

Today's Awe-Inspiring Design, Tomorrow's Plexiglas Dinosaur: How Public Aquariums Contradict Their Conservation Mandate in Pursuit of Immersive Underwater Displays

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I yelled at the Lorax, Now listen here, Dad!
All you do is yap-yap and say, 'Bad! Bad! Bad! Bad!'
Well, I have my rights, sir, and I'm telling *you*
I intend to go on doing just what I do!
And, for your information, you Lorax, I'm figgering
on biggering
and BIGGERING
and BIGGERING
and BIGGERING.

DR. SEUSS, 1971

THE MODERN MEGA-AQUARIUM

The past few decades have been described as a revolutionary period in aquarium design. Gone are the recessed glass panels arranged like paintings along a museum wall. As one aquarium engineer put it, “the watchword today is total immersion” (Smith 1994). Developments in the fabrication of Plexiglas and other acrylics allow for two-foot-thick panels that tower above the awestruck visitor. For example, the Okinawa Churaumi Aquarium in Japan boasts an underwater viewing panel 8.2 meters high and 23 meters wide (fig. 27.1). It was outdone in 2008 by the panel 8.3 meters by 32.8 meters at the Dubai Mall Aquarium. Similar exhibits are popping up throughout Asia, Europe, and North America (table 27.1). Older aquariums,

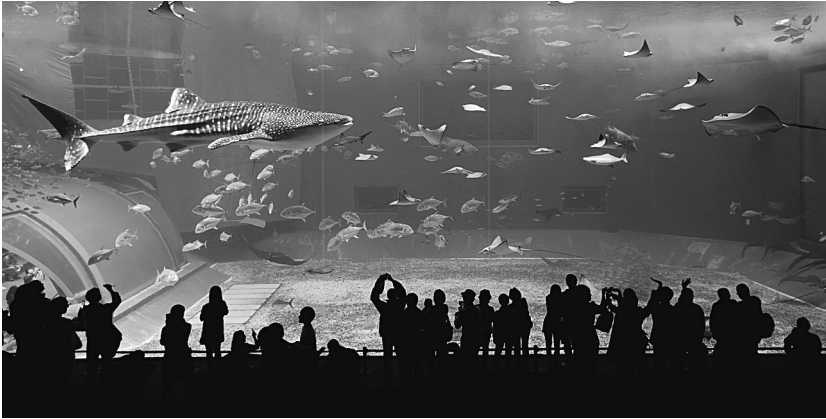


FIGURE 27.1. At the Okinawa Churaumi Aquarium (2002) technological advances take the theme of immersion to a large scale. Image by Leungchopan/Shutterstock.com, used by permission.

whose displays seem outdated by comparison, are undertaking major renovations to keep up with the industry standard (see table 27.1).

Another popular feature is the walk-through viewing tunnel. An industry brochure produced by Reynolds Polymer Technologies (2014) explains its benefits: “The sight of the underbelly of a shark swimming overhead is certain to bring out delight in any crowd. However, another advantage of aquarium tunnels is their ability to direct traffic. . . . Nothing can clog an exhibit or walkway like a handful of guests milling around without progressing to the next station.”

This comment also reveals how the visitor experience in modern aquariums has become choreographed. The “cinematic” approach to aquarium design was pioneered by Peter Chermayeff, legendary designer of the New England Aquarium (1969), who went on to construct massive aquariums in Baltimore, Osaka, and Chattanooga. “In Baltimore,” Chermayeff explains, “we orchestrated the visitor experience in a linear path, like a musical piece, a book or a film. We carried people on travelators and escalators up to the top, gradually, through a central space, working upward, gallery by gallery” (Smith 1994, 57). In a further effort to orchestrate the visitor experience, many modern aquariums broadcast thematic music in their display areas, creating what Chermayeff describes as “a low-key sensory collage” (Smith 1994, 57).

