

The Diorama Dilemma: A Literature Review and Analysis

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“[Dioramas] are an illusion created not to deceive us, but – like all great art – to tug at our hearts and open our minds.”

-- Stephen Christopher Quinn, 2006.

Introduction

The value of dioramas has been hotly debated within many institutions. Are they still relevant as museum exhibitions? Can they deeply engage a diverse public in this digital age? Some museum professionals regard dioramas as “boring” and “static,” while visitors have called them “creepy” displays of “dead animals.” Yet many more professionals and visitors alike describe dioramas as “evocative,” “beautiful” and “powerful” fusions of art and science (Wonders, 1989; Quinn, 2006; Yanni, 2008; Benton, 2009). Since dioramas occupy significant square footage in many natural science museum galleries, the question is thus raised: should museums dismantle them, maintain them for the sake of nostalgia, or re-purpose them for contemporary audiences?

In recent years, several institutions have removed dioramas without fully considering their educational potential or historic value. Decisions about removing, retaining or modifying historic dioramas from natural science galleries should not be taken lightly. The field needs to be informed by existing data and research. Museums must know how their publics perceive dioramas and how dioramas contribute to the overall experience of the museum visit.

The purpose of this report is to inform the museum field of the many complex issues involved in re-envisioning habitat dioramas in natural science galleries and museums. Specifically, it intends to provide direction for the team currently re-designing the natural sciences gallery at the Oakland

Museum of California (OMCA). It also raises questions about gaps in the field's knowledge as a springboard for further research at other museum sites.

The research question guiding this report is:

- What can we learn from the vast literature on habitat dioramas, as well as the less developed literature on visitor studies of dioramas?

To address this question, the report is organized into nine sections that cover the following topics:

1. **Definitions:** What is a diorama?
2. **A brief early history of the diorama:** How did dioramas come about as museum display? What are some notable examples? Why did they fall out of favor?
3. **Dioramas from 1969 – the present:** How have museums adjusted dioramas in modern times?
4. **Contemporary Diorama Typologies – Art Installations and Digital Technology:** What potential do these typologies have for extending the visitor's experience and perception of the diorama?
5. **Visitor Studies:** What do we know about how visitors experience or perceive dioramas? What do we know about dioramas as educational resources?
6. **Gaps in knowledge:** What don't we know about dioramas, particularly vis-à-vis the visitor experience?
7. **Recommendations:** Which issues should teams redesigning or re-envisioning dioramas consider as they go forward? What are avenues for further research?
8. **Annotated Bibliography.**
9. **Summaries of Visitor Evaluation Reports.**
10. **Appendices.**

Key themes raised in the report include:

1. Dioramas are complex forms of exhibitry that bring together many disciplines, such as environmental education, natural science and art.
2. Dioramas are cultural artifacts and works of art. Cultural historians believe that part of their power lies in the blend of art and science, illusion and realism (Wonders, 1989).
3. Dioramas are powerful museum icons; they evoke memories as well as emotional feelings on the part of many visitors.
4. Dioramas – especially ones with large animals – are effective at engaging visitors. Doris Ash has observed that “Learners are stimulated by dioramas to watch, point, seek more information, and ask questions” (Ash, 2007.)
5. Dioramas can be effective tools for environmental and science education, especially when supplemented by interpretation and hands-on activities. Science educators suggest that dioramas present objects in a concrete way that is immediately accessible to visitors.
6. Visitor studies conducted at dioramas at 17 different natural science museum galleries (see Appendix B) in the English-speaking world provide relatively consistent data about what visitors want to know and what attracts them to dioramas. We know that visitors are most interested in: large animals; animals’ names; animal behavior, especially predator-prey relationships; and knowing more about the depicted habitats’ locations.
7. **Parents** are strongly interested in engaging science and educational activities for their children and appreciate museums as “learning enhancers, vocabulary suppliers and long-term learning facilitators” (Chittenden, 2003; Gyllenhaal & Cheng, 2003).
8. Visitors have **emotional connections** to dioramas but little is known about dioramas and personal meaning-making.

9. Little to nothing is known about the impact of new technologies (eg, augmented reality, youtube, etc) on the viewing of dioramas.

Methodology and Limitations of Methodology:

This report focuses on writings about dioramas in over 50 scholarly books, museum journals, unpublished theses, and some newspaper accounts. Also reviewed are 30 visitor studies reports, including unpublished research. These evaluations measured the diorama-viewing experiences of over 3,800 visitors at 17 different institutions. A limited number of theoretical works is mentioned, as appropriate to dioramas. Materials were gathered through university library databases, such as ProQuest and J-Stor, as well as the in-house collection at the John F. Kennedy University Museum Studies library in Berkeley, California. Various personal contacts provided in-house visitor studies reports; in some cases, mimeographed copies were pulled from file drawers. Each visitor study uses its own methodology, and these methodologies are inconsistent with one another.

This review is by no means exhaustive: many scholars including art historians, cultural critics, scientists, educators, evaluators, journalists, poets and filmmakers have considered the diorama. What follows represents a small selection of those documents with a focus on visitor studies. A number of relevant avenues were not investigated because the research is widely available elsewhere; these include the team model of exhibition development, related kinds of exhibition staging (such as period rooms and life groups with human manikins) and the philosophy of interactive exhibitry (Demars, 1991; McLean, 2001).

A given, not explored in this paper, is that people can and do learn science in nonschool places like museums (Falk & Dierking, 2000; Bell, et al., 2009) and that successful exhibitions are multi-sided, multi-user, multi-modal, accessible to both children and adults with a variety of abilities and learning styles, and supported by easily-readable labels (Borun, 1998). Another given is that exhibitions that are intended to serve as resources for public school field trips support and link to state and local curriculum and standards (Deisler-Seno & Reader, 1991).

Subjects like taxidermy, the theory of evolution, and the aesthetics of landscape painting frequently appear in diorama literature but are not discussed here. Also not addressed is the use of **robotic** animals in dioramas. Since the 1990s, robots appear in occasional dinosaur displays, either as the roaring and nodding fossilized creature one might encounter in a shopping mall or amusement park, or the more modest incarnation found in some natural history museums. The literature review did not reveal any specific uses of robots in wildlife dioramas. More importantly all of the writers reviewed frowned upon the technique as being “overly fake,” a discussion beyond the scope of this report.

“Dioramas are enclosed spaces where moments are captured for visual delight.” (Olalquiaga, 1998).

Section 1:

Definitions: What is a diorama?

Also called **Habitat Diorama**, **Wildlife Diorama**, **Habitat Group**, and **Habitat Display**, the general term **diorama**, as it is used in this report, refers to an exhibit (sometimes life-sized, sometimes miniature) that is often (although not always) displayed behind glass, containing wildlife taxidermy specimens posed lifelike with simulated (or actual) flora and geology of their native terrain, often (but not always) in front of a painted scene or backdrop (Wonders, 1989). Stephen Quinn (2006) offers a definition of the “classic habitat diorama,” explaining that it has three artistic components that work together as a unit: **taxidermy specimens**, a **foreground** of the diverse flora and geology of the habitat, and a **curved background painting** which creates the illusion of “space, distance and environment.” (Other scholars have also defined this elusive term, as documented by Gail Binder in Appendix A).

Most dioramas **represent a specific place, time of year, and time of day**; for example: California Academy of Sciences’ San Joachin Valley Waterfowl diorama, unveiled in 1917 and no longer extant, was intended to be **a snapshot** of dusk on a February day at Pacheco Pass (American Association of Museums, 1917). The famous “Four Seasons” side-by-side dioramas at the Field Museum of Natural History show white-tailed deer in the same habitat during the different seasons (Metzer, 2007).

Other terms associated with dioramas are: **artifact**, **object**, **work of art**, **specimen** and **taxidermy**. In the museum field, **artifact** generally refers to “**the real thing**,” that is, a specific tangible unique object associated directly with a historic event, important person, or specific place and time. **Thus many dioramas are also artifacts**, because they contain work created or collected by a famous person (eg, Carl Akeley, Theodore Roosevelt) as well as “real things” taken from a specific place at a specific time. An artifact differs from a **scientific specimen** (a *sample* taken from a larger whole, such as a

golden eagle or a moon rock), an **object** (a material item that occupies space), and a **work of art** (something created or viewed for aesthetic experience). Some dioramas are considered to be works of art, and because only few are constructed from “scratch” these days, have even been called a “**lost art form.**” (Metzler, 2007; Steller, 2007).

