of living fish and marine plants from the New York Aquarium in glass globes and tanks at several of their branches.<sup>37</sup> At least one small aquarium was kept at the Riverside Branch of the New York Public Library for public viewing (Fig. 1.10). In the case of the relationship between the library and the aquarium, there is a clear emphasis on the didactic and educational elements of the living collection.

Even if one avoided cultural and educational institutions entirely, private aquaria found their way into the public eye. A photograph of the Daleville Dentist Office waiting area from around 1908 features a large, rectangular aquarium with at least one fish and a decorative fountain (Fig. 1.11).<sup>38</sup> Meanwhile, a feature on “Sidewalk Vendors at Holiday Time” in New York City from 1906 included a photograph of a goldfish vendor on Sixth Avenue (Fig. 1.12).<sup>39</sup> Indeed, the now forgotten aquarium pursuit was a significant part of the late nineteenth life experience.

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<sup>37</sup> New York Public Library, *Bulletin of the New York Public Library: Report of the Director, January to December 1908* (New York: New York Public Library, 1908), 125, Collection of Harvard University.

<sup>38</sup> Little information exists regarding this photograph. All of the known information is based on what is visually present in the image. For example, it is not known which Daleville this dentist office operated in, but merely that it is Daleville because it says so on the window behind the men.

<sup>39</sup> It may appear that this goldfish peddler was merely selling rustic-style fish bowls strung up on a tripod, but in actuality the enclosure featured in the picture was patented by Henry Bishop as “the tripod aquarium.” Albert J. Klee, *The Toy Fish: A History of the Aquarium Hobby in America: The First Hundred Years*, (Pascoag, RI: Finley Aquatic Books, 2003), 63.

Regardless of whether in an educational institution, an exposition, a dentist office, or even on the streets of New York, experiencing fish in small-scale habitations was for the first time a ubiquitous experience. And the many perspectives and factors from which the aquarium was approached allowed for it to be displayed or consumed in widely disparate ways.



Figure 1.10 *Riverside, Girl Reads as Another Smaller Girl Looks at Aquarium*, likely Lewis Hine (1874-1940), ca. 1897-ca.1920. Lantern Slide. Manuscript and Archives Division, the New York Public Library. Image courtesy of the New York Public Library, Astor, Lenox and Tilden Foundations.



Figure 1.11 Daleville Dentist Office, ca. 1900 – ca. 1910. Photograph on Paper. Image in public domain.

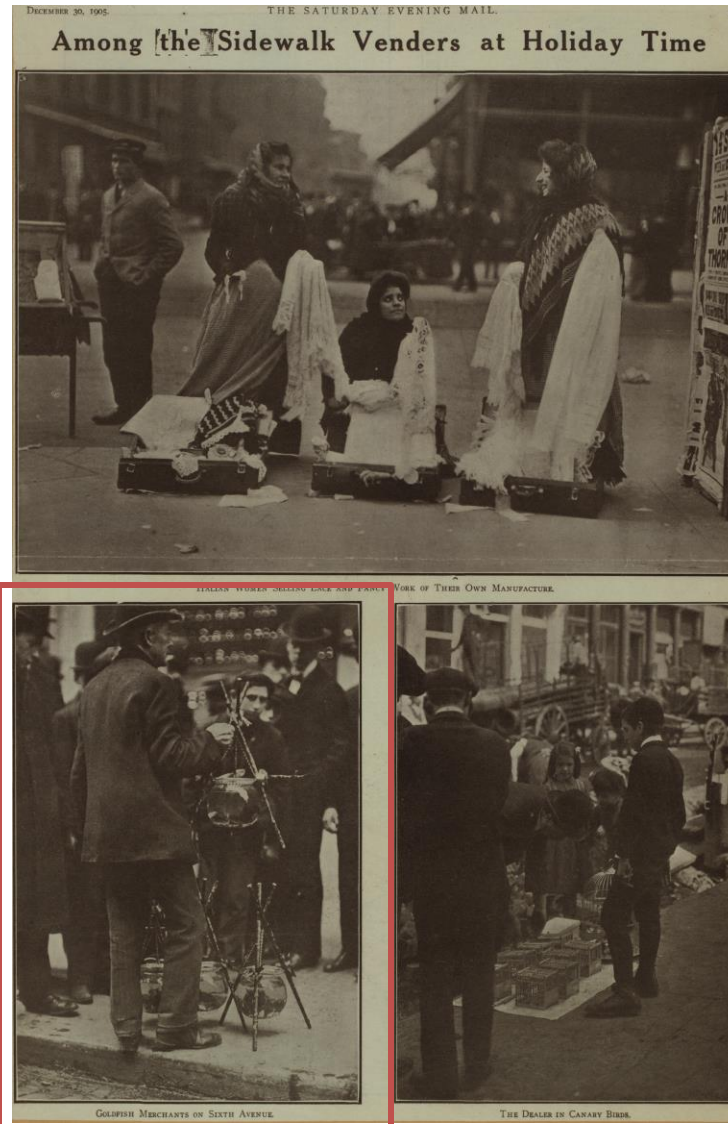


Figure 1.12 *Occupations, Peddlers, Among the Sidewalk Vendors at Holiday Time*, 1905. Published in *The Saturday Evening Mail* December 30, 1905. Irma and Paul Milstein Division of United States History, Local History, and Genealogy, the New York Public Library. Image courtesy of the New York Public Library, Astor, Lenox and Tilden Foundations.



## 1.5 Historiographical Presence

Like their *wunderkappen* predecessors, the shape of these aquatic displays ranged from large-scale public exhibits to personal parlor aquaria. While some of the earliest water cabinets (ca.1850), were nearly identical in appearance to a cabinet of jarred specimens, as interest grew tanks, mounts, and ornaments took increasingly varied forms. From the classical to the gothic to the carnival-esque, the miniature world encapsulated in the aquarium provided a place for collectors to combine a living and visual representation of their scientific knowledge and economic prowess with their personal aesthetic taste in whimsical landscapes. For those who wanted to learn more and those who were weary of the aquarium investment, a print culture surrounding marine ecology, aquarium maintenance, and fish breeding exploded. By 1915, every major city in the United States housed an Aquarium Society and several publishers devoted substantial resources to the publishing of Aquarium Society texts and newsletters. Though an interest in the fish tank and balanced micro-environments continues to this day, the craze surrounding the scientific natural-ness of the balanced aquarium declined following World War I.

Yet despite extant aquaria, an abundance of prescriptive literature, and overwhelming presence in period newspapers, the current historiography surrounding Victorian interest in these objects is surprisingly thin. There are only three secondary sources written specifically on the topic. *The Ocean at Home* by Bernd Brunner, which seeks to tell a comprehensive and encyclopedic history of both domestic and public aquaria in the nineteenth century.<sup>40</sup> His primary argument for their growing

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<sup>40</sup> Bernd Brunner, *The Ocean at Home: An Illustrated History of the Aquarium* (New York: Princeton Architectural Press, 2005).

popularity is cased in documentary evidence supporting a revived interest in cabinets of curiosity and natural science experimentation. While Brunner often uses aquaria as illustrations of social interactions particularly pertaining to gender, he unfortunately does not clearly indicate his source material, making it difficult for the reader to understand how he reached his interpretation. Meanwhile, Albert J. Klee's *The Toy Fish: A History of the Aquarium Hobby in America, the First Hundred Years* provides a more comprehensive and better documented guide to the study of nineteenth and twentieth century fish-keeping in America. His focus is more informational than interpretive and therefore his work primarily reads as a chronology of major changes in the aquarium industry. His work largely neglects extant material evidence.<sup>41</sup>

Finally, *Parlor Ponds* by Judith Hamera offers a more theoretical approach to the study of the aquarium. Her academic background in theater history and sociology greatly shaped the trajectory of her argument, which applies Zygmunt Bauman's sociological theory regarding solid and liquid modernity to her understanding of growing Victorian interest in the parlor aquarium.<sup>42</sup> Her thesis is effective and sophisticated in regards to the ongoing performative and reflective aspects of the aquarium that may have encouraged contemporaneous viewers to explore the complex anxieties and contradictions of the Victorian era. She focuses primarily on the act of watching the inhabitants of the aquarium and the anxieties of being watched as exemplified by the relationship between industrialism and consumerism. However,

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<sup>41</sup> Klee, *The Toy Fish*.

<sup>42</sup> Judith Hamera, *Parlor Ponds: The Cultural Work of the American Home Aquarium, 1850-1970* (Ann Arbor, MI: University of Michigan Press, 2010).

this argument considers only one perspective of the aquarium. It does not explore the varied perspectives of aquarists as reflected in the material culture which remains.

Some researchers in allied fields have performed material analysis in their work, but they have yet to apply it to the aquarium. For example, Katherine Grier's *Pets in America* considers the realities and practicalities of living with animals in the past through the interrogation of material and documentary evidence. Her work focuses on the development of human relationships with other living and domesticated creatures rather than an in-depth study of their relationship to natural science.<sup>43</sup> Conversely, Frances Terpak's seminal study of the role of eighteenth-century *wunderkabben* in Europe highlights the various approaches of amateur and professional natural specimen collectors and their experiences and reasoning for maintaining such collections shaped the proliferation of their *wunderkabben*.<sup>44</sup> Finally, scholars of natural history museums such as Carla Yanni have explored the significance of the changing aspects regarding the display of natural history specimens within the immediate historical moment surrounding the publishing of Charles Darwin's *Origin of Species*.<sup>45</sup>

This thesis will therefore draw from Grier's material framework, Terpak's focus on the influence of collectors, and Yanni's theoretical discussion of the historical moment with specific regard to natural history to fill the gap left between the

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<sup>43</sup> Katherine C. Grier, *Pets in America: A History* (Chapel Hill, NC: University of North Carolina, 2006).

<sup>44</sup> Terpak, "Objects and Contexts," in *Devices of Wonder*, 143, 162.

<sup>45</sup> Yanni, *Nature's Museums*.

more encyclopedic works of Brunner and Klee and the very specific use of the aquarium in the work of Hamera. It will use material culture perspectives to investigate how personal aquaria straddled the realms of decorative adornments, natural history collections, and precious pets. The extant objects, which include aquaria, their outfitting, and the tools to manage them, as well as trade catalogs, prints, photographs, and paintings will be considered in terms of their relationship to a growing interest in scientific education and aesthetic theories of beauty. This particular aspect will shed light on seemingly unrelated elements of Victorian life including: the relationships among Darwinian natural science, Christian spirituality, and exoticism through their convergence in the aquarium. Second, the study of extant aquaria, and print evidence will highlight the active role these objects played in shaping the everyday lives of Victorians. Logistically, their maintenance altered day-to-day routines while their very presence challenged Victorians to confront the uneasy relationships embodied by the aquarium. The challenge these objects presented will reveal the intriguing complications and contradictions woven into their lives and will suggest a perhaps more voracious and vivacious experience than the historiography typically attributes to this period. The Victorians were not just workhouses, smoke stacks, parlor particulars, and high-buttoned lace collars; their world was full of experiment, wonder, and even messes. Frankly, it was full of aquaria and that means it was full of life.

Chapter two will explore the rise of the aquarium in Victorian England drawing upon the theoretical and historical context as well as direct developments in micro-environment technology which allowed for the actualization of the aquarium. This chapter will define the unique status of the nineteenth-century aquarium as a

space negotiated by both human and non-human actors and will situate it within a broader history of fish-keeping.

Chapter three will consider the elemental organization of the parlor aquarium and its inhabitants. A focus on the collector's intended composition will stress the performative aspects of display, the active nature of viewing, and the social significance of the aquarium as a miniature society encapsulated within a space controlled by its human actor.

Conversely, chapter four will express the role of the aquarium within networks of human interaction. By considering Philadelphia's aquarium industry as a case study, this chapter will highlight the ways in which a locale's set of circumstances shaped the proliferation of the aquarium pursuit and how the pursuit itself prompted new communities of people.

Finally, chapter five will discuss the challenges these once lively objects present in terms of interpretation in the museum setting today by sharing the recent work done at the Henry Francis du Pont Winterthur Museum.

Overall, this thesis demonstrates that the parlor aquarium as an object was unique to the era from 1850-1920. It was clearly defined by both a particular physical form and a specific set of human/non-human relationships. At the object's height, a strong fish-keeping community and aquarium industry developed around it, which reshaped not only personal human networks, but also physical neighborhoods within cities and the broader theoretical trajectory of human/non-human interactions. Aquaria arose as a result of complex, uniquely Victorian circumstances and declined when such discussions and excitement waned. Their brief manifestation illustrates the ways in which English and American cultures utilized fun, experience, and experiment as a

didactical approach whilst developing moralistic notions of human and non-human welfare in the uneasy historical moment of debates surrounding creationism and the newly proposed evolutionary theory.

## Chapter 2

### THEY POURED THEMSELVES INTO IT: THE PRINCIPLES OF THE AQUARIUM AND THE AQUARISTS' PRINCIPLES

“An aquarium should be constructed on such principles that it will be, to a certain extent, a world in miniature, being self-supporting, self-renovating and, in fact, nature on a small scale removed into our parlor.”

-Arthur M. Edwards, 1858<sup>46</sup>

Since I began this project, I have found myself reminded of its constant presence in our own lives today. One evening whilst reading Gosse's manual for aquaria, the Animal Planet was playing in the background. David Attenborough spoke, “What is this? The little bird will offer her his most prized possession: the scarlet heart. He puffs out his feathers. He hopes this gift and the display will convince her to stay.” I found myself constantly glancing up as he shared the stories of the curious little bird's mating ritual, of the great adventures of the migrating turtles, and of the arduous daily commute of the penguins. “Interesting, Attenborough has imparted so much reason, so much routine on the animals,” I thought to myself. I found myself distracted now – how do they film those birds anyway? Did the cameras distract the birds from their mission? What do the producers choose to show and what do they edit

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<sup>46</sup> Arthur M. Edwards, *Life Beneath the Waters, or the Aquarium in America* (New York: H. Bailliere, 1858), 15.

out? What aspect of this is natural and what have they curated? As I watched, and I read, I laughed at the silly little crabs, stared in awe at the cuttlefish. All the while the questions continued to arise and the aquarium handbook text continued to fly by. Soon I found Gosse's words on paper and the words of Attenborough blended together. While so much was different, so much was the same. One hundred and fifty years apart, interest, wonder, and excitement about nature continues to captivate.

## 2.1 The Aquarium in Text

The explosion of new printing technologies in the mid-to-late nineteenth century offered unparalleled access to printed media and the increased availability of books, newspapers, and penny pamphlets. These new publishing technologies revolutionized the way people dispersed information, shared knowledge, and discussed issues. Just as the visual arts were exploding with interest in the natural world in the wake of late nineteenth century expeditions and the re-emergence of Chinese and Japanese culture in the United States, so too, were the rhetorical arts. Nature writing emerged alongside travel accounts. Meanwhile, naturalism developed as a common motif across every genre from fiction to poetry.<sup>47</sup> In a trajectory parallel

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<sup>47</sup> The body of historiography on nineteenth century nature writing is extensive. From primary source accounts of expeditions to the poetry of Thoreau. A few broad historiographical sources on this topic include:

Alexander von Humboldt, Aime Bonpland, and Helen Maria Williams, *Personal Narrative of Travel to the Equinoctial Regions of the New Continent During the Years of 1799-1804* (London: Longman, Hurst, Rees, Orme, and Brown, 1814).

Alexander von Humboldt, E.C. Otte, H.G. Bohn, *Views of Nature*, (London: H.G. Bohn, 1850);

Isabella Bird, *The Yangtze Valley and Beyond*, (London: John Murray, 1899);

Isabella Bird, *A Lady's Life in the Rocky Mountains* (New York: J.G. Putman and Sons, 1886);



to our own modern experiences of popular natural science as mediated by the television programs of Carl Sagan and David Attenborough, the primary mediators of natural philosophy and arbiters of taste regarding naturalism in the home during the nineteenth century were people like P.H. Gosse, who were publishing texts on the material. In terms of the aquarium pursuit, various kinds of publications became increasingly prominent and influential, among these were gift books, magazines, and a broad range of natural science texts. Readers at various levels could acquire information about aquaria and aquarium management from a host of sources in texts ranging from expensive natural science volumes to everyday newspapers.

Straddling the world of practical publications on natural science and the frivolous, yet approachable publications of various gift books and satirical magazines, was a full genre of prescriptive literature manuals for managing the natural world in the home. These books and pamphlets explored issues of gardening, traditional pet-keeping, and more exotic, specialized fields such as terrarium and aquarium management. The titles regarding the history of aquaria were primarily written by public-amateur aquarists – though some were written by professional aquarists, such as Gosse and Henry Butler. The result was a large body of aquarium recipe books, each one beginning with the basic principles of the balanced aquarium. They also included brief histories of fish-keeping practices, the methodology for establishing

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Thomas S. Edwards, and Elizabeth A. de wolfe, eds. *Such News of the Land: U.S. Women Nature Writers* (Hanover, NH: University of New England Press, 2001); Thomas J. Lyon, *This Incomparable Land: A Guide to American Nature Writing* (Minneapolis, MN: Milkweed Editions, 2001); Steven R. Brown, *The Naturalists: Scientific Travelers in the Golden Age of Natural History* (New York: Barnes and Noble Books, 2002).

aquaria, suggestions of where to acquire materials, descriptions of floral and faunal elements, solutions for fish ailments, and even arguments regarding the aesthetic and intellectual benefits of keeping these objects in the home. But perhaps most importantly, in prescribing this information they utilized language to define what exactly the aquarium was.

## **2.2 The Balanced Aquarium**

Nineteenth-century aquarists were careful to delineate the new "aquarium" from earlier "fish globes" (Fig. 2.1). The fish globe, merely held goldfish specimens, but the aquarium was intended to hold floral and faunal life, scavengers, herbivores, and omnivores. The aquarium operated as a micro-environment, a miniature world complete with an ecosystem within the walls of the parlor.<sup>48</sup> Contemporary aquarists felt so strongly about the distinction between the fish bowl and the aquarium, they often started their prescriptive literature by defining the difference. For example, on the third page of their book, aquarists Otto Eggeling and Frederick Ehernberg discuss the fish globe with disdain:

Fish-globes hardly deserved to be mentioned. While...with proper care, fishes may live [in these] for a very limited length of time, it is undoubtedly cruel to place them in there, as the amount of water contained in the average globe is not sufficient to sustain the fish and to supply the oxygen necessary for their life. In such a vessel a very frequent renewal of water is indispensable to the life of the fish, and

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<sup>48</sup> Edwards, *Life Beneath the Waters*, 15.

this is, in itself, a great detriment, since it disturbs and irritates even the most hardy inmates of this very poor substitute for the aquarium.<sup>49</sup>

Visually, the hallmark of the well-balanced aquarium was clean water. The fish globe held fish and sometimes vegetal life as well, but the balance of life inside could not be sustained. Because fish globes generally narrow at the top, the surface area of the water with direct contact to air was not great enough to manage a sufficient diffusion of oxygen into the depths of water. To combat this inherent issue in the fish globe, aquarists suggested the use of a rectangular tank with a wide mouth. But the balance of the natural world in a small micro-environment did not depend solely on the surface area of the mouth of the tank; pond and marine ecosystems are far more complex, so other than visual form, what made the aquarium so unique?

According to nineteenth-century understandings of ecology, a miniature version of the natural world could be contained within a glass structure if the owner ensured the management of the principles with which nature operates. The invention of the Wardian case by Nathaniel Bagshaw Ward provided the impetus for Victorian interest in sustained miniature micro-environments. Searching for an easier way to transport plant life from the West Indies and East Asia in 1829, Ward discovered that by keeping the plants in an air-tight environment they would arrive in England with an unsurpassed freshness.<sup>50</sup> After initial discovery, Ward continued to experiment with

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<sup>49</sup> Otto Eggeling and Frederick Ehernberg, *The Freshwater Aquarium and its Inhabitants: A Guide for the Amateur Aquarist* (New York: Henry Holt and Company, 1908), 3.

<sup>50</sup> Because the collection of aquatic specimens was so intimately related to the collection and maintenance of ferns and other plant life, there is a clear connection to horticulture and botanical imperialism. Historians have long focused on the role of gardens, both in rendering a sense of mastery over the nineteenth century world as well as in terms of actualizing the aesthetic picturesque. This is absolutely related to

the management of plants inside jars, or what later would become known as Wardian cases. Like aquaria, Wardian cases could take a number of forms, but they most often were crafted as bell jar shades, or as plate glass and iron boxes. So long as a human did not intervene and open the case, the plant could survive solely within the confines of the shade, with just a one-time addition of sufficient water and placed in a locale with sufficient sunlight. The water inside the shade would continue to be absorbed by the plant, utilized, expelled, absorbed by the air, condensed into droplets on the leaves, and once again absorbed by the plant—essentially creating a miniature version of the water cycle. Additionally, the glass case trapped the heat of the sun, keeping the environmental temperature steady and warm. If kept in an airtight vessel in the sun, even tropical ferns could be sustained in London homes.<sup>51</sup>

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the proliferation of the aquarium hobby and is an imperative background study, particularly in terms of ponds and aquaculture in the garden. However, I have opted to leave it out of the main text because the management of these collections does take place out-of-doors and the emphasis of this study is on indoor, small-scale aquaria. To learn more about botanical imperialism and ponds, see the following sources: Shirley Hibberd, *The Fern Garden: How to Make, Keep, and Enjoy It: Or, Fern Culture Made Easy* (London: Goombridge, 1872); David Elliston Allen, *The Victorian Fern Craze* (London: Hutchinson, 1969); Ann B. Shteir, *Cultivating Women, Cultivating Science: Flora's Daughters and Botany in England, 1760-1860* (Batimore: Johns Hopkins University, 1996); Richard Harry Drayton, *Nature's Government: Science, Imperial Britain, and the "Improvement" of the World* (New Haven, CT: Yale University Press, 2000). Harriet Ritvo, "The Natural World," in John M. MacKenzie, *Victorian Things* (London: V&A Publications, 2001); Frederic Edwin Church, *Fern Hunting Among these Picturesque Mountains* (Hudson, NY: Olana Partnership, 2010).

<sup>51</sup> Allen, *The Victorian Fern Craze*.



Figure 2.1 Fish Bowl, 1830-1870, United States. Glass. 9 ¼" x 7 ½". Collection of the Corning Museum of Glass, 74.4.100. Image Courtesy of the Corning Museum of Glass.

Operating on the principle of the water cycle, enclosed in a heated, air-tight space, the Wardian case allowed those living in northern climates to maintain tropical plants in their households with little involvement on the part of the owners. The beauty of exotic plants and the marvel of the science which sustained them incited a craze among the English. The fern case quickly became fashionable and then ubiquitous across the homes of wealthy Londoners. The success of this fern craze directly inspired the more complex aquarium and terrarium fads which followed.

Ward's discoveries were rooted in the work of famed chemists Joseph Priestly (1733-1804) and Jan Ingenhousz (1730-1799), both of whom experimented with gas,

air, and electricity in the late eighteenth century. Priestly's *Experiments and Observations on Different Kinds of Air* highlighted his findings regarding the relationship among airs with varying chemical make-ups and the ability of plants to revitalize oxygen levels in air within an enclosed space.<sup>52</sup> Meanwhile, Ingenhousz was credited with the discovery of the mechanism which allows plants to do so, photosynthesis. Simplified greatly, photosynthesis explained the plant's need for light as it utilized the energy to nourish itself with the carbon dioxide (CO<sub>2</sub>) and water (H<sub>2</sub>O) it absorbed. The primary products released by this process were glucose (C<sub>2</sub>H<sub>12</sub>O<sub>6</sub>) and oxygen (O<sub>2</sub>). As a result of the work of Priestley, Ingenhousz, Ward, and others, contemporary natural scientists subscribed to the ecological theory that if enclosed, plant life would "throw off" the necessary oxygen to sustain animal life and conversely, the animal life would "throw off" carbon dioxide which would be absorbed by the vegetal matter.<sup>53</sup>

Through the 1830s and 1840s marine biologists Phillip Henry Gosse and Robert Warrington experimented with applying Ward's theories to contained aquatic ecosystems, which they managed for the purposes of scientific experimentation and zoological study in London. Both sought to create environments based on the natural world for their specimens in order to study them in their "natural habitats."<sup>54</sup> To do so,

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<sup>52</sup> Joseph Priestly, *Experiments and Observations on Different Kinds of Air* (London: Printed for J. Johnson, 1775).

<sup>53</sup> Charles Strange, *Ponds in the Parlor* (Manchester: John Heywood, 1861) 14-15; J.E. Taylor, *The Aquarium: Its Inhabitants, Structure, and Management* (London: Hardwicke & Bogue, 1876), 24-25.

<sup>54</sup> In actuality these "natural habitats" were not natural at all, rather mimicked versions of the habitat in an enclosed tank.

they continuously introduced various natural elements in response to the needs which arose. The first marine vivarium in London is often credited to a Mrs. Tynee, “the lady who brought fish to London,” in 1846, but her tank did not operate on the principles of the balanced aquarium. Instead, it required a maid to constantly aerate the water.<sup>55</sup>

According to John Shirley Hibberd (referred to almost exclusively as Shirley Hibberd), the leading English arbiter of rustic style taste and amateur aquarist, it was Warrington who was the first to manage a balanced aquarium in March 1850.

Warrington had attempted to manage two small goldfish and a specimen of *Vallisneria spiralis* in about twelve gallons of water. The simple balance of floral and faunal life maintained clear water until the older leaves of the plant began to decay. This, and likely the degree of exposure to sunlight, resulted in algal growth which accumulated on the sides of the tank as well as on the surface of the water. There needed to be more complexity in the faunal life in order to best maintain balance. Hibberd explained:

To meet this emergency, Mr. Warrington introduced a few pond snails, which greedily fed on the decaying vegetable matter and slimy mucus growth, so as quickly as to restore the whole to a healthy state.

Here was a complete circle of compensating process. The plants grew and increased by the offsets, and at the same time exhaled sufficient oxygen to preserve the health and beauty of the fishes. The snails ate up the mucus, and bred rapidly; their eggs and young supplied the fishes with food. Thus, the three tenements of the globe maintained each other as in any well-ordered human community; and the water preserved its

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<sup>55</sup> Little is known about Mrs. Tynee, or her fish other than what Hibberd tells us. Shirley Hibberd, *The Book of the Aquarium and Water Cabinet: Or Practical Instructions on the Formation, Stocking, and Management, in all Seasons of Collections of Fresh Water and Marine Life* (London: Groombridge & Sons, 1856), 7-9.

purity unchanged, and the compensating powers of animals and vegetables were established.<sup>56</sup>

Hibberd's words reveal much about the Victorian notion of the aquarium: it was rooted in a theoretical approach to ecology reliant upon the concept of homeostatic conditions. Therefore, in the historical moment from 1850-1920, "the aquarium" inherently referred to the sort of balanced aquarium established by Warrington. The balanced aquarium was "a receptacle for aquatic animal and vegetable life in fresh or saltwater which need never be changed," and thus, the traditional fishbowl, which could not meet those requirements, would not suffice.<sup>57</sup>

### 2.3 The Ideal and the Practical

Although contemporary aquarists were careful to distinguish the new balanced aquarium from the traditional fish bowl or globe, in reality the lines between the two were often blurred and many amateur fish keepers used the words synonymously. True aquaria of the late nineteenth century were visually codified by their flat sides. Fish globes, bowls, and ball jars were all round or cylindrical in shape, either blown or molded in two-parts. Their sides were curvilinear which weakened the structure of the

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<sup>56</sup> Ibid., 7.

<sup>57</sup> It is likely that in common speech, phrases such as aquarium, fish tank, fish bowl, etc. were used interchangeably; however, the theoretical construct of these enclosures, clearly maintained through rhetorical devices in written language, suggest that there was a significant desire to distinguish amongst them.