TABLE 27.1. Sample of large aquariums constructed since 1990, noting size of largest fish tank (excluding mammal enclosures)

<i>Year/ location</i>	<i>Largest fish tank (liters)</i>	<i>Year/ location</i>	<i>Largest fish tank (liters)</i>
1990 Osaka	1,892,000	2008 Stralsund	2,600,000
1992 Chattanooga	1,700,000	2009 Istanbul	4,900,000
1998 Long Beach	1,324,000	2010 Seoul	6,000,000
1998 Lisbon	4,000,000	2010 Dubai	10,000,000
1999 Cincinnati	1,430,000	2012 Singapore	12,000,000
1999 Fukushima	2,500,000	2012 Sujeong-dong	6,000,000
2000 Charleston	1,400,000	2013 Copenhagen	4,000,000
2002 Shanghai	2,200,000	2013 Toronto	2,800,000
2002 Okinawa	7,500,000	2014 Hengquin	22,700,000
2003 Valencia	7,000,000	2015 Chendu	9,464,000
2005 Atlanta	23,850,000		

Note: Data collected from institution websites and press releases.

Biomass levels within display tanks are also on the increase. For instance, the six-million-gallon tank at the Georgia Aquarium contains more than one hundred thousand animals. This feat is achieved, in part, by 218 pumps working continuously to drive 261,000 gallons of water per minute through approximately sixty-one miles of pipe. Such advances allow today's simulated coral reefs to stock a higher density of fishes than their natural counterparts. They also make it possible to display larger, more charismatic specimens. At both the Georgia Aquarium and the Okinawa Churaumi, visitors encounter circling whale sharks, the world's largest fish. Recently constructed aquariums in Seoul and Singapore display schooling manta rays, apparently the latest "must have" specimen. The Monterey Bay Aquarium has pushed the envelope on several occasions by attempting to display a great white shark. This spectacle generated a significant boost in attendance, but the first animal died after just sixteen days in captivity, and subsequent attempts were also unsuccessful (Rogers 2011).

Unlike zoos, the rate of new aquarium construction is on the upswing. According to the World Association of Zoos and Aquariums (Penning et al.

2009), of the approximately 315 aquariums that exist globally, over a hundred have been established since the year 2000. In China alone, eleven new aquariums were built in the past decade. It is estimated that 450 million people visit an aquarium annually—more than will attend a professional soccer match.

The rest of this chapter argues that this trend toward larger, more immersive displays contradicts the environmental values most aquariums profess. I begin by tracing the historical origin of the “theatrical” approach to the visitor experience, contrasting it with a more authentic approach. The theatrical mode of engagement is so entrenched that people today rarely question it. I highlight it here to gain some critical distance on our experience as aquarium visitors. We expect an aquarium to simulate the world’s oceans and are accustomed to playing along with the pretense of encountering wild nature. That we are actually engaging with a highly artificial, technologically mediated environment is something most visitors effortlessly overlook. It is helpful to consider how we got here.

I then turn to the educational mission endorsed by public aquariums. Immersive underwater exhibits are often justified by the hypothesis that they influence visitors’ behavior positively. I argue that this claim lacks adequate empirical support and that, historically, it served to deflect attention from animal welfare concerns.

Moreover, there is a direct conflict between the growing public concern over CO² emissions and the trajectory of modern aquariums. At a time when conservationists are calling for reduced emissions, these institutions are increasing their rate of pollution while imposing greater stress on marine habitats. Although aquarium organizations acknowledge these problems and promise reform, I believe these efforts stand little chance of success. Mega-aquariums are locked into a boom-bust-expand economic cycle that makes growth necessary for their survival.

The final section of the chapter points to an alternative theme in aquarium design that aims to avoid these pitfalls. The emergence of the regional mini-aquarium provides a sustainable example of how people can enjoy more authentic experiences of marine life.