One more term, prominent in the diorama literature, deserves discussion: **taxidermy**. The practice of preserving dead animals has existed for millenia. In ancient Egypt, embalmers created mummies, not just of humans, but of cats, alligators, and other sacred animals, preserving the substance and form of the body, but not the skin. By the 16th century, Europeans used animal skins to create more precise visual representations: employing sticks to prop up a hide, sewing it up with thread, and stuffing it with straw (Olalquiaga, 1998). In the late 19th century, Carl Akeley, an apprentice at Ward’s Scientific Establishment (Rochester, New York) innovated a wholly new approach to taxidermy (Alexander, 1997). Often called the “father of modern taxidermy,” Akeley’s goal was to create a more lifelike product. Starting with Jumbo, circus impresario P.T. Barnum’s prized elephant, Akeley began by studying, dissecting and sketching an animal’s anatomy. He then modeled the animal in clay, showing its muscles and tendons. He attached the hide to the model, slowly and carefully. Since Akeley’s breakthrough, taxidermy techniques have refined to include freeze-drying. Taxidermists now omit poisons like arsenic that were commonly used in the early 20th century. Papier mache and wire are also used to shape animals.

Akeley is also considered to be the “father” of the museum field’s first wildlife dioramas, further cementing the historic link between taxidermy and dioramas. Today, taxidermy is practiced by both amateurs and in professional studios, with a wide following as evidenced by the multitude of websites, studios and conferences devoted to it.

As this short explanation of taxidermy suggests, diorama fabrication requires **intensive resources and skills**. Not only must specimens be collected and then skinned, prepared and mounted, but the habitats from which they were collected must be documented, photographed, and then recreated. This involves **skilled artisans and artists**, practiced in landscape painting, the preparation or manufacturing of organic material or props like rocks and flora, and set and lighting design, among other talents. It also involves the work of **scientists knowledgeable about animal behavior, habitats and eco-systems**. High quality dioramas are valued for their

exacting detail of natural habitats; every blade of grass, every sun angle, every animal pose is carefully studied and replicated. The creation of a diorama is thus an **involved and expensive process**. For example, in the 1920's and 30's the fabrication of dioramas could require as much two-thirds of a museum's annual operating budget (Quinn, 2006).

The following points summarize Section 1:

- There is no singular definition for the term diorama.
- Dioramas are complex exhibits that exist in many forms.
- Habitat dioramas usually represent specific places at specific times of the year and day.
- All museums that create dioramas use source references—maps, photos, specimens—taken from real places to make their artificial versions of those places.
- Creating a diorama involves a range of specialized materials and skills.
- Dioramas originated with innovations in taxidermy that began in the late 19th century.
- Dioramas are expensive to produce.

“Dioramas: palaces of collective dreaming ...” (Grunbein, 2002).

Section 2:

A Brief Early History of the Diorama

Dioramas are an enduring form of public museum display that developed in the late nineteenth century due to three linked phenomena: 1) **cabinets of curiosity** and wunderkammer (Porter, 1991); 2) natural science collecting and **classification** (Wonders, 1989.); and 3) popular forms of **entertainment** including cycloramas, world’s fairs and (later) cinema (Cummings, 1940; Schwarzer, 2006). Although they also appeared in Europe (especially Sweden) this discussion will focus primarily on the United States.

During the post Civil War period, **natural science collecting** grew in popularity due to wealthy industrialist-philanthropists’ and adventurers’ keen interest in travel to Africa, the Arctic and the American west. At the same time, public school systems began to emphasize “nature study” for children. The goal was to encourage stewardship of the natural world, thought to be rapidly vanishing in a landscape increasingly populated by factories, roads and other manmade structures.

Dioramas came about because natural history museums wanted to display the growing numbers of philanthropists’ trophies, meet the nation’s educational mandate, and be **less elitist and dull** (Woods, 1887). Cabinets of curiosity displayed natural specimens in a pleasing way. But they were largely private, their viewing limited to an invited audience of prominent citizens. Public institutions also possessed natural science collections, but these specimens were **systematically arranged**. To the nonscientist, the rows of shelves, drawers and cases were monotonous and dusty.

Dioramas represented a perfect combination of the curiosity cabinet, natural science collection and educational mandate because they use specimens to **tell a story**; for example, a predator stalking prey or a mother lion surrounded by her newborn cubs (Roberts, 1998). Arranging taxidermy in lifelike poses framed by the plants and geology in which they lived – and set against a vivid painted backdrop that added depth -- could give the rising number of urban dwellers a glimpse of exotic worlds they had never before seen. Thus dioramas fulfilled museums’ desires to be more **popular, educational** and **accessible**.

In 1889, Carl Akeley's Muskrat diorama debuted at the Milwaukee Public Museum. Inside a wood-and-glass case with a curved backdrop painted to resemble the waning dusk light on a river bend, Akeley posed a colony of Wisconsin muskrat specimens performing various real-life activities – searching for and eating food, swimming, sleeping. He included a subsurface view of the river so viewers could see a slice of the animals' watery habitat, a view that would be impossible in real life. The Muskrat Group became a prototype for the arrangement of taxidermy where an entire story (in this case, the muskrats at dusk) unfolded in a small interior space. It was called "the Milwaukee Style" and replicated in museums around the nation. The how-tos of taxidermy and the diorama-building received much attention at early professional museum conferences, the subject of many technical briefs and conference sessions.

Dioramas represented two kinds of places: local and exotic. Local scenes (such as the Wisconsin muskrats at a **local** river bend) provided visitors with the chance to study a nearby habitat closely and to view its details in way that was not possible otherwise. These local diorama scenes also preserved an impression of a landscape that many people thought was going extinct; thus they were linked to **environmental conservation efforts**.

In some cases dioramas led to important actions. In south Florida in 1905, a young wildlife warden was murdered while trying to protect a rare colony of snowy egrets from plume hunters. Diorama designer Frank M. Chapman drew attention to this plight in AMNH's Hall of North American Birds, reminding visitors in a label that the birds were in danger of complete extermination unless the site could be protected. The Cuthbert Rookery is now under federal protection as part of the Florida Everglades Park, due "in no small measure to Chapman's efforts" (Quinn, 2006).

Dioramas also replicated **exotic** worlds. Before the days of automobile and jet travel and long before nature movies and television shows, dioramas offered urban dwellers a spellbinding vision of far away continents. After World War I, "great white hunters" traveled to Africa and the Arctic to "bag and tag" large game and then reproduce realistic renditions of those environments at home. When Akeley's famed Hall of African Mammals – filled with his and other hunters' trophies -- opened in 1936 at the American Museum of Natural History, the effect was stunning. "It is Africa. Not only the animals, but the trees, the leaves and grass, and the earth itself were brought from the place where each [diorama] was collected," exclaimed museum director and famed adventurer Roy Chapman Andrews (quoted in Gallenkamp, 2002).

As educational theorist Lisa Roberts notes, in their time, “well-crafted dioramas had the power to whisk viewers to the earth’s farthest corners, from the highest mountain tops to the deepest woods” (Roberts, 1997). Because of this power, Akeley’s dioramas were widely imitated throughout the nation’s natural science museums. Universities (eg, University of Iowa) and museums (eg, the Buffalo Museum of Science) trained students in how to design and construct them. Likewise students at art schools (eg, the Rhode Island School of Design) found work painting backdrops in the many studios that produced dioramas.

During the **Great Depression**, the Works Progress Administration funded museums to hire artists, artisans and scientists to refurbish and construct more dioramas. At that time, a skilled diorama-maker from the Staten Island Natural History Museum named Ned Burns became the first director of museums for the National Park Service. He led the development of large- and miniature dioramas that **depicted scenes from national parks**, a trend that spread to other natural history museums.

Throughout the 1950s dioramas remained popular. They had become **iconic** museum features; visitors knew they weren’t really in Africa or sitting on a river bend when they viewed a diorama, but, as Roberts notes, dioramas were regarded as “authentic,” because they were part of an authentic natural history museum experience (Roberts, 1998).

Diorama halls also received their share of criticism. Critiques ranged from the practical to the philosophical. Almost as soon as the first ones were unveiled, curators bemoaned **dioramas’ intensive use of space**. Museums used to put virtually everything they acquired on display, cramming items into cases, shelves and drawers and onto walls, fitting new acquisitions right into galleries as a form of visible storage (Porter, 1991). Dioramas, on the other hand, used collections selectively, and needed ample room for viewing. This forced the issue of **increased space for collections storage**. There was also considerable discussion about **the spectacle of the diorama trumping serious scientific research**. This concern dovetails with ongoing debates about the museum as a place of **entertainment** and **public education** as opposed to scholarship. (Cummings, 1940; Bennett, 1995; Yanni, 1999).

Dioramas occasionally **sacrificed scientific facts to artistic license** and accessible storyline. Animals which might have never actually “met” in the wild were grouped together. In other instances, they were positioned to model

human behavior including “**completely bogus nuclear families,**” where a mother and father tenderly cared for their babies (Asma, 2003). A since-modified diorama at the Field Museum showed a mother bird distracting a predator from her nest with the label stating that ‘a parent will go to just about any length to save the lives of its young. . . . Biologists say that self-sacrifice can sometimes increase the number of young that survive.’ Yet, in fact, as the curator pointed out: “The implication . . . is that the mother bird is prepared to commit suicide to defend her young. But that's sentimental, romantic and untrue. . . . The truth is that in this situation in nature the mother always lets the young get eaten and survives to bear another clutch of babies.” (Honan, 1990).