Henry D. Butler, *The Family Aquarium, or Aqua Vivarium. A New Pleasure for the Domestic Circle: Being Familiar and Complete Instructor Upon the Subject of the Construction, Fitting Up, Stocking, and Maintenance of the fluvial and Marine Aquaria, or River and Ocean Gardens* (New York: Dick and Fitzgerald Publishers, 1858), 12.



glass and distorted any view of the inhabitants inside. The aquarium, on the other hand, was constructed from several flat, rectangular panes of glass which were adhered to one another. As a result, true aquaria were most often rectangular, hexagonal, or octagonal.


Yet, “Aquarium Departments” in stores around the world sold fish globes and true aquaria side-by-side. Of course, aquarium dealers and tastemakers continued to distinguish the significance of their products as superior to the make-shift aquarium, or fish globe. For example, an advertisement for Cugley and Mullen, the premier fancy fish dealer in Philadelphia asks: “Have you an aquarium? We don't mean a glass bottle with one or two fish and a piece of grass in it – but an ornamental aquarium” (Fig. 2.2). The advertisement acknowledges the commonality of the makeshift aquarium, or the fish globe used as such, and sets the true aquarium, apart by referring to it as an “Ornamental Aquarium.” According to Cugley and Mullen, the ornamental aquarium was more attractive as well as more thoughtful in its holistic consideration of tank form, intended aesthetic, and living inhabitants. Yet, for many, the fish globe was a more familiar and easier to use, though most recognized it could be improved upon. As a result, most products actually featured aspects of both - taking the form of “more scientifically-minded” fish globes.

## **2.4 Categories of Aquarists**

This negotiation of the practical and the ideal was a careful balance among aquarists of ranging backgrounds and approaches. As nearly anyone could engage in the aquarium pursuit, varying groups of people fell under the wide net of “aquarists.” These figures ranged from P.H. Gosse, marine biologist, to Shirley Hibberd, arbiter of

taste, and even to contemporary painter, Robert Chanler. Thus, it is helpful to divide these aquarists into three groups, categorized by the realm in which they operated, the perspective from which they approached the aquarium, and the degree to which they interpreted the basic aquarium principles.

**Have You An Aquarium?**



*We don't mean  
a glass bottle  
with one or two  
fish and a piece  
of grass in it—  
But an*

## **Ornamental Aquarium**

that has been put together by an expert, who in an artistic way makes it attractive and a suitable decoration for a library, den, living room, dining room, porch or conservatory; in fact, it will add materially to the appearance of any room. It would be admired by your friends and afford you hours of endless pleasure and enjoyment watching the beautiful Japanese fish in their iridescent colorings, the wonderful tropical aquatic plants of brilliant foliage, and other small inhabitants of lakes and rivers, that are so frequently used in decorating the up-to-date aquarium, making it an ornament worthy of any person's home.

Our illustrated booklet contains much valuable information about the aquarium. It is **FREE**. We invite you to see our display of Aquariums and Ornamental Gold Fish before buying elsewhere.

**Cugley & Mullen Co.** 1237  
ARCH ST.  
FORMERLY AT 1229 MARKET ST.

Figure 2.2 Advertisement. Cugley and Mullen, 1922, Philadelphia. Published in *The Philadelphia Inquirer*. Sunday, May 28, 1922. Accessed online, March 2018 at: [newspapers.com](http://newspapers.com).

For example, the first group were the “professional aquarists.” These included figures such as P.H. Gosse, Robert Warrington, and Henry Butler who identified professionally as marine biologists and managed both large and small-scale aquaria for themselves and for the public. They were hired by scholarly institutions to observe and postulate on aquatic or marine life. Therefore, it was not that aesthetics were not of interest to this group, but there was a greater concern for the idealized balanced aquarium theory actualized from a natural science perspective.

The next group were “public-amateur-aquarists.” This group included arbiters of taste, such as Shirley Hibberd and well-known amateur aquarists like William T. Innes. Occupationally, the members of this group did not identify themselves as aquarists, however, they pursued aquarium culture in a very meaningful and public way. They wrote and published extensively about their aquarium experiences and held open exhibitions of their own private aquaria in public forums. They were keenly knowledgeable, but perhaps slightly more forward about their interest in balancing scientific accuracy and beauty. Their discussions of aquaria likely bridged the musings of the professionals with the realities faced by the third group.

Finally, the last group of aquarists were “at-home-amateur-aquarists.” This was probably the largest group of aquarium owners, though we know the least about them. Like the public-amateur-aquarists, this group did not identify themselves occupationally by the pursuit. Neither did they publish on the topic and likewise never publicly displayed their aquaria. They managed their tanks within the home and the collections they created were only observed by the aquarist themselves or by their friends and family. This group is therefore hard to identify and their priorities regarding the aquarium were widely disparate. As a whole, they engaged with aquaria

as a fad or a hobby, rather than a full-fledged pursuit. While some kept the aquarium as a symbol of middle class purchasing power or to illustrate educational prowess, others kept the fish simply as pets or for their aesthetic beauty. Additionally, many professional artists, such as Robert Chanler, fall within this group as they kept extensive fish tanks and menageries as life studies for their work. Moreover, there was a strong, incorrigible interest in featuring aesthetics over scientific accuracy. Overall, despite varied priorities for the at-home-aquarist, the line between true, balanced aquarium and fish globe was far blurrier than it was for the other groups.

## **2.5 Basic Aquarium Construction**

The aquarium itself could be constructed by the aquarist upon acquiring and assembling the basic materials or it could be purchased whole from an aquarium dealer, pet store, or even department store. Either way, the tank consisted of two main parts: the frame and the glass viewing portals. The frame could be made of various materials from metals to woods. It was generally agreed that some form of treated iron was the best material for aquarium frame construction. Often this meant the use of tinned or enameled sheet iron which was easy to cut, piece, and solder together, yet was still protected from corrosion when in contact with water. However, some manufacturers, such as Jacob C. Cassel of Philadelphia used white terra cotta and plasters. Others sold aquaria constructed from cut zinc frames or turned mahogany. Either way the flat glass panes were slid into rabbets, cut into the rails and puttied so that they were water tight. The ways in which to putty the viewing portals into place varied amongst aquarists. Most suggested common window putty or a deviation thereof made with sand, white lead, resin, and linseed oil. However, this threatened to

endanger the aquarium's inhabitants if the lead were to leech into the water. It was in this case some suggested the use of a wooden frame with the glass slid into rabbets and coated in one-eighth -inch-thick of hot pitch both for both adhesion and protection.

To keep dust out and prevent the decampment of inhabitants, the aquarium required a cover. This could either be purchased as a part of the tank or could easily be made as necessary. A thin sheet of glass over the top of the tank could act as a tight lid for an aquarium which held at bay splashing or climbing creatures such as newts, crustaceans, or certain kinds of fish. However, a tight-fitting lid prevented the regular diffusion of oxygen from the surrounding air into the water, therefore tanks with these lids required more frequent, manual aeration. Thus, unless necessary for holding in particularly rambunctious specimens, aquarists suggested a piece of cheesecloth, or other netting, stretched over a wire frame as a cover, rather than glass. The perforations in the cheesecloth would still allow oxygen to reach the surface of the water but would prevent larger dust particles from settling.<sup>58</sup>

Additionally, to protect the inside of the aquarium from algal overgrowth, aquarists suggested at least one side and the bottom of the aquarium be outfitted with a darker material to reduce light permeability. For some, this was managed simply by the adhesion of a black paper or cloth to one of the viewing portals. Others included a slate or marble bottom to prevent the passage of light; however, this often resulted in particularly heavy tanks. To combat algae growth, Robert Warrington developed a

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<sup>58</sup> P.H. Gosse, *A Handbook to the Marine Aquarium: Containing Practical Instructions for Constructing, Stocking, and Maintaining a Tank, And for Collecting Plants and Animals*, (London: John Van Voorst, 1855), 9-10; Taylor, *The Aquarium and its Inhabitants* 36-42; Hibberd, *The Book of the Aquarium*, 13-21.

sloped-back tank. His effort was to mimic the tide pool in water movement and depth, while simultaneously minimizing light exposure to particular regions of the tank. But his product was met with mixed reviews. For example, Shirley Hibberd touted the slope-back tank as a successful aquarium form, while P.H. Gosse complained of the lack of elegance in design, as well as the logistical issues of depth and the permeability of light for viewing.<sup>59</sup>

Finally, various manuals and prescriptive sources suggested ranges of dimensional ratios. Perhaps unsurprisingly, Victorian aquarists conceived of different sorts of tanks for different sorts of creatures. Those which did not require much depth, such as anemones or other benthic creatures could still live in something with the depth of a milk pan, while others required more space and greater water depth.<sup>60</sup> Some aquarists, such as P.H. Gosse suggested very specific ratios for the aquarium, where others did not find particular height, width, and depth specifications imperative. Nearly all aquarists agreed, however, that the aquarium be at least one foot deep and three to five gallons in volume in order to avoid overcrowding the various critters and plants of the miniature ecosystem.<sup>61</sup>

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<sup>59</sup> Edwards, *Life Beneath the Waters*, 22-29;  
Gosse, *A Handbook*, 5.

<sup>60</sup> Gosse, *A Handbook*, 4-10.

<sup>61</sup> Edwards, *Life Beneath the Waters*, 22-29;  
Eggeling and Ehernberg, *The Freshwater Aquarium*, 2-15;  
Gosse, *A Handbook*, 4-10;  
Hibberd, *The Book of the Aquairum*, 13-21;  
William T. Innes. *Goldfish Varieties and Tropical Fishes* (Philadelphia, PA: Innes Publishing, 1916), 6-9, 102-118;  
Taylor, *The Aquarium and its Inhabitants*, 36-42.

Though nineteenth-century aquarists were specific in terms of what defined an aquarium, in reality these objects proliferated in a nearly infinite number of ways. Varied manufacturers were creative in their adherence or discordance with the principles outlined by popular contemporary aquarists. The objects which they created highlight the gaps between the ideal and the practical. As a result, their works reflect much about the complex factors which shaped aquaria.

For example, the decorative nature of the aquarium frame varied according to manufacturers, materials, and clients. Most aquaria featured a simple iron frame with a fancy wire pedestal. Other aquarium designers were more ambitious with the form of the tank itself, resulting in visually stunning pieces. J.W. Fiske Iron Works in New York, one of the most popular late nineteenth century aquarium manufactures, tended to offer rectangular or octagonal aquaria with whimsical pedestals including highly-detailed herons, fish, and even seahorses (Fig. 2.3). Often drawing from idealized architectural inspirations, fancy aquaria forms varied in shape from wooden Chinese lattice work constructions to faux log cabin rustic vases.

Despite the diversity in form, true aquaria tended to come with a hefty price tag—often ranging from \$4 to \$100 depending on the form and style. In response, those who wanted to participate in the pursuit but could not afford to purchase a new tank created home aquaria out of bell jars, vases, and milk pans. Though the lack of extant makeshift aquaria makes it nearly impossible to tell just how many people participated in this way, aquaria in the forms of bottles, vases, and jars are regularly referenced in advertisements and even prescriptive literature.



Figure 2.3 Fountain Aquarium with Heron Base, J.W. Fiske, ca. 1890, New York. Cast Iron, glass. 29" x 49". Collection of Joan Bogart Antiques. Image Courtesy of Joan Bogart Antiques, Long Island, NY.



## 2.6 Different Aquaria for Different Aquarists

While the definitions developed for the true aquarium often included guidelines for size and shape of the habitation, some aquarists suggested that nearly any glass case would do, so long as there was space to manage a homeostatic ecosystem. In *Parlor Ponds*, Charles Strange encourages those who cannot afford the aquarium to secure a vase or bell jar from which to enjoy the wonders of the underwater world. He even included instructions regarding how to turn the bell jar or vase into an aquarium. He wrote:

A vase having been purchased and brought home (getting it home, by the way, is attended with danger; more than one individual has had his glass smashed by some mishap in a crowded street); when safely at home a stand of turned wood is needed wherein to fix the vessel, - one may be procured for a few shillings; however, in this case, cheapness is desirable, and as a good, large, flowerpot can be purchased for twopence or threepence, this filled up to the brim with sand, will do capitally. Now insert the glass firmly, knob downwards...Should the look of the flowerpot be objected to, neat and quick fingers are sure to be found, and willing hearts too, to run together a pretty pattern of needle or crochet work, to throw over it.<sup>62</sup>

The make-shift aquarium could then be filled and stocked according to his instructions in the following chapters. Strange and others who supported the make-shift aquarium did note that this was not the ideal form, as it would be easy to overcrowd the critters in such a small space and even more difficult to maintain the balance between floral and faunal life, but that it did expand prospective aquarists (Figs. 2.4, 2.5).<sup>63</sup>

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<sup>62</sup> Strange, *Parlor Ponds*, 14-15.

<sup>63</sup> Innes. *Goldfish Varieties*.

To consider the role of bell jars in the larger balanced aquarium movement it is imperative to distinguish Strange's objective in instructing readers on the creation of the make-shift aquarium. Strange did not suggest bell jars as a substitute for the true aquarium, a far more complex apparatus. Rather, the bell jar provided a cheaper alternative for those who could not afford any other and would benefit most from the didactic quality of managing an ecosystem within their home.

I do not hold these [bell jars] up as the best forms for securing the entire comfort of the creatures they are intended to contain, for they are not; but, nevertheless, as it is my desire to popularize this beautiful object with the masses, cheapness must be a paramount consideration.<sup>64</sup>

Strange and some of his American contemporaries' desired to "popularize this beautiful object with the masses" by finding alternative proliferations of the aquarium theory which would be more available and accessible to larger groups of people, including the working class. The aquarium, if available to all, could then be used as a didactic tool to instruct on moralism. From this perspective, the aquarium became a physical manifestation of the contemporary conception of the "Social Gospel."<sup>65</sup>

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<sup>64</sup> Strange, *Parlor Ponds*, 12.

<sup>65</sup> The Social Gospel movement was far more complicated and pervasive than simply a reason to have an aquarium. The term "social gospel" was a period term used to describe the nineteenth and twentieth century application of Protestant Christian-based morality as a solution to broader political, social, and economic discussions. Essentially, the concept of "social gospel" hinged on Christian morals and notions of virtue to respond to larger structural issues including labor reform, educational theory, and temperance. The historiography on this topic is particularly deep. For further discussions and debates regarding the various definitions, applications, meanings, and outcomes see:

Paul A. Carter, *The Decline and Revival of the Social Gospel: Social and Political Liberalism in American Protestant Churches, 1920-1940* (Ithaca, New York: Cornell University Press, 1954);

The “Social Gospel” utilized discussions of Christianity and spirituality to negotiate discussions of poverty, education, race relations, and crime. Strange saw the aquarium, the world in a tank, as a potential solution to occupy minds and teach compassion, spirituality, and responsibility. In an effort to engage the impoverished masses in the aquarium hobby, Strange printed cheap pamphlets such as *Parlor Ponds*. These pamphlets included the basic principles of the aquarium, simple instructions for management, and the ways in which the aquarium could enrich one’s life. To accomplish his task, Strange wrote in conversational prose and attempted to explain the more jargon heavy aspects in a way which would be meaningful, even to those who were relatively uneducated. These simple pamphlets, and the make-shift aquaria they suggested, were intended to encourage parents to utilize the tanks to teach responsibility to children and to encourage adults to utilize the aquarium as a forum to learn about natural science. Strange considered the practice of managing an ecosystem in the home a fun and engaging forum for adults and children alike to learn their place in the great chain of being and to grow their relationship with their God.<sup>66</sup>

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Robert T. Handy, ed., *The Social Gospel in America, 1870-1920* (New York: Oxford University Press, 1966);

Walter I. Trattner, *From Poor Law to Welfare State, 6<sup>th</sup> Edition: A History of Social Welfare in America* (New York: The Free Press 1999);

Peter Higginbotham, *Workhouse Encyclopedia* (Stroud, UK: The History Press, 2012);

Christopher H. Evans, *The Social Gospel in American Religion: A History* (New York: New York university Press, 2017).

<sup>66</sup> Strange, *Parlor Ponds*, 14-15.

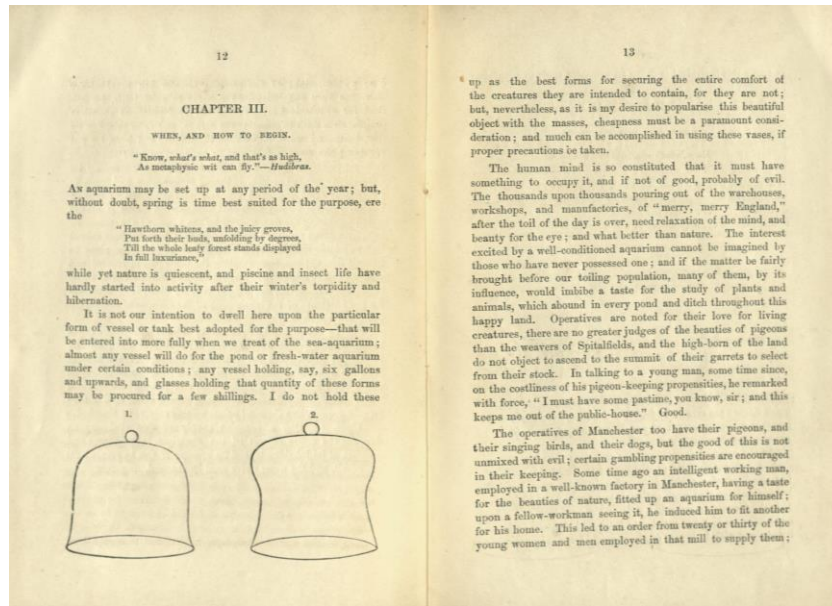


Figure 2.4 “The Bell Jar,” In Charles Strange, *Ponds in the Parlor* (Manchester: John Heywood, 1861). Image Courtesy of the Winterthur Library: Printed Book and Periodical Collection.



Figure 2.5 “The Bell Jar Aquarium,” in Shirley Hibberd, *The Book of the Aquarium and Water Cabinet: or Practical Instructions on the Formation, Stocking, and Management, in All Seasons, of Collections of Freshwater and Marine Life* (London: Goombridge and Sons, 1856). Image Courtesy of the Winterthur Library: Printed Book and Periodical Collection.

## 2.7 The Aquarium Fights Back: Challenges to Maintaining a Life Collection

Despite Strange, Hibberd, and others' best prescriptive efforts, many at-home-aquarists struggled with the maintenance of the balanced aquarium. Mark Samuel opened his care manual with a conversant tone, addressing this discrepancy:

My aquarium gives me so much trouble! The fish die! I shall give it up! Such exclamations would not be so often heard if the principle of the self-sustaining aquarium was so thoroughly understood. The aquarium should be one of the most ornamental, entertaining, and instructive features of the home. Its management is perfectly simple.<sup>67</sup>

Samuel intended for the following pages of text to illustrate that the aquarium was not actually as challenging to maintain as the reader may have heard. His work was intended to clarify and address the many concerns. Yet despite all of the care manuals, frustration with the balanced aquarium continued.

The knowledge needed to maintain a home aquarium in perfect balance was met with uneasiness. Although the care manuals attempted to facilitate the theoretical understanding of homeostatic ecosystems the reality was that the slightest imbalance in salinity or oxygen-levels could cause even the most learned aquarist's micro-environment to fail – whether they understood all of those details or not. As a result, the misbehaving aquarium—characterized by escaping critters, leaking tanks, smelly water, and glass scum, as well as the aquarium's natural enemies, children and cats, became the punchline of jokes both in England and the United States.

For example, *Punch Magazine* commonly featured aquaria. In 1860, “Valuable Addition to the Aquarium,” appeared, visualizing popular fears (Fig. 2.6). In the print, a mother has abandoned her guests to deal with two boys who have brought a strange

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<sup>67</sup> Mark Samuel, *The Amateur Aquarist* (New York: Baker and Taylor, 1894), 1.

critter back from their day of specimen hunting. The boys stand in the right foreground, extending towards the woman a long spear with a wild-eyed octopus-like creature on its end. As she presumably scolds them for their nuisance, her guests remain entranced by the aquarium in the background. They lean their full bodies over the tanks pointing out the various plants and fish, hardly noticing the bucket beneath, collecting water as drips and splashes. Meanwhile the wonder of the aquarium and the havoc of the boys' new addition has distracted almost everyone from the crabs which have fled their enclosure. In the central foreground a nightmarish scene unfolds as a little dog barks at the escapees, and a crab raises his pincher in retaliation.

Similarly, the American magazine *Harper's Weekly* frequently commented on the aquarium phenomenon. Winslow Homer's "August in the Country - The Seashore," published in 1859 illustrated an equally wild scene (Fig. 2.7). Homer sets his illustration at the beach, rather than in the home, and conveys the act of specimen collecting. In Homer's print, children and adults alike hunt specimens in the tide pool. The boys in the left foreground wade in as deep as their ankles. They jump and squeal as one little boy raises up his hand. A crab has pinched his finger and refuses to let go despite the boy's flailing. To their right, ladies recoil as a gentleman threatens to throw another crustacean in their direction. Two ladies in the background lean so far over to observe the specimens swimming below them that they unknowingly reveal their petticoats in an unlady-like manner. Still, others are relaxing, observing, hunting, chatting, and even sketching on the rocks above.

Meanwhile, in addition to managing the complicated contents of the aquarium, the aquarist also had the aquarium's enemies with which to contend. Cats frequently appeared as a motif in American, English, and Japanese prints. The cat staring intently

at the fish, paw poised to capture one became a visual trope for the sorts of mayhem the aquarist dealt with in keeping tanks at home. Likewise, children represented the other natural aquarium enemy. If left unmonitored, children, like cats, often became too curious. “The Youthful Idea Fishing,” in *Harper Weekly* in 1868 featured Fred and his cousin harassing “mamma’s new aquarium” (Fig. 2.8). In the right corner, mamma walks in to see a manic scene unfolding before her eyes. Fred stands up on a chair with a determined look on his face. He holds a fishing rod in his hand, with a fish on the end, dangling above the aquarium. His cousin stands next to him, watching intently, clutching her doll under her arm. Two fish flop beside her feet on the floor. Despite the advantages the aquarium could bring to the home, the incorrigible curiosity of the aquarium’s “enemies” posed the threat of a mess in the parlor and even potential bring harm to the aquarium critters—a clear point of anxiety for at-home-amateur-aquarists.

Together, the prints highlight the discrepancies between the ideal and the practical in terms of managing the aquarium. Much like furniture assembly instructions or Pinterest recipes today, the contemporaneous prescriptive literature made aquarium management seem much simpler than the reality. However, their writings were not totally unreasonable. Their process could be achieved by a highly motivated individual. The average person was able to navigate a number of modifications to reach a similar result. And much like today, the key in doing so was trial-and-error, experimentation, fun, and even play.





Figure 2.6 “Valuable Addition to the Aquarium,” United States, 1860. Published in *Punch’s Almanack*, 1860 (London: Punch Publications, Ltd. 1860). Image Courtesy of the John P. Robarts Library, University of Toronto.



Figure 2.7 “August in the Country - The Seashore, United States,” Winslow Homer, 1859. Published in Harper & Brothers, *Harper’s Weekly* (New York: Harper & Brothers, August 27, 1859). Image Courtesy of Reynola House Museum of American Art, Affiliated with Wake Forest University.





Figure 2.8 “The Youthful Idea Fishing,” United States, 1868. Published in Harper & Brothers, *Harper’s Weekly*, (New York: Harper & Brothers, April 25, 1868). Image courtesy by author.

As Strange suggested, it truly was “fun” to “seek out specimens from local ponds.”<sup>68</sup> It brought groups of disparate people together, resulting in humorous interactions among one another and the specimens they were searching for. It was also messy. At times that level of mess was acceptable. The splashing water, the pinching crabs, the sandy feet, were all part of the experience. However, that mess of engaging with the outdoors was not intended to permeate the indoor space. Once the critters made it into the Victorian home, into the aquarium, they and their viewers needed to

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<sup>68</sup> Strange, *Parlor Ponds*, 32.

behave. The experiment had shifted. The animals could still be playful and beautiful, but their splashing and spilling was not nearly as appreciated indoors.

Experts attempted to anticipate potential issues by devoting sections to problem-solving, but despite their best attempts, aquaria were messy. They leaked, they spilled, they splashed, and many feared they may even retaliate. In reality, regardless of the desire of aquarists and aquarium owners to maintain a rigid formality within their imagined world, living critters did not always play along. For some aquarium owners this inspired anxiety, but for many others it presented a challenge. If someone could master the aquarium, they were almost certainly a genius. If they could not, they ought to laugh it off with everyone else.

## **2.8 The Ubiquity of the Aquarium**

The true aquarium was often rectangular or octagonal in shape, though its lessons could be learned from the bell jar substitute. It could sit on a table in the parlor or stand on its own in the conservatory. It featured wide glass panes or viewing portals for observing the contents. The proper aquarium included plant and animal life and the gamut of carnivores, omnivores, herbivores, and scavengers. The successful aquarium was identified by its consistently crystal-clear water. As a result of the work of aquarists such as Strange, who sought to popularize the practice for the masses, there are recurrent references to simple, at-home fixes for creating fish habitations in advertisements and the writings of contemporary aquarists suggesting their enduring and relatively ubiquitous presence. Meanwhile, the recurrence of the aquarium in satirical prints and the language of later prescriptive literature suggests that most

owners likely managed their tanks as scientifically-minded fish globes, rather than full-fledged true, balanced, aquaria.

Regardless of the intention—children’s didactic, parlor adornment, pet, or scientific collection—the successful, balanced aquarium represented an ordered society. It could be carefully selected and curated by its owner who could manage and maintain the miniature world with the utmost wisdom and the slightest hand. The process acted as a didactic, teaching the latest natural science and ecological principles, but was also inherently spiritual because it was God-like—watching the world one had created unfold from above. This world could be set in an imagined past, one which was designed and expressed solely by its human owner, their ideal, nostalgic and whimsical world, where everything should happen according to their plan. Of course, much like reality, their subjects fought back, and the aquarium was a space negotiated by humans and their relationships with non-human living creatures. But what exactly were the intentions? How was the narrative crafted? What role did the creatures inside play? And what, after all, was all of this about?

### Chapter 3

#### CARP-ERNICUS: FISH AT THE CENTER OF THIS UNIVERSE

“Its neatness and elegance; its fascinating combination of subtle philosophy and commonplace everyday facts; its ever-changing, never-wearing feature, of kaleidoscopic novelty; its tempting peculiarity, to thoughtful minds, as an introduction to the study of nobler and more recondite pages in a volume of natural history; all constitute an attraction as chaste as it is beautiful, as refined as it is irresistible.”

-Henry D. Butler, 1858<sup>69</sup>

Composing the proper aquarium was akin to creating an oil painting. As such, the final aquarium was pre-mediated; the considerations were largely thought out, the decisions made, and the methodology planned before anything was added to the tank. Yet, also like an oil painting, the composition of the aquarium was an additive process. It required a support and a layer of ground, coatings of paint to create the picture, and finishing layers including a frame to ensure it continued to sparkle, even well after the composition had been completed. It could not be worked in sections, instead each layer had to be included in a particular order, over a specific time span to achieve the proper result.

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<sup>69</sup> Henry D. Butler, *The Family Aquarium, or Aqua Vivarium. A New Pleasure for the Domestic Circle: Being Familiar and Complete Instructor Upon the Subject of the Construction, Fitting Up, Stocking, and Maintenance of the fluvial and Marine Aquaria, or River and Ocean Gardens* (New York: Dick and Fitzgerald Publishers, 1858), 1.

Although nineteenth-century aquarists attempted to clearly define the use of their term, the “aquarium” itself was complex. It was defined both by its physical form of glass and by the inhabitants which lived inside. However, because of what remains, it is easy for us today to think about the aquarium from the perspective of just one element, the tank. But the glass and metal structure which we now refer to as the “aquarium” was just one part of the larger composition. Because many of these objects are held in museum collections, very few still hold fish, aquatic plants, or even water. Thus, today we are left with a carcass of the object, a frame without its picture. In order to reconstruct the entire composition, we have to make sense of each of the intended elements, the order they were put together, and the ways in which they interacted with one another to create a comprehensive image of the aquatic world.