STRIVING FOR IMMERSION

Visiting a modern public aquarium has become like attending a theatrical performance. Both require a willing suspension of disbelief. As theatergoers, we allow two-dimensional scenery to stand in for buildings. We regard cast members as characters, not as ordinary people with bank accounts and

commuting schedules. Such pretense is necessary if we are to enjoy the performance. Similarly, aquarium visitors are encouraged to pretend they are on a tour of the world's oceans. Artificial coral sculptures and naturalistic backdrops evoke wild habitats, and extensive pumps and filtration systems are hidden. Visitors are encouraged not to inquire about husbandry or collection techniques. Instead, an aquarium visit is typically billed as a quasi-wilderness experience, where visitors connect emotionally with animals as if they were encountering them in nature.

For some visitors, however, these efforts are largely wasted. Members of the aquarium hobbyist community enjoy a different kind of aquarium experience. Hobbyists are attuned to the difficulties of maintaining fishes artificially. They approach an aquarium visit the way an amateur stagecraft designer might view a Broadway production: keenly interested in what happens behind the scenes. The hobbyist might wonder, for instance, how delicate specimens were obtained from the wild. She might be interested in the feeding schedule that enables predators to cohabit with prey. And so on. This mode of engagement is undeniably more authentic than that of the typical aquarium visitor, because it recognizes that many species have ecological requirements that are costly and difficult to simulate.

The hobbyist's perspective predates the theatrical mode of engagement. The first public aquarium was an outgrowth of an already thriving home aquarium industry. Historian Bern Brunner (2005) documents the period in Victorian England when home aquariums became a craze. Their chief popularizer was naturalist Philip Henry Gosse, whose enthusiastic descriptions of fish and invertebrate behavior drove a generation of hobbyists to the seashore to gather specimens for private collections. Gosse's *The Aquarium* (1854) is partly a work of popular nature writing, partly a how-to guide for the hobbyist. It offered detailed instructions on aquarium construction, specimen compatibility, maintaining water quality, and a host of other technical concerns. In keeping with this dual focus on both technology and natural history, many commercial home aquarium systems accentuated the mechanics of life support. We can imagine that at Victorian social gatherings, where such items were admired, conversation focused as much on the problems of animal husbandry as on natural history.

It is therefore no surprise that when Gosse was commissioned to build the first public aquarium in London, about 1853, there was little attempt to construct an immersive underwater exhibit (fig. 27.2). Visitors wandered freely around each tank, inspecting life support systems as well as the contents of each display (Holdsworth 1860). This was a public aquarium designed for an audience of hobbyists, not theatergoers.

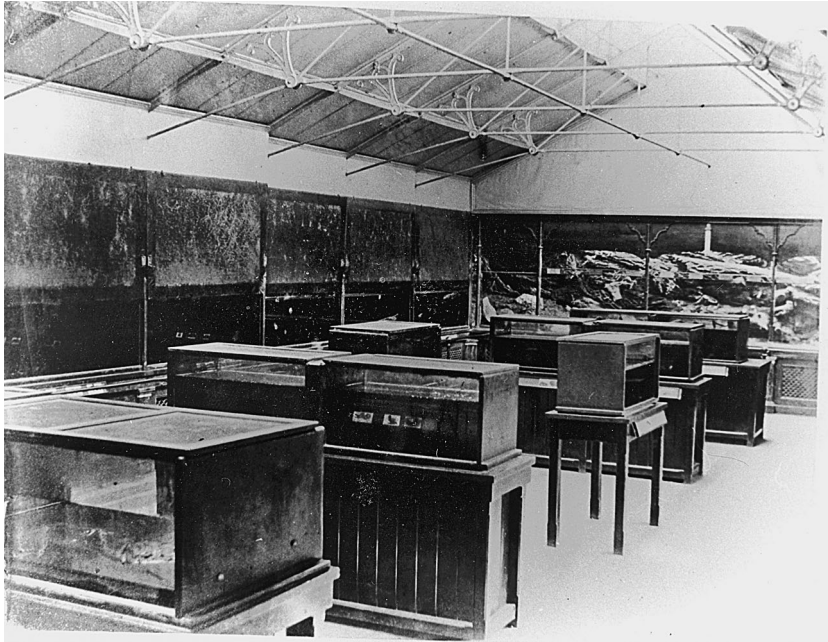


FIGURE 27.2. Philip Henry Gosse's "Fish House" (London, ca. 1875) made little effort to disguise the way display specimens were being artificially maintained. This theme was consistent with his natural history writings, in which ecological principles were interwoven with animal husbandry suggestions for the home aquarist. Image from London Zoological Society, used by permission.