While some curators have been suspicious of this kind of **artifice**, other cultural critics go so far as to claim that the old-fashioned lines of specimens on shelves are a purer form of museology than the diorama. Rebecca Solnit (1997) claims that dioramas are “dishonest” because they don’t show the full extent of museum collecting practices. “[Displaying] the collection [in rows on shelves] doesn’t disguise the seductions of collecting, of trophies, accumulations, abundances ...”

Along the same lines, in 1989, anthropologist Donna Haraway published a scathing and seminal critique of dioramas and collecting practices. Focusing on Akeley’s African Hall at AMNH, Haraway exposed dioramas’ inherent **racism, imperialism and sexism**. For example, the “great white hunters” were wealthy industrialists asserting their “dominance of the world,” while their wives did much of the legwork without receiving a shred of credit. Likewise, Akeley favored male specimens in his displays because they were more charismatic. To Haraway and others (Scott, 2007), African diorama halls perpetuate a romantic image of Africa that does not include its people, cities and civilizations. What is also significant here is that dioramas provoke social commentary. Beyond the habitats they represent; they are rich places to expose museum planners’ values.

Finally, as dioramas could not withstand competition from a variety of media experiences now available to the public (including nature documentaries and IMAX films). Former Field Museum director Willard Boyd (1999) admit that while dioramas are “enduring masterpieces . . . irreplaceable because the art of realistic taxidermic sculpture is now rare,” they are also “often viewed by today’s visitors as a dead zoo located in a dark tunnel – to be either avoided or used as a race track.”

The following points summarize Section 2:

1. Dioramas were developed to attract audiences and popularize museums.
2. Dioramas are linked to the environmental conservation movement because they were meant to accurately depict scenes and landscapes for posterity that were thought to be in danger of extinction. (Wonders, 1989, Quinn, 2006).
3. Dioramas are accessible to visitors because they tell stories.
4. Dioramas are iconic.
5. Despite their august early history, traditional diorama halls have been criticized as inaccurate, overly-theatrical, perpetrators of stereotypes, and dull.

“What one generation esteems, the next deplures, and so forth *ad infinitum*.”
--- Willard Boyd, former director of the Field Museum of Natural History (1999).

Section 3

Dioramas: Post-1969

During the late 1960s, a **wholly new concept in diorama design** was born at the **Oakland Museum (OMCA)**. Oakland’s original Natural History Museum opened in 1926 and featured traditional dioramas of animal life in the Arctic and Africa. Forty years later, as it planned a new modern facility, OMCA hired a team of environmental scientists to re-envision its natural science component. The old dioramas were dismantled (and their contents auctioned off). A new set of dioramas was created to focus on California **ecology** and illustrate the interdependence of its flora, fauna and geology. What distinguished the new dioramas was their **intricacy**. “We want to avoid putting animals on pedestals in the spotlight,” said Don MacNeill, a lepidopterist, who oversaw the production of the new natural sciences galleries, “a lion, for instance, is no more important than the wren perched on the tree over his head or the plants that grow around the rocks where he walks” (quoted in Schwarzer, 2010).

As Tom Steller, former natural sciences curator at OMCA explained, “What we did was create dioramas that had enormous diversity typical of a particular part of a [plant and animal] community. We have three-by-five foot diorama that has 65 different kinds of specimens. That’s a lot of detail!” (personal interview, 2007). In addition, the dioramas displayed realistic scenes – such as two bear cubs playfighting -- that would be almost impossible to witness in the wild, making them of interest to both general visitors and ardent naturalists and scientists.

OMCA’s natural sciences gallery – which opened in phases through the 1970s – represented a **radical breakthrough for the museum field**. No longer did dioramas showcase a series of disjointed snapshots of time and place; they were now displayed as a narrative across local geography: **A Walk Across California**. In addition, many were positioned at eye-level so visitors could look at them closely. “If you are going to show that level of complexity, you

have to allow people to see it. 'That's why I call it 'nose to the glass exhibitry'" says Steller. Finally, the days of "bagging and tagging" animals in order to display them in a museum diorama were over. "Our hunting is often by phone, searching the contents of freezers at other museums, state and federal wildlife agencies or animal rehabilitation centers," notes Steller. OMCA's gallery became a prototype for the **ecology diorama**. In addition, the staff pioneered new exhibition enhancements, including using scents and smells of the outdoors (eg, coastal sage brush) for the first time in an indoor gallery.

Other natural science museums followed suit and transformed their dioramas from frozen encased vignettes into flowing themed narratives. In the 1970s, the Royal British Columbia Museum in Victoria, Canada and the Milwaukee Public Museum innovated the diorama by removing glass barriers "and flat wall presentations, substituting an open, and, often, three-sided exhibition and creating for the visitor the illusion of being inside the exhibition, rather than on the other side of the glass" (Bedno & Bedno, 1999). Thus the **immersive** style of natural science was inaugurated.

In 1983, Minnesota Science Center opened "**Wolves and Humans: Coexistence, Competition, and Conflict**" exhibition at **Minnesota Science Center** which later traveled to other museums. The Wolves exhibit was notable for two features: first, it employed interactive elements that were gaining popularity in science museums and second, it addressed a controversial local issue – the fate of the Minnesota grey wolf -- from diverse perspectives. In the center of the gallery was an open (non-glassed) diorama of a wolf pack, including an alpha wolf killing a deer. Team member Paul Martin explains how the design of this diorama reinforced the exhibition's intended educational messages: "The largest design element is a circular environment that is almost eighty feet in diameter. The prominent design element reinforces in a visual and experiential way the idea of multiple perspectives central to the interpretation of the exhibition. At the center ... mounts of twelve wolves [display] various aspects of wolf behavior. Visitors move around the pack getting multiple perspectives of the behavior (Martin, in McLean, 2004)."

Augmentations further reinforced the messages. A computer game allowed visitors to play the part of wolves on a deer hunt, and at a "howling booth," visitors could howl in order to elicit a response from a pack of wolf images hidden on a light board map. A video loop presented different attitudes on reintroducing wolves to the wild, with a range of opinions from ranchers, trappers, hunters, environmentalists and biologists. Cultural statements on people's perceptions of wolves in literature – from the big bad wolf in Little

Red Riding Hood to Romulus & Remus – helped to set a broader context for people’s attitudes toward wolves.

In the early 1990s, the **Field Museum of Natural History in Chicago**, in a move that generated some controversy (discussed later in this section) supplemented its dioramas with “labels, videos, computers and other interactive devices” in order to raise contemporary issues (eg, by the Deer Diorama, a discussion of the overpopulation of deer in suburban areas”) (Boyd, 1999). The new exhibitions used hands-on and electronic interactives, computers, live specimens and smells to tell stories (Rabineau, in McLean, 2004). Likewise the **Denver Museum of Nature and Science** refashioned its Works Progress-era dioramas into an organized presentation about Colorado’s eco-systems. Visitors could join fictional scientist-narrator C. Moore as she ascended from grasslands prairies to alpine tundra and told her story through mock field notes, displayed as labels. Denver added video games and activities and also revealed the story behind the exhibition’s creation, displaying photos of the old hall and photos of the 1990s exhibition team, including a staff-member’s dog.

More museums augmented or altered their dioramas, adding maps, touchable parts, and interactive components. Diorama halls animated with live animals and plants, real water, animal sounds and videos and labels were updated. The first natural science museum of the 21st century opened near **Yellowstone National Park in Cody, Wyoming** in 2002. The **Draper Museum of Natural History** focuses on its local environs, integrating “science and natural history with cultural history” of the region, “illuminating the complex relationships among humans, wildlife, and landscapes.” Non-glassed dioramas proceed geographically through the region’s eco-system: from alpine to plains. Catalog captions (a potential model for labels) explain how some animals were acquired; eg: “This bighorn sheep ram was confiscated from poachers by the Wyoming Game and Fish Department who provided it to the Draper for exhibition” or “This 19-year-old [Grizzly Bear] sow was struck and killed by a truck in the Shoshone National Forest near the east entrance of Yellowstone Park.” The dioramas are augmented with sounds, computer kiosks, and small cases of wildlife inspired art and photography. As part of the immersive environment, visitors can walk through a beaver lodge.

To prepare for its 2008 renovation, the **California Academy of Sciences** in San Francisco conducted visitor studies research (discussed in Section 9) to determine what it should do with its two aging diorama halls. Eventually, the museum chose to eliminate its California diorama hall, but to conserve the

badly-frayed specimens in its African Hall and recast the gallery as the “Tusher African Hall.” The Tusher Hall opened in 2008 and features two rows of beautifully-restored dioramas supplemented with video stations, film projections onto one of the dioramas to add a sense of movement to the scene, and the most popular stop of all: a glassed –in aquarium of live Namibian penguins which swim and waddle to visitors’ delight.