Although aquarium construction was an additive process, beginning with the layer of sand, the final intention was imperative to have established ahead of time. Was the intent in the process or the product? Would the aquarium be built piecemeal, from personal explorations of ponds and commitments to specimen collecting, or would the elements be purchased in-full, from the stock of an aquarium dealer? How personalized would the set-up be? And what would it focus on – the scientific accuracy of the ecosystem, the beauty of the plants and fish inside, or a negotiation of the two? What sort of budget did the aquarist have? These decisions would continue to amplify as each layer of the aquarium was added to the composition.

Luckily for us, aquarists and aquarium-keepers wrote much of their reasoning down. Therefore, to recreate the imagery that would have been inside the frame, it is necessary to scour the writings of aquarists – professional and amateur – for their suggestions regarding the major element categories: sand consistency, water source,

plant life, animal life, decorative adornments, frame, and accessories. By considering those suggestions which are most consistent and those which occur irregularly, and by cross-referencing them with contemporaneous imagery including paintings, photographs, and prints, we can knit a picture of what common aquaria most likely looked like. While a sense of any one individual interpretation is lost, the tensions and disagreements represented by aquarists of varying backgrounds suggest the sort challenges and decisions an individual faced when curating their own aquarium.

### **3.1 “The Support Layer”: Sand, Soil, and Pebbles**

According to Noel Humphreys, author of the several aquarium handbooks, “A layer of sand and pebbles, about three inches deep placed upon the flooring is the first step towards arranging the interior of a tank.”<sup>70</sup> Just as is the case today, the first step recommended for composing a nineteenth century aquarium was to create the base layer of sand, silt, or rock. Yet, while all aquarium literature explained this layer was necessary for plants to root and for critters to nest, they often disagreed on the material make-up and depth of such a layer.

For example, it was important to consider the intended plant and animal life before finalizing the base sand layer. Though utilized by animals for burrowing and by plants for rooting, the aquarist would want to use the minimal amount of sand or soil necessary in order to maintain relatively clear water even when the animals were kicking it up. Varying depths of sand offered areas for plants to grow, without

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<sup>70</sup> Noel Humphreys, *Ocean Gardens: The History of the Marine Aquarium and the Best Method Now Adopted for its Establishment and Preservation* (London: Sampson Low. 1857), 36.

overwhelming the bottom of the tank. Additionally, aquarists, such as J.E. Taylor and William T. Innes also suggested utilizing small potters.<sup>71</sup> The pots themselves could be decorative or hidden by rockwork. These would not only add visual interest and beauty to the landscape of the tank but would also provide a contained area of soil for plants which required greater soil depths to grow.

In terms of material, the professional aquarist of the London Zoological Gardens, P.H. Gosse, suggested sea sand for marine aquaria. For all freshwater systems, or for marine systems where sea sand could not be obtained, he suggested coarse river sand. J.E. Taylor also recommended the use of river sand, but included the addition of a few pieces of charcoal – not enough to injure the life inside, but enough to absorb foul smells and decomposing organic matter.<sup>72</sup> Gosse, Butler, Humphreys, Innes, and Strange agreed the sand would need to be rinsed in drinking water until it ran clean and then mixed with thoroughly cleansed fine pebbles or gravel before it was poured into the tank at a depth of anywhere from one to three inches.<sup>73</sup>

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<sup>71</sup> J.E. Taylor, *The Aquarium its Inhabitants, Structure, and Management* (London: D. Bogue, 1881), 45;  
William T. Innes, *Goldfish Varieties and Tropical Aquarium Fishes: A Complete Guide to Aquaria and Related Subjects* (Philadelphia, PA: Innes, 1917), 14.

<sup>72</sup> Taylor, *The Aquarium and its Inhabitants*, 45.

<sup>73</sup> P.H. Gosse, *A Handbook to the Marine Aquarium: Containing Practical Instructions for Constructing, Stocking, and Maintaining a Tank, And for Collecting Plants and Animals*, (London: John Van Voorst, 1855), 12-13;  
Charles Strange, *Ponds in the Parlor: or, How to Form and Manage an Aquarium* (Manchester, UK: John Heywood, 1861), 17;  
Butler, *The Family Aquarium*, 33;  
Innes, *Goldfish Varieties*, 14;  
Humphreys, *Ocean Gardens*, 36-39.

Several aquarists advised the use of silver sand, but this particular recommendation was highly contentious. Gosse explicitly warned his readers not to use silver sand as it would leech hazardous lime into the water even after it had been washed. In contrast, Mark Samuel in *The Amateur Aquarist* suggested two inches of fine white sand as the bottom layer material, and a number of the garden suppliers selling aquaria retailed silver and white sand in their aquarium departments.<sup>74</sup> Similarly, Otto Eggeling recommended “bird gravel, obtained from bird dealers, cleaned and spread across the surface at a slope.”<sup>75</sup> While both Samuel and Eggeling adhere to the depth suggestions, their material choice varied significantly.

Both Samuel and Eggeling, professional and public-amateur-aquarists, marketed their books for the budding at-home-amateur-aquarist. As a result, the prose in the works of both Samuel and Eggeling is conversational and approachable. Their explanation of aquarium principles is limited to the necessities and the basic steps for creating one. The explosion of exotic pet shops and garden stores in the late nineteenth century meant that the bird seed and silver sand recommended by these aquarists were fairly easy to acquire in any city. In fact, the sand along with the tank and some inhabitants could be purchased as a “kit.” Therefore, it is likely they elected to suggest materials which were more easily obtained with a smaller financial investment. While the same is true of the work of Charles Strange, he insisted on the value of visiting the

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<sup>74</sup> Gosse, *A Handbook*, 13;  
Mark Samuel, *The Amateur Aquarist: How to Equip and Maintain Self-Sustaining Aquarium* (New York: The Baker and Taylor Co., 1894), 7.

<sup>75</sup> Otto Eggeling and Frederick Ehernberg, *The Freshwater Aquarium and its Inhabitants; A Guide for the Amateur Aquarist* (New York: H. Holt and Company, 1908), 12-15.



local pond or river to collect specimens. Thus, Strange encouraged his readers to obtain their sand from the very same ponds from which they collected their vegetal and faunal specimens. Samuel and Eggeling focused on the aquarium which could be purchased, rather than constructed piecemeal.

### **3.2 “The Ground Layer”: Water**

Once the base layer was laid across the bottom of the tank, the next consideration was the source of the water. Would the aquarist use freshwater or saltwater? Where would they obtain it? And how would they fill the tank?

Despite the complexity of the saltwater system, both fresh and saltwater aquaria were managed as early as the 1840s. If the aquarist sought to contain a marine system, they could acquire either natural or manufactured saltwater. Natural saltwater was available to those who lived along the coastlines in port cities such as New York, Philadelphia, and London. According to Gosse, “In London, seawater may be easily obtained, by giving a trifling fee to the master or steward of any steamers that ply beyond the mouth of the Thames.”<sup>76</sup> It was crucial the aquarist provide the steamer with an unused fir or well-seasoned oak cask to prevent harmful substances from leaching into the aquarium’s future water supply. Additionally, the captain obtaining the seawater would need to dip the cask out beyond where the rivers empty; in order to avoid collecting brackish water. Although, Gosse discusses this process as a simple task, obtaining a cask, having it filled, transporting, and storing it was likely far too much of a hassle for the amateur aquarist.

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<sup>76</sup> Gosse, *A Handbook*, 13.

In fact, in Gosse's own publication on the manufacturing of seawater, he explains, "Even in London it [obtaining natural seawater] is an awkward and precarious matter; how much more in inland towns and country places where it must prove not only a hindrance, but to the many an insuperable objection."<sup>77</sup> Instead, the practice of obtaining natural saltwater through steam ship captains and stewards was most likely limited to professional aquarists and natural science researchers in major port cities whose studies necessitated large quantities of water with the exact chemical balance of seawater.<sup>78</sup>

For those who could not obtain natural seawater, Gosse suggested manufactured seawater. By the 1850's in London and the 1870's in the United States, manufactured saltwater could be purchased from a number of sources, and recipes for saltwater with the proper salinity and PH levels for aquarium management had been

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<sup>77</sup> Ibid., 15-16.

<sup>78</sup> Seawater, of course, could also be obtained in small quantities by visiting the beach. The practice of gathering seawater and even collecting specimens on the beaches of Western England became a highly popular hobby amongst women in the 1870s. Aquarium dealers and tank shops, such as Lloyd's Aquarium Warehouse, opened along the beaches, so that ladies could purchase their tank and other equipment, fill holding jars, with water and ship the collection back to their homes in the city via railroad. However, this craze in England was short-lived and while it certainly occurred in the United States, the ladies' ritual of visiting the seashore to build a collection never caught on in quite the same way. A number of contemporary aquarists mused as to the reasons why and reached no real conclusions. Regardless, it appears that beach trips among aquarium enthusiasts in the United States – male or female – were primarily limited to exploration and relatively small-scale specimen collection. Few, if any, entrepreneurs seemed to have established aquarium shops at the beach. Bred Brunner, *The Ocean at Home: An Illustrated History of the Aquarium* (New York: Princeton Architectural Press, 2012), 55-57.

mass-published.<sup>79</sup> While recipes varied in occasional component or quantity, they generally required: roughly 80% common table salt, 13% chloride of magnesium, 5% epsom salts, and 2% chloride of potassium in 4 quarts of river water.<sup>80</sup> Gosse also cites the average price of these products in London circa 1854, suggesting that the manufacture of one's own seawater would cost approximately 5*d* or \$3 per gallon.<sup>81</sup> The purchase of artificial saltwater ran similarly in price, but according to J.E. Taylor was rarely prepared properly and often resulted in unsuccessful aquaria.<sup>82</sup>

If the average aquarium was about two to five gallons, it would have cost approximately \$6 to \$15 to fill. This meant that for a small aquarium of a few gallons, the saltwater would cost more than the aquarium itself; meanwhile, for a larger tank the cost of the saltwater would be more negligible in comparison to the cost of the frame. In either case, the saltwater itself represented an added cost because it required tools to maintain. When water evaporates, the phase change only occurs for the water itself and not the elements in solution; therefore, the salinity concentrations could drastically increase if the water level were not properly monitored.

This posed an additional challenge in the day-to-day maintenance of the aquarium that could be solved by the addition of a "gravity bubble." The gravity

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<sup>79</sup> Though not all the scientific tools utilized for measuring these sorts of properties existed at the time, early marine biologists such as Gosse worked with proposed saltwater recipes, eliminating and simplifying ingredients to balance the components necessary for sustaining life with the practicality of manufacturing one's own artificial saltwater.

<sup>80</sup> Gosse, *A Handbook*, 16.

<sup>81</sup> *Ibid.*, 16.

<sup>82</sup> Taylor, *The Aquarium and its Inhabitants*, 155-157.

bubble, or gravity bead, operated on the principle of density (Fig. 3.1). Because saltwater is more dense than freshwater, a gravity bubble with the specific gravity of 1.026 should “just sink” in artificial saltwater of the proper density.<sup>83</sup> If it floated, the ratio of salts was dangerously high, if it sank quickly the concentration of salts was too low.<sup>84</sup> Similarly, if one had access to a hydrometer, they could insert the tube into the water and measure the liquid density in relation to pure and saline water to determine whether the artificial seawater was at the proper salinity level (Fig. 3.2).<sup>85</sup> It is unlikely, unless water were hand removed from the tank, that once the proper balance had been met, that the tank would lose a significant amount of the salts. However, the water would eventually evaporate, therefore once the gravity bubble or hydrometer indicated the salt concentration level was too high, the aquarist needed to add river water to the tank until the proper balance was once again met.

This is noteworthy because it means that once manufactured saltwater was acquired, it could be maintained for a significant period of time by adding freshwater. However, just as the salts would not evaporate with the water, neither would dirt, dust, or other contaminants. Thus, it was imperative to actively keep the water as clean as possible, not just for the health of the animals inside, but also because of the temporal and monetary investment posed by acquiring the saltwater in the first place.

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<sup>83</sup> Gosse, *A Handbook*, 12-14.

<sup>84</sup> Taylor, *The Aquarium and its Inhabitants*, 157-159.

<sup>85</sup> The particular hydrometer shown only measures specific gravity of .7 to 1.00, so it likely would have been part of a set of hydrometers which could measure liquids of a high specific gravity such as seawater (1.026).



Figure 3.1 Philosophical Beads, or Gravity Beads, John Galletti, 1860, Glasgow, Scotland. Glass, wood, paper. 33 ½" x 15 ¾". Inv. 54509. © Museum of the History of Science, University of Oxford. Image Courtesy of the Museum of the History of Science.

Freshwater – whether to fill the aquarium or to replace the base of the artificial saltwater – was far easier to obtain. The suggestion was that the freshwater be as clean as practical, meaning it ought to come from a river, pump, or well.<sup>86</sup> Stagnant water from puddles, ditches and slow-moving streams invited too much bacteria, and boiled water removed any healthy bacteria, vitamins, or minute levels of oxygen which would otherwise help sustain the critters inside. The price to obtain this water was relatively negligible and therefore it posed a far less substantial monetary investment.

Regardless of aquarium type, freshwater would evaporate in sunlight, and thus would need to be refilled regularly; however, the balance of the water was far less crucial. Enough water had to be maintained so that there was enough absorbed oxygen to sustain the animals inside, but the issues of salinity was far less significant in the

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<sup>86</sup> Butler, *The Family Aquarium*, 33-36.

case of a freshwater system. It was still recommended the water be maintained for cleanliness utilizing both natural creatures and artificial, human intervention, but this was merely based in a desire to maintain a crystal-clear water for viewing and the idealized self-sustaining aquarium.



Figure 3.2 Beaume and Specific Gravity Scale for Light Liquids, possibly made by Jerry Donaldson, late 19<sup>th</sup> – early 20<sup>th</sup> century, United States or Germany. Glass, paper, lead. 10  $\frac{3}{4}$ " x  $\frac{1}{2}$ ". Collection of Historical Scientific Instruments, Harvard University. Image Courtesy of Harvard University.

Despite modern concerns regarding the challenges of maintaining saltwater systems, the saltwater aquarium arose simultaneously with its freshwater counterpart. However, the geographical and fiscal impositions of acquiring the saltwater itself – artificial or natural—indicate the practice of maintaining one of these systems was substantial—at times even more costly on its own than the tank itself. Therefore, the practice of keeping saltwater systems was likely limited to professional aquarists sponsored by zoological gardens or universities, and to a group of highly wealthy amateur aquarists. The maintenance of a freshwater system meant more readily available water and less meticulous management of chemical concentrations, thus, generally a lower degree of financial investment and specialized knowledge.

### **3.3 Composing the “Paint Layers,” Part 1: Plants**

According to Shirley Hibberd, arbiter of English aquarium taste, “The next step is to insert the plants – the arrangement of which will depend of the size and shape of the vessel.”<sup>87</sup> Whether salt or freshwater, aquarists found many suggestions regarding a rich variety of aquatic plants and animals for their aquaria. However, because it appears that most at-home-amateur-aquarists and even a fair number of public-amateur-aquarists likely maintained freshwater systems for ease of skill, time, and finance, the consideration of floral and faunal species in this paper will focus

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<sup>87</sup> Shirley Hibberd, *The Book of the Aquarium and Water Cabinet: or Practical Instructions on the Formation, Stocking, and Management, in All Seasons, of Collections of Freshwater and Marine Life* (London: Goombridge and Sons, 1856), 31.

solely on the freshwater species.<sup>88</sup> As the first and most important layer of adornment, the living elements forced a new trajectory of decision making: the balance of the practical ideal with the beautiful ideal.

In order to achieve homeostatic, ecological balance, particular plant species lent themselves to the needs of the faunal life. While some offered a food source for goldfish, others with a thick, forest-like quality offered a reclusive shelter for more timid varieties of faunal life, and still others were admired for their color, shape, and style as elements simply of beauty. Though recommendations of floral species depended greatly on geography and availability of aquatic plants, certain genera and even particular species were nearly universally recommended.

In the nineteenth century, aquarists understood the process of photosynthesis but subscribed to a conception that some plants released greater amounts of oxygen than others during the photosynthetic process.<sup>89</sup> As a result, they often ranked their “practical” aquatic plants by alleged oxygen-producing capability. Any aquatic plant ranked as an excellent or superior oxygenator was recommended, at least in small clusters, in the aquarium regardless of its ornamental quality. Thus, the plants most commonly suggested for any aquarium included tape grass (*Vallisneria spiralis*) and pond weed (*Potamogeton*). Both genera contain dozens of species and varieties, but

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<sup>88</sup> The same sort of analysis used here could certainly be applied to the discussion of the kinds of living creatures which would have inhabited a marine aquarium. Some of the animals most frequently kept included salt-water bony fish species, small sharks, anemone, and corals.

<sup>89</sup> Since the nineteenth century botanists have discovered that it is not that some plants produce more oxygen than others; rather, this observed phenomenon occurs as the result of the ratio between plant size and density of photosynthesizing cells to the area inhabited by the plant.



only a few species were apt for the aquarium. The varieties suggested were widely available, easy to cultivate, and considered to be among “the best oxygenators.”

Much like today, tape grass was widely recommended for beginning aquarists because it was easy and free-growing. It could be collected in nearly any freshwater source (rivers, lakes, canals) on the American east coast and by the twentieth century could be easily purchased from aquatic plant dealers and aquarium stores.<sup>90</sup> It was considered a superior oxygenator—even a small amount could help establish the necessary concentration of oxygen to sustain animal life. It was referred to as “one of the most useful of all the aquatic plants;” however, it was not considered particularly ornamental, or graceful.”<sup>91</sup> Yet it is clear that the practical advantages of the plant outweighed the simplicity of its form. It appears regularly in the care manuals as well as in aquarium imagery. For example, Lovis Corinth’s portrait of his wife, Charlotte, contains a rectangular aquarium, complete with the green, grassy stalks of *Villarsia spirales*, or tape grass (Fig. 3.3).

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<sup>90</sup> Arthur M. Edwards, *Life Beneath the Waters: or, the Aquarium in America* (New York: H. Bailliere, 1858), 52;  
Innes, *Goldfish Varieties*, 170-172;  
Taylor, *The Aquarium and its Inhabitants*, 74-75;  
Eggeling and Ehernberg, *The Freshwater Aquarium*, 46-50.

<sup>91</sup> Edwards, *Life Beneath the Waters*, 52.



Figure 3.3A *Dame Am Goldfischbassin* [*Women with Aquarium*], Lovis Corinth (German, active 1858-125), 1911. Oil on canvas. 29" x 35 ½". Collection of the Belvedere, Inventory number 1829. Image © Belvedere, Vienna.

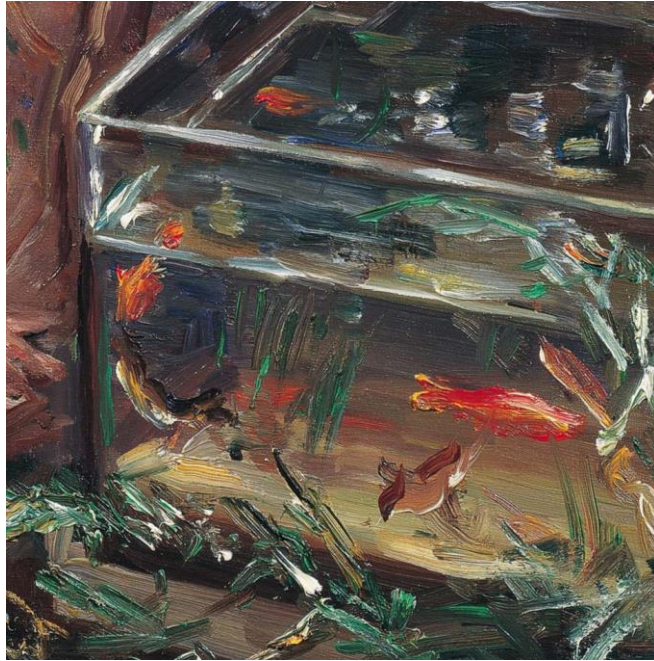


Figure 3.3B Detail, *Dame Am Goldfischbassin* [Women with Aquarium], Lovis Corinth (German, active 1858-1925), 1911. Oil on canvas. 29" x 35 1/2". Collection of the Belvedere, Inventory number 1829. Image © Belvedere, Vienna.

Similarly, pond weed (*Potamogeton*) was considered easy to obtain, slightly more visually intriguing than *Vallisneria*, and an equally strong oxygenator (Fig. 3.4). It could grow in soil or mud with pebbles and generally kept itself free of unwanted algae. The range of leaf colors across the varieties from deep olive to light pea greens offered an opportunity to create interesting contrasts in the color of the vegetal life within the aquarium.<sup>92</sup>

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<sup>92</sup> Herman T. Wolf, *Goldfish Breeds and Other Aquarium Fishes, Their Care and Propagation; A Guide to Freshwater and Marine Aquaria, their Fauna, Flora, and Management* (Philadelphia, PA: Innes and Sons, 1908), 201-203.



Figure 3.4 “*Potamogeton densus*,” in Henry D. Butler, *The Family Aquarium, or Aqua Vivarium. A New Pleasure for the Domestic Circle: Being Familiar and Complete Instructor upon the Subject of the Construction, Fitting Up, Stocking, and Maintenance of the Fluvial and Marine Aquaria, or River and Ocean Gardens*, (New York: Dick and Fitzgerald Publishers, 1858). Image Courtesy of the Winterthur Library: Printed Book and Periodical Collection.

The starwort (*Callitriche verna*) was one of the more commonly recommended floating plants. The pretty flowers and green leaves floated to the surface and rested in a star shape, giving it its name and adding ornamental complexity to the waterline. The plant was considered hardy, thrived with little care, was a decent oxygenator, and was used by a range of animals for both food and shelter.<sup>93</sup> Meanwhile the genus *Lemna*, with its pretty white flowers and long, dangling roots, was considered highly

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<sup>93</sup> Wolf, *Goldfish Breeds*, 204;  
Taylor, *The Aquarium and its Inhabitants*, 87-91;  
Eggeling and Ehernberg, *The Freshwater Aquarium*, 38-40.

ornamental and picturesque. Similar to *Callitriche*, the roots provided important shade from the sun, shelter from the open water for animal life, and food for a variety of fish. However, it was not considered a good oxygenator. Instead, its use lay solely in its nutritional and ornamental qualities.<sup>94</sup>

Other plants in the aquarium served little to no practical use at all. This grouping was either considered highly ornamental or was kept because they were otherwise engaging. For example, aquarists disagreed on the oxygenating quality of the bog plant, arrow-wort (*Sagittaria sagittaeifolia*). However, it was generally recommended for aquarium use because of its pretty white flowers and graceful, curving, arrowhead-shaped leaves (Fig. 3.5). Despite its lack of practical uses, the arrow-wort was so regularly recommended that by the early twentieth century it was often hard for aquatic plant dealers to maintain regular stock.<sup>95</sup>

Moreover, the water violet (*Hottonia palustris*) was particularly rare, especially in England, and presented a number of challenges. While most aquarium plants would float on the surface with their roots hanging down, or anchored to the gravel or rocks beneath, the water violet required deep soil along the bottom of the tank in order to grow. Aquarists were able to mitigate this by containing that sand and the roots in a pot and then placing the plant and its pot on the aquarium floor. However, the water violet required such deep soil that the whole process was rather

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<sup>94</sup> Wolf, *Goldfish Breeds*, 208-209;  
Eggeling and Ehernberg, *The Freshwater Aquarium*, 86-87;  
Edwards, *Life Beneath the Waters*, 60.

<sup>95</sup> Taylor, *The Aquarium and its Inhabitants*, 76-77;  
Wolf, *Goldfish Breeds*, 62-64;  
Innes, *Goldfish Varieties*, 166-170.



cumbersome. Furthermore, once it grew, its leaves were brittle and delicate. It was not considered a good oxygenator and it was not described as useful for animal shelter, food, or enrichment. However, nearly every aquarist recommended it, if one could get their hands on a specimen of it, because of its picturesque clusters of delicate lilac flowers—a delight amongst the bright green fern-like leaves.<sup>96</sup>



Figure 3.5 “*Sagittaria sagittaeifolia*” in Henry D. Butler, *The Family Aquarium, or Aqua Vivarium. A New Pleasure for the Domestic Circle: Being Familiar and Complete Instructor upon the Subject of the Construction, Fitting Up, Stocking, and Maintenance of the fluvial and Marine Aquaria, or River and Ocean Gardens*, (New York: Dick and Fitzgerald Publishers, 1858). Image Courtesy of the Winterthur Library: Collection of Printed Books and Periodicals.

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<sup>96</sup> Wolf, *Goldfish Breeds*, 215;  
Taylor, *The Aquarium and its Inhabitants*, 81-83;  
Eggeling and Ehernberg, *The Freshwater Aquarium*, 50-51.

However, the concept of the “aquarium fit-up picturesquely” was not simply about the shape and color of plant life. Like pre-Raphaelite paintings, the composition of the aquarium was not just about inspiration from nature, but about dialogue with nature. The natural world and human improvements on it were continuously in discussion with one another and likewise sparked discourse among groups of people. So, while aquatic floral species were recommended because of their practical capabilities or their idealized, organic curves, a number of other plants were suggested because of their more curious attributes.

For example, the sweet flag (*Acorus calamus*) was adored for its elegant, linear leaves and strong fragrance, despite its need for relatively deep soil pots for rooting.<sup>97</sup> The plant itself was simply too big for ordinary parlor aquaria, and therefore probably was not cultivated by most aquarists. But for those who could manage sweet flag in their collection, the plant offered a unique opportunity to share and discuss other areas of knowledge. In particular the aquarist could share that the exotic sweet flag plant was originally introduced from India, or that during antiquity it was cut-down and sharpened to be used as a writing implement.<sup>98</sup> To hold sweet flag in an aquarium collection meant the opportunity to hold dialogue regarding the aquarist’s ability to acquire, collect, and successfully cultivate exotic species from faraway places or to build connections with the past.

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<sup>97</sup> Taylor, *The Aquarium and its Inhabitants*, 93-95;  
Butler, *The Family Aquarium*, 48;  
Edwards, *Life Beneath the Waters*, 51.

<sup>98</sup> Butler, *The Family Aquarium*, 48.

Although these are only a few aquatic plants utilized in the aquarium here, it is imperative to note that dozens of genera were suggested by aquarists, and often the suggestions contradicted one another. For example, in the case of hornwort (*Ceratophyllum demersum*), nearly equal numbers of aquarists recommended hornwort as condemned it. Described as graceful, free-growing, and an excellent aerator by some, yet described as brittle, fragile, and non-helpful by others, the hornwort represents the expanse of aquatic plants which simply worked for some aquarists and not for others.<sup>99</sup> Factors ranging from skill level, intention, geographic location, and even personal taste effected the kinds of plants an aquarist would choose to cultivate in their personal aquarium. However, despite the contention between aquarists regarding most aquatic species, they all agreed on one plant: American weed (*Anacharis canadensis*). Because of its excellent oxygen producing ability, ornamental quality, and wide availability *Anacharis canadensis* was considered by many to be the most ideal aquarium plant. Its roots would set easily into a pebble bottom, so it required little to no special care, and it would grow quickly once introduced. Its leaves offered refuse for the promulgation of snail populations and were a favorite snack of goldfish.<sup>100</sup> As Henry Butler described, “it is hardy, easily obtained, graceful, gaily colored, prolific, easily thinned-out, and active in its oxygenating capacity, nothing

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<sup>99</sup> Wolf, *Goldfish Breeds*, 197-198;  
Taylor, *The Aquarium and its Inhabitants*, 87-88;  
Edwards, *Life Beneath the Waters*, 54-55.