However, by the 1860s, when public aquariums began appearing in continental Europe, immersion had become a popular design goal. An immersive exhibit (whether in a zoo, a natural history museum, or an aquarium) aims to transport visitors to the location represented in the display. In an aquarium this involves disguising plumbing and filtration systems with naturalistic scenery and props. Adjustments to lighting also create a sense that one is undertaking an ocean descent. This technique was pioneered by French naturalist Arthur Mangin, who explicitly adopted design principles from the world of stagecraft to produce what he described as a "new kind of theatre" (Brunner 2005, 103). His aquarium at the Jardin d'acclimation in Paris (ca. 1860) had visitors enter a darkened corridor lined with tanks illuminated from above (fig. 27.3). His efforts were celebrated in an article in a German industrial magazine: "One forgets about how many artificial

resources had to be employed to create such an exposition” (Brunner 2005, 104)—a comment that would apply equally to the mega-aquariums of today.

The 1860s saw several attempts to take immersion to its technological limits. The 1867 World Exposition in Paris boasted a twenty-thousand-gallon aquarium that visitors viewed from below through a glass ceiling. As with today’s acrylic tunnels, the aim was to create the impression of walking along the ocean bottom. However, Brunner (2005) explains that the exhibit was poorly conceived. Visitors complained of neck strain, and wind and rain clouded the water, so the vantage from below offered suboptimal views of marine life. The idea of having visitors look upward at passing fishes would have to wait for technological advances of the late twentieth century.

Perhaps the pinnacle of nineteenth-century immersion was achieved at the Berlin Aquarium, completed in 1869. This two-story grotto simulated a Jules Verne adventure. Visitors descended into a series of stone cham-

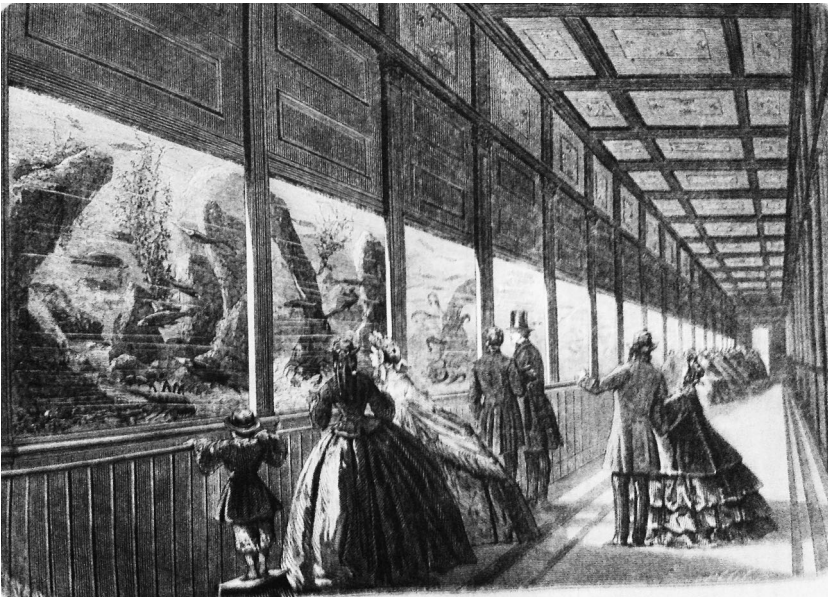


FIGURE 27.3. Arthur Mangin’s Aquarium du Jardin d’acclimation was one of the first attempts to create an immersive underwater display by incorporating theatrical design elements: visitors entered a darkened corridor in which tanks were lit from above and life-support systems were hidden from public view. Bertrand 1863 (PD-1923). From *Le Monde*, January 10, 1863; public domain image (Wikimedia Commons).