Other recent contemporary touches can be seen at The Los **Angeles County Museum of Natural History** which put real water into one of its dioramas and added a display of a coyote with a domestic cat in its mouth on a suburban swimming pool diving board, touching on the urban-wildland interface issues that arise with increasing development. As of this writing, the **Bell Museum of Natural History** (Minnesota) is prototyping different approaches for its upcoming renovations. These include playful interventions such as a build-it-yourself scale diorama activity, peek-a-boo dioramas and a small electric campfire.

Since the development of the diorama in the late 1800s, institutions have revisited, retrofit and repackaged dioramas in order to keep up with trends in technology, science, and education and harness their power to **entertain and delight** the public. At the same time, the innovations have not been without their own set of problems. Like prior criticisms, the issues have been both practical and philosophical.

In the realm of **collections care**, some specimens have not stood the test of time, shedding to the point of disintegration. In extreme cases, the poisons with which taxidermists treated specimens posed potential danger to staff. Some museums have thus chosen to remove dioramas rather than invest the funds to conserve, augment or re-tool them. Another practical consideration pertains to the trend to integrate live animals into displays. “Keeping live beasts in a building that is more accustomed to stuffed or fossilized ones is not a simple task,” one journalist has noted, “there are issues of animal welfare, feeding, safety and ventilation, and above all money” (Fountain, 2007). Furthermore, there will always be visitors (roughly 10%, according to some studies) who are bothered by the display of dead animals.

Other criticisms pertain to **educational interpretation**, claiming that it is either lacking, inadequate, or too glitzy. The Oakland Museum’s 1960s and 70s dioramas “essentially were props for docents (Steller, 2007). A docent tour was “extremely important to help connect visitors to the diorama,” implying that

without a human explainer much of the content wasn't fully evident to visitors. Visitor studies at both Oakland's and other dioramas confirm that this **lack of stand-alone interpretation** is a problem. Drop-in audiences desire **more basic information** about the dioramas in the form of labels and other non-mediated educational devices. (The results of visitor studies of dioramas at 17 different natural science museum galleries are discussed in more detail Section 5). Without more adequate stand-alone interpretation, some visitors may still come away from dioramas with false ideas about nature. Some think that dioramas **show nature the way it was in the past**. Other critics attest that dioramas perpetuate the "feel-good" idea of nature as intact, pristine and timeless, while relentless urban development continues to destroy natural habitats (Luke, 2002).

On the flip side, traditionalists have derided the **"Disneyfication"** and "shopping mallification" of the diorama hall. Renovations at the Field Museum of Natural History in Chicago during the late 1980s and early 1990s under the direction of former Boston Children's Museum director Michael Spock were scrutinized in the press as a harbinger of educators overtaking curatorial expertise in favor of "the ten-year old child from the ghetto" (Honan, 1990; Pridmore, 1991). Articles in the *Chronicle of Higher Education* have expressed dismay over the **edu-tainment** direction of natural history museums, especially ones that have gutted historic exhibitions in favor of "expensive renovations that destroy the work of prior generations of curators and the memories of older visitors" and added video and other "juvenile" blockbuster enhancements (Benton, 2006, 2009).

A recent literary essay about the diorama hall at the **Bruce Museum in Greenwich, Connecticut** weaves nostalgia for the traditional halls, with an optimism for the power of the newer techniques, touching on the possibilities that thoughtful renovations bring: "Here in front of the dioramas we got tranquilly alert, like two people fishing: we wanted to catch the dioramas' secrets, and these artificial windows on the real world seemed to have an endless supply. The old dioramas, also, have been jettisoned, and a solitary new one has been built ... A [multi-media] wall-sized panoramic piece of a Connecticut shoreline Habitat ... incorporating sounds of birds and insects as well as subtle lighting effects that change from dawn to dusk in a matter of minutes" (Shinto, 2000).

The following points summarize Section 3:

1. The Oakland Museum was the first museum to design a natural science hall with an **ecological theme** and dioramas that were intricate “slices” of an environment.
2. Since the 1970s, museums have augmented, renovated and re-envisioned diorama halls in tandem with developments in educational theory, technology, science and visitor evaluations/studies.
3. Noteworthy innovations have been undertaken by natural history museums in Chicago, Cody Wyoming, Denver, Greenwich Connecticut, Milwaukee, Minneapolis-St. Paul, San Francisco, Victoria, Canada, among others.
4. Common augmentations include **immersive environments**, containing touchable objects, crawl spaces, video, live animals and plants, sound, lighting effects, different kinds of staging, and labels explaining how the diorama was created and/or the animal acquired.
5. The new environments have been scrutinized by critics as well as evaluators, resulting in both philosophical and practical ideas about the future of the diorama.

“[Natural history] museums can remain vital centers of discovery and wonder for our communities, while helping address the pressing need we have for a responsible relationship with our natural and cultural worlds” (Pisano, 2006).

Section 4.

Contemporary Diorama Typologies – Art Installations and Digital Technology

Two increasingly popular typologies stretch the meaning and viewing of dioramas. Both have great potential for extending the environmental conservation themes so important to natural history museums, as well as creating new points of access to dioramas.

Artists’ responses to dioramas

Since dioramas are artistic creations, it is not surprising that artists have used the form for both playful, “kitschy,” and biting social critiques. In 1851 at the Crystal Palace in Great Britain, German taxidermist Hermann Plouquet unveiled 1500 “comicalities,” scenes where mounted animals were dressed up and posed with furniture to imitate human behaviors: a group of ermines daintily sipping from porcelain cups at a tea party; hedgehogs skating on a frozen pond; a weasel playing the piano (Olalquiaga, 1998). Even the Oakland Museum’s predecessor the Snow Museum of Natural History engaged in a bit of comicality, staging an animal fashion show in 1946 where the mounted elephant, moose, and zebra modeled the season’s latest hats and bonnets (Schwarzer, 2010).

Filmmakers have used dioramas as backdrops to make larger statements about the world and social relations. The classic 1962 art film by Chris Marker, *La Jetee*, features a haunting scene between two lovers in an unnamed diorama hall in Paris to comment on the relationship between memory and eternity. Likewise, the AMNH diorama halls become sets that stoke fantasy and adventure, both in the television situation comedy *Friends*, and the blockbuster movie “Night in the Museum.”

Since the late 1990s, visual artists have created installation pieces that investigate environmental concerns using taxidermy collections and the archetypal form of the diorama. In 2000, the Museum of Contemporary Art in La Jolla, California presented “Small World: Dioramas in Contemporary Art.”

Artist **Mark Dion** created a habitat diorama of urban raccoons preying on heaps of human refuse beside a suburban garbage can, a commentary on the relationship between wildlife and human beings. Dion, as stated in his biography on wikipedia, creates “works that question the distinctions between objective (rational) scientific methods and subjective (irrational) influences;” he also uses his work to comment on environmental politics and public policy. His interventions have occurred mostly at art museums, but he has also “deconstructed” natural science museums, like the Natural History Museum of London, where, in 2007, he created a series of workshops and installations that investigated the relationship between the Museum’s collection and those plastics and other non biodegradable garbage found when excavating contemporary London environs.

Digital Technology meets Diorama

Any “non-wiki” report on internet typologies is, by the very nature of the topic, out-of-date within minutes of being written. That said, many museums are developing dynamic websites that provide a wealth of information to extend viewers’ appreciation and understanding of dioramas. Constantly evolving websites hosted by the American Museum of Natural History (AMNH), Field Museum, Peabody Museum, Royal Alberta Museum (RAM) and the Bell Museum of Natural History (BMNH) all contain extensive information about their dioramas’ zoological, geographic, historic or artistic **content**. Some features allow **close up views** or **panoramic scrolling** across the dioramas. A few include **podcasts** of curators talking about the fabrication process as well as the animals featured, including sounds made by animals in the wild. Additional material helps **teachers** link dioramas to **curriculum standards** in order to help them justify school field trips.

BMNH’s website text uses explicit language to comment on local environmental changes: “today, the Mall of America is less than one mile from the site of the tundra swan diorama. There, fields of asphalt have replaced farms. This has probably reduced the amount of soil eroding into Long Meadow Lake, but it has made storm floods more severe. Oil, anti-freeze, road salt, and other pollutants flow in with the runoff” (www.bmnh.org). This comment represents an opportunity for thoughtful visitor response and dialog that may not be possible directly on a gallery floor.