<sup>100</sup> Wolf, *Goldfish Breeds*, 197;  
Innes, *Goldfish Varieties*, 9;  
Edwards, *Life Beneath the Waters*, 55-57;  
Butler, *The Family Aquarium*, 52.



could be me appropriate for an aquarium.”<sup>101</sup> As a result, it is safe to assume that most freshwater aquaria in the United States and England would have, or have at least considered including a cluster of *Anacharis*.

### 3.4 Composing the “Paint Layers,” Part 2: Animals

While it is possible to narrow down at least one plant which probably occurred in most aquaria, the animal life inside varied far too extensively to make any sweeping conclusions. In fact, aquaria did not even need to contain any form of animal life as aquatic gardens were simply composed of vegetal life.<sup>102</sup> However, most aquaria appear to have intentionally held both floral and faunal specimens, and like the vegetal species, the faunal elements fell into rough categorical groupings.

Some animals were kept because of their aesthetic nature or their allegedly exotic design. These included species of paradise fish and goldfish which will be discussed at length in the next chapter, but they represented both a high degree of skill and a significant financial investment. Other animals simply completed a homeostatic environment, serving a purpose in the miniature world inside. These included wide ranging species of mollusks, crustaceans, and even carnivorous fish. The snails and their larvae helped clear the tank of excess algae and acted as food for young fish. Meanwhile, crustaceans and bivalves, such as small crabs and mussels, added

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<sup>101</sup> Butler, *The Family Aquarium*, 52.

<sup>102</sup> Although some aquaria sought to only include vegetal species, it was impossible to preclude all animal life. Most simply, like an indoor potted plant, an aquatic garden with no intended animal species would still attract small flying insects and their larva—opportunistic in their search for a cozy landing place.

curiosity, representing the range of odd creatures in the pond or tide pool whilst performing the important functions of filtering the water and feeding on decomposing matter. Carnivorous fish were not often included, nor suggested by most aquarists, but they did complete the full ecological cycle. The inclusion of one or two predatory fish could keep smaller fish populations low and were entertaining to watch hunt.

In the consideration of the living elements it is important to draw a distinction between the vegetal and animal. In the late nineteenth century, there was much discourse regarding the degree of awareness and reason among animals. In the wake of these discussions, early versions of the American Society for the Prevention of Cruelty to Animals (ASPCA) were formed and zoologists actively debated the forms of intelligence embodied by animals. From elephants to bees, increasing numbers of people conceived of animal life as containing – to varying degrees – minds, dispositions, and even the ability to feel pain.<sup>103</sup> Whilst fish and other small aquatic life certainly did not hold the same clout of reason and intelligence as a trainable creature such as a horse or dog, the various species were assigned personalities and temperaments. They were admired for their colorful bodies and vivacious dispositions. Their habits were carefully observed, and at times adored. While aquatic plants were

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<sup>103</sup> Though the historiography on this is thin, it is particularly fascinating. Much of this work was rooted in simultaneous zoological studies of animal nervous systems and discussions regarding the relationship between intelligence and instinct. The outcomes of these contentious debates were two-part. First, they resulted in a classification system for animals based on perceived intelligence. Second, these studies informed larger socio-political discussions surrounding human behavior and natural theology. A particularly well-written chapter, “Struggle for the Minds of Insects,” on these discussions is found in:

J.F.M. Clark, *Bugs and the Victorians* (New Haven, CT: Yale University Press, 2009), 34-53.

certainly important in shaping the composition, the aesthetic achievement of the aquarium and its ecological sustenance, they were not active characters in the narrative formed by the composition. Plants created the scenery and highlighted or enhanced the relationships between elements, whilst the animals performed the theater.

The alleged habits and dispositions of certain fish species more candidly portrayed narratives or messages for their aquarists. For example, three-spined sticklebacks (*Gasterosteus aculeatus*) were particularly admired for their nest building habits (Fig. 3.6). When spawning, male sticklebacks root around the bottom of the pond or aquarium for small sticks, plants, and other things to build a nest for their mates. The females then lay their eggs in the nest and the male stands guard until the eggs hatch. If the male is provoked or the nest is disturbed in anyway whilst the eggs are present, the usually docile male stickleback becomes pugnacious and protective, chasing down the perpetrator – even if she is the mother of the hatchlings.

The stickleback was considered by aquarists as an architect—beautiful, and intelligent, but a mischievous little worker with a strong sense of territory and private property.<sup>104</sup> This interpretation was extrapolated to a loyal, but militant force, a knight. Henry Butler describes them:

We have, too, the graceful stickleback, who makes his nest like a bird, waits upon his mistress with all the gentle complaisance of the knight-errand of old, and enters the lists in his uniform of glowing scarlet trimmed with white and green, or deep, deep, purple to do nettle for the object of his affections.<sup>105</sup>

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<sup>104</sup> Innes, *Goldfish Varieties*, 72; Samuel, *The Amateur Aquarist*, 99; Strange, *Parlor Ponds*, 22-23.

<sup>105</sup> Butler, *The Family Aquarium*, 19-20.



Figure 3.6 “Sticklebacks and Their Nest” in William T. Innes. *Goldfish Varieties and Tropical Fishes* (Philadelphia, PA: Innes Publishing, 1916) Private Collection. Image Courtesy of the author.

Surrounded by the strapping branches of *Valniseria* and perhaps enhanced with a decorative castle or statuette, the stickleback performed like the medieval knight, protecting the castle he had built from any invader, shifting back and forth from the graceful nobleman dressed in stunning colors to the violent warrior.

In addition to their lively performances, sticklebacks were easy to procure as they are native to most freshwater sources in the northern hemisphere. In this case, they also conveyed an interest in local aquatic life. A number of local species, considered aesthetically interesting for their colors and graceful movements, were likewise kept to convey a proposed sense of locality. The common roach (*Rutilus*

*rutilus*), the perch (*Perca fluviatilis*), and minnows such as the common shiner (*Notropis cornutus*) were kept for these purposes as well. The collection and management of local specimens was conceived of in two ways. First, it could construct a sense of locality, an illustration of a nearby pond. Like Arts and Crafts artisans across a variety of media, some aquarists were using and celebrating local materials to create their art and reflect their world. These were the kinds of aquarists who were repeatedly intentional in their theoretical approach to the aquarium. The second way the collection of local specimens was conceived of was far more innocuous. This group of aquarists merely featured common species because they were easy (maybe even fun) to acquire and cost-free.

Fish such as the perch and the roach were of a calm disposition. They featured shimmering silver scales, and in the case of the perch, sported bright yellow stripes. However, the minnow was among the most prized of the small, freshwater fish for both its elegance and beauty. Minnows were easy to find and secure in the wild. Considered by Butler, “the dandy of his tribe,” the minnow featured green and rose coloring and graceful, darting speed (Fig 3.7).<sup>106</sup> Aquarists also lauded their fun and whimsical dispositions. They could be trained to do a limited number of tricks and jumps, and could even swim to the surface to be stroked or tickled.<sup>107</sup> In this way, aquarists were fond of the interaction and the degree of responsiveness minnows appeared to exhibit. They also enjoyed their alleged light-hearted mischievous, and even opportunistic behavior; personified, for example, by their propensity to steal food when others were not looking.

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<sup>106</sup> Butler, *The Family Aquarium*, 22.

<sup>107</sup> Strange, *Parlor Ponds*, 22.

Henry Butler mused upon the system of law-and-order within his own aquarium when a confrontational minnow stole the food of a crab:

I once had a little minnow who had his tail entirely bitten off by shrimps and crabs, and could not swim with the speed and grace of his fellows...I must say, however, that I think he deserved the treatment he got, for he was an extremely pugnacious little chap, and would attack my crabs for the purpose of stealing their food.<sup>108</sup>

His understanding of the relationship between the animals illustrates the grafting of human behavior and reason onto the aquatic world. To Butler, the event was laughable, comedic because the characters were all animals and not expected to respond with such a reasonable method, but the punishment of the minnow was also deserved. It was, perhaps, in his mind not as sophisticated as the “civilized” organization of law and order, but simple crime and punishment likely resonated with Butler’s own Western-centric imperial notions of justice.

It is unlikely these thoughts were conceived and carried out by the animals. Rather, the crab reacted instinctually in the protection of his food. In today’s understanding we would reason this behavior as having been evolved. Those males which had a stronger tendency to protect their eggs procreated more successful than those who did not and so passed on the behavior. The interpretive reasoning of vengeance and chivalry was completely a human conception foisted upon the creatures. However, the application of this interpretation opened a world of theatrical composition and narrative for the aquarist, which then relied on setting the proper scene or composing the imagery for such events to take place.

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<sup>108</sup> Butler, *The Family Aquarium*, 89.



Figure 3.7 “Rainbow Minnow, *Notropis lutrensis*” in William T. Innes. *Goldfish Varieties and Tropical Fishes* (Philadelphia, PA: Innes Publishing, 1916) Private Collection. Image courtesy of the author.

The living elements of the aquarium were far more varied and complex than can be addressed here. However, certain species and types of life clearly became increasingly predominant in public-amateur and at-home-amateur aquaria. These living elements each can be grouped into categories which highlight the sorts of values and goals aquarists negotiated in the composition of their work: the balance of scientific accuracy and beauty, a story with a scene to set, or a comment on one’s ability to acquire the exotic. The result was a miniature world, actualized by an enclosed and entirely constructed complex ecosystem in which the aquarist was the God, the master of the plan, and before their eyes, a theater was continuously preformed. However, the aquarist did not have complete control over his medium. Yet, at the same time they could interact with it, interpret, and experience it. Their design of both natural elements and finishing elements could sway the trajectory of the

story which unfolded inside. As a result, the compositions often oscillated through the spectrum of picturesque works from the pastoral to the sublime.

### **3.5 “The Finishing Layers”: Artistic Elements**

Like a Thomas Cole painting, the aquarium often did not just encapsulate the wonders of the natural world, it also captured the non-living environment. As was the case with the floral and faunal life, these elements were widely varied and balanced a sense of the practical and the ideal. While aquarists included particular elements such as dirt, sand, and rocks to provide the necessary animal habitats and anchorage sites for plants, they also included completely frivolous statuettes, castles, and grottoes.

The aesthetic roots of these non-living decorative elements lie in contemporary artistic conceptions of the romantic landscape. For nineteenth-century painters, the romantic natural realm was divided into three categories: the picturesque, the sublime, and the pastoral.<sup>109</sup> The picturesque drew upon the charm of the landscape whence happened upon in its human-less state. It was explorative in nature and was intended to be a delightful reminder of unspoiled beauty. This concept was often represented in paintings with scenes of elegant critters bathed in sunlight or majestic panoramic vistas. However, unlike the uplifting nature of the charming picturesque, the sublime and the pastoral were entangled with more complex emotions. The sublime commented on the rawness and violence of the natural world. Jagged cliffs and raging

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<sup>109</sup> Lauren Rabb, “Nineteenth Century Landscape: the Pastoral, the Picturesque, and the Sublime,” University of Arizona Museum of Art & Archive of Visual Arts, Exhibition Essay, October 9, 2009 - March 2, 2010, Accessed March 2018, <http://artmuseum.arizona.edu/events/event/19th-century-landscape-the-pastoral-the-picturesque-and-the-sublime>.



rivers comprised of a world in which God dominated over man. Meanwhile the pastoral, in many ways the opposite of the sublime, celebrated the gentle and even peaceful realm where human influence had tamed the natural world.<sup>110</sup> This is often represented by imagery of calm vistas and gardens or grazing livestock.<sup>111</sup>

By the late nineteenth century, though some artists and writers still discerned these categories as distinctly different, they increasingly coalesced within the same works, particularly in regard to their relationship to the artificial. The composition of the aquarium offered a particularly unique opportunity to epitomize these discussions. If outfitted to appear as a pond or tide pool, the aquarium and its lively inhabitants was a picturesque environment, filled with elegant creatures to be observed in a supposedly un-altered state. Of course, despite aquarists' best efforts to maintain a scientifically-minded aquarium, these creatures could not always be controlled. The stickleback would attack if his nest were threatened, the goldfish may pick at the *Lemna* roots

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<sup>110</sup> Rabb, "Nineteenth Century Landscape."

<sup>111</sup> The distinctions between the picturesque, the sublime, and the pastoral have been simplified here to make sense of the ways in which these theories applied to nineteenth century aquarists; however, there is a far-ranging body of historiographical literature, theory, and debate surrounding these discussions. For further reference see: Uvedale Price, *An Essay on the Picturesque, As Compared with the Sublime and the Beautiful; and on the Use of Studying Pictures for Improving Real Landscape* (London: Painted for J. Robson, 1796); John Hipple Walter Jr. *The Beautiful, the Sublime, and the Picturesque: In Eighteenth Century British Aesthetic Theory* (Carbondale, IL: Southern Illinois Press, 1957); Carl Woodring, *Nature into Art: Cultural Transformations in Nineteenth-Century Britain* (Cambridge, MA: Harvard University Press, 1989); Christopher Donaldson, Ian Gregory, Joanna Taylor, "Locating the Beautiful, Picturesque, Sublime, and Majestic: Spatially Analysing the Application of Aesthetic Terminology in Descriptions of the English Lake District," *Journal of Historical Geography* (2017): 43-60.

until the plant could no longer survive, and the crustacean may grab a small fish for his dinner. The violent happenings inside the aquarium could not be maintained as picturesque. They naturally fluctuated from the uplifting majestic to the ferocious sublime.

One way to mitigate the sublimity and accentuate the picturesque was to add non-living decorative adornments to the tank. Though greatly ranging in design from miniature floating ducks to sunken castles, the functionality and graceful aesthetic of these decorations offered respite from the events that may unfold inside – for both the viewer and the creatures. Elements of rockwork and sham ruins, carefully composed to appear as if naturally growing and indicative of the stillness of time, were common in picturesque landscape paintings and actualized in contemporaneous garden-scapes. The same applied to the aquarium aqua-scape. According to a sampling of photographs, it appears rockwork was the most common of these added adornments (Figs. 1. 10, 1.11, 3.21). This was probably because it required no added material or cost—pebbles and rocks were already necessary to formulate the bottom of the aquarium. Meanwhile, even for those wealthy enough to acquire other adornments, the rockwork fit more appropriately into the aquarists’ emphasis on the naturally-occurring picturesque. The prescriptive literature often suggested building post and lintel archways of the rocks, stacking them carefully to hide plant pots and to form little caverns, or to arrange them like cliffs for climbing critters.<sup>112</sup> Stylistically, these rock structures were intended to add to the texture and complexity of landscape. Like

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<sup>112</sup> Gosse, *A Handbook*, 12;  
Samuel, *The Amateur Aquarist*, 8.

in a painting, they created areas of light and shadow and they allowed the eye to travel upward and across the aquarium. But they also served a practical function. Rockwork provided anchorage sites for plants, and the caverns and archways acted as hiding places for the animal life. In this case the rockwork provided respite both for the critters inside and for the viewers' eyes.

Castles, grottoes, and sham ruins offered a similar effect, but with a more whimsical approach to the picturesque. Nearly all aquarium suppliers offered a range of small architectural structures to adorn the aquarium. These ranged from the fifteen-inch-tall, \$2 grotto with bowl for planting to much smaller castles, towers, light houses, archways, and "ancient forts," each costing between \$0.25 and \$0.50 (Figs. 3.8, 3.9).<sup>113</sup> Like the rockwork, these pieces offered anchorage sites for plants and hiding places for animals. Many of them also contained recesses along the structure or bowls for plating blooming species that required soil to grow.

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<sup>113</sup> J.W. Fiske Trade Catalog, 17-19;  
Jacob C. Cassel, *Fair-Hill Terra Cotta Works* (Philadelphia: The Company, 1877), 56-58, Collection of Rare Books and Trade Catalogues, Winterthur Library;  
J.L. Mott Iron Works, *Illustrated Catalog of Statuary, Fountains, Vases, Settees, etc., for Parks, Gardens, and Conservatories, Manufactured by the J.L. Mott Iron Works* (New York: E.D. Slater, 1875), New York Public Library Collection.





Figure 3.9 “Statuettes and Floaters,” in Jacob C. Cassel, *Fair-Hill Terra Cotta Works* (Philadelphia: The Company, 1877). Image Courtesy of the Winterthur Library: Collection of Printed Books and Periodicals.

Statuettes and floaters comprised another group of aquaria ornament. At-home-aquarists could purchase ceramic statues ranging from three inches tall to almost eight inches tall.<sup>114</sup> These figural statuettes helped to bolster the perceived character of the critters inside the tank. Small knights could stand guard alongside the medieval tower and the living knight of the tank, the stickleback. Meanwhile, a statuette of a fisherman resting on the composed a serene pastoral narrative.

<sup>114</sup> J.W. Fiske, *Catalog*, 17-19;  
Jacob C. Cassel, *Fair-Hill Terra Cotta Works*, 56-58;  
J.L. Mott Iron Works, *Illustrated Catalog*.

In contrast to the statuettes, floaters almost always suggested a pastoral composition for the aquarium. Floaters were light-weight ceramic figures, often in the form of graceful birds or amphibians (Figs. 3.10, 3.11). Their bottoms were flat, so that they could float. As they swayed and bobbed they added a sense of gentle movement to the surface. Although these animals were not living, they were carefully and realistically painted. In addition to animal forms, they also came in picturesque vignettes. Floaters in the form of a boy in a rowboat, or of a babe riding on the back of a swan added a sense of the romantic to the surface (3.12).



Figure 3.10 Swan Floater, ca. 1890, Trenton, NJ. Ceramic. Collection of the Chester County Historical Society. Image Courtesy of Chester County Historical Society, West Chester, PA.



Figure 3.11 Turtle Floater, ca. 1890, Trenton, NJ. Ceramic. Collection of the Chester County Historical Society. Image Courtesy of Chester County Historical Society, West Chester, PA.



Figure 3.12 Boy in Boat Floater, ca. 1890, Trenton, NJ. Ceramic. Collection of the Chester County Historical Society. Image Courtesy of Chester County Historical Society, West Chester, PA.

In the aquarium all three were aspects of romanticism—the picturesque, the sublime, and the pastoral—were prevalent. Each could be enhanced with the right decorations as the narrative of nature unfolded before the viewers’ eyes. Regardless of the form, the floaters added to the picturesque, often pushing towards the pastoral as they gently rested on the surface of the water. But, below the water line, visible in cross-section through the aquarium glass, was a realm full of mystery, where the picturesque was often surpassed by the sublime.

Although not usually recommended by professional or public-amateur-aquarists, these kinds of *artificialia* probably showed up regularly in at-home-aquarists’ tanks. Otto Eggeling is one of the only published aquarists to even mention the ceramic castle ornaments in his writing. While he does not admonish their use, he does consider their presence artificial and distracting from the living elements. He writes,

Ornaments of colored china or terra cotta representing miniature ruins of castles, or rocks and grottoes, with different openings are popularly used in aquariums of moderate size, but while they may be tolerated where nothing better is obtainable, they should not be used where better material for the same purpose can be had. The ornaments are too artificial to blend harmoniously with the other and most important contents of the aquarium. Far preferable are ordinary, colored stones, tastefully arranged.<sup>115</sup>

Eggeling’s commentary on the artificial ornaments raises a few significant points. First, he comments on the popularity and obtainability of these adornments. He

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<sup>115</sup> Similarly, Mark Samuel described the castles and praying babies frequently found in aquaria as “unnatural and unartistic.” Eggeling and Ehernberg, *The Freshwater Aquarium*, 16; Samuel, *The Amateur Aquarist*, 8.



recognizes that these aquarium ornaments were available at almost every pet store or aquarium dealer. They were likely present in most non-professional at-home tanks. It is likely so because for most the fish stood in for the allegorical pictures in the painting, each representative of set dispositions and personalities. Meanwhile, the castles, grottoes, and medieval archways would have completed the setting for the picturesque composition. The result was a narrative theater in which each element played a role.

But, in his second comment Eggeling explains that all these ornaments actually lack authenticity, rather than create it. Despite what at-home-aquarists imagined, to knowledgeable aquarists this kind of theater was too far removed from the natural environment. Instead the composition of the tank needed to be crafted in adherence with the environment from which the specimen came. This would encourage the critters to act and perform in their own *natural* aquatic ways, rather than some play imposed upon them. Last, Eggeling's discussion of the lack of authenticity, casted these adornments as distractions from the "most important contents." Eggeling was clear that the living elements are the most important components of the aquarium. Their beauty, livelihood, and presence was primary whilst the design of the aquarium was secondary.

Thus, public-amateur-aquarists such as Eggeling focused instead on functional or living decorations, rather than castles or floaters. In particular, fountains were often recommended because they both added a sense of aesthetic whimsy and served the very important function of aerating the aquarium water. If a fountain oxygenated the water regularly, the aquarist did not depend so greatly on the vegetal life to produce the necessary oxygen to sustain the faunal life. They then could then select plants

which were considered poor oxygenators and instead were more aesthetically pleasing such as lilies and water plantains.<sup>116</sup> Fountains, whilst playful and directly functional, played a crucial role in allowing the aquarist to be more creative with “the most important contents,” the living elements.<sup>117</sup>

### 3.6 The Frame

Although aquarists were clear to stress the living elements, today it is perhaps easiest for us to consider the role of aquarium frame. It is the first issue addressed in nearly all prescriptive literature and it is the last object to remain once an aquarium is no longer in use. However, it is imperative to remember that the frame, much like the frame of pre-Raphaelite painting, served two roles. First and foremost, it set the boundaries for the composition within, it enclosed the world inside. But the frame of

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<sup>116</sup> Taylor, *The Aquarium and its Inhabitants*, 33.

The style of the fountains will be discussed further in the frame section because they were often purchased in tandem with the frame; although photographic imagery does suggest that individuals did acquire fountains and place them into aquaria for which they were not necessarily designed.

<sup>117</sup> There was also a sense of decorating the aquarium within its larger context. Because of the many trajectories this consideration can take, the aquarium within human interior design is not the focus of this thesis –though it certainly is a fascinating direction to pursue. However, according to contemporary imagery, the immediate space of the aquarium was often surrounded by terrestrial plants. These plants appear to be cascading around the aquarium in the portrait Lovis Corinth painted of his wife, Charlotte. And the concept of including potted plants around aquaria appears regularly in the design of the aquarium structure. Mott and Fiske’s large-scale octagonal aquaria all have platforms for potted plants, as do Cassel’s designs for large-scale rectangular aquaria. Pairing the aquatic garden or aquarium with other potted plants accentuated the natural, living elements of the aquarium and added to the picturesque composition as life seemed to explode beyond the boundaries of the aquarium frame. (Fig. 3.3)

the aquarium was also meant to be aesthetically interesting, drawing upon the sorts of themes encapsulated within the composition.

Much like a painting frame, the aquarium frame had few restrictions and therefore came in a wide variety of shapes, sizes, and styles. The only requirement of the aquarium was that it have at least one flat side for viewing the composition within—and even this was often negotiable. However, two forms appear to have been particularly common and seem to have been always referred to as aquaria or fish tanks, rather than as fish bowl or globe: the rectangular and the octagonal.

The rectangular form was likely the most common, as it is today. Most available photographs, paintings, and prints with an aquarium in the composition appear to present a rectangular form. The aquaria in the photograph of the girl peering in at the New York Public Library (Fig. 1.10), the photograph in the Daleville Dentist's office (Fig. 1.11), the painting by Covineth of his wife Charlotte (Fig. 3.3), the root medicine trade card composition (Fig. 3.20), the photograph of the German lady beside her aquarium (Fig. 3.21), and even the satirical *Punch* and *Harper's Weekly* prints (Figs. 2.6, 2.7, 2.8) are all rectangular.

Though particular ideal measurements were suggested by aquarists, including the one-foot depth requirement, these rectangular aquaria came in a wide range of sizes and styles from plain to fancy and from rustic to whimsical. From nearly any aquarium dealer, one could order a plain, wrought iron, slate bottom rectangular aquarium with simple swirl adornments in black or white enamel at sizes ranging from approximately nine and a half gallons up to almost eighty-two gallons.<sup>118</sup> These

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<sup>118</sup> Cassel, *Fair-Hill Terra Cotta Works*, 48-49.

aquaria were aesthetically simple. Rather than appear beautiful, they offered the necessary materiality to sustain aquatic life. The slate bottom kept the water cool, the wrought iron made the construction durable, and the narrow frame left plenty of room for viewing and minimized contact between iron and water. In 1877, this form of aquarium could be purchased from Jacob C. Cassel, Philadelphia aquarium dealer, who called it “the new aquarium” and would have cost anywhere from \$7.50 to \$43.00 depending on the size and the enamel color (Fig. 3.13).<sup>119</sup> However, Cassel also supplied a fancy, wrought iron aquarium stand. This line of plain, rectangular aquaria was certainly too large to be kept on table tops and therefore, required a stand, but with this element Cassel did not stop at practicality. With its bountiful, delicate S-curves, swirling motifs, and potted plant shelf, the aquarium stand added aesthetic grace to Cassel’s “new aquarium” design without sacrificing utility.<sup>120</sup>

Similarly, New York’s J.W. Fiske Iron Works and J.L. Mott Iron Works, offered over-sized, eighty or more-gallon aquaria with large, clear glass viewing portals and minimal wrought iron frames. Though these also required cast iron stands, they were not the delicate, winding stands of Cassel. Fiske and Mott capitalized on their roots as iron works to create large-scale architectural aquaria (Figs. 3.14, 3.15). Though the wrought iron frame forming the joints between glass panes was minimal, they often took the form of decorative ionic columns, which held up the tabular rail of the top of the aquarium. The joint at which the aquarium articulated to the stand was integrated stylistically through a flaring base with a simple striated design. The

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<sup>119</sup> Ibid., 48-49.

<sup>120</sup> Ibid., 48-49.

aquarium and its base sat on four hefty, s-curve cabriole legs. As large-scale iron works, Fiske and Mott had access to a wide-range of molds which even appear to have been shared amongst one another. Because of their access to molds and the componentized nature of iron working, Fiske and Mott designs offered a rich number of stylistic choices, combinations, and upgrades.<sup>121</sup> For example, though many of the leg designs appear to take the form of classically-inspired sweeping acanthus leaves, others were could be upgraded to serpentine seahorses and dolphins. Although many extant Mott and Fiske aquaria have been overpainted black to match the iron, it is likely the finished frames were bronzed, giving the overall appearance of a shimmering, metallic aquarium complementing the reflection of the sunlight on the water inside.<sup>122</sup>

In addition to large-scale rectangular aquaria, Fiske and Mott both offered a variety of octagonal aquaria with integrated fountains. These aquaria ranged in size from the ten-gallon table top model to a full-on furniture piece—five feet six inches tall from base to fountain tip and holding eighty-five gallons (Fig. 3.16).<sup>123</sup> These octagonal aquaria formed the cornerstone of Fiske and Mott designs and offered even more customizable elements than the rectangular tanks.

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<sup>121</sup> J.W. Fiske, *Catalog*.  
J.L. Mott Iron Works, *Illustrated Catalog*.

<sup>122</sup> The aquaria are often described as bronzed in the trade catalog descriptions. Green oxidation on non-restored pieces and minute areas of oxidation in corners of over-painted works corroborate the trade catalog evidence.

<sup>123</sup> J.W. Fiske, *Catalog*, 17-19;  
J.L. Mott Iron Works, *Illustrated Catalog*.





Figure 3.14 Rectangular Aquarium, J.W. Fiske, ca. 1890, New York. Cast Iron, glass. 29" x 49". Collection of Joan Bogart Antiques. Image Courtesy of Joan Bogart Antiques, Long Island, NY.



Figure 3.15 “Aquaria,” in J.L. Mott Iron Works, *Illustrated Catalog of Statuary, Fountains, Vases, Settees, etc., for Parks, Gardens, and Conservatories, Manufactured by the J.L. Mott Iron Works* (New York: E.D. Slater, 1875), the General Research Division, the New York Public Library. Image Courtesy of the New York Public Library, Astor, Lenox and Tilden Foundations.