bers evoking a system of underwater caverns. Brunner explains that “the glass panels of the water basins on the first floor looked like random breakthroughs in the rock” (2005, 110). Through these portals visitors observed diverse animals, including sea anemones and octopuses as well as crustaceans and fishes. Initially the Berlin Aquarium was a great success, with one hundred thousand visitors in the first three months. However, this immersive masterpiece was difficult to maintain both economically and structurally. Tanks burst. Pipes corroded. Rats colonized grotto cavities. Visitors eventually lost interest. The Berlin Aquarium soon resorted to more pedestrian streams of income, using tanks to stock fishes and lobsters for local restaurants. In a desperate effort to draw crowds, in 1876 a gorilla was put on display. The aquarium eventually closed in 1910.

As public aquariums started appearing in North America, efforts at immersion took a more modest turn. The South Boston Aquarium (ca. 1912) is typical of this period. The building consisted of a darkened corridor surrounded by viewing panels five feet high. Display tanks were illuminated from above “to give the visitor the impression of being underwater” (Ryan 2011, 62). What this aquarium lacked in architectural flair, it made up in size. The eight-thousand-square-foot building was twice as large as originally planned. The South Boston Aquarium also contained an impressive collection of specimens for its day. A 1927 inventory lists sixty-two tanks containing 2,835 fishes along with a few marine mammals, reptiles, and amphibians. The aquarium was also popular. On opening, it attracted fifteen thousand visitors in a single day, and even fifteen years later its average daily attendance was 811 visitors. However, after the wars the building fell into disrepair and was eventually closed in 1952 (Ryan 2011).

American aquariums became more ambitiously immersive starting in 1969 with the opening of the New England Aquarium. The main exhibit involved a four-story “Giant Ocean Tank” that was the largest of its kind at the time. The New England Aquarium website recalls that this exhibit “was notable for its size but also for how it created an intimate space for visitors to really see, experience, and connect with an ocean world that was largely unknown to them” (New England Aquarium 2016). The 1980s saw another step in this direction with the creation of the Monterey Bay Kelp Exhibit. Julie Packard (1989) recounts the technical challenges associated with its construction. The tank was at the forefront of acrylic construction, with panels seven inches thick rising to twenty-eight feet, enclosing 335,000 gallons of water. To sustain living kelp, natural seawater was brought in each evening, and surge pumps circulated it continuously throughout the day.

High-pressure sand filters prevented an accumulation of debris in the water column. It was a considerable undertaking, but the efforts were rewarded in attendance and fanfare.

This series of historical snapshots suggests that today's mega-aquariums are the expression of a design ideal that traces back to 1860s Europe. Going back just a little further, however, to the very first example of a public aquarium, we see an alternative design model. It is fascinating to contemplate how the history of aquarium design might have unfolded had it followed Gosse's original creation. Presumably these institutions would place as much emphasis on communicating the conditions for sustaining life as on displaying the wonders of the ocean.

The rest of this chapter will explore whether the theatrical approach to aquarium design is in conflict with the conservation ideals that aquariums have (more recently) embraced. It is helpful to keep in mind what I have called the hobbyist perspective (perhaps better described as an *authentic* mode of visitor engagement), though I am not suggesting that the aquarium hobby industry is environmentally benign. Gosse's influence, in fact, led to the denuding of the Devonshire seashore. On a much larger scale, today's aquarium hobby industry is responsible for significant destruction of habitat. Nor do I claim one must keep fishes to gain a more enlightened perspective on public aquariums. I hope to emphasize that there is a way of appreciating aquariums that does not depend on generating a sense of spectacle through immersion. This more authentic approach opens up a range of design possibilities that do not require building increasingly larger, ecologically harmful mega-aquariums.