Newer web and social media technologies hold great promise for further interpretation of dioramas, both off and on site. Diorama-making is popular on “e-how,” the *youtube* channel that features how-to video demonstrations

about just about anything; likewise there are multiple Taxidermy social groups on Facebook. More possibilities exists with **Google maps** and **global positioning systems** – where original locations can be located on a **zoomable map** --; **photo commons** where both historical and contemporary images can be shared, as well as overlaid on a map and linked to many sites at once --; **wikis** – which allow visitors to layer content into a site --; and **augmented reality** – which allows visitors multiple views of an infinite array of past, present and future places all at the single touch of an application on an I-phone.

The following points summarize Section 4:

- Art installations that play off of the traditional diorama format provoke new understandings about animals, nature and even the form of the diorama itself.
- Digital technology not only provides new ways to share information but it extends our notion of geography and place, both of which are vital aspects of dioramas.
- Museums can help people see how places change over time and shift how people their relationships to places and the history of places.

“Are the animals real? What are their names? What do they eat? Who eats them? Are the colors real?”

-- questions asked at Oakland Museum dioramas (Neitzel, 2005).

Section 5.

Visitor Studies

The collective body of 30 diorama visitor studies conducted at 17 natural sciences galleries examined for this report have a variety of disparate goals, sample sizes, and methodologies. They range from Doris Ash’s intensive analysis of three visitor groups’ conversations at the Los Angeles Museum of Natural History (2004) to Randi Korn’s summative evaluation of 800 drop-in visitors’ use of exhibitions at the Draper Museum of Natural History (2003) to a study the Corpus Christi Museum of Science and History conducted with 20 teachers to assess how to improve school field trips (Deisler-Seno & Reader, 1991). Taken together, the 30 examined visitor studies have assessed about 3,880 adults and children. The majority of studies consist of **quantitative** research that uses techniques like **tracking and timing, standardized interview questions** and **observations** to evaluate extant exhibitions.

This section synthesizes the core findings of the studies. Fuller summaries of each report are presented in Section 9, and Appendix B lists the institutions studied.

Common goals of diorama visitors studies:

Evaluators have gathered data on:

- visitors’ reaction to **proposed new label content for dioramas** and **new augmentations** such as interactives, audio and video;
- the average amount of time spent (**dwell time**), frequency of stops or other visible patterns of behaviors at dioramas versus non-dioramas;
- **questions** that visitors ask about what they are seeing;
- the educational potential of facilitated or guided viewings and school field trips;
- the effects of **hands-on or media based augmentation** on diorama viewing and learning;
- what visitors notice when they first look at a diorama;

- whether visitors think a diorama hall should be eliminated or changed;
- whether visitors understand the **main message** or intent of the diorama;
- attitudes toward conservation and the environment; and
- memories, **feelings** or personal associations evoked by dioramas.

Results:

Despite their variety of approaches and intent, the studies reveal consistent information. Aggregating results gleaned across different institutions and methodologies, we can conclude the following about dioramas:

1. Dioramas **attract** visitors' attention. In natural science galleries, visitors will **stop and look** at dioramas **more than at other kinds of exhibitions**, with the exception of dinosaurs (Falk, 1991; Korenic, 1995). At the Draper Museum of Natural History, 97% of 570 observed visitors stopped at the dioramas (Korn, 2003). Only a small percentage find the dead animals disconcerting (Garibay, 2008).
2. **Size matters.** Visitors are most attracted to **large dioramas** and dioramas with **large animals**. (Peart & Kool, 1981; Falk, 1991; Pekarik, 2005). Yet, parents have difficulty focusing their kids' attention in large, sprawling spaces (Gyllenhall & Cheng, 2003).
3. Visitors stay longer at dioramas that depict stories, especially **interactions between animals**.
4. **Lighting matters.** Visitors frequently say they prefer **brightly-lit** galleries.
5. **Color matters.** Colors are frequently mentioned by visitors. Visitors ask about whether a diorama's color is natural or real and they appreciate deep, rich colors from nature. At the Oakland Museum, they also remarked negatively about drab wall and carpet colors.
6. Activities and interpretation enhance dwell time (Serrell, 1996; Mackinney, 1996).
7. Overall, the most popular enhancements are: **hands-on activities, audio** and **maps**. Beverly Serrell (1996) gives the example of a

successful activity supported by a label at a deer diorama, in an unnamed museum. The label poses the question: “What is the fuzz on the antlers?” and lets visitors touch a velvety facsimile of an antler. Serrell writes that “after touching it, visitors were seen pointing at the mule deer buck in the diorama and overheard saying, “That’s what his antlers feel like.””

8. **Well-written labels make a difference.** Visitors tend not to read long **labels** at the entrances to diorama halls and prefer label copy that is **simple, direct and concrete** (Serrell, 1996; Mackinney, 1997; Gyllenhaal, 2003). Yet, in several studies conducted at the Oakland Museum of California (Nietzel, 2005; Garibay, 2008), visitors requested more information in labels.
9. Parents are strongly in favor of science activities and experiences for their children (Chittenden, 2001; Gyllenhaal, & Cheng, 2003; Garibay, 2008).
10. Dioramas can successfully support **state curriculum standards** and can **increase student understanding of scientific processes and concepts** (Deisler-Seno and Reader, 1991).
11. Dioramas promote and enhance **observational skills, questions, and social conversations.** For example, at AMNH, Ellen Giusti (1995) found out that 30% of visitors who stopped at the diorama of a “Lynx Hunting a Hare” had a conversation related to the subject matter. As Doris Ash (2004) states, “Dioramas ... provide a different kind of experience than the physical one found in hands-on museums and discovery centers. At dioramas, visitors focus on observation, rather than physical manipulation of objects.”
12. **Interpretative materials** are essential for communicating science concepts. Peart & Kool (1981) note that large dioramas “wow” visitors but don’t necessary “teach them anything.” Perry, Garibay & Edington (1995) made a similar observation in their analysis of interviews about the Chicago Academy of Sciences’ dioramas; visitors view the dioramas concretely and don’t connect to larger science ideas without interpretation.

13. The five most frequently-asked questions asked at dioramas are **concrete**:

- **What is the animal's name?** This was the top question of twenty-five percent of visitors surveyed at AMNH (Giusti, 1994), as well as the most frequent question asked at the Natural History Museum in London and Oakland Museum (Tunnickliffe, 2003; Neitzel, 2005).
- **What does it eat** and who eats it? (predator/prey relationships)
- **Where does it live** (asked more frequently if no map is present)? During a front-end evaluation of the African Hall at the California Academy of Sciences, Lisa Mackinney found that 71% of visitors wanted to see a map that showed where the animals live.
- How does it reproduce and how does it live? (**animal behavior**)
- **Where** is this habitat? (geography)

14. Visitors also have **strong affective** (or **emotional**) reactions to dioramas. The six most frequently affective responses mentioned are:

- Dioramas' "**realism.**" (Guisti, 1994; Perry, Garibay & Edington, 1995; Garibay, 2008).
- Appreciating a **safe opportunity to view natural "close up."** (Perry, Garibay & Edington, 1995).
- **Memories** of childhood or being in nature. At the Chicago Academy of Sciences, 98% of visitors said that viewing dioramas such a evoked a memory. (Fialkowski, 1992)
- Being **outdoors** (Garibay, 2008).

- **Personifying** an animal's emotions or behavior. At the Natural History Museum in London, Tunnicliffe (2002) observed children making statements like "The giraffes are friendly." Ash (2004) believes that personification of animals is a possible entry point toward greater science understanding in a diorama.
- Beauty, serenity, imagination and relaxation (Korenic, 1995; Garibay, 2008).

15. Diorama halls do not change drop-in visitors' attitudes on conservation and environmental issues, but **reinforce prior attitudes and knowledge** (Tunnicliffe, 2003; Korn, 2003).

16. In general, visitor attitudes and reactions to dioramas are **overwhelmingly positive**, with only a small percentage expressing concern about "dead animals" (Garibay, 2008).

Other interesting results were unique to particular studies and institutions:

Role of Photography: At the Smithsonian, 17% of visitors **posed for photos** at certain spots in the diorama galleries (Pekarik, 2005). This observation is noteworthy because it implies that visitors saw something special or wanted to "capture" the moment to share with others. More study of photo taking in other diorama halls might yield similar observations about popular spots where visitors choose to take a photo.

Crawl Spaces: At the Smithsonian and the Draper, **crawl spaces** that immersed visitors (especially children) within an environment were popular, eg, a cave. (Korn, 2003; Pekarik, 2005).

Diversity: At the Oakland Museum of California and in a cross-comparative study conducted at Natural Science Museums in London, New York and Nairobi, preliminary findings suggest that there are **no discernable differences between how people from different cultural groups view or perceive dioramas**. This might imply that the diorama is such an iconic museum feature that its institutional/authoritative aura does not invite questioning or social commentary (Scott, 2007). In a study at the Boston Museum of Science on access for **people with disabilities**, Serrell (1996) found that universal design that made dioramas easier to view for people in wheelchairs benefited everyone who visited the exhibition.