Styles ranged from the relatively demure to the exceptionally ostentatious. One octagonal aquarium featured a fancy tulip-shaped fountain, eight bloom-shaped flower pots, a scalloped edge along the base, an hourglass pedestal and tri-partite foot with fancy cast iron designs. Another could be customized top to bottom with fern cases, dragon-shaped fountains Gothic, Renaissance, and Baroque revival inspired designs.

At Mott and Fiske, the purchaser – whether an individual or wholesaler – could customize nearly every element from design style to fountain shape and pedestal add-ons. Much like shopping today, the options offered in the trade catalog illustrated base aquarium styles within which one could choose to include add-on elements or swap out particular elements for other styles based on their preference or budget. Though varying greatly in exact shape and detail, there are some consistencies.

Most Mott and Fiske aquarium pedestals were vasiform in shape. They featured compositions of swirling acanthus leaves, scalloped edges, bow knots, gadrooning, and strap work.<sup>124</sup> Like the large-scale rectangular stands, they at times featured aquatic life: a singular curving dolphin or a grouping of four herons. Many of the fountain options were composed of delicate shafts terminating in globular or urn-shaped fountains. Some contained curving and whispering floral vines, or bands of shell shapes along the shaft. They varied in composition and degree of detail or texture. At least one fountain took the form of a potting vase terminating in a flaring rim with an inset fern case atop a long fountain shaft of floral, leaf, and other vegetal motifs. A whimsical style fountain had a shaft in the shape of a little boy, an extended umbrella over his head and water raining down from the corners.

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<sup>124</sup> J.W. Fiske, *Catalog*, 17-19;  
J.L. Mott Iron Works, *Illustrated Catalog*.

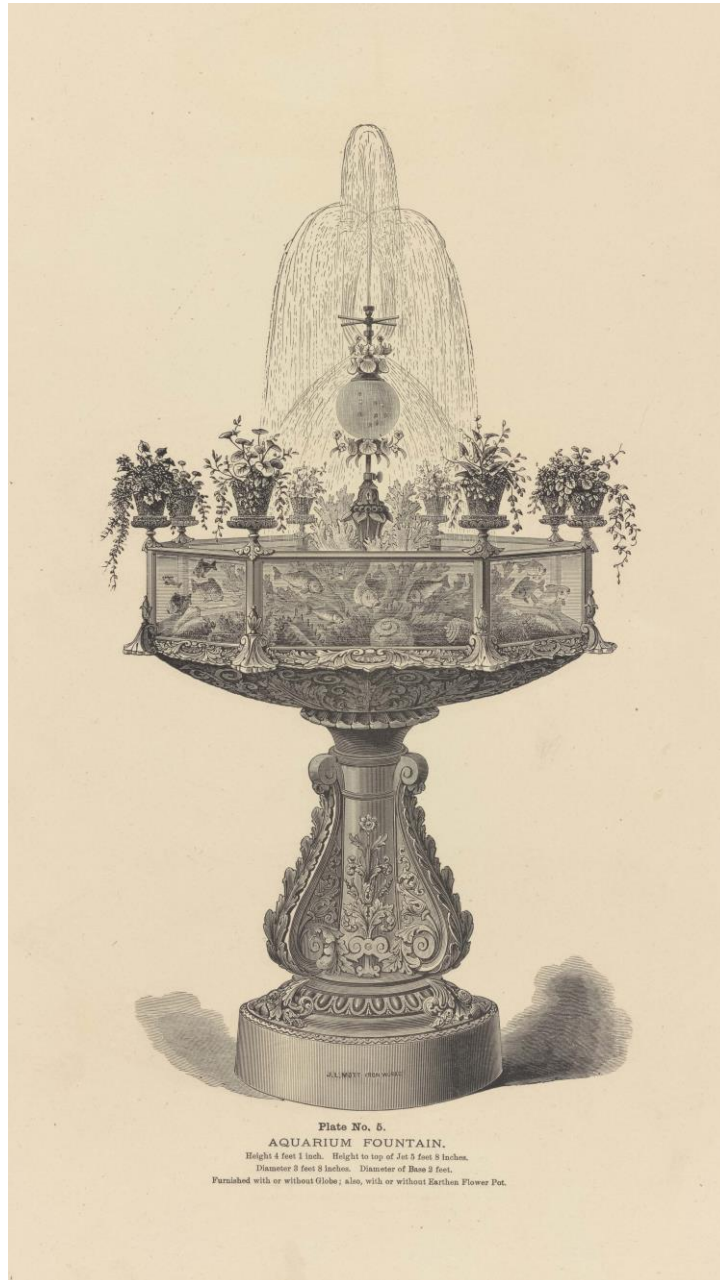


Figure 3.16 “Aquarium Fountain No. 6,” in J.L. Mott Iron Works, *Illustrated Catalog of Statuary, Fountains, Vases, Settees, etc., for Parks, Gardens, and Conservatories, Manufactured by the J.L. Mott Iron Works* (New York: E.D. Slater, 1875), the General Research Division, the New York Public Library. Image Courtesy of the New York Public Library, Astor, Lenox and Tilden Foundations.

These elements of octagonal fountain aquaria were not explicitly neo-classical, nor were they Gothic or Renaissance revival, often they were mixed and matched.<sup>125</sup> However, it certainly was possible to compose an entire aquarium in a singular style and Mott and Fiske advertised exemplary aquaria as such. These aquaria reflected a clear message about the aquarist's intended experience both for the collector and the viewer, which often was bolstered by the curation of the contents inside as well.

For example, "Aquarium Fountain Number 10" featured all the desired elements of both the Gothic and Renaissance revival in the form of an aquarium (Fig. 3.17). Over six-foot-tall, the \$220 Number 10 was a bronzed octagonal aquarium with fountain, fern shade, and pedestal with silver plated highlights and inlaid tile.<sup>126</sup> The tank itself held over ninety gallons of water. The pedestal, hefty and cylindrical, featured Tudor-inspired rose and crucifix designs, bands of arabesques, and sweeping strapwork reminiscent of the clamps on medieval book bindings. Four flying buttresses with tracery designs extend out to the sides and terminate in scepter-like globes. The joins between the viewing portals and along the top were adorned with simple columnar, silver plated rails. Each was topped with a small, scalloped stand and silver-plated flower cup. The bronzed, cylindric fountain adorned in bands of arabesques extended upwards from the center. It included a series of globes and knops, reminiscent of Gothic and Baroque drinking goblets that terminated in a crown-like vase. From the sides of the shaft extend fountains in the form of serpentine dragon

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<sup>125</sup> Though fountains are sometimes found in rectangular aquaria constructed piecemeal, such as the Daleville Dentist aquarium, the author has not found any rectangular aquaria with elaborate fountains in trade catalogs.

<sup>126</sup> J.L. Mott Iron Works, *Illustrated Catalog*, plate 10.

heads, whose mouths allow the water to flow down into the aquarium body. Crowning the display is a fern-shade for growing an exemplary collection of tropical floral life.

The resulting design was entirely imagined and almost encyclopedic in representations of the Gothic and Renaissance revival styles. For example, the warm, golden color of the bronzed iron with silver plated highlights of the individual elements would have evoked the marvel of the mounted naturalia exhibited in sixteenth and seventeenth century cabinets of curiosity. Likewise, the natural elements in works such as the seventeenth century naturalia-turned cup and the nineteenth century aquarium featured a grouping of objects selected from nature for their curious and wondrous display (Fig. 3.18). In both cases, those natural elements were collected, carved, re-shaped, and recomposed from their sources by artificial, human composition and framed by extensive displays of human acumen. The individual design elements share a clear common vocabulary: fantastical animal heads, sweeping swirling leaf patterns, strapping arabesques, and patterns of gadrooning. Similarly, the mounts predominately occupy the space above and below; though in each, straps of the gilded mount do continue through the middle ground, interrupting the natural element with human artifice. Drawing upon Noel Humphreys' and Henry Butler's jewel-box curiosity aquarium, the Gothic and Renaissance revival frame encasing a collection of knightly sticklebacks, and curling, strappy, Villiarsia spirales would have served as a cue for the viewer to experience the aquarium as they would imagine the cabinet of curiosity—a wondrous display of the collector's imperial and educational prowess. Of course, this was not the only message one could achieve.



Figure 3.17 “Aquarium Fountain Number 10,” in J.L. Mott Iron Works, *Illustrated Catalog of Statuary, Fountains, Vases, Settees, etc., for Parks, Gardens, and Conservatories, Manufactured by the J.L. Mott Iron Works* (New York: E.D. Slater, 1875), the General Research Division, the New York Public Library. Image Courtesy of the New York Public Library, Astor, Lenox and Tilden Foundations.



Figure 3.18 Cup with Cover, Hans van Amsterdam (Dutch, recorded 1535-1565), ca. 1533-1534. Silver gilt, coconut shell. 11" x 4". Gift of J. Pierpont Morgan, 1917, Collection of the Metropolitan Museum of Art, 17.190.622a,b. Image courtesy of the Metropolitan Museum of Art.

Because Cassel's Fair-Hill was a terra-cotta works, rather than an iron works, the shop could not achieve the same intricate design work on such a large-scale. However, Cassel's own materials allowed him to actualize uniquely organic shapes and to paint them with a host of natural elements. As a result, Cassel's specialty was the "rustic aquarium." Rustic aquaria rarely adhered to traditional aquarium shapes as they were inspired by the organic and composed of faux bois elements. For example, Cassel's two-gallon stump aquarium was shaped like a rounded cube cut from the trunk of a tree, with circular ship-like viewing portals on each flat face. It sat on a pedestal comprised of four c-curve shaped "tree branches" (Fig. 3.19).<sup>127</sup>

Cassel's process and material differed from that of Fiske and Mott. First, Fair-Hill Terra Cotta created molds for the elements in the shape of logs, tree branches, and tree trunks, so that the form adhered to the shape. These two-part molds would encompass the entire form of the aquarium. Once the piece was actualized in white terra cotta or plaster it would then be painted with varying shades of brown to create texture and depth. Growth rings and slight variation in the color between the pith and heartwood added detail to the tree trunk disk segments, while green moss and light-brown golden edges made the logs elements appear more realistic.

Cassel was far more liberal than Fiske or Mott with forms of aquaria. In addition to the unique rustic shapes, he also created a number of bell jar stands. These stands also imitated the natural world – both from the 1877 catalog are in the form of tree trunks with curving vines around them and even faux leaves.<sup>128</sup> Designs like

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<sup>127</sup> Cassel, *Fair-Hill Terra Cotta Works*, 53-56.

<sup>128</sup> *Ibid.*, 53-56.



“Rustic Fish Globe and Stand” convey that bell jars are entirely respectable and stylish forms for aquaria by visually embodying all of the same discussions regarding the picturesque and the sublime (Fig. 3.19). These forms fall into a different realm in terms of style, equally complex as the Fountain Aquarium Number 10, but composed in a completely distinctive manner.



Figure 3.19 “Rustic and Japanned Aquaria,” in Jacob C. Cassel, *Fair-Hill Terra Cotta Works* (Philadelphia: The Company, 1877). Image Courtesy of the Winterthur Library: Collection of Rare Books and Periodicals.



Particularly popular in the development of late nineteenth century Aesthetic movement and personal garden-scapes, faux bois techniques drew verisimilitude from the proximity of nature.<sup>129</sup> The tree branch benches, stump tables, and faux logs stacked together to form planters, conjured notions of traditional craftsmanship with straight-forward construction and championed the use of natural materials. Thus, the very style of these works comment on a sense of nostalgia and a desire to continue interaction with the natural world in a rapidly industrializing and urbanizing moment. A crumbling medieval castle inside, like that shown in the “Rustic Fish Globe Stand,” was actually more akin to the Thomas Cole’s *Arch of Nero*, than the cabinet of curiosity inspired style of Aquarium Fountain Number 10. Rather than a jewel box of knightly fish, the rustic style aquarium was intended to be filled with local, personally-caught specimens in order to capture the narrative of one’s own journey in connection with nature, rather than the traditional opulence of the cabinet. Much like the writing of Charles Strange and Shirley Hibberd, the message instead is a fondness for a nature and a comment on its sublimity, its power, and its majesty.

Regardless, both compositional schemes and more broadly, the introduction of these human experiences into the notion of the picturesque were deeply rooted in late nineteenth and early twentieth century art theory. These conceptions were consistent with the values of the contemporary Pre-Raphaelite, Arts and Crafts, and Aesthetic movements. The fine and functional works of those movements, along with cultivation

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<sup>129</sup> For examples of late nineteenth century use of faux bois and other “rustic styles” in the home see:

Shirley Hibberd, *Rustic Adornments for Homes of Taste: And Recreations for Town Folk, in the Study and Imitation of Nature* (London: Goombridge and Sons, 1857).

of living arts such as aquaria, and the cabinets of curiosity which came before them was a continued intentional mixture of *naturalia* and artifice. The result was a comment on nature and artifice in which each inspired the other whilst each commented on the expanse of the other. Of course, in actuality both were constructions deeply rooted in the centrality of the human and their ability to conquer them both through the collection of encyclopedic knowledge.<sup>130</sup> Yet, theoretical messages such as these, so carefully articulated through the design are likely not what was actualized by the greatest number of aquarists.

Although the trade catalogs provided customers with inspiration for cohesive designs and cued clear messages about the meaning of the collection and the intentionality of design, contemporary paintings, photographs, and prints suggest this careful composition of frame elements was likely not as common as it may appear. The rectangular forms appear far more frequently in the imagery from the period, even amongst professional aquarists. The octagonal form is only illustrated occasionally, and rarely are the tanks as fancy as the trade catalogs suggest. Most of them are simple metal frames with large glass viewing portals. The most commonly purchased aquaria were probably similar to Cassel's \$2 Japanned aquarium, which held about one and a half gallons, or the \$5 Fiske "oblong glass" aquarium, which held about six gallons of

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<sup>130</sup> Joy Kenseth, "The Age of the Marvelous: An Introduction," in Joy Kenseth, ed. *The Age of the Marvelous* (Hanover, NH: Hood Museum of Art, Dartmouth College, 1991), 24-59;

Joy Kenseth, "A World of Wonders in One Closet Shut," in Joy Kenseth, ed. *The Age of the Marvelous* (Hanover, NH: Hood Museum of Art, Dartmouth College, 1991), 80-101;

James V. Mirollo, "The Aesthetics of the Marvelous: The Wonderous Work of Art in the Wonderous World," in Peter G. Platt, ed. *Wonders, Marvels, and Monsters in Early Modern Culture* (Newark, DE: University of Delaware Press, 1999), 24-44.

water—certainly not the Mott Fountain Aquarium Number 10 (Fig. 3.18).<sup>131</sup> This is contrary to what may be suggested by extant aquaria, but such is likely the case due to preservation bias. The complex and architectural pedestals of Fiske and Mott's fountain aquaria were likely kept because of their creative and artful design. Meanwhile, the simple, cheap tank designs were more likely thrown out and replaced than fixed and kept.

While it is perhaps easy to slip into the pitfall that aquarists intended a cohesive message conveyed among frame, plants, and animals in an effort to say something prolific about the nature of the universe, it is clear that individuals took it upon themselves to purchase separate elements to dress their own tanks. The aquarium at the Daleville dentist's office has Gothic-style turrets added on to the joints between viewing portals, rockwork stacked inside, a single common roach fish, and Mott's whimsical boy with umbrella fountain in the middle (Fig. 1.11). However, what this tells us is equally important.

Some aquaria were intended as theoretical commentary on the construction of knowledge, and these were almost certainly held by scholars and artists. Other aquaria were almost entirely composed to mimic a picturesque pond, complete with the full ecological system encased. These were perhaps held by professional aquarists and public-amateur-aquarists. They demonstrated an important complex regarding the dominance of man's knowledge over natural occurrences and even mysteries. But most aquaria were held by at-home-aquarists. These were the same people who owned fishbowls or bell jars with a few plants and fish in them and referred to them as an

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<sup>131</sup> J.W. Fiske, *Catalog*, 15-16;  
Jacob C. Cassel, *Fair-Hill Terra Cotta Works*, 53-56.

aquarium. Their narrative had a far less theoretical, though equally intentional approach. They wove together the very many sources from which they learned about the aquarium, and they constructed an underwater world which balanced the many theories they encountered to fit their interpretation. In this way it was a way of illustrating one's competency in a new and high-class fashion. Such was the case with Lovis and Charlotte Corinth who maintained an aquarium as a symbol of their proximity to the wealthy individuals for whom Corinth most frequently painted.

Regardless, the vital element for all aquarists was not the frame. The aquarium itself framed the world within. While future research should certainly consider the context and role of these aesthetic frames within the larger body of nineteenth century art and design, it is important to remember that conclusions on their form cannot be drawn without an understanding of their purpose because they would have had a wide spectrum of meanings depending on the owner, the viewer, and the aquarium contents. The aquarium was a collection and it was meant to be seen, so it is unlikely an empty aquarium sat as an art piece on display empty—as perhaps is the most common way in which we encounter them today. For many the frame was the easiest part. They could purchase it from a department store, a garden retailer, or even a street peddler. The hard part was finding and keeping the collection inside alive. That was the central indicator of their success, not necessarily the artistic style.

### **3.7 The Sustaining Elements: Aquarium Tools and Apparatuses**

Unlike a painting, the life inside the aquarium frame required the upkeep of its fundamental elements. Thus, in addition to the sand, dirt, water, plants, animals, frame, and other adornments, the aquarist also required a set of tools or apparatuses.

Despite the theory that a fully homeostatic micro-environment would perpetuate in perfect harmony on its own, the enclosed nature of the aquarium, and the human aversion to particular natural smells, required the aquarist to do more work than perhaps advertised. To manage the decay and eventual rot of organic waste, as well as natural dust and dirt accumulation, aquarium stores and scientific instrument retailers advertised a number of aquarium tools ranging from small nets, to siphons, to simple, hollow dip tubes.<sup>132</sup> Professional aquarists and others publishing on the topic suggested a few of these tools would be absolutely necessary, whilst others simply offered convenience.

Small nets, dip tubes, and siphons were among the more imperative of the tools. Nets allowed for the safe transport of fish, either between tanks, or during cleaning time. These were suggested as the most basic tool for aquarium management by most aquarists. Philadelphia public-amateur-aquarist, William T. Innes, and others were specific about the material of the netting, suggesting Brussels netting or cheesecloth.<sup>133</sup> However, Innes admitted that the sort of nets he recommended could not be purchased, but rather would need to be made at home. Instead, it is likely that most home aquarists were simply utilizing small fishing nets or even make-shift catching devices, which they had crafted, rather than worrying about the specifics of materiality. The visual evidence corroborates this discordance. In “Valuable Addition to the Aquarium,” one of the young boys holds a fishing net for transporting specimens (Fig. 2.6) and in Dr. Morse’s Root Indian Pills trade card, a young girl

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<sup>132</sup> Innes, *Goldfish*, 228-234.

<sup>133</sup> *Ibid.*, 228.

fishes through the aquarium using a small metal can with attached handle (Fig. 3.20).<sup>134</sup>



Figure 3.20 Dr. Morse's Indian Root Pills Trade Card, New York and Pennsylvania, ca. 1890. Polychrome, lithographic print on paper. Private Collection. Image courtesy of author.

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<sup>134</sup> This particular composition was repeatedly used to advertise on a wide range of trade cards. In this case it has been used as a calling card for Indian Root Pills which were distributed to doctors from Buffalo, New York to Adams County, Pennsylvania; however, the very same composition was used on a wide range of other advertisements and calling cards including a Philadelphia confectioner.

The other fundamental tool was the dip tube. Dip tubes were used to remove small amounts of refuse. Operating on simple air pressure and suction, Innes suggested any tube, preferably glass, one-quarter to three-eighths inch in diameter and long enough to insert into the aquarium.<sup>135</sup> Essentially, the tube acted as a straw. The user would cover one end with their thumb, insert the tube into the water near the refuse, and remove their thumb to allow the water and dirt to rush into the tube. They would then once again cover the end to hold the contents inside and remove the tube from the water to empty it. These tubes could be purchased from scientific instrument stores, but similarly to the catching devices, it is more likely aquarists would have used what they had on hand.

Some tools could not be easily made at home and had to be purchased at a specialty store. These included siphons for cleaning and hydrometers for maintaining the proper salinity level. The simplest of these instruments were siphons, used for removing large areas of dirt.<sup>136</sup> Long tube siphons could be purchased for about \$9 from a chemical glassware company such as Whittall Tatum, which had retailers in both New York and Philadelphia.<sup>137</sup> However, other specialty tools ranged from spawning nets for breeders to early forms of aeration and filtration systems, which were harder to acquire and required access to an aquarium specialist.

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<sup>135</sup> Innes, *Goldfish Varieties*, 228-229.

<sup>136</sup> *Ibid.*, 229.

<sup>137</sup> Whittall Tatum and Co., *Whittall, Tatum and Co Glass Manufacturers Druggists', Chemist', Perfumers' Glassware*, (New York and Philadelphia: The Company, 1880), Collection of the Corning Museum of Glass.

Though one could filter and re-oxygenate the water by hand, the earliest bubblers or aerators and filtration systems were invented by German aquarists in the mid-nineteenth century. At first, these systems operated on simple machines and mechanical physics. However, by 1900 they featured steam and even gasoline powered engines.<sup>138</sup> The gravity operated fountain aerators were the least complex of these systems. Often these were produced by large-scale garden supply and fountain manufacturers because they had already mastered the physics to create continuous water flow. As a result, both Fiske and Mott retailed a high number of fountain aquaria.<sup>139</sup> But the technology was so ubiquitous that even aquaria which were tanks, rather than a fountain form often featured an ad hoc, homemade fountain system for continuous aeration.<sup>140</sup>

By the early twentieth century, Innes recommended two forms of aeration/filtration systems instead of the fountain. The “beer pump” operated on the mechanical physics of compressed air. Air held in a separate air chamber was forced out by the entrance of water. Once the air was completely expelled, a siphon was triggered by an internal float which emptied the chamber in preparation for the next filling.<sup>141</sup> The filtration system could be used in conjunction with an aeration system.

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<sup>138</sup> At least one known aquarium retains its steam and gasoline powered appliances. This aquarium-birdcage in the style of department store architecture was scratch made by a New York sheet metal worker in the late 1880s, is currently residing with descendants of the maker.

<sup>139</sup> J.W. Fiske, *Catalog*;  
J.L. Mott Iron Works, *Illustrated Catalog*.

<sup>140</sup> Taylor, *The Aquarium and its Inhabitants*, 33.

<sup>141</sup> Innes, *Goldfish Varieties*, 11.



The filtration also operated on compressed air and essentially a series of sieves.<sup>142</sup> The introduction of compressed air would force water through a series of tubes coated in fine sand, charcoal, and other dirt absorbing materials. The water, expelled of its dirt, would then flow through the rinse tube back into the tank. This could be accomplished through an external system along either side or through a bottle rigged beneath the aquarium.<sup>143</sup> In the photograph of the woman working on needlework beside her aquarium, an early aeration/filtration system is evident (Fig. 3.21). Although it is not clear exactly how the featured system worked, the hourglass-shaped reservoir likely operated on the introduction of compressed air to force reserved air into the tank from the bottom. Though it is unclear from the image and no patent has yet been found, it is possible this also operated as a filtration system similar to the bottle system discussed by Innes in his book *Goldfish Varieties and Tropical Aquarium Fishes*. In this case the water would have fallen into the reservoir and passed through a series of sieves including pebbles, fine sand, and charcoal as it was forced by compressed air back up towards the surface through a cork.

As these technologies were developed in Germany they were introduced almost immediately into the United States and England. Aquarium specialists in Cleveland, New York, Chicago, and Philadelphia attempted to modify these German appliances to best accomplish the needs of American fish-keepers.<sup>144</sup> As a result of the

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<sup>142</sup> Ibid., 232-234.

<sup>143</sup> Ibid., 232-234.

<sup>144</sup> The Aquarium Society of Philadelphia, *The Aquarium*, (Philadelphia, PA: Innes Publishing, 1913), Collection 2010.29, Academy of Natural Sciences Philadelphia.

work, new aquarium appliances including heater-illuminators and improved aerating filters were introduced throughout the early twentieth century.



Figure 3.21 Woman with Aquarium, ca. 1890, Germany. Photograph on paper from black and white negative. Private Collection. Image courtesy of Wolfgang Wiggers.

Aquarium tools and appliances varied in availability and in price, so it is likely that at-home-amateur-aquarists only purchased those which were necessary such as small nets. Some, like the German woman featured in the photograph clearly employed the latest technology in the home, but others, embodied by the composition

of the little girl fishing in the aquarium with a bucket in the India Root Pills trade card, likely utilized make-shift tools (Figs. 3.20, 3.21). Though this equipment could be purchased from numerous sources, aquarium tools and appliances posed yet another expense for managing the balanced aquarium. It is likely most at-home-aquarists gave up on dealing with specialized equipment and apparatuses before they even started.

As new tropical and exotic fish became accessible to the North American market, aquaria required more complex filtration, heating, and lighting systems. Thus, a study of the sorts of tools and appliances available in any given time offers an interesting paradox: the importation of new species spurred the invention of new aquarium appliances, yet at the same time those same species could not live in North American climes without those very same appliances. In other words, the appliances allowed for the containment of more genera, but access to new genera encouraged the production of new equipment. In the end, the cycle of this paradigm suggests that even the most perfectly designed scientific environments could not escape their own artificiality. Regardless of the thousands of pages of theory, the aquarium could not sustain perfect balance, and thus always required human assistance – whether by personal aeration of the water or mechanical pump. As a result, the aquarium always straddled the natural and the artificial, and the negotiation of the ideal aquarium and the practical reality was in constant conversation.

### **3.8 Conclusion: The Human Element**

Though the composition of the aquarium was akin to an oil painting, it did not always operate the way a painting did. Aquarium manuals and prescriptive literature, much like a paint-by-numbers, suggested a particular grouping of materials and a step-

by-step trajectory for success. Theoretically, the aquarist would then step back and allow their work to unfold before their eyes. They would pull their hand away and allow the aquarium to become a constant story, evolving in the world they had created—an experience which felt natural, despite its artificial impetus. Of course, this was the ideal. However, close adherence to the instructions and an effort to consider the necessary precautions never guaranteed the success of the aquarium, even for the most seasoned professionals. In reality, they required an immense amount of precision, care, time, and compliance on the part of the inhabitants. But for most, the aquarium was not a pursuit, but a fleeting interest—a novelty and fad which easily arose out of the zeitgeist of the late nineteenth century. It occupied common interests, a creative hobby particularly useful for teaching and learning about the world.

To sustain public interest, professional aquarists tried to simplify the process, suggesting that the pursuit could be mastered by anyone with the desire to do so. English aquarist, J.E. Taylor suggested, “the young beginner has only to remember that the secret of his successful preservation of animals and plants lies in his imitating natural conditions as much as possible.”<sup>145</sup> But the reality of the negotiation of the practical and the ideal realized by at-home-amateur-aquarists illustrates that for those who did retain the hobby, the concern was for keeping the creatures alive enough to look good, rather than to compose a world.

Of course, even the simple task of keeping the creatures alive and visible was hard enough. The animal tendencies to hide in the rock work, rather than display themselves for human viewing and the human propensity to overcrowd the tank were

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<sup>145</sup> Taylor, *The Aquarium and its Inhabitants*, 30-31.

the most common reasons they failed. To cope with the unruly aquarium, aquarists invented a number of tools to aid in the sustainment of the space. Moreover, they utilized stylistic decorative adornments and overflowing displays of plants to accentuate the vivacity of the aquarium. And when all else failed they even coaxed their fish out of hiding and poured alcohol in the tank to pickle them in place; forever on display, forever looking lively, if not vivacious.<sup>146</sup>

Regardless of Taylor's suggestion to mimic natural conditions, aquarists navigated the natural and the artificial to varying degrees to achieve the result within their reach. Despite what the theorists imagined, the aquarium was never for the animals, or the plants. It was always about the human experience; whether that be the human experience of relating to the natural world or the human experience of the building relationships with one another to discuss or even complain about the aquarium. An oil painting is rarely if ever discussed without its artist and the aquarium ought to not be discussed without the human networks which operated as the mechanism for its very existence.