AQUARIUMS' CONSERVATION MESSAGE

The 1980s and 1990s saw growing alarm about the loss of global biodiversity. Avoiding the impending "biodiversity crisis" required that consumers, industries, and governments become mindful of their impact on species extinction. Aquariums, with their expertise in displaying exotic specimens, were well positioned to capitalize on this narrative. As Susan Davis (1997) observes, visitors to SeaWorld encounter—amid the dolphin and whale shows—a fairly urgent message: the world's oceans are in peril, and conservation action is necessary. Similar values are expressed in the mission statements of most public aquariums (see, e.g., Spring, this volume). Such claims give the impression that aquariums are leaders in conservation science. Visitors are comforted by the (highly questionable) idea that simply

visiting an aquarium qualifies as a form of environmentally responsible action (see Davis 1997).

Embracing this role as conservation educators allowed aquariums to deflect a different criticism. The publication of Peter Singer's influential *Animal Liberation* (1975) saw growing concern for the welfare of captive animals. For a burgeoning aquarium industry, the biodiversity crisis came at a convenient time. The tradition of exhibiting sentient animals could now be defended on the grounds that these "animal ambassadors" (Taylor 1995) helped promote awareness about the importance of marine conservation. The issue of animal welfare is particularly relevant for aquariums that display sentient organisms in cramped quarters—as it is, of course, for zoos (see, e.g., Palmer, Kasperbauer, and Sandøe, this volume). These ethical issues have been addressed in a number of recent publications.¹ Without minimizing the questionable ethics of displaying captive marine mammals, I now turn to more general inconsistencies between aquarium operations and their conservation mandate.

Aquariums claim to fulfill their conservation mandate through three activities: research, conservation outreach, and public education. As exemplified by some of the larger, more established institutions, research has become an important component of aquarium operations (see Muka, this volume). However, critics note that most of this research focuses on animal husbandry issues that pertain to captive populations (Lawson, Ogden, and Snyder, 2008). In fact aquariums are even less productive than zoos in research output. An analysis of 395 articles in *Zoo Biology Journal* over fifteen years found that aquariums accounted for just 5.5 percent of total publications (Wemmer, Rodden, and Pickett 1997). It is also important that aquariums derive a number of institutional benefits from their research programs. For example, funding can be used to maintain animal husbandry experts on staff. It can help to build multipurpose holding facilities. Research excursions double as collecting trips. Most significant, perhaps, the appearance of a viable research program is a useful public relations tool. For example, the Vancouver Aquarium continues to point to its research on captive beluga whales to deflect mounting criticism from welfare advocates (Lupick 2014; Kane 2015). One should perhaps not be overly cynical about the conservation benefits of aquarium research, but these programs tend to serve institutional interests as much as they do nature.

A more direct form of conservation involves various outreach programs (see Knapp, this volume). The New England Aquarium, Monterey Bay Aquarium, and Shedd Aquarium are world leaders on this front. Funding for such projects derives in part from ticket sales at the door. Hence one

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might argue that the conservation efforts of modern aquariums must be assessed in terms of their outreach, not just their displays. In reality, however, few public aquariums engage in meaningful outreach programs. Most aquarium websites I reviewed for this chapter reported minimal efforts. Fraser and Sickler (2009) concur that “although some [zoos and aquariums] are able to contribute to field conservation as part of their mission-driven activities, the maintenance of zoological parts is still the predominant route by which [they] work towards their mission” (103).

Hence the key question is whether displaying exotic marine life, particularly in an immersive setting, has a meaningful effect on visitors’ conservation behavior. Public aquariums often take such effects for granted. For example, Peter Chermayeff justifies the construction of immersive exhibits in terms of their educational value:

The designs basically rely . . . on biophilia—that human bond with other species—and on the power of the experience when a child or adult, eyes open with wonder, peers at the gills, jaws, and fins of a passing shark, or the soft pulsing forms of jellyfish. The stimulation of curiosity, we hope, will encourage discussion, reading, environmental consciousness, and direct involvement in the protection of natural resources. (1992, 56)