Heightened Awareness of Place and Local Issues: At the Oakland Museum of California and the Draper Museum of Natural History, visitors had a **heightened sense of place and local environmental issues**. In Oakland, visitors frequently identified **Yosemite National Park** as a place of strong interest, whether they had actually been there or not (Garibay, 2008). They were divided as to whether OMCA should address issues like **environmental degradation and global warming**. Some felt that the museum had a responsibility to address this issue, whereas others don't want to feel bad when they visit the museum. At the Draper, visitors mentioned specific concerns about forest fires and fire management; wolf reintroduction; and ranching/agriculture (Korn, 2003).

The following points summarizes Section 5:

- Visitor Studies give us insight into consistent concrete meanings and questions that visitors have about dioramas.
- Visitor studies confirm that, despite dioramas' large size, cost, and reputation in some corners as being dusty and old-fashioned, they are attractive, interesting and valuable to natural history museum visitors, especially parents and children.
- Dioramas promote, in casual visitors, the skills of observation, question-asking and conversation.
- Visitors respond to and recognize a well-crafted diorama's beauty, colors and the artistic skill involved in creating it.

"We tend to forget that natural history museums are also places of inspiration. Despite a prevalent stereotype of science as dispassionate stamp collecting, there is a romance of science, and museums are prime movers in generating that emotional experience."

-- Stephen Asma (2001), 34.

Section 6

Gaps in Knowledge

The aggregate findings reported in Section 5 offer practical guidance to all museums considering renovations and augmentations to dioramas. Yet very few research projects were designed to be relevant beyond the needs of the sponsoring host institution and have broader application to the museum field. This section suggests three gaps in the field's overall knowledge about visitors' experiences of dioramas that deserve further consideration.

Gap 1: Dioramas' **affect** on visitors' emotions, feelings and connection to place has not been fully considered or analyzed.

Recent research on learning in free-choice environments like museums suggest that **learning is a constructive process that depends on personal, socio-cultural and physical context factors**. Emotions, conversations, and prior knowledge all contribute to our learning experiences at museums. Most visitors create their own meaning and narratives within a visit (Falk, Dierking & Adams, 2003; Ash, 2007). This kind of learning is difficult to document with the traditional quantitative evaluation instruments that have been used to assess visitors' experiences at dioramas. All evaluations of dioramas note their emotional impact. Words like "wow-factor," "color," "realism," "memories of childhood," "sparked imagination," "relaxation," "beauty," "inspiration," and "sharing," appear frequently in visitor comments. Yet no study links these elusive values to prior knowledge of nature, attitudes about conservation and wildlife, cultural and social background, or the psychology of aesthetics and art-viewing.

Ash, Melber, Perry, Garibay and others have **analyzed conversations** between visitors in order to identify affective reactions to dioramas and measure how parents might facilitate their children's experiences. However, many interviews have not been transcribed or deeply analyzed. Of the

interview transcriptions that do exist, there is an opportunity to “mine them” more thoroughly for trends.

Falk, Dierking & Adams (2003) have proposed the technique of **Personal Meaning Mapping** (PMM) as a way of measuring affect. This technique has not yet been applied to dioramas (Institute for Learning Innovation, personal communication, 2009). Since dioramas evoke conversation as well as **strong emotion and memories**, PMM holds promise for uncovering some of the deeper learning and meaning-making that may occur at dioramas.

Serrell, Scott and Garibay have done preliminary investigations as to how people from **diverse cultural backgrounds and abilities perceive dioramas**. The results thus far have been inconclusive, with the exception of the fact that we know that universal design principles are of benefit to all visitors. PMM and other qualitative techniques might help deepen their research by providing a way for visitors to express themselves more fully.

Qualitative research might help us gain insight into questions such as:

- If visitors ask questions which become part of the display or if they see the questions of others do they engage more deeply?
- Can dioramas help people think about conservation issues more strongly?
- How can dioramas be used to increase the focusing, observation skills of children?
- How can dioramas be used to help people extend their individual empathy for one animal to the whole species and beyond?
- What can dioramas offer visitors about deepening attachment of sense of place or connection to nature?
- How can dioramas best be a bridge to the real place, inspiring people to seek experiences in nature?
- What kinds of long-term impacts do dioramas have on such factors as career choice, educational attainment and other behaviors?

Gap 2: No study has measured the impact of new digital technologies on dioramas and visitors' sense of place.

As suggested in Section 4, rapidly-evolving digital communication technologies like Google mapping, global positioning, cell phone applications, social networking and augmented reality, are changing our relationship to each other as well as our sense of and relationship to places, including nature. Through augmented reality, we can stand in one place in real-time and, with our cell phone, access images from the past and present with layered information and maps, as well as feedback from our social networks and even strangers. For example, while standing at Bridal Falls in Yosemite, on our cell phone we can send photos to our friends around the world, call up photographs taken by others, access wikipedia as well as other sites containing more information, and look up other national park sites. What do these rapidly-developing multiple layers of access do to our experience and appreciation for the nuances and details of nature? Where do dioramas fit within this paradigm?

We know that dioramas inspire close looking, observation and conversation, but there is no research, as of this date, that shows the role or potential of digital technology in encouraging this kind of learning.

Gap 3: Collaboration between institutions re-considering and re-evaluating dioramas is non-existent.

Many institutions have invested resources in visitor studies of their dioramas. Yet, no researchers have rigorously cross-compared visitors' diorama experiences across institutions and collaborated to test ideas about improving or enhancing dioramas.

As discussed above, the few cross-comparative studies that touch on dioramas focus primarily on: the qualities of **family learning and parent-child interaction**, (Borun, 1998; Ash, 2004); family units' visitation patterns, **social dynamics** and **learning** process (Falk, 1991); and **mother-child scaffolding** during conversations at exhibits (Ash, 2007, Melber, 2007).

These studies that exist raise interesting ideas about **universal attributes of social learning in museums** as well as **prior knowledge that visitors bring with them to museums**. Yet, the conclusions are, at this point, largely theoretical. For example, Ash's work emphasizes **Vygotsky's interpretation**

of the zone of proximal development (zpd) between adult and child. She believes that social conversations at exhibitions like dioramas can be vehicles for building knowledge. So, how can museums create environments that stoke these conversations and support parent-child dialog and learning? We don't know. Dioramas may also powerfully support other learning theories, especially ones that relate to aesthetic experiences or our changing relationship to nature, the outdoors and place. Yet, no studies of these ideas exist.

“Where have they gone?” Wheeler asks, “but he knows ... but for a moment longer he allows himself to be held at the window by the almost solemn stillness of the square.”

--Wendell Berry, “The Wild Birds” (1986).

Section 7

Recommendations

Based on the literature reviewed, this section offers recommendations to the Oakland Museum as well as to the field at large.

Recommendations to the Oakland Museum:

1. **The existing dioramas at OMCA are an invaluable resource** worthy of full consideration in the planned renovation. The team should explore ways **to use them and real objects to their full potential**, before making any decisions to remove them from the galleries. The dioramas' intricacy and size are assets. They are large enough to serve as potential anchors or attractors in an exhibition, but small enough to focus visitors within a large space. Their intricate details can inspire observation, close looking and conversation, which are all desired visitor behaviors.
2. Carefully considered **lighting and color choices** will be important components to the new gallery. Visitors respond to and care about lighting and color.
3. **Enhancements** will increase visitor enjoyment, learning and dwell time. These include:
 - a. Better labels. Labels must be simple, easy-to-read and include such information as animals' names, animals' diets and other behaviors, clear maps of the habitats depicted, and information about the time of year or season.

- b. More information. Other information to be included in a more layered version of the label might be: how the animals/plants were collected/acquired, whether the animal/plant is endangered or its status; how the diorama was made; how to visit the area that the diorama depicts; and behaviors visitors can engage in that support the survival and health of the habitats.
- c. Parent-child activities. The exhibition should include questions and activities to encourage parent-child conversations and interactions.
- d. Stories and themes. Exhibitions with stories (such as how a predator stalks prey or the how a prey evades a predator; how a natural community responds to a fire or other kind of disturbance; the impact of humans on an animal's survival and habitat) engage visitors. The team also needs to negotiate the balance between personifying an animal's behavior (the birds are happy) in order to tell a story, and scientific understandings that animals are not human. We know that personification is a positive entry point for novice visitors, in spite of scientists' concerns about perpetuating stereotypes or misinformation.
- e. Augmentations. Based on the elements that visitors responded strongly to in the visitor studies, these should include sound (especially animal sounds), touchable objects (such as antlers, bone, fur, plants, etc), and crawl spaces and other walk-through immersions. OMCA should also consider that visitors at other museums responded less-positively to video monitors (they are becoming all too common these days) and smell (no studies mentioned smell, except for visitors' negative responses to the "mildew" in the OMCA gallery (Garibay, 2008)).
- f. Spaces for relaxation, conversation and exhibition-related programs.
- g. Information on conservation and environmental issues. Although dioramas represent an ideal context for introducing larger issues about environmental degradation, the way that this material is introduced will need to be carefully considered, and would benefit from more research and prototyping about prior knowledge and visitor expectations.
- h. Opportunities for participation and meaning-making. Taking a photograph, adding a comment to a space or web component, or offering take-home activities all represent ways to extend a visitor's memories and feeling of belonging. The team should

consider these and other methods for inviting visitors to take part in the exhibition.