To make sense of the ways in which these aquatic worlds depended on their human networks, we must consider the relationship between communities of aquarists and their fish tanks. Full of characters with an immense desire to record their art, the papers, photographs, and art work of Philadelphia's aquarists – both public-amateur and at-home-amateur – offer a rich opportunity to unravel the networks of people which enabled these objects to exist. Lacking the presence of a professional public aquarium, Philadelphia's amateur aquarists of the late nineteenth and early twentieth

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<sup>146</sup> Brunner, *The Ocean at Home*, 66-67.

centuries came together in public spaces to discuss, share, and even exhibit their aquatic worlds. The result was a robust aquarium district in the center of the city in which everyday people shaped the discussion of natural philosophy, aesthetics, and fish care. And although this certainly happened elsewhere, and at a similar rate, the distinct lack of professional aquarists left Philadelphians in the unique position of interpreting the aquarium pursuit for themselves in a very public way.

## Chapter 4

### AQUAMEN: PHILADELPHIANS AND THEIR FANCY FISH

“In the opinion of the writer, aquarium societies should avoid too frequent competitive exhibitions. They promote discord and tend to develop professionalism. Those truly interested in the development of the fancy will be willing to bring out their fish without thought of reward other than giving pleasure to their friends and the public.”

-William T. Innes, 1917<sup>147</sup>

In the 1870s fancy fish breeders and importers, tank suppliers, and aquarium plant providers had exploded onto New York’s Lower West Side scene, but the move to Philadelphia was slower. Exasperated by the lack of a public aquarium, or even an official Aquarium Society, the Philadelphia pursuit was publicly silent. However, this did not stop enterprising entrepreneurs from capitalizing on the craze. Despite the fact that just thirty years earlier the aquarium fad had only just arrived in Philadelphia, by 1910 one could stroll down Arch Street in Center City and find themselves surrounded by the fishy world of the “Aquarium District.”

Jacob C. Cassel was born into a family of farmers in Montgomery County, Pennsylvania sometime around 1849. By the time he had turned twenty-one he had

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<sup>147</sup> William T. Innes, *Goldfish Varieties, and Tropical Aquarium Fishes: A Complete Guide to Aquaria and Related Subjects*, (Philadelphia: Innes, 1917), 43.

moved out of his family home and resided with other Montgomery county natives, the Rudy family. In 1873, he married Harriett Pattern and the couple moved to Philadelphia where Cassel opened Fair-Hill Terra Cotta works at 2341 N. 7th Street.<sup>148</sup> In Cassel's time there were about six terra-cotta works operating in the southeast Pennsylvania region. Four of those six were producing utilitarian objects, primarily sewer pipes, and one was producing some utilitarian wares as well as some garden equipment. Cassel, the sixth, was producing primarily floral and garden equipment, and uniquely, aquaria.<sup>149</sup>

Indeed, Cassel was primarily a garden supplier. About 70% of his twenty-five different forms advertised in the 1877 Fair-Hill trade catalog were garden related; meanwhile, only 25% were related to the aquarium trade. This coincides with contemporaneous demographic representations of Cassel. In the 1870s, 1880s, and 1890s, the census and city directories list "terra cotta" or "florist" as Cassel's occupation.<sup>150</sup> Similarly, most of his advertisements appeared in garden catalogs or

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<sup>148</sup> St. John's Episcopal Church, Marriage Certificate, "Jacob C. Cassel and Harriet A. Pattern," April 14, 1873, Historical Society of Pennsylvania, Philadelphia, Pennsylvania; Reel: 848, Accessed, March 2019, at: [ancestry.com](http://ancestry.com); *The 1900 United States Federal Census*, "Jacob C. Cassel," *Philadelphia Ward 19, Philadelphia, Pennsylvania*, Roll: 1460, Page: 12A, Enumeration District: 0390, Accessed, March 2018, [ancestry.com](http://ancestry.com); *Philadelphia, Pennsylvania City Directory, 1888, 1891, 1893, 1904 1909, 1917*, "Jacob C. Cassel," Accessed, March 2018, [ancestry.com](http://ancestry.com).

<sup>149</sup> *Annual Report of Pennsylvania State College, 1898-1899*, "Jacob. C. Cassel," (Harrisburg, PA: William Stanley Ray, State Printer, 1900), 50-52, 72. Accessed, March 2018, Google Books.

<sup>150</sup> *The 1870 United States Federal Census*, "Jacob C. Cassel," *Marlborough, Montgomery, Pennsylvania*, Roll: M593\_1377, Page: 596A, Family History Library Film: 552876, Accessed, March 2018, [ancestry.com](http://ancestry.com).



garden sections of newspapers. However, the 1909 Philadelphia City Directory reflects an identity change for Jacob Cassel and Fair-Hill terra cotta.<sup>151</sup> After the works moved out of Philadelphia and into nearby Kennett Square, Pennsylvania in 1898, but imperatively still retained a show room in Center City Philadelphia, Cassel began listing his occupation as “aquarist” or “aquariums.”<sup>152</sup> Cassel had always been producing and retailing aquaria, fish globes, and aquarium adornments, but the way in which he conceived of his aquarium department fundamentally changed at the turn of the twentieth century. But why and what does this reveal about a shift in Philadelphians’ notions of the aquarium and the natural world?

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<sup>151</sup> *The 1900 United States Federal Census*, “Jacob C. Cassel,” *Philadelphia Ward 19, Philadelphia, Pennsylvania*, Roll: 1460, Page: 12A, Enumeration District: 0390, Accessed, March 2018, Ancestry.com.

<sup>152</sup> The Aquarium Society of Philadelphia, *The Aquarium*, (Philadelphia, PA: Innes Publishing, 1912), Collection 2010.29, Collection of the Academy of Natural Sciences Philadelphia;  
The Aquarium Society of Philadelphia, *The Aquarium*, (Philadelphia, PA: Innes Publishing, 1913), Collection 2010.29, Collection of the Academy of Natural Sciences Philadelphia;  
The Aquarium Society of Philadelphia, *The Aquarium*, (Philadelphia, PA: Innes Publishing, 1916), Collection 2010.29, Collection of the Academy of Natural Sciences Philadelphia;  
Hugo Mulertt, *The Goldfish and its Systematic Culture with a View to Profit. A Practical Treatise on the Fish, Its Propagation, Enemies, Diseases, and Care of the Fish in Captivity, Together with Hints on the Construction of Ponds, etc.* (Cincinnati, Hugo Mulertt, 1883).

#### 4.1 The American Aquarium Pursuit

Although the craze for parlor aquaria started in England around 1850 with the work of P.H. Gosse (1810-1888), it did not become ubiquitous with parlor culture until it reached the United States two decades later. Drawing upon the principles of Gosse's writing as well as capitalizing on human interest in curiosities, P.T. Barnum's American Museum and Aquarium in New York became the first American public aquarium in 1841. The spectacle created a new demand for knowledge surrounding marine and aquatic life. This knowledge was transferred primarily by way of literature, as many of P.H. Gosses' and other authors' books enjoyed a resurgence in popularity.<sup>153</sup> All the while, numerous American scientists and New York publishers began releasing their own manuals. As the fashion for the aquatic bubbled in New York, interest spilled at varying rates into nearby cities including Brooklyn, Boston, and Washington D.C. By 1876, aquaria were featured at the United States Centennial Exhibition and nearly every major city in the country featured a permanent public aquarium—with one notable exception, Philadelphia.

Throughout the late nineteenth century, the aquarium industry remained a private enterprise in Philadelphia, but Cassel's business and his network of co-aquarists indicate that despite the lack of permanent public aquarium, the industry was not any less robust. In the absence of the public aquarium, the publications and exhibitions of the Philadelphia Aquarium Society shaped much of the local awareness of the theories of the balanced aquarium. As a result, public-amateur-aquarists, such as

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<sup>153</sup> Albert J. Klee, *The Toy Fish: A History of the Aquarium Hobby in America: The First Hundred Years*, (Pascoag, RI: Finley Aquatic Books, 2003), 25-45.

William T. Innes and George Cugley were the primary arbiters of Philadelphia's aquarium taste. In contrast to international professional aquarists such as Henry Butler and P.H. Gosse, the local public-amateur aquarists in Philadelphia prioritized the beauty and style of the fish over the natural-ness of the tank. For them the natural science element was a function of increasing the life span of a prize-winning fish, rather than the opportunity to contribute to the field of marine biology. As a result, their interpretation of the professional ideal was embodied by the promulgation of unique goldfish varieties and by the rustic style tank, both negotiations of the true balanced aquarium.

As a public-private hybrid, Philadelphia's aquarium community illustrates both the unifying factors and the individualistic nature of the relationship among the aquarist, their network, and their fish. Thus, the development of this particular aquarium industry embodies both the typical trajectory of the pursuit's movement across the United States, and yet in other ways is particularly unique. One specific result of this was that Philadelphia's understanding of the relationship between the aquarium and the fishbowl were not totally at odds with one another, and in many ways their proliferation of the pursuit embodied the best of both ideals. Moreover, the arc of the Philadelphia industry encompasses the full temporal period within which the aquarium pursuit dominated American popular culture and, in many ways, played a major role in the balanced aquarium fad's ultimate demise. The exploration of Philadelphia's figures and their fish, therefore, will not only highlight the human element of the aquarium composition, its central mechanism, but also the ways in which the aquarium element reshaped the human world.

## 4.2 Fair-Hill Terra Cotta and Aquarium Production

By 1877, Cassel had enjoyed reasonable success and had opened his showroom on Arch Street. The trade catalog he released the same year featured numerous forms of garden equipment, but also a healthy selection of aquaria and aquarium supplies.<sup>154</sup> Cassel retailed wholesale and individually Fair-Hill produced garden and aquarium wares as well as a small number of objects imported from New York's J.W. Fiske and J.L. Mott. Although both the garden and aquarium departments reflected popular contemporary styles ranging from the neo-classical to the Gothic revival, the rustic style was the primary stylistic source for Cassel's Fair-Hill Terra Cotta manufactured goods—over 40% of the form manufactured or retailed by Fair-Hill were identified as such.<sup>155</sup>

The rustic style was not unique to Cassel. Faux bois, false stumps, and sham logs had been popularized in English garden and landscape design during the mid-nineteenth century. Rustic design elements had previously been applied to both public and private aquaria in Europe as well, including Noel Humphrey's award winning rustic aquarium, and a grotto-inspired public aquarium in Washington D.C..<sup>156</sup>

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<sup>154</sup> Jacob C. Cassel, *Fair-Hill Terra Cotta Works* (Philadelphia: The Company, 1877), Printed Books and Periodical Collection, Winterthur Library, 56-58.

<sup>155</sup> For more on Cassel's material and stylistic choices see the previous chapter, 3.6 "The Frame."

<sup>156</sup> The first grotto-style public aquarium was in Berlin, Germany (1869). Noel Humphreys, *Ocean Gardens: The History of the Marine Aquarium and the Best Method Now Adopted for its Establishment and Preservation* (London: Sampson Low, 36, 1857), 35; Herman T. Wolf, *Goldfish Breeds and Other Aquarium Fishes, Their Care and Propagation; A Guide to Freshwater and Marine Aquaria, their Fauna, Flora, and*

However, Cassel seems to be the only major producer of these rustic aquarium designs on the American east coast. His competitors in the iron industry designed primarily in the styles of the fancy and the Renaissance and Gothic revivals.<sup>157</sup> As a result, his products represent an American perspective on the application of rustic design to the aquarium industry. Inspired by a taste for naturalism and a nostalgia for created conceptions of the American frontier, Cassel's products framed non-human living things – whether plants or fish – in an artificial naturalism deeply entangled in the shape of the Philadelphia Aquarium industry and nineteenth century American notions of self and nature.

The mechanisms which allowed Cassel's Fair-Hill Terra Cotta Works to operate both garden and aquarium departments were certainly not unique. Though carefully hidden, an exposed mold line on the underside of the pedestal of an extant Cassel-made Mulertt aquarium, bears the evidence of the object's creation. Like the great New York iron works of J.W. Fiske and J.L. Mott, Cassel likely broke into the aquarium industry because of the relationship between the products he was already creating and the materiality of aquaria. As is the case with iron, his terra cotta forms were created from molds of a particular shape, which could be used for any number of forms. In the case of the Mulertt Aquarium, Cassel used the same mold to create a

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*Management*, Unpublished Manuscript, ca. 1908, Collection 138, The Academy of Natural Sciences Philadelphia;  
Bernd Brunner, *The Ocean at Home: An Illustrated History of the Aquarium* (New York: Princeton Architectural Press, 2005), 110-113.

<sup>157</sup> J.L. Mott Iron Works, *Illustrated Catalog of Statuary, Fountains, Vases, Settees, etc., for Parks, Gardens, and Conservatories, Manufactured by the J.L. Mott Iron Works* (New York: E.D. Slater, 1875), New York Public Library Collection.

nearly identical flower vase (Fig. 4.1, 4.2). The Mulertt Vase was featured in the same 1877 trade catalog, but in the garden department section. It features the same half-moon shape constructed from stacked faux logs and faux log pedestal. It varied in that instead of glass viewing portals on either side, the space was filled with rustic style logs radiating outward from a central star. Otherwise, the products are identical.

In the case of the Mulertt Aquarium and Mulertt Vase, it is likely the design for the aquarium preceded the vase because the name of the design references the famous aquarist, Hugo Mulertt.<sup>158</sup> Overall, this reveals that Cassel's business interests resided particularly in the proliferation of rustic style and second in use. Cassel was making most of his products in the rustic style and applying it to both garden equipment and aquaria because the forms and molds were similar. Cassel likely started an Aquarium department because he could fill a demand for a particular set of products using the same skills and materials he had already cultivated, rather than a personal interest in the aquarium pursuit. Despite beginning as a florist and garden supplier, as the Aquarium society emerged in Philadelphia Cassel became more deeply entangled with aquarists, and his aquarium designs became the icon of the burgeoning Aquarium district.

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<sup>158</sup> However, it is crucial to point out that Cassel was also adapting flower pot design molds to aquaria. On page twelve of the catalog, he included a statement under the Square Panel Pot and Large Square Box, "Either Square Panel Pot or Large Square Box will be made into aquariums to order. We do this by cutting out the sides and inserting glass. Price of Aquarium, \$6 each." In this case, though the mold had been made for the flower pot first, the process was the same. A mold with a volume which was reasonable for either holding flowers or fish would create the frame with grooves inside the openings and either glass, or panels of other materials could be used to fill the openings.

Cassel, *Fair-Hill Terra Cotta Iron Works*, 12.

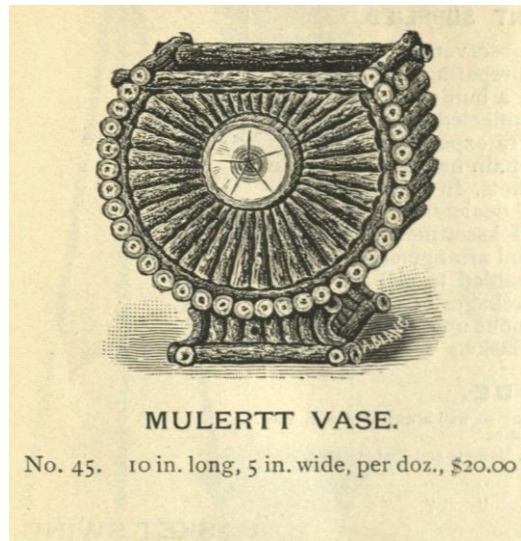


Figure 4.1 “Mulertt Vase,” in Jacob C. Cassel, *Fair-Hill Terra Cotta Works* (Philadelphia: The Company, 1877). Image Courtesy of the Winterthur Library: Collection of Printed Books and Periodicals.

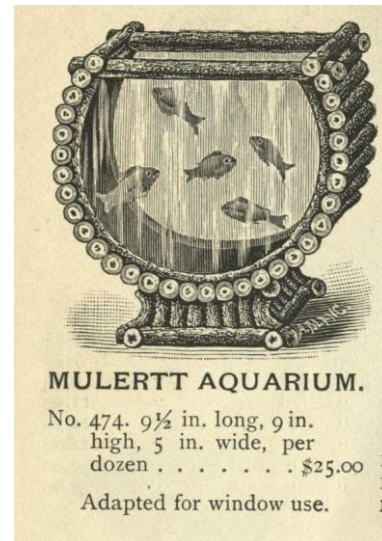


Figure 4.2 “Mulertt Aquarium,” in Jacob C. Cassel, *Fair-Hill Terra Cotta Works* (Philadelphia: The Company, 1877). Image Courtesy of the Winterthur Library: Collection of Printed Books and Periodicals.

### 4.3 Cassel, Cugley, Wolf, and Innes: Philadelphia’s Aquarium Community

As the aquarium craze spread across the United States, an Aquarium Society developed in nearly every American city. Aquarium Societies consisted of both professional and amateur aquarists, meaning some of the members worked for public aquaria or scientific institutions, while others kept their own private collections and worked in various other fields. In New York, Brooklyn, Cincinnati, and Chicago the members tended to be professionals. Their activities more often focused on scientific research and discussion. However, in Philadelphia, where no permanent public aquarium was present, the society was nearly entirely composed of public-amateur-

aquarists. These men sought to engage the larger public in the aquarium industry through regular exhibitions, loaning their own personal aquaria to them. They also were active in disseminating aquarium knowledge through regularly published written communication including newsletters, newspapers, and books. While the Philadelphia Aquarium Society may have made fewer contributions to national scholarly discussions surrounding marine biophysiological concerns, the networks of individuals involved, including Cassel, reshaped the direction of engagement with the natural sciences through aquatic life for Philadelphians of the early twentieth century and created a miniature aquarium district right in the heart of city center.

By 1910, a year after Cassel began referring to himself as an aquarist, a concentration of at least seven aquarium operations were located within a three block radius of Arch and 10th streets, including: Jacob C. Cassel, Fair-Hill Terra Cotta Works Showroom (Arch and 7th), William T. Innes, aquarium publisher (Cherry and 10th), Cugley and Mellon, fancy fish purveyor (Arch and 12th), and the Aquarium Society Headquarters (Arch and 13th). Thirty years earlier when Cassel had just opened his showroom, none of the others surrounded him. However, as the Philadelphia Aquarium Society developed, Cassel found himself positioned in a perfect geographic position to shape the market he had facilitated.

To best make sense of this tangled web of Philadelphians, it helps to begin underwater. On February 6, 1902, a portrait of one “barnacled Japanese or paradise goldfish” was recorded in pen and ink (Fig. 4.3).<sup>159</sup> He had been imported from Japan

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<sup>159</sup> Herman T. Wolf, *Goldfish Breeds and Other Aquarium Fishes, Their Care and Propagation; A Guide to Freshwater and Marine Aquaria, their Fauna, Flora, and Management*, Unpublished Manuscript, ca. 1908, Collection 138, The Academy of Natural Sciences Philadelphia.



by George Cugley of Philadelphia in 1897. The specimen was quite intriguing. His snout was long, his eyes tubular, and his body was like the Telescopic goldfish Cugley was well-known for importing.<sup>160</sup> He had large paired fins and a double tail. While his body was red and white, his tail and fins were outfitted in black and white. But he and the other paradise goldfish were unique: they were covered in wart-like growths which caused their scales to ruffle up unevenly, as if they were covered in barnacles.<sup>161</sup> Other paradise goldfish had been imported before, but they were exceedingly rare and challenging to bring home successfully. As both direct importation and breeding were continually unsuccessful, the last paradise goldfish on the eastern coast of the United States became a celebrity of sorts. Was he, and those which came before him a unique kind of fish, or were they a strange variation? His rarity attracted aquarists from around the city, across east coast, and as a result he interacted in some way or another with each of the main characters who participated in Philadelphia's aquarium story.

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<sup>160</sup> Telescopic goldfish are a particular variety of the goldfish which feature stout round bodies, and large eyes which bulge from either side of their head in either globular, cylindrical, or tubular shapes.

<sup>161</sup> Herman T. Wolf, *Goldfish Breeds and Other Aquarium Fishes, Their Care and Propagation; A Guide to Freshwater and Marine Aquaria, their Fauna, Flora, and Management* (Philadelphia, PA: Innes and Sons, 1908), 51-52.

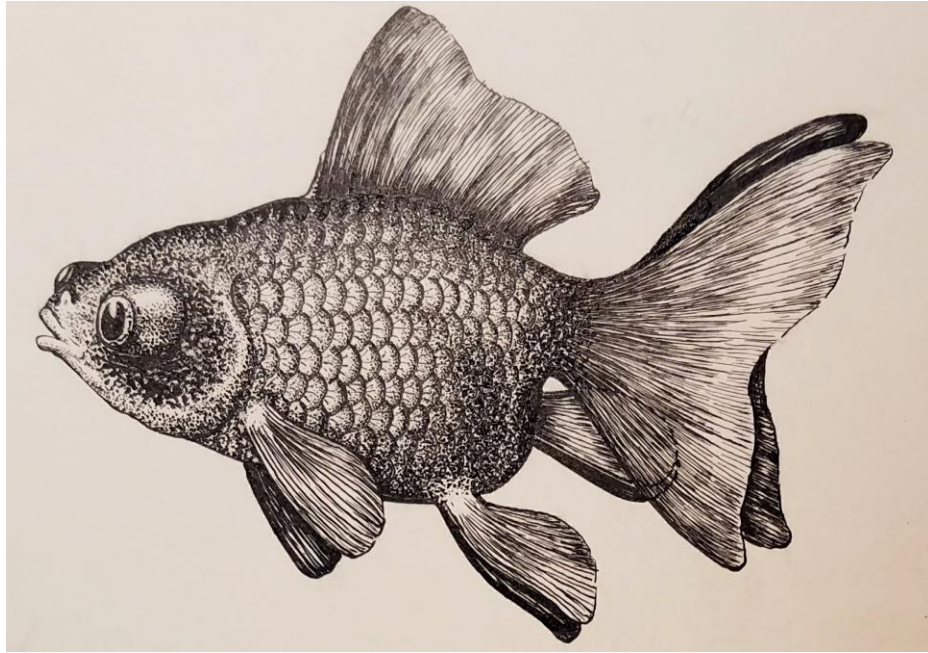


Figure 4.3 *George Cugley's Japanese Barnacled Paradise Golfish*, Herman T. Wolf, February 6, 1902. Pen and ink drawing. Collection of the Academy of Natural Sciences, Philadelphia, Collection 138. Photograph courtesy of author.

Cugley and his partner, George Mullen, operated a pet store first on Market, and later on Arch and 12th. Cugley and Mullen identified primarily as bird dealers but like Cassel, became increasingly involved in the fancy fish trade.<sup>162</sup> Over the course of the first decade of the twentieth century, Cugley and Mullen advertised their Telescopic varieties and fancy aquaria in nearly every issue of the *Philadelphia Inquirer*, touting the high quality and affordability of their aquarium products (Fig. 4.4). Perhaps most significantly, Cugley and Mullen become important arbiters of

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<sup>162</sup> Cugley and Mullen often advertised multiple times within the same issue and even on the same page. Their advertisements each focused on separate aspects of their business from their aquarium imports, to their exotic birds, to their other pet supplies.

taste, coining particular varieties of Philadelphia fish. Cugley, himself, was well-known for breeding his Telescopes with Japanese fringetails, resulting in a fish with a short and stocky body and a blocky, but beautifully elegant tail.<sup>163</sup> This shape, not totally unlike that of the lost paradise goldfish, became known exclusively as the Philly veil-tail—a brand new variety. However, its emergence as a variety, and a popular one at that, was owed to the prevalence of fancy goldfish competitions and public-amateur exhibitions at the Aquarium Society in Philadelphia.

Over the first decades of the twentieth century, fancy goldfish competitions became increasingly popular on the east coast of the United States, particularly in Philadelphia. Just as at a county fair, goldfish were judged and awarded an overall score based on the quality of their body, eye, head, fin, and tail shapes (Fig. 4.5).<sup>164</sup> It was out of these competitions that regional varieties and shapes of goldfish developed. Cash prizes and ribbons were awarded to fish which scored the highest, adding an additional financial element to the pursuit. But judging committees quickly realized there was more to goldfish aesthetic than just special variety and specimen quality. The result was an intriguing, yet problematic development of regional style goldfish, such as the Philly veil-tail, which aquarists attributed to breeders' artistic and cultural predispositions.

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<sup>163</sup> Herman T. Wolf, *Goldfish Breeds and Other Aquarium Fishes, Their Care and Propagation; A Guide to Freshwater and Marine Aquaria, their Fauna, Flora, and Management* (Philadelphia, PA: Innes and Sons, 1908), 52-62; Innes, *Goldfish Varieties*, 41-43.

<sup>164</sup> Innes, *Goldfish Varieties*, 40-46.

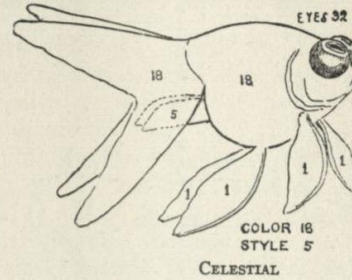
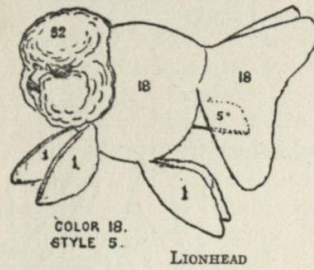
FISH  
**"GOLDFISH"**  
FROM  
**JAPAN**

An out of the ordinary exhibition of imported Fantails, Telescopes, Comets, Nymphs and Snails. Wild and game fish and other valuable specimens, the inspection of which will alone make your visit worth while.

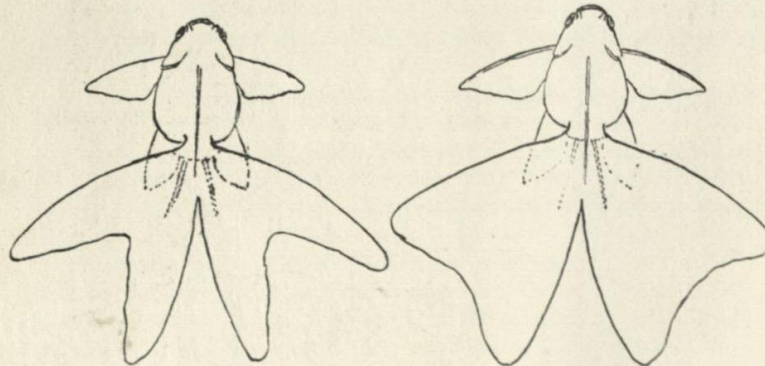
**\$1.00 to \$25.00**

**Cugley & Mullen Co.** 1237 Market St.  
Aquariums made and filled to order.

Figure 4.4 Advertisement, Cugley and Mullen, 1913. *The Philadelphia Inquirer*, Sunday, November 30, 1913. Accessed online, March 2018 at: [newspapers.com](http://newspapers.com).



	Body	Tail	Dorsal	Fins	Color	Double Anals	Style	Eyes	
Telescopes .....	18	18	14	4	18	5	5	18	100
Japs .....	24	26	18	4	18	5	5		100
Nymphs .....	25	27	20	5	18		5		100
Comets .....	20	32	20	5	18		5		100
Telescope Nymphs.....	19	19	16	5	18		5	18	100
Celestials .....	18	18		4	18	5	5	32	100
Shubunkins .....	10	10	10	5	60		5		100
Lionheads.....	18	18		4	18	5	5	32	100
Orandas .....	18	18	14	4	18	5	5	18	100



The above two illustrations show the two types of tails. At the left the "Swallow-tail", "Ribbontail" or "Cut-out-tail;" the right the "Veiltail" or "Broadtail." All varieties of the fancy goldfish may be subdivided into these two classes for purposes of competition, but it is a step of doubtful wisdom, for in many cases it is impossible for the judges to decide even to their own satisfaction in which class a fish belongs, much less to the satisfaction of the contestants.