This makes for a fairly compelling story, but it enjoys little empirical support. A study conducted by the American Zoo and Aquarium Association (Falk et al. 2007) is widely cited as the first direct evidence of a positive effect of attendance on visitors’ conservation behavior. However, this study has been soundly refuted for its numerous methodological flaws (Marino et al. 2010). To date there is no reliable evidence supporting the claim that aquariums contribute to lasting conservation behavior, let alone that increasing the size of exhibits or their degree of immersion enhances this effect. At the same time, an alternative hypothesis proposes that aquariums instill precisely the opposite set of values. Visitors realize they are viewing captive animals under human control. It is possible that such encounters reinforce a sense of entitlement in their domination over nature (see Minter, this volume). The trend toward more immersive displays, containing ever more spectacular inhabitants, might only promote this attitude.

AN EVEN GREATER CRISIS

The threat of human-induced climate change has become the dominant environmental concern of our time. With this new crisis upon us, it is very difficult to see how public aquariums can maintain credibility as environ-

mental educators (see the chapters by Norton and by Cerezo and Kapsar, this volume). Aquariums have a much larger ecological footprint than zoos, partly because fishes—unlike mammals—are unable to internally regulate body temperature. This means that specimens from different parts of the world require a constant regimen of heating and cooling, drawing considerable energy. Massive pumps must also continuously provide adequate filtration and circulation. The lighting and humidity control required to keep visitors comfortable also is a significant electricity draw. One must also consider the transport of food and display specimens from around the world. It is difficult to obtain reliable data about the energy demands of modern mega-aquariums. For obvious reasons, aquarium representatives tend not to be forthcoming on this issue. In a rare moment of candor, however, the director of the Shedd Aquarium in Chicago compared the that institution's CO₂ emissions to “an endless 2,200-car traffic jam” (Wernau 2013).

On top of these energy demands are two more direct ecological impacts that aquariums impose on natural habitats. Most aquarium specimens are carnivorous, relying on a diet of herring, smelt, or other wild-caught fish. These animals occupy a fairly high rung on the trophic ladder. Hence there is a cascade of ecological effects from nourishing the more than one hundred thousand fishes contained in a typical mega-aquarium. The second direct impact involves the procurement of display specimens. Unlike zoos, aquariums rely primarily on wild populations to stock tanks. The turnover rate for these animals can be significant. For example, the Okinawa Churaumi Aquarium reportedly lost sixteen whale sharks over a ten-year period (Mihelich 2005).

A proper environmental accounting is sure to cast a sobering light on the theatrical approach to aquarium design. At a time when conservationists are calling for a reduction in global CO₂ emissions, aquariums keep growing larger. As the rate of habitat loss due to coral bleaching increases, aquariums are ramping up the number of wild animals on display. While environmental leaders call on everyone to become more mindful of our global impact, aquariums continue to disguise their destructive practices. How could such hypocrisy possibly be consistent with an effective role in environmental education?

PLEXIGLAS DINOSAURS

In 2009 the World Association of Zoos and Aquariums published a policy document outlining “a global aquarium strategy for conservation and sus-

tainability.” The report describes a number of environmental issues aquariums should focus on. These include overfishing, pollution, the aquarium pet trade, and ocean acidification caused by CO² emissions. The report goes on to propose that “all zoos and aquariums will serve as leaders by example, [by] using green practices in all aspects of their operations and by demonstrating methods by which visitors can adopt sustainable lifestyles” (Penning et al. 2009, 40). This statement suggests that aquariums are planning to improve on traditional practices.

However, economic considerations suggest that these goals cannot be achieved by mega-aquariums. These institutions are trapped in a growth cycle dictated by the economics of their industry. Aquarium professionals are well aware that “most aquariums experience lucrative attendance numbers in their first few years, but unless they begin to insert additional exhibits, even the most remarkable facilities will see a dramatic decline” (Macdonald 2006, 17). The Newport Aquarium in Cincinnati is an example of this boom-bust-expand cycle. During its opening year in 1999, it had 1.25 million visitors. By 2003 attendance had dropped by 50 percent. This inspired plans for expanding by twenty-one thousand square feet and including a sea otter exhibit, among other attractions. Director Timothy Mullican justified this expansion by saying: “You need to stay fresh. You need to give people a reason to come back, and you do that by adding new exhibits” (Crowley 2003). In 2015 the aquarium announced plans for a new “shark bridge,” which is being touted as “the only suspension bridge in North America on which visitors can walk just inches above nearly two dozen lurking sharks” (Shafer 2015).