4. **School groups and teachers are an important audience.** Although school field trips are currently in decline due to state budgeting and curriculum issues, the research shows that dioramas are popular and effective exhibits that can **link to state curriculum standards**. Teachers and other educational stakeholders should be consulted as interpretation is developed to assure that their needs are considered. Other audiences to consider are parents who **homeschool** their children and other organizations that provide educational services.
5. **Focus on California, but extend to the globe.** OMCA has the advantage of being located in a region and state with abundant natural variety that is accessible. It sits at the edge of Lake Merritt, the nation's first waterfowl refuge; on a reasonably-clear day, the Oakland hills and San Francisco Bay can be viewed right from the museum's rooftop garden. Furthermore, visitors to OMCA frequently mentioned Yosemite National Park as a point of reference when asked about specific places. OMCA would benefit from using its location as well as the powerful icon of Yosemite to connect the themes in its galleries directly to the outdoors and resources within the state. These can serve as entry points and possibly coupled with digital media to extend to other natural places with which visitors may be familiar because of their family or immigration history.
6. **Harness the power of art and technology to extend (but not replace) the power of the real object.** As discussed in Section 4, art installations and digital technology can successfully extend the meaning and understanding of nature.

Recommendations to the Field:

1. **Establish, through cooperation, pilot or test sites at collaborating museums to evaluate different approaches to dioramas suggested by the studies cited above and disseminate this information to the field.**
2. **Engage in more rigorous cross-institutional study of visitors' experiences of dioramas.**

As discussed in Section 6, little has been done to analyze visitors' experiences of dioramas that could suggest universal attributes and attitudes on dioramas (beyond the fact that visitors are most attracted to big animals and want to know their names). Opportunities exist to develop **both quantitative and qualitative instruments and methods** that begin to answer some of the questions posed in Section 6 that might contribute to our knowledge of how natural science diorama exhibitions reinforce each other and contribute to the public's perception of both natural science museums and nature itself. Such knowledge might mirror and extend the goals of the original Nature Study curriculum of the early 19th century: to instill in the public a sense of responsibility and stewardship of nature, and to establish museums as resources for gaining this kind of understanding in a way that is entertaining and engaging.

Section 8

Works Cited (selected works are annotated).

Adrian, T. (2006). “Endangered Collections: Legal Obligations for Museums Holding Endangered Species.” *Collections*, 2/4, 331 – 350.

Museums with “dead” specimens in their collections (either purchased or donated) must comply with a large number of endangered species laws, which are described in this article.

Alexander, E. (1997). “Carl Ethan Akeley.” *The Museum in America*. Walnut Creek, Calif: AltaMira Press, 33 – 49.

American Association of Museums. (1917). “Museum of California Academy of Sciences.” *Museum News letter* (1/4).

This news item on the new habitat groups at the California Academy of Sciences is notable in its precise descriptions of time and place. For example: “The San Joachin Valley Water-fowl group shows the various species of ducks and geese that winter in the valley. The scene is in February, and in the evening just as the sun is disappearing behind Pacheco Pass. Various species are on the ground about some ponds and tules and a flock of White-fronted geese is just arriving.”

Ash, D. (2004). “How Families Use Questions at Dioramas: Ideas for Exhibit Design.” *Curator*, 47/1, 84 – 100.

This paper explores **family discussions** in front of dioramas at the Natural History Museum of Los Angeles County. The focus is on the role of questions to either enable or hinder movement towards scientific understanding.

Asma, S. T. (2001). *Stuffed Animals and Pickled Heads: The Cultural Evolution of Natural History Museums*. New York: Oxford University Press.

Bedno, J. & Bedno, E. (1999). “Museum Exhibitions: Past Imperfect, Future Tense.” *Museum News*, September/October.

The Bednos summarize salient historical trends in museum exhibitions, in this useful article.

Bell, P., Lewenstein, B., Shouse, A. W., & Feder, M.A., eds. (2009). *Learning Science in Informal Environments: People, Places and Pursuits*. Washington DC: National Research Council.

This publication presents viewpoints on the question of whether people learn science in nonschool settings. The overwhelming conclusion is that they do. Informal environments can motivate and excite the public to engage in and reflect on science. Learning in “designed spaces” (like museums) tends to “be more fluid and sporadic” because visitors choose which exhibits they want to interact with.

Bennett, T. (1995). *The Birth of the Museum: History, Theory, Politics*. London: Routledge.

Bennett is interested in how museums control and display knowledge. “What is seen [in a museum] leads to what is not seen.” Museum natural history displays promote a visible sense of order that is not controlled by theology.

Benton, T.H. (2006). “The Decline of the Natural-History Museum.” *Chronicle of Higher Education*, 9 October.

The author laments the direction of natural history museums. He warns against the tendency to turn science museums into “theme parks and shopping malls.” On the other hand, he praises museums for standing up to the “pressures to expunge evolution” from their educational message.

Benton, T.H. (2009). “Preserving the Future of Natural-History Museums.” *Chronicle of Higher Education*, 30 October.

Science, the author argues, is an evolving interdisciplinary enterprise worthy of celebration. He cautions natural-history museums to “honor their histories and avoid expensive renovations that destroy the work of prior generations of curators and the memories of older visitors.” “The world is full of simulations. Natural-history museums should cultivate the aura of the real: the rare and unique, the beautiful, the exotic, and the grotesque. Better to showcase one crackalured bone for the great rarity that it is than to add one more fake-looking T-Rex skeleton, in midattack, posed as a photo op.”

Berry, W. (1986). *The Wild Birds*. San Francisco: North Point Press.

Bjork, L. (2000). *Wildlife Dioramas and Natural History Museums in Theory and Practice*. Orinda, CA: John K. Kennedy University, unpublished masters thesis.

Bjork presents a history of the diorama, perspectives of scientific and educational departments in museums and an analysis of visitor studies. Bjork believes that in order to judge the success or failure of dioramas, one must be willing to consider them with an inquiring mind and fresh eyes; this includes an analysis of visitor studies as well as focused conversations between stakeholders within an institution about how dioramas do or do not meet specific audience or brand identity goals.

Borun, M., et. al. (1998). *Family Learning in Museums: The PISEC Perspective*. Philadelphia: Philadelphia/Camden Informal Science Education Collaborative (PISEC). Franklin Institute.

This seminal study of how families learn in museums suggests seven characteristics of “family-friendly” exhibitions. They are: multi-sided so families can cluster around them; multi-user so several people can use them at once; multi-outcome, so they can spark conversation; accessible; multi-modal, appealing to different learning styles; relevant to visitors’ prior knowledge; and easy-to-read, in the form of easily-understandable and viewed labels.

Boyd, W.L. (1999). “Museums as Centers of Controversy.” *Daedalus*, 128/3, 185 – 228.

The former director of the Field Museum of Natural History discusses the museum’s exhibit development process during his 15 year tenure during the 1980s and 90s. One goal was to “expand the effectiveness of dioramas ... engaging the visitor’s mind as an active participant rather than a passive learner.”

Buffalo Bill Historical Center Staff. (2007). *Our West*. Cody, Wy: Buffalo Bill Historical Center.

This glossy catalog presents illustrates the Draper Museum of Natural History in Cody, Wyoming which opened in 2002, the “first natural science museum of the 21st century.”

Clark, J. L. (1966). *Good Hunting: Fifty Years of Collecting and Preparing Habitat Groups for the American Museum*. Norman: University of Oklahoma Press.

Cummings, C. E. (1940). *East is East and West is West*. Buffalo: Buffalo Museum of Science.

This classic text analyzes the 1939 world’s fair in New York City with an eye toward discovering what science museums with dioramas can learn from world’s fair displays. Cummings recommends that exhibitions should “tie up with the visitor’s own life and experience” and “tell a story.” Amusingly, he also recommends that visitors be allowed to light up a cigarette in front of an exhibition: it will enhance their enjoyment.

Demars, L. L. (1991). “The Evolution of Exhibitions in A Natural History Museum,” in Cato, P.S. and Jones, C. *Natural History Museums: Directions for Growth*. Lubbock: Texas Tech University Press.

Louise Demars worked at the Yale Peabody Museum of Natural History for three decades and documents the evolution of how natural history exhibitions have been developed, from authoritative curator to multidisciplinary team. She advocates providing multiple layers of information to visitors through videos and other technologies.