Figure 4.5 Goldfish Judging Criteria in William T. Innes. *Goldfish Varieties and Tropical Fishes* (Philadelphia, PA: Innes Publishing, 1916) Private Collection. Image Courtesy of the author.

In *Goldfish Varieties*, Innes describes the depth to which arcane human cultural stereo-types shaped the physicality of the goldfish and the reception of new varieties:

When it is borne in mind what a considerable period of time must have been necessary to bring about these strange breeds [of goldfish], it is not surprising that racial ideas and characteristics should, to a certain degree, be expressed in them. The telescope gold fish was originated in China and undoubtedly bears a resemblance to Chinese art. It has a sort of beautiful ugliness, a deliberate grotesqueness, intended first to shock and then excite curiosity. The wonderful range of colors, too, suggests the art of the Chinese – that race which continues to-day to lead the world in the clever use of color. The Japanese Fringetail Goldfish is another expression of national art. It is the very embodiment of that aesthetic elegance and grace so well understood by the Japanese people. America has not been without its logical contribution. Here in this vast melting pot it is our desire to bring forth combinations of the best from the old worlds, to which is added a touch of individuality of our own.<sup>165</sup>

For Innes, if it was true that cultural background shaped preferred fish variations, it would mean that breeders were artists both in their exhibition of fish and the individual fish's visual qualities. However, these conceptions were deeply problematic for two major reasons. First, they encouraged breeders to risk fish health and well-being to achieve certain artistically-inspired designs. As a result, telescopic varieties of goldfish were bred so round that they could no longer swim forward, and fringe tails were bred with such long fins that their bodies had to withstand great pressure just to hold themselves upright.<sup>166</sup> Second, these "inherent artistic predispositions" promulgated a sense of racial exoticism and otherization among the

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<sup>165</sup> Ibid., 23-24.

<sup>166</sup> Ibid., 150-152.

people who managed these fish. This allowed a style canon or hierarchy to develop which exalted or condemned breeders based on their ethnic background that mimicked the contemporaneous discussions regarding rationalized colonialism. This imperial rhetoric continued as prize-winning fish, considered exemplary for their type and regional variety, earned the title “king” or “queen.”

The sheer financial investment engrossed in these animals and their display, contributed to a desire to maintain their health. Breeders and fancy fish aquarists found the principles of the balanced aquarium crucial to the maintenance of their little kings’ and queens’ livelihoods. As a result, Hugo Mulertt, a celebrated fancy fish breeder working in Cincinnati from the late 1870’s until the early 1900’s, became an increasingly popular presence in the Philadelphia Aquarium scene at the end of the nineteenth century. His goldfish had won numerous awards at both the Centennial exhibition and the Philadelphia Aquarium Society fancy goldfish competitions.<sup>167</sup>

In Mulertt’s writing, he continually references the principles of the balanced aquarium by suggesting goldfish were best maintained in a full ecosystem including vegetal and faunal elements. By mimicking their natural environment, the goldfish would have adequate access to oxygen, food, and shelter. Thus, they were more likely to remain in good health. The only difference between Mulertt’s aquarium theory and

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<sup>167</sup> Herman T. Wolf, *Goldfish Breeds and Other Aquarium Fishes, Their Care and Propagation; A Guide to Freshwater and Marine Aquaria, their Fauna, Flora, and Management*, Unpublished Manuscript, ca. 1908, Collection 138, The Academy of Natural Sciences Philadelphia.

the standard aquarium principles was that goldfish were to be the pinnacle of the food chain as to not risk their well-being.<sup>168</sup>

However, the depth of financial investment and the exaltation within which these fish were held, is perhaps best embodied by a fairly unique form of Philadelphia object: goldfish portraits. At the turn of the century Philadelphia aquarist, Herman T. Wolf, completed a manuscript of pen and ink portraits of prize-winning fish. Three decades later, fellow Philadelphia aquarist, William T. Innes, continued the same practice by pioneering fish portrait photography.<sup>169</sup> The exact reasons for creating said portraits certainly ranged by portraitist and breeder, but they generally reflected the pride and sense of accomplishment held by owners. For example, in the 1902 pen and ink portrait of the last paradise goldfish, Wolf drew the specimen in order to record its likeness in perpetuity. Wolf claims to have first drawn the paradise goldfish out of interest for the unique looking fish and to have acquired the knowledge of its variety to write the text later. Others, such as his sketch of the white male fringe tail were recorded by Wolf for alternative reasons (Fig. 4.5). As the Columbian exhibition winner, the fish was considered a particularly perfect specimen of its kind. Its image ought to be saved in perpetuity as it most accurately represents the ideal form of its

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<sup>168</sup> Hugo Mulertt, *The Goldfish and its Systematic Culture with a View to Profit. A Practical Treatise on the Fish, Its Propagation, Enemies, Diseases, and Care of the Fish in Captivity, Together with Hints on the Construction of Ponds, etc.* (Cincinnati, Hugo Mulertt, 1883), 5-13.

<sup>169</sup> Innes, *Goldfish Varieties*, 161-165; Herman T. Wolf, *Goldfish Breeds and Other Aquarium Fishes, Their Care and Propagation; A Guide to Freshwater and Marine Aquaria, their Fauna, Flora, and Management*, Unpublished Manuscript, ca. 1908, Collection 138, The Academy of Natural Sciences Philadelphia.



particular variation.<sup>170</sup> However, despite the incredibly meticulous and beautiful pen and ink portraits of fish denoting varieties both common and uncommon in their ideal form for budding aquarists, Wolf could not manage to get his work published; that is, until he brought the book of illustrations and accompanying text to William T. Innes in Philadelphia.

Innes was born in Philadelphia in 1874, graduated from the Friends' Central School, and joined his father's publishing company in 1895.<sup>171</sup> But later in his life Innes, who became known as one of the most prolific aquarists of his time, shared the unexpected root for his passion. Innes' initial run-in with Philadelphia's aquarium community (established in 1897) occurred when Herman T. Wolf approached Innes with his manuscript for *Goldfish Breeds*.<sup>172</sup> Wolf had been unsuccessful with other publishers, but Innes recalled being intrigued by Wolf's brilliant ink drawings, perhaps even that of our celebrity paradise goldfish, and he became entranced with the prospects of owning an aquarium of his own. Innes published the manuscript and joined Wolf in the Aquarium Society. Still a publisher by trade, Innes became the dedicated publisher for the Aquarium Society, putting together its seasonal newsletter as well as various aquarium books and manuals—including several editions of his

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<sup>170</sup> Herman T. Wolf, *Goldfish Breeds and Other Aquarium Fishes, Their Care and Propagation; A Guide to Freshwater and Marine Aquaria, their Fauna, Flora, and Management*, Unpublished Manuscript, ca. 1908, Collection 138, The Academy of Natural Sciences Philadelphia.

<sup>171</sup> William T. Innes Papers, Collection of the American Philosophical Society, Philadelphia, PA.

<sup>172</sup> William T. Innes to Mrs. Lorde, Correspondence. ca. 1950, Collection 2010.29, Collection of the Academy of Natural Sciences Philadelphia.

own. All the while, Innes pioneered fish photography, invented his own tanks, and established the best methodologies to breed award winning fish.<sup>173</sup> By the time Innes Publishing became an aquarium-focused publishing company in 1912, Innes had moved just a few blocks down from the Aquarium Society offices on Arch Street and Innes Publishing became the hub for Philadelphians and their fish.

While Innes partook in fancy goldfish breeding competitions alongside famed aquarists, George Cugley, Hugo Mulertt, and Herman Wolf, he also was committed to sharing his fish and his passion with the public. The newsletters and other works Innes published attempted to interest wide audiences in the aquarium pursuit. His printed materials ranged in price and offered content for a variety of interest levels. He ran everything from manuals on balanced aquarium theory and basic fish types for beginners to complex articles considering the deeper implications of goldfish in the household, musings on cures for peculiar fish ailments, instructions for establishing a successful breeding center, and more. To stay engaged with the latest discussions in aquarium management, Innes organized inter-publishing circles with other aquarium societies across the country including those filled with professional aquarists such as the New York and Chicago groups.<sup>174</sup> For the broad public, Innes held public exhibitions and competitions featuring public-amateur aquarist's compositions at Horticultural Hall in Philadelphia and encouraged other amateur aquarists to show

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<sup>173</sup> The Aquarium Society of Philadelphia, *The Aquarium*, (Philadelphia, PA: Innes Publishing, 1912), Collection 2010.29, Collection of the Academy of Natural Sciences Philadelphia.

<sup>174</sup> The Aquarium Society of Philadelphia, *The Aquarium*, (Philadelphia, PA: Innes Publishing, 1912), Collection 2010.29, Collection of the Academy of Natural Sciences Philadelphia.

their fish to a wider public—outside of just elite competitions. His work illustrates that his focus was not on professionalism, as was the case with Aquarium Societies in New York and Chicago, but in encouraging the Philadelphia Aquarium Society to be accessible. As a result, Innes sat at the center of two very different but overlapping aquarium community circles: local, public-amateur aquarists and professional aquarists on the national scene. Meanwhile, he also created and promulgated the relationship between the public-aquarists, and at-home-aquarists living in Philadelphia. His more prolific works attempted to draw all three groups together.



Figure 4.6 *Franklyn Barrett's Scaled Fringetail, Columbian World's Fair Prize Fish*, Herman T. Wolf, February 6, 1902. Pen and ink drawing. Collection of the Academy of Natural Sciences, Philadelphia, Collection 138. Photograph courtesy of author.

Perhaps most importantly, Innes curated the shape of the industry in Philadelphia by advertising local aquarium providers and dealers; including them as nearby, trusted sources for readers to reference. On the other hand, he worked to expand Philadelphia's supplier network by cross-advertising dealers and societies as they erupted on the mid-western and southern landscapes in Chicago, Milwaukee, Detroit, and even New Orleans.<sup>175</sup> But among his favorite to advocate for was Jacob C. Cassel, Fair-Hill Terra Cotta, Arch Street, Philadelphia.

Over the course of Cassel's lifetime, he continued to operate the terra-cotta works and his show room at 7<sup>th</sup> and Arch. Innes' support was crucial for Cassel as Innes and the other Aquarium Society members dictated Philadelphia's popular understanding of aquaria. Without a public aquarium, the publications and exhibitions of the Aquarium Society seemed to have shaped the local awareness of the balanced aquarium, whether through their texts or through the availability of hybridized products sold by local aquarium dealers.

In Philadelphia, figures such as Cugley and Innes followed the path of Mulertt, prioritizing the beauty and style of the fish as an embodiment of one's successful connection to the natural world. Although they frequently discussed the science of the balanced ecosystem, for them the natural science element was more of a function of increasing the life span of a prize-winning fish, rather than the opportunity to discover

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<sup>175</sup> The Aquarium Society of Philadelphia, *The Aquarium*, (Philadelphia, PA: Innes Publishing, 1912), Collection 2010.29, Academy of Natural Sciences Philadelphia; The Aquarium Society of Philadelphia, *The Aquarium*, (Philadelphia, PA: Innes Publishing, 1913), Collection 2010.29, Academy of Natural Sciences Philadelphia; The Aquarium Society of Philadelphia, *The Aquarium*, (Philadelphia, PA: Innes Publishing, 1916), Collection 2010.29, Academy of Natural Sciences Philadelphia.

new species. Thus, the beauty of the enclosure was crucial for Philadelphians as it framed the exquisite, carefully bred creatures within.<sup>176</sup> So what did Cassel's aquaria look like? And how did they reflect Philadelphia's fancy fish craze?

#### **4.4 Jacob Cassel and the Mulertt Aquarium**

A final analysis of the Mulertt Aquarium, designed and retailed by Cassel's Fair-Hill Terra Cotta illustrates the unique circumstances under which the Philadelphian interpretation of the aquarium pursuit arose and embodies the ways in which Cassel engaged with the network of Philadelphian aquarists. The Mulertt aquarium is composed of faux bois logs covered in painted moss and stacked in a half-moon shape to form the frame of the aquarium and the rectangular pedestal (Fig. 4.7). Flat, semi-circular, glass viewing portals on either side allow the viewer to peer into the watery world inside. Meanwhile, the faux-stacked logs occupy the two curvilinear sides. These prevented obscured viewing as well as additional unwanted light sources from encouraging algal growth along the tank walls. Overall, the tank could hold approximately 1.5 gallons of water, but because of its semi-circular shape, the mouth of the aquarium is the widest area of water, whilst the deepest section contains the least surface area. Materially, the frame of the Mulertt aquarium was not composed of iron or zinc, as was most common. Instead it was a refined, earthenware ceramic. Rather than cut, folded and soldered, like the metals, the earthenware was poured into the Mulertt design mold, dried, fired and painted.

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<sup>176</sup> Innes, *Goldfish Varieties*, 20-27.

All of these aspects of the Mulertt aquarium suggest the interpretative nature of the form. In many ways the aquarium adheres to contemporary aquarists' definitions of the parlor aquarium laid out in the previous chapter, and yet in others it retains many of the characteristics of the fish bowl. For example, the two flat, glass viewing portals certainly suggest an interest in creating a visually undisrupted view of the inhabitants inside. Additionally, the non-translucent quality of the two curvilinear sides protects the inhabitants inside from receiving too much light, and thus also algae overgrowth. These are clear suggestion of Cassel's knowledge of contemporaneous natural science philosophy and aquarium design. However, the size and shape raise concerns. A 1.5-gallon tank could not physically hold the sort of well-maintained ecosystem definitive of an aquarium. Moreover, the limited volume is exasperated by the semi-circular shape which allows for little if any, flat bottom surface area for benthic organisms to crawl or for plants to take root. The Mulertt Aquarium did not follow Gosse's suggested size, shape, or material. Instead, it embodies a particular form of interpretation of the balanced aquarium formed in Philadelphia.



Figure 4.7A Mulertt Aquarium, Jacob C. Cassel Fair-Hill Terra Cotta, Philadelphia, 1877-1919. Earthenware, glass, paint, gilding. 9 ½" x 9" x 5". Collection of the Chester County Historical Society. Image Courtesy of Chester County Historical Society, West Chester, PA.



Figure 4.7B Detail 1, Mulertt Aquarium, Jacob C. Cassel Fair-Hill Terra Cotta, Philadelphia, 1877-1919. Earthenware, glass, paint, gilding. 9 ½" x 9" x 5". Collection of the Chester County Historical Society. Image Courtesy of Chester County Historical Society, West Chester, PA.

Figure 4.7C Detail 2, Mulertt Aquarium, Jacob C. Cassel Fair-Hill Terra Cotta, Philadelphia, 1877-1919. Earthenware, glass, paint, gilding. 9 ½" x 9" x 5". Collection of the Chester County Historical Society. Image Courtesy of Chester County Historical Society, West Chester, PA.

To make sense of the aquarium, we must turn instead to its namesake and the human relationship its name references. In his writing, Mulerttt, celebrated fancy fish breeder, continually suggested a particular form for managing fancy goldfish in the home: a window aquarium with flat sides, featuring glass viewing portals, and two darkened sides. Mulertt, though a professional aquarist advocating for the upkeep of



homeostatic ecosystems within fish enclosures, did not believe in sacrificing the beauty of the frame for the management of the collection held inside. Unlike Gosse's simple, scientifically adequate shapes, or Strange's fiscally-friendly make-shift designs, Mulertt's aquaria were highly ornamental. His designs drew particularly on chinoiserie and rustic styles; although, the theoretical framework of his tanks were no less aquarium in nature.<sup>177</sup> In fact, he even regularly advertised Cassel's products, including the Mulertt and the "Stump Bell Jar and Stand" in his magazines and books.

Thus, by attaching Mulertt's name to the aquarium design, Cassel signaled to clients his engagement in the fancy goldfish community and the quality of the product. Although the Mulertt aquarium did not technically meet the standards of the stringent professional aquarists, it was still identified as such. It was clearly disparate in form, material, and style from the fish bowl or globe, but it was easier to manage in the home than the theoretical designs of the professional aquarists. Moreover, in terms of aesthetics it created exactly the kind of beautiful frame Mulertt suggested for enhancing an exquisite collection. As a result, the Mulertt aquarium as an extant object reflects the negotiation of the ideal and practical as discussed by Philadelphia aquarists in the late nineteenth century. With only temporary visits from professional aquarists and no professional public aquarium, the public and at-home-amateur-aquarists developed their own interpretations of the professional ideal. The goldfish and the rustic style tank, both negotiations of the true balanced aquarium, became the hallmarks of that interpretation. Just as Cassel's career trajectory from florist to aquarist mimicked the development of private-public hybrid aquarium industry in

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<sup>177</sup> Hugo Mulertt, *The Aquarium* (Brooklyn, NY: Aquarium Society of Brooklyn, 1893), 165-170.

Philadelphia, the Mulertt aquarium, one of Cassel's best-known products for over thirty years, reflected an unchanging and perhaps unique Philadelphian interest in goldfish as beautiful elements and well-loved pets, over scientific collections. Both in name and physicality, it embodied the needs of the goldfish aquarium fancier – a beautifully designed space to view prize winning goldfish unhindered by distortion from algal growth, yet still maintained in the theoretical homeostatic aquarium balance.

#### **4.5 Conclusion: The Aquarium Element and the Aquarist**

As aquarium societies continued to develop around the country, William T. Innes remained at the center of both the national and local circle, imparting Philadelphia's unique interests on the much larger scope of the aquarium pursuit in America. In December of 1912 Innes took over the publishing of *The Aquarium*, the national newsletter co-published with the eight American aquarium societies.<sup>178</sup> At this moment, Philadelphia found itself in the center of eight distinct aquarium societies, each full of different personalities. But gathering a wide range of material to complete a regular newsletter proved more challenging and costly than advertisements and subscriptions could account for.<sup>179</sup> As a result, the last issue of *The Aquarium* was

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<sup>178</sup> The eight American aquarium societies were New York, Brooklyn, Philadelphia, Chicago, Milwaukee, Boston, Minneapolis, and San Francisco.

<sup>179</sup> The shape of the aquarium society changed greatly in the course of the 1908-1920 due to the introduction of various new members as well as a relatively amicable schism between goldfish fanciers and aquarists. The changing nature of the Philadelphia society during this period and its relationship to both local and national discussions would prove to be a rich direction for future study. Klee, *The Toy Fish*, 100-101.

published in February 1914. After the collapse of the newsletter, Innes attempted to reshape the cooperative program into a national association of aquarium clubs, but his effort failed. At this point, the aquarium pursuit certainly did not disappear, but it did change shape. Aquarium societies continued to erupt across the country from Washington D.C. to Lancaster, Pennsylvania to Newark, New Jersey.<sup>180</sup> However, the efforts of these societies focused increasingly on prolific breeding. Meanwhile, popular interest for at-home-aquarists turned back to the sleek lines and easy care of the fish bowl. A schism had developed, drawing the public-amateurs of the pursuit, such as those leading the society in Philadelphia, closer to the professionals and away from the amateurs who managed their tanks at home. As the dialogue between the three groups collapsed, so did the pursuit in American popular culture.

Though the aquarium fad quickly spread from England to New York and subsequently across the country, it proliferated differently in Philadelphia. It followed much the same process of development, but rather than a focus on specimen collection, or educational didactic, Philadelphia became an American center for fancy goldfish breeding. Though a lack of professional aquarists in the city resulted in an Aquarium Society of primarily amateurs, their interest in developing public audiences, and the approachable, maneuverable, nature of a membership with a broad range of skill sets from breeding to publishing, allowed the Philadelphia Aquarium Society to become one the most visible and effectual city aquarium societies. In the absence of a public aquarium, the Aquarium Society exhibitions and goldfish competitions became a focal point for Philadelphian relationships with the aquatic natural world, as the

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<sup>180</sup> Klee, *The Toy Fish*, 115.

private, parlor aquarium was quite literally brought outside the home and shown side-by-side with other aquarium collections. The presence of these animals and the objects which held them reshaped a community of individuals and resulted in the founding of an aquarium district in the center of Philadelphia.

Yet, the shape of Philadelphia's aquarium society illustrates the broader and far more applicable ways in which networks of people operated to formulate each and every aquarium. The object itself had a social life.<sup>181</sup> Whether in New York, London, or Philadelphia, it required a network of people who assigned value to the work over and over as they continued to re-craft and re-shape its composition. To exist, an aquarium needed a supplier for each of its elements. It relied on a fish breeder, a tank retailer, and an aquatic plant cultivator. The successful aquarium relied on publishing networks and the movement of knowledge, particularly through text-based sources. These human networks could interpret and reinterpret the same recipe to achieve vastly different results and discussions. But when these networks of people failed, so did the pursuit. Then again, without the aquarium element in their lives, the networks of people, the community, would not have developed either.

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<sup>181</sup> Arjun Appadurai, "Commodities and the Politics of Value," in Susan Pearce, ed. *Interpreting Objects and Collections* (London: Routledge, 1994), 76-91.

## Chapter 5

### CONCLUSION: THE AQUARIUM ELEMENT AND THE MUSEUM

Of course, the aquarium pursuit has never truly disappeared. The maintenance of aquaria and fish bowls remains as pertinent to our own lives as it did to those in the past. That familiarity, and yet the distance from how the pursuit was practiced, is exactly what draws people to these objects today—despite their empty frames. Recall the Winterthur aquarium with its Atlantean pavilion, its reflective mirrors on copper screens, and its glorious mansard roofed building with cupola, dormers, and clocks (Figs. 1.1, A1, A2). The very same aquarium served as the impetus for this project and a host of others because of its form. Its obvious aquarium-ness posed a host of questions: how was it constructed? What did it hold? How, if it was in regular contact with water is it in such good condition? Indeed, the Winterthur Museum's very own parlor aquarium has inspired its own network of people that continue to discuss, shape, interpret, and reinterpret its meaning for a new generation.

The Winterthur aquarium came to the museum by purchase of Henry Francis du Pont from premier glass dealer, George McKearin in 1950.<sup>182</sup> McKearin claimed to have happened across the aquarium in New Jersey where it sat allegedly untouched.

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<sup>182</sup> Henry Francis du Pont, Correspondence with George McKearin, July 31, 1948, Winterthur Museum Correspondence File, McKearin 1941-1949, Collection of the Winterthur Museum, Garden and Library.

With Mr. du Pont's approval, he packed and shipped the aquarium over to Winterthur from his shop in upstate New York. When it arrived, Mr. du Pont wrote back to McKearin asking where the little fish flag that sat atop the cupola had gone. Recalling no such flag, Mr. McKearin insisted all the pieces had been sent to du Pont.<sup>183</sup> Despite the minor disagreement, Mr. du Pont agreed to pay \$75, the aquarium joined the collection at Winterthur, and no fish flag ever arrived.

The object was later filled with rock, pebbles and faux fish. It was electrified, so that the windows would glow, and the small hinged door was propped open. The idea was to recreate the warmth and the liveliness the composition once embodied. But even without the fish, the aquarium had already served its purpose at Winterthur. It had already done what aquaria were made to do. Just as the form had in the past, the aquarium at Winterthur united two collectors, and it sparked discussion. And now, this little aquarium, sat amongst a myriad of objects in the premier collection of American decorative arts.

But what drew Mr. du Pont to such an object? What brought a late nineteenth century aquarium to such a notable collection of pre-industrial American craft? Perhaps it was the level of skilled craftsmanship, plucked from a period characterized by machine work and so-called unskilled labor. Maybe Mr. du Pont was entranced by it because of his deep love of life collections—illustrated by the bird and plant specimen collections he kept as a child, or the immense garden of carefully cultivated, widely curated botanical specimens surrounding the museum. Perhaps both. However,

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<sup>183</sup> Henry Francis du Pont, Correspondence with George McKearin, August 20, 1948, Winterthur Museum Correspondence File, McKearin 1941-1949, Collection of the Winterthur Museum.

what is most interesting about the Winterthur aquarium is not why it ended up in a decorative arts collection in the first place but is what would be discovered sixty-five years later.

A collaboration between the author, a Winterthur material culture student, and Haddon Dine, a Winterthur and University of Delaware conservation student, yielded an interpretation of the Winterthur aquarium which could not have been reached without combining both curatorial and conservation-based skill sets. Based on a series of tests performed and interpreted by both students, it appears the Winterthur aquarium likely never held water at all. An examination of the object under ultra violet light indicated that while there was an oil-based sealant or varnish on the bottom on the octagonal tank and on the exterior of the pavilion, there is no evidence of varnish protection on the interior of the pavilion.<sup>184</sup> A series of pencil inscriptions and tin tabs on the bottom of the tank used to set the architectural structure into place indicate the aquarium has been in its current composition for much of its lifespan, if not all of it. Yet, had the aquarium had been filled with water with the pavilion in place for any substantial amount of time, there would likely be obvious areas of corrosion or rust on the galvanized and tinned sheet iron structure.<sup>185</sup>

In contrast, X-ray Fluoresce (XRF) and Fourier-transform infrared (FTIR) analyses revealed that the sealant in the joints between the glass viewing portals and the metal rails is composed of drying oil, barium sulfate, and lead. This is largely

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<sup>184</sup> Haddon Dine, *Technical Examination of a Nineteenth Century Aquarium (1965.2192 A, B)*, unpublished technical analysis performed for Winterthur/University of Delaware Program in Art Conservation, December-May 2018, 18.

<sup>185</sup> *Ibid.*, 18-31.

consistent with the aquarium and window putty recipes suggested by professional aquarists such as Gosse.<sup>186</sup> This suggests the tank, without the architectural structure, could have held water. Furthermore, there is an intentional vocabulary of the aquarium within both the aesthetic and material choices. In addition to its clearly “aquarium-like” shape with eight pane glass viewing portals and metal rails, the creator clearly intended to reference the idea of the aquarium through the pheasants at the rail joins in place of potted plant shelves (Fig. 3.17), the mirrors pointed-down as if reflecting something below (Fig. 2.8), and the rising, central architectural piece in the place of the traditional, rising shaft of the fountain (Fig. 3.16). Moreover, the maker did include certain scientifically accurate aspects of the “balanced aquarium.” The octagonal tank features a wide mouth, as well as a flat, water-resistant bottom. Thus, it does seem the creator of this object was clearly aware of and initially referencing the objecthood of the aquarium pursuit in their work—even if they intended it to display their skills, rather than display an aquatic life collection.

Deducing from the degree of expertise in metal materiality and metal working technique exhibited by the Winterthur aquarium, the piece was likely created by someone with a strong skill set in that field. The intention was likely to display that skill, rather than hold aquatic specimens. The water-proofing on some of the tank features suggest it is possible that the creator may have purchased the octagonal tank from an aquarium dealer, and then embellished the design with the high-end metal work: the pewter pheasants, the tin and copper punches, pierces, and swirls. This maker would have also constructed the architectural structure and all of its visual

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<sup>186</sup> Ibid., 18-31.



elements to draw the composition together. They then would have modified the bottom of the tank by soldering tin tabs fasten their architectural structure in place and likely would have left the pencil inscriptions when working out the arithmetic of scale and orientation of the structure.<sup>187</sup> But they would not have intended to fill the tank, and thus would never have needed to water-proof the architectural structure.

If this was the case, at what point was this object an aquarium? And at what point did it lose its status as one? Was it when the creator of the Winterthur aquarium as we know it conceptualized it as masterpiece of their own handiwork? Was it when the architectural structure which would not withstand contact with water was placed inside? Was it after months, years, decades of not holding water, or plants, or fish that this object was stripped of its aquarium status? Is an empty fish tank no longer a fish tank at all? Or is an object simply always what it has been previously named?