With each turn of the wheel, aquariums become saddled with ever larger, costlier exhibits. Those displays often require maintenance at about the same time that their appeal begins to wane. This means aquariums inevitably land in an ever more desperate financial predicament with each downturn in the cycle, leaving little option but to expand yet again. One is reminded of anthropologist Franz Boas’s (1937) criticism of the excessive costs invested in the immersive museum dioramas of his day. He complained that those “dinosaur-like” displays committed museums to a particular educational message that was bound to become outdated with the marching progress of science (Rader and Cain 2008). Arguably, modern aquariums are engaged in an even more capricious pursuit. It is a truism that society’s threshold for spectacle is constantly being raised (see, e.g., Minter, this volume). Special effects in movies that enthralled us a decade ago now seem quaint compared with the latest and greatest. Why should

it be any different for underwater exhibits? Apparently some aquariums are now offering snorkeling trips into “shark infested” tanks (Cater 2010). Talk about immersion! How enthralling will today’s large viewing panels or Plexiglas tunnels appear by comparison?

AN ALTERNATIVE MODEL

Where does this all leave the many people who enjoy, and perhaps derive inspiration from, viewing captive marine animals? Perhaps in this day and age no one is entitled to enjoy a simulated stroll through the world’s oceans. However, an alternative model might also be considered.

I have suggested that the earliest example of a public aquarium provides an alternative to the theatrical approach to aquarium design. Smaller-scale institutions, providing authentic experiences to smaller groups of visitors, are the contemporary embodiment of Gosse’s model. In fact there appears to be a growing counterculture of “regional” zoos and aquariums that are rejecting traditional design ideals. One such example is the Arizona-Sonora Desert Museum. Another is an innovative “mini-aquarium” established in 2005 on the west coast of Vancouver Island. As one of the founding directors of the Ucluelet Aquarium Society, I was involved in formulating the design ideals this institution is based on. Most of its displays are touch pools (fig. 27.4). No attempt is made to construct an immersive underwater experience. Instead, visitors are informed about the open-flow system that brings water directly from the inlet into tanks and back again. Displays are therefore a physical extension of the surrounding ocean. This approach aims to provide visitors with a grounded sense of the importance of maintaining water quality in the local harbor. It also allows the aquarium to display a broader range of species (e.g., filter-feeding invertebrates) that do not survive in large filtration systems.

The Ucluelet Aquarium displays only locally collected fishes and invertebrates—no mammals. Tank sizes are modest. Visitors’ thirst for novelty is satisfied by adapting displays to seasonal changes in the local environment. For example, when squid show up to spawn in the inlet, a suitable display can be created on the fly. On hatching, larvae flow back into the ocean with minimal interruption. Little attempt is made to conceal plumbing and filtration—in this respect the aquarium feels more like a lab than a museum or amusement park—and many visitors express interest in learning about the operation of life support systems. Most distinctive, perhaps, is that all the animals on display at the Ucluelet Aquarium are released back



FIGURE 27.4. The Ucluelet Aquarium (2013) abandons the theme of immersion in favor of a more transparent approach where tanks serve as interaction centers, life-support systems are on display, and the animals are eventually returned to the ocean. Photo by Kumiko Bruecker, used by permission.

into the wild at the end of the season. This feature encourages people to view display organisms as fellow visitors, not as curios for our possession and amusement.

Admittedly, we currently do not know whether this alternative model of aquarium design is more successful than its larger counterparts in instilling love of nature. This is an area for future research. But it is perhaps encouraging to think that there are alternative, more ecologically responsible ways to bring people into contact with marine life.