Falk, J. et. al. (1991). “Analysis of the Behavior of Family Visitors in Natural History Museums.” *Curator* 34/1, 44 – 57.

What is of interest vis-à-vis dioramas in this discussion of visitor studies at the Florida State Museum of Natural History, Smithsonian’s National Museum of Natural History and the New Delhi National Museum of Natural History (India) is that in encyclopedic natural history museums, families are most attracted to: dinosaurs (34%) and mammal exhibits (21%). Families tend to

navigate the museum in “social groups” and spend more time at large exhibits, no matter what their content is. When given the choice, paleontology is more interesting than “large mammals.”

Falk, J. and Dierking, L. (2000). *Learning from Museums: Visitor Experiences and the Making of Meaning*. Walnut Creek: AltaMira Press.

Since the 1980s, Falk and Dierking’s numerous publications have guided museum educators in formulating programs and exhibitions. In this book, they describe museums as “free choice” learning environments: “Free-choice learning tends to be non-linear, personally motivated, and involves considerable choice on the part of the learner as to what to learn, as well as where and when to participate in learning.”

Falk, J., Dierking, L. & Adams, M. (2003). “Things Change: Museum, Learning and Research” in Xanthoudaki, M. et. al. (eds). *Research of Visual Arts Education in Museums and Galleries*. The Netherlands: Kluwer Academic Publishers.

Learning is a constructive process that is dependent on personal, socio-cultural and physical context factors. **Personal Meaning Mapping** (PMM) is an evolving qualitative evaluation tool to assess these factors vis-à-vis the museum experience.

Gargiulo, C. (2005). “Natural History Dioramas: Do Existing Evaluations Provide Direction?” unpublished report.

As the James Ford Bell Foundation intern at the Bell Museum of Natural History, Gargiulo gathered and assessed various evaluations of dioramas. She advocates for immersive exhibitions, but concludes that evaluations provide little direction.

Fountain, H. (28 March 2007). “A Challenge for Curators: An Iguana in the House.” *The New York Times*, H27.

The article discusses the display of live animals in various indoor traveling science exhibitions such as AMNH’s 2005-2006 Darwin exhibition as well as plans to mix live animals in permanent diorama displays.

Gallenkamp, C. (2002). *Dragon Hunter*. New York: Penguin.

A history of the American Museum of Natural History is told from the perspective of explorer Roy Chapman. Chapman was director during the era the famous Akeley dioramas were created.

Grunbein, D. (2002). "Useful Illusions." *Harper's*.

In this poetic tribute to dioramas, the essayist predicts that the time will come again for these "palaces of collective dreaming ... when it becomes necessary to document dying species."

Gyllenhall, E. D. & Cheng, B. (2003) *Outdoors/Indoor Exhibitions: A Front End Evaluation Literature Review*. Unpublished document. Portland: Oregon Museum of Science and Industry.

This report reviews relevant studies of modes of family learning in science museums.

Haraway, D. J. (1989). "Teddy Bear Patriarchy: Taxidermy in the Garden of Eden, New York City, 1908-36." in Kaplan, A. & Pease, D. (eds) (1994). *Cultures of United States Imperialism*. Duke University Press: Durham and London, 237-91.

Haraway's seminal critique of Carl Akeley's dioramas at the American Museum of Natural History exposes latent racism, sexism and hypocrisy extending from the culture in which dioramas makers worked.

Honan, W. H. (1990). "Say Goodbye to the Stuffed Elephants." *The New York Times*, 14 January.

Honan discusses the curatorial tensions around the Field Museum's late 1980s hiring of a children's museum team headed by former Boston Children's Museum director Michael Spock to update its galleries.

Karp, I. and Lavine, S., eds. (1991). *Exhibiting Cultures: The Poetics and Politics of Museum Display*. Washington DC: Smithsonian Institution Press.

This anthology looks at the relationship between museum display and the cultural assumptions of the people who arrange them. The editors argue to

reflect a culturally-diverse world, exhibitions need to “offer multiple perspectives or to reveal the tendentiousness of the approach taken.”

Luke, T. (2002). “Southwestern Environments at Hyperreality: The Arizona-Sonora Desert Museum.” in *Museum Politics*. Minneapolis: University of Minnesota Press, 146 – 164.

This analysis explores ideological contradictions inherent in the display of representations of nature at a museum in Tucson, within the very environment that the museum is trying to represent. Luke accuses the museum of perpetuating the “desert’s cultural and ecological mystique” while in reality the desert is being “paved over rapidly by urban sprawl,” thus providing an artificial “feel-good” experience.

McLean, K. (1999). “Museum Exhibitions and the Dynamics of Dialogue.” *Daedalus*, Cambridge, MA.

“Museums are not museums without exhibitions,” begins this essay. The author goes on to discuss the evolution of museum exhibitions amid continual debates within the field.

McLean, K. and McEver, C., eds. (2004). *Are We There Yet? Conversations about Best Practices in Science Exhibition Development*. San Francisco: The Exploratorium.

This book includes many activities, suggestions and reflections on developing excellent science museum exhibitions. Paul Martin, Director of Exhibits for the Science Museum of Minnesota contributed an essay about the *Wolves and Humans* exhibition.

McLean, K. (2001, third printing). *Planning for People in Museum Exhibitions*. Washington DC: Association of Science and Technology Centers.

This influential book provides an overview of the exhibition development process with a strong consideration for how exhibitions can best serve visitors’ needs. McLean reminds her readers that exhibition development has “deep roots in the past.”

Melber, L. (2007). “Maternal Scaffolding in two museum exhibition halls.” *Curator* 50(3), 341 – 354.

This is an analysis of 31 mother-child conversations in two exhibitions: a traditional diorama of a bear group in the North American Mammal Hall of the Los Angeles County Museum of Natural History and a discovery center, arrayed with carts, activities and small animal mounts. The dioramas invoked more conceptual, higher level verbal teaching and conversation.

Metzler, S. (2007). *Theatres of Nature: Dioramas at the Field Museum*. Chicago: Field Museum of Natural History.

In this 67-page picture book on the Field Museum's 85 dioramas, director Jack McCarter describes them as "beloved by visitors of all ages ... charm[ed] with their evocations of nature."

Museums and Social Issues: A Journal of Reflective Discourse (Walnut Creek: Left Coast Press).

Two issues of this journal are of interest. The theme of Volume 1, Number 1 is "Museums and the Public Understanding of Evolution" and the theme of Volume 4, Number 1 is "Science and Civic Life." Several articles argue that **museums with science content must promote scientific literacy in service of public policy** on issues like global warming; examples are provided of museums (eg, the Wild Center in Adirondack Park, New York) that have hosted symposia on public policy issues. As one editorial board member George Hein states: **"learning science is a social good."**

Pisano, J. G. (2006). "Foreward." in *Conversations Los Angeles Leiden: Nature and the City*. Los Angeles: Natural History Museum of Los Angeles County.

This book documents the collaborative artist installations between the Natural History Museum of Los Angeles County and Naturalis, the National Museum of Natural History, the Netherlands.

Porter, C. (1991). "Natural History in the 20th Century," in Cato, P. and Jones, C. *Natural Science Museums: Directions for Growth*. Lubbock: Texas Tech University Press.

The author reviews the history of natural history collecting and display, from the work of 17th century naturalists to 20th century museum directors. She

predicts that more attention will be paid to imparting conservation messages through exhibitions, as opposed to systematic classification and research.

Pridmore, J. (1991). "Flap at Field Museum." *Archaeology*. 44/6.

Pridmore discusses the raging debate around the revamping of the exhibitions at Chicago's Field Museum in order to generate a wider range of audiences.

Roberts, L. (1998). *From Knowledge to Narrative: Educators and the Changing Museum*. Washington DC: Smithsonian Institution Press.

In this history of museum education, Roberts discusses the diorama's educational power.

Serrell, B. (1996). *Exhibit Labels: An Interpretative Approach*. Walnut Creek: AltaMira.

A few references to dioramas appear in this intensive study of exhibition labels. Serrell's extensive evaluations of museums reveal that visitors seek: memorable, personal experiences that offer "lots of opportunities to investigate and make observations." A case study of the renovated dioramas at the Field Museum of Natural History (pages 128 – 129) showed that visitors spent a total of 10 minutes in the new galleries; while most enjoyed what they saw, the majority did not grasp the intended themes. Many skipped the 75-word introductory panel. To remediate, the developers limited the label copy to approximately 50 words or less and made "the concepts of each diorama reinforce and complement the main themes." Language used was direct, and "visually-reinforceable". These remediations were successful: visitors moved more slowly through the galleries now, used a higher percentage of the available elements, and grasped the main message more.

Schinto, J. (2000). "The Palace of Green Porcelain." *Michigan Quarterly Review*, 39/3.

This literary ode to the diorama includes the author's reminiscences of those at the Bruce Museum in Greenwich, CT.

Schwarzer, M. (2006). *