This discovery raises a series of entirely new questions which plague us in the study of this object, in the study of the aquarium pursuit, and in the broader entity of material culture. What defines the aquarium? Is it the shape of the frame, the physical object of pane glass and metal, in other words its visual form which allows us to call it

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<sup>187</sup> There are a range of other possibilities regarding how this aquarium may have come into existence. It may, for example, have been completely created by the sheet metal worker who constructed the architectural structure. There is also a possibility that the entire piece was purchased piecemeal and placed together. Finally, it is possible the pan, the tank, and the architectural structure were married later by an owner in the twentieth century, or by a later collector. However, the evidence as it currently stands suggests that either the architectural structure and tank were made for each other, or they were modified, so that they could be put together. Additionally, it seems that the evidence regarding the standardization with which the tank was built and the customization with which the structure was built suggests that the tank may have been purchased and embellished. The result was a product which looked like an aquarium but would not have intended to function as one.

such? Can an aquarium be missing all of its other elements? Can it be missing its sand, its water, its plants, and its animals? Or, is the aquarium truly shaped by the set of human/non-human relationships embodied by the effort to manage homeostatic balance within regardless of the shape the enclosure of the collection takes? Or perhaps the aquarium truly lies in the set of human relationships, the discussion forums, and collecting initiatives it inspires? If the answer be the latter, the Winterthur aquarium has surely held up its end of the bargain.

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In “Setting the World in a Room,” Daniela Bleichmar reframes the ways in which we approach objects known to have resided in early modern cabinets of curiosity. In recognizing that the same object – say a mounted rhinoceros horn – could be interpreted as both natural and artificial, scientific and artistic, antique and exotic, she highlights the inherently “slipperiness” of these objects, their inherent categorical fluidity.<sup>188</sup> However, she challenges us to push beyond simply considering the complexity of categorization, to recognize that they are in fact all of these things, and yet also none of them. The object does not define itself, rather the viewer defines the object. And that viewer’s interpretation is affected by the space that surrounds the object and the way in which it is displayed. The viewer, past or present, allows the object to represent something for them. What is an aquarium, but a careful series of elements brought together in a miniature room, in a miniature world?

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<sup>188</sup> Daniela Bleichmar, “Seeing the World in a Room: Looking at Exotica in Early Modern Collections,” in Peter C. Mancall, and Daniela Bleichmar, eds. *Collecting Across Cultures: Material Exchanges in the Early Modern Atlantic World* (Philadelphia, PA: University of Philadelphia Press, 2011), 20-21.

The aquarium was carefully curated through an additive process in which each and every element was scrutinized to determine if it would assist in achieving the aquarist's vision. The aquarium was not meant, however, to be seen as separate elements, apart from one another: a frame with glass, misplaced statuettes, tattered curtains, or false fish. Because the aquarium does not actually exist without all of its many parts. In its full form it is a masterpiece, an artificially crafted construction of natural and artificial elements, both exotic and antique, both scientific and artistic.

This additive process and the resulting composition was interpreted widely by its audiences. Just like a cabinet, the aquarium “could signify differently according to multiple political, artistic, historical, religious, and sociological factors depending on who owned it, what that person made of it... who viewed it and the location.”<sup>189</sup> It did not submit to strict classification and as it moved, and even as its aquarist mused, the aquarium's meaning changed. In the public library the aquarium was a didactic learning piece. An aquarium kept by an at-home-aquarist with at least some of the artistic and living elements was enough to satisfy their inclusion in middle class, whilst the full composition remained out of most of their reach. In the showroom the aquarium was an artistic piece to be coveted, just as its goldfish were in the Philadelphia competitions. For some it embodied prevailing natural science theories of the day, for others it was a beautiful and interesting decoration, still for others, a precious pet. Regardless, in most cases it straddled all three worlds simultaneously as its aquarist continuously negotiated the practicalities with the ideals. In reality, it served as a wide range of cues for a wide range of people, but the aspect which held

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<sup>189</sup> Bleichmar, “Seeing the World in a Room,” 20-21.

it—and the cabinets of curiosity before it—together was that they embodied a temporal moment through the visual collection of all things considered wonderful.

Despite theorists' best attempts to carefully define the aquarium, in reality, they were interpreted so broadly and creatively that almost anything which held aquatic life could be called "an aquarium" even George Selden's bird cage, aquarium, fern shade, plant stand (Fig. 5.1). Because, at its root, the aquarium was an experience constructed by the aquarist, the viewer, and inevitably by the life which was contained inside. Just like the cabinets, the aquarium offered a series of narratives and stories.<sup>190</sup> And although the aquarist could guide the experience through his composition of the elements and his explanation, new stories continually unfolded before their eyes as the little world inside kept turning. It was an experience embodied by a sense of wonder and exploration, even in the face of anxiety and risk.

So how do museums pay homage to what the aquarium truly was? Without all of its parts it cannot be interpreted or utilized in the way it was intended. What do we do with the Winterthur aquarium, which may never have been an aquarium at all? We can continually work to rediscover what it may have looked like, we can realign the architectural structure as it was intended to sit, we can discover what colors the curtains may have been. But we can never reconstruct the relationships it embodied because the aquarium was not always about aqua-scaping, nor the connoisseurship of its frame. It wasn't even always about the fish inside. It was about experience. It was beautiful and messy, natural and imagined. It was precise but bound to be erroneous. It was practical and ideal. It was about exploration, imagination. It was about

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<sup>190</sup> Bleichmar, "Seeing the World in a Room," 30.

possibilities, even if some of those possibilities could be frightening or even risky. As we enter a new era of displaying these objects it helps to remember that interpreting them has always been complex and variable. But we ought to not give up on illustrating what the aquarium was about. We can revive the parlor, and its aquarium, a place for discussion, for laughter, for play. A place full of life.



Figure 5.1 Bird cage, Aquarium, Plant Stand, George B. Selden (American, 1846-1922), ca. 1880). Albumen silver print. 5 ¼ x 3 ½". Gift of Mrs. Louise Carey, Collection of the Eastman Museum, 1981.1856.0041. Image Courtesy of the George Eastman Museum.

Of course, in order to accomplish this we still have much more research to do on these unique objects, more stories to uncover, and more complicated discussions about balancing their material conservation with their innate embodiment of the cycle of life. In doing so, we must treat them as a full and complex grouping of objects. We must approach them with their own body of connoisseurship. While dazzling light displays and recreating assemblages may seem enticing, in terms of exhibiting these objects the right textual and visual prompts, time for observation, and a forum for asking questions, for debating, and for discussing is all we need to spark interest in the parlor aquarium once again. Perhaps moving forward we ought to ask each other to take one of the aquarium's greatest theorizers advice regarding the use of these objects, because perhaps we as curators, educators, and conservators are not necessarily at odds with one another in the pursuit of aquarium interpretation:

Everyone who loved nature could not help feeling attracted towards the lovely objects [parlor aquaria]... to a great extent this was in advance of the natural science of the time, and although it was the means of collecting a great deal of information relative to the habits of the invertebrate animals, it had to fall back until science came up with it. The enormous strides which natural science has made since the publication of 'Origin of Species' have necessitated large aquaria, where the new study of the embryology and larval conditions of the lower animals could be more easily followed. The fact that evolutionists and non-evolutionists have taken sides over zoological questions, renders it imperative that both shall observe more and theorize less.<sup>191</sup>

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<sup>191</sup> J.E. Taylor, *The Aquarium its Inhabitants, Structure, and Management* (London: D. Bogue, 1881), 1-2.

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**Appendix A**  
**WINTERTHUR AQUARIUM TERMINOLOGY GUIDES**



Figure A1 Guide to Terminology Used to Describe Section of the Winterthur Aquarium. Prepared by author.



Figure A2 Guide to Terminology Used to Describe Elements of the Winterthur Aquarium. Prepared by author.

**Appendix B**  
**IMAGE PERMISSIONS**

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Title The Age of Aquaria: The Aquarium Pursuit and Personal Fish-keeping, 1850-1920 Textbook \_\_\_\_\_ Trade Book \_\_\_\_\_  
Publisher University of Delaware Journal: Scholarly \_\_\_\_\_ OR profit/commercial \_\_\_\_\_  
Address Newark, DE Exhibit/Other (specify) Master's Thesis  
Print Run \_\_\_\_\_ Type of Rights: USA ☒ WORLD \_\_\_\_\_  
Image Size 1/2 page Image Placement interior  
Expected Date of Publication OR period of exhibition: April 2018 Duration of exhibit \_\_\_\_\_

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Date: 3/29/18

Approved:

Date: 3/30/2018

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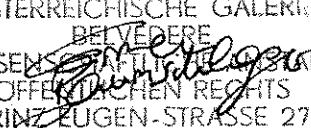
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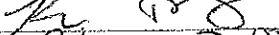
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 Author: Rebecca Duffy  
 Publisher: University of Delaware  
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 Proposed date of Publication: \_\_\_\_\_  
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Title of book: **Dawning of the Age of Aquaria: Parlor Aquaria and Fish-Keeping, 1850-1920**

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Address: 324 Hullihen Hall, University of Delaware, Newark, DE 19716

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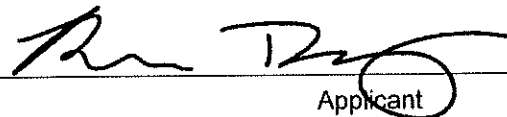
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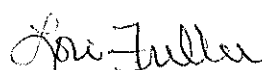
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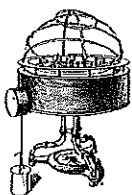
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Sara J. Schechner, Ph.D.  
*David P. Wheatland Curator*

February 26<sup>th</sup>, 2018

Rebecca Duffy

Dear Ms. Duffy,

Permission is hereby granted to you to use the following one (1) image.

Inv. # 1998-1-1013, Rendition # C500429, *Beaume and Specific Gravity Scale for Light Liquids*

The permission is for a one-time use your thesis with the working title "*The Age of Aquaria: Parlor Aquaria and Personal Fish-Keeping, 1850-1920*", with the expected publication date of April 6, 2018.


Please credit the images to the Collection of Historical Scientific Instruments, Harvard University. Thank you for using our images.

Sincerely yours,

A stylized, handwritten signature in black ink, appearing to read 'Sara M. Frankel'. The signature is fluid and cursive, with a large loop at the end.

Sara M. Frankel  
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sfrankel@fas.harvard.edu

Reply all


 Joan Bogart <joanbogart@yahoo.com>  
Sun 2/25, 9:59 PM  
Rebecca Duffy

Inbox

Rebecca,  
I am happy to allow you to use my images. I would love to read your thesis when it is published. Please let me know.  
Please refer to me as Joan Bogart Long Island NY [www.joanbogart.com](http://www.joanbogart.com)  
Joan

Sent from my iPad

\$

 Rebecca Duffy  
Sun 2/25, 9:53 PM

Dear Joan,

I hope all is well and you are enjoying your time in Florida. As I am wrapping up my thesis regarding 19th and early 20th century parlor aquaria at Winterthur, I find myself often coming back to your objects for reference. I was wondering if you would be willing to allow me to use the photographs on your website as graphics in my thesis? I would be happy to credit you however you may prefer.

In particular I am looking at:  
<http://joanbogart.com/garden-antiques1277>  
<http://joanbogart.com/garden-antiques2700>  
<http://joanbogart.com/victorian-decorations2227>  
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Please let me know.  
Thank you, as always, for all of your help,  
Rebecca Duffy



## Fish Tank/Aquarium by Fiske

Send Inquiry

This is a J W Fiske Cast Iron Fish tank or aquarium. It is in original as found condition. I have decided not to paint and restore it as the buyer may prefer to do it themselves.

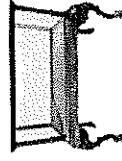
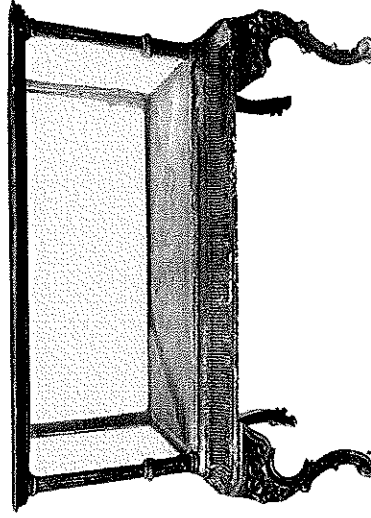
The base of the actual tank has 2 wholes, but those wholes cannot be accessed as there is a glass placed on top of them. I would think the wholes are original and for emptying water and possibly adding a pump to the fish tank. With the glass piece this cannot be done. This glass piece is cracked as shown. This larger Fiske rectangular aquarium model rarely appears in the market place.

The glass sides appear to be original and are in good condition, with a minor

imperfection the size of a penny near the top of one panel 38 in.

WIDTH: 45 in.

DEPTH: 22 in. (Item number: 1277)

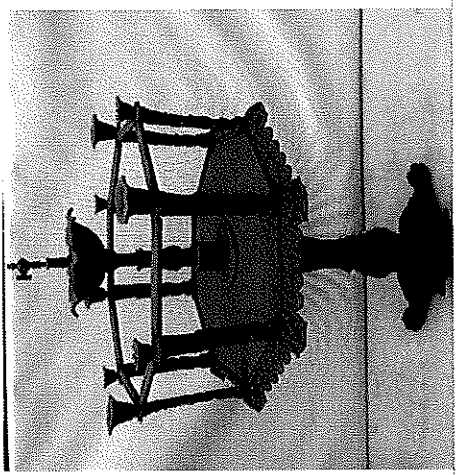


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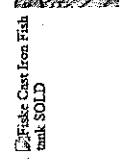
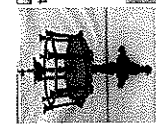
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- ANTIQUE LIGHTING DECORATIVE ARTS MORE INFORMATION CONTACT

### Fiske Cast Iron Fish tank SOLD

Send Inquiry



A Cast Iron Fish Tank by JW Fiske NY late 19th Century There are glass pieces that need to be installed or can be used as is for a terrarium (Item number: 2700)



Fiske Cast Iron Fish tank SOLD

Fiske Cast Iron Fish tank SOLD

Fiske Cast Iron Fish tank SOLD

Fiske Cast Iron Fish tank SOLD

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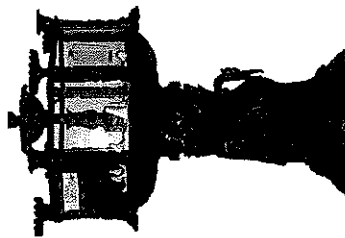
## Cast Iron Fiske Fish Tank— Sold

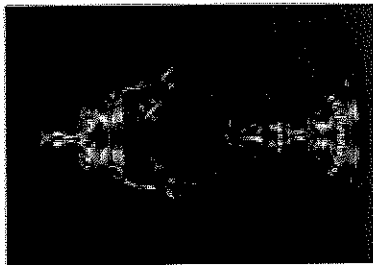
[Send Inquiry](#)

Pricing please inquire  
 Available: yes  
 Item Number: 647  
 Class: 1390

Victorian Cast Iron fish tank with detailed egypt on the base in the brackets. These are getting impossible to sign, especially since this one bears the JW FISKE Park Place label. The glass panes have been replaced.

Measurements: 25" wide, 49" tall  
 (Item number: 2227)





Quasi-Newton algorithms

[illegible]

2017-18-2018-19

The authors gratefully acknowledge the financial support of the National Science Foundation Grant DMR-8706927. The authors also thank Dr. J. H. W. Lam, University of Illinois at Chicago, for his helpful discussions during the course of this work.

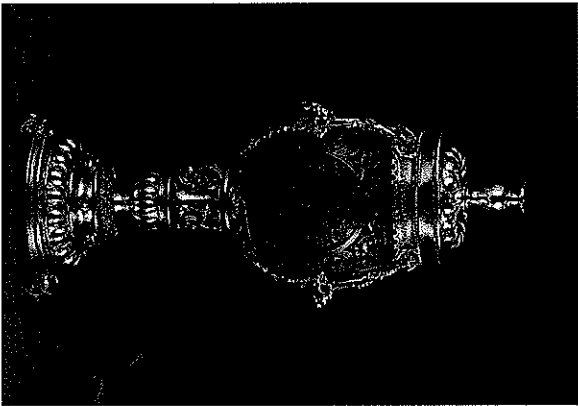
Figure 1. The effect of the concentration of the *Agrobacterium* strain on the transformation efficiency of *Agrobacterium* strain.

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[illegible]
$$E_{\alpha}^{\beta} = \frac{1}{\Gamma(\beta)} \int_0^{\alpha} (\alpha - \tau)^{\beta-1} E_{\alpha}^{\beta-1}(\tau) d\tau$$

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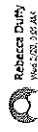


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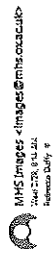


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Jiading Period (1796-1820)

1796-1820

Porcelain with overglaze enamel decoration; gilt wood pedestal

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## ITEM DATA

### CITE THIS ITEM

### TITLE

Kingyo] = [Goldfish]

### NAMES

Brinkley, F. (Frank) (1841-1912) (Former owner)

Kitagawa, Utamaro (1753?-1806) (Artist)

### COLLECTION

Japanese Color Woodcuts by Kitagawa Utamaro

Print series

Scenes of everyday life]

### DATES / ORIGIN

Date Created: ca. 1793-ca.1804

Publisher: Uemura Yohei



## LIBRARY LOCATIONS

The Miriam and Ira D. Wallach Division of Art, Prints and Photographs: Print Collection

Shelf locator: MEXG

## GENRES

Prints

## NOTES

Ownership: Frank Brinkley.

Content: According to Shugo Asano and Timothy Clark in The Passionate Art of Kitagawa Utamaro, un these five prints "There is no title, but since they all have yellow backgrounds, they all show one or two full-length figures and, stylistically, they all appear to date from about the same time; this probably means that they were intended as a series."

Content: Holdings checked in departmental copy of Shugo Asano and Timothy Clark, The Passionate art of Kitagawa Utamaro.

## PHYSICAL DESCRIPTION

Extent: 1 print ; 36.3 x 25 cm. (ôban)

## TYPE OF RESOURCE

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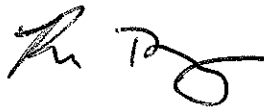
University Microfilms Inc.

Dear Representative,

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Innes, William T., *Goldfish Varieties and Tropical Fishes*. Philadelphia, PA: Innes Publishing, 1916.

Dr. Morse's Indian Root Pills Trade Card. New York and Pennsylvania. Ca. 1890. Polychrome lithographic print on paper.

A handwritten signature in black ink, appearing to read "Rebecca Duffy".

4/1/2018



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Date	1859	<input checked="" type="checkbox"/> Educational	<input type="checkbox"/> Textbook
Dimensions	9 1/8 x 13 3/4 in. (23.2 x 34.9 cm)	<input type="checkbox"/> Nonprofit	<input type="checkbox"/> Commercial
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Edition	n/a	<input type="checkbox"/> World Rights	<input type="checkbox"/> Other:
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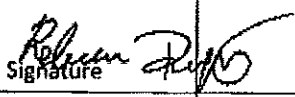
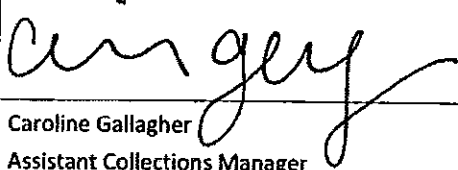
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Name and Title	Rebecca Duffy Lois F. McNeil Fellow in American Material Culture	Name and Title	Caroline Gallagher Assistant Collections Manager
Date	2/27/2018	Date	2/28/18

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Tax: \$0.00

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**Amount Due: \$45.00**

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Credit Card Type (Circle One):

VISA/MC/DISC/AMEX

Account Number: \_\_\_\_\_

Expiration Date: \_\_\_\_\_

Amount to be charged: \_\_\_\_\_

Authorized Signature: \_\_\_\_\_

Submit top portion with payment. Payment terms: due and payable upon receipt. Deposits are non-refundable.

Keep lower portion of invoice for your records.

UCLA FEIN: 95-6006143

Product/Service	Total
Photography	Production Fee: 1.0 @ \$45.00 per each
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Question About Graphic Permission Order 72525

Index X



Rebecca Duffy <rebecca.duffy2012@gmail.com>  
to LIB

Mar 22 (11 days ago)

Dear Inquiry Team,

I have been working with you all and Molly Haigh on my order (72525) for photography of the John Marshall *Infant's Cabinet of Fishes* for my *Winterthur Program and University of Delaware MA thesis*. I have received the photograph and was able to successfully download it - thank you! I was wondering if I could acquire from you the permission contracts in order to use that photograph in my thesis and the credit line your institution prefers for the image's caption.

Thank you so much for all of your time.  
Rebecca Duffy

LIB YRL Special Collections Duplication via ucis.ornmicrosoft.com  
to me

Mar 22 (11 days ago)



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[Identification of item], Children's Book Collection, Library Special Collections, Charles E. Young Research Library, UCLA.

Molly Haigh  
Library Special Collections  
A17J3 Charles E. Young Research Library

libhaigh@libraryucla.edu  
mhaigh@libraryucla.edu


From: Rebecca Duffy  
Sent: Thursday, March 22, 2018 10:46 AM  
To: LIB YRL Special Collections Duplication <speccol-duplication@libraryucla.edu>  
Subject: Question About Graphic Permission Order 72525

→



—

Keep Move to Categories ...

 Larí Langford <larilangford@utoronto.ca>  
Thu 3/1, 12:49 PM


Undo

Reply

Dear Rebecca  
You could simply cite the source as  
The John P. Roberts Library, University of Toronto

Thanks,

Larí


 Rebecca Duffy  
Thu 3/1, 12:50 PM

Reply

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Thank you so much again,  
Rebecca

 Larí Langford <larilangford@utoronto.ca>  
Thu 3/1, 1:09 PM  
Rebecca Duffy <

Reply all

Inbox

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February 22, 2018

Rebecca Duffy

[REDACTED]

[REDACTED]

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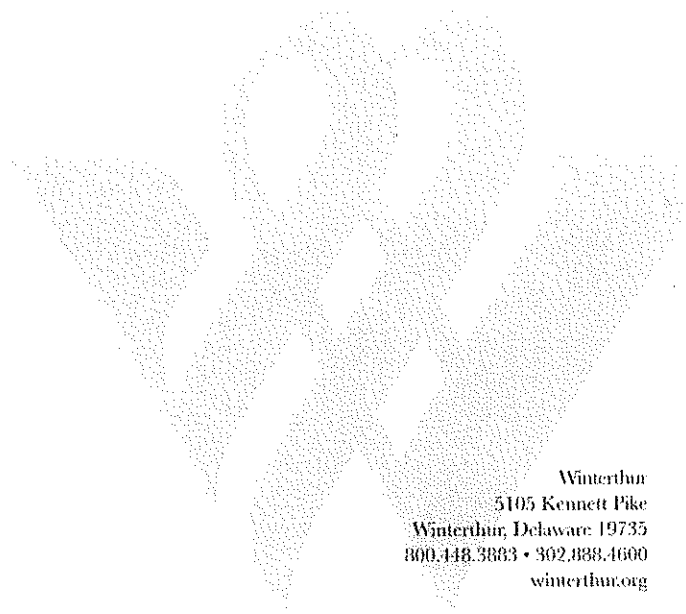
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PZ10 A65	Swan, Abraham. <i>The Aquarium</i> New York: McLoughlin Bros. c.1886 <ul style="list-style-type: none"><li>Cover of pop-up book and image of book opened up</li></ul>	Digital Photo

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Rebecca Duffy

April 2, 2018

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RBR QH68 F54 TC*	<i>J. W. Fiske Iron Works. Illustrated Catalogue of Aquaria Manufactured by J. W. Fiske Iron Works</i> . New York: J. W. Fiske Iron Works, [188-]. <ul style="list-style-type: none"><li>• Pages 14, 18</li></ul>	Digital Image
RBR QH68 E26	Edwards, Arthur M. <i>Life Beneath the Waters: or the aquarium in America</i> . New York: H. Baillière, 1858. <ul style="list-style-type: none"><li>• Page 49</li></ul>	Digital Image
RBR QH68 H62 S	Hibberd, Shirley. <i>The Book of the Aquarium and Water Cabinet</i> . London: Groombridge & Sons, 1856. <ul style="list-style-type: none"><li>• Pages 15-16, 59, 60, 77, 96</li></ul>	Digital Image

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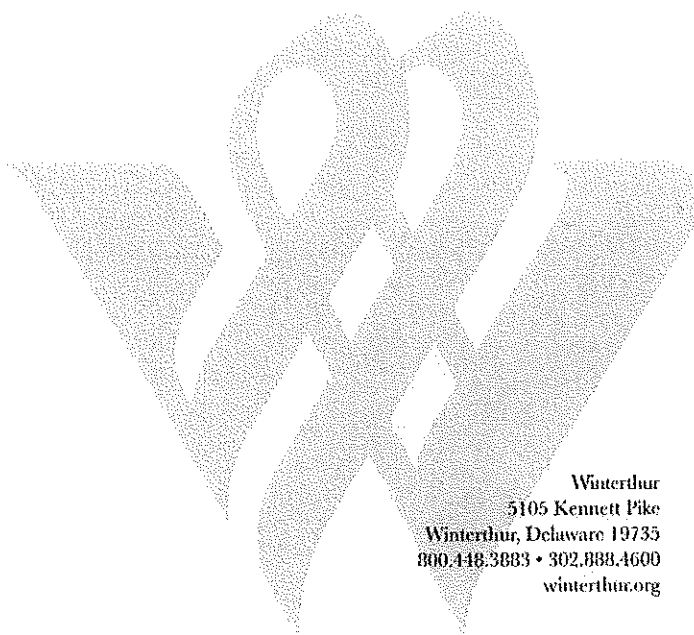
RBR QH68 B98	<i>Butler, Henry D. The Family Aquarium; or, Aqua vivarium.</i> New York: Dick & Fitzgerald, c. 1858. <ul style="list-style-type: none"><li>• <i>Page 50</i></li></ul>	Digital Image
RBR QH68 S89S	<i>Strange, Charles. Ponds in the Parlor: or, How to form and manage an aquarium.</i> Manchester: John Heywood; London: Simpkin, Marshall & Co., 1861. <ul style="list-style-type: none"><li>• <i>Pages 12-13</i></li></ul>	Digital Image

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March 30, 2018

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Rebecca Duffy

[Redacted]  
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Courtesy, Winterthur Museum, Punch bowl, 1740-1770, Jingdezhen, China, Hard-paste porcelain, Lime glaze, Bequest of Henry Francis du Pont, 1961.812

Courtesy, Winterthur Museum, Aquarium, 1840-1880, Tinned sheet iron, Pewter, Glass, Iron, Paint, Silk, Paper, Iron wire, Bronze powders, plastic, England or United States, Bequest of Henry Francis du Pont, 1965.2192

Courtesy, Winterthur Museum, Tureen, 1800-1830, Fused plate, Silverplate on copper, Birmingham, England, Campbell Collection of Soup Tureens at Winterthur, Gift of Margaret Dorrance Strawbridge Foundation II

Courtesy, Winterthur Museum, Tureen and stand retailed by R. J. & S. Garrard, possibly made by Paul Storr, 1824-1825, Silver, London, England, Campbell Collection of Soup Tureens at Winterthur, 1996.4.254

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## FlickrMail / Inbox

From:  cckami.dou  
wolfgang.wiggers

Subject: Re: Question Regarding Photograph of Fishtank

Dear Rebecca,  
feel free to use the photograph, but I have absolutely no further information about the photograph.  
Regards,  
-wolfgang-

[SEND A REPLY](#)[DELETE](#)[Hide your original mail...](#)**Question Regarding Photograph of Fishtank**

25 Feb '10, 4:57PM PDT

Dear Mr. Wiggers,

I am writing because I am interested in a photograph you uploaded in 2008. It features a woman working on needlecraft next to an aquarium complete with statuary and an aerating system (<http://www.flickr.com/photos/13593507@N0002416323516/>). As I am a graduate student studying early 20th century fish-keeping, I have a number of questions about the photograph. Would you be willing to answer some of my questions and potentially allow me to use your image of this photograph in my thesis?

Thank you for your time. I know this may be an odd request.  
Sincerely,  
Rebecca

Or, return to your message list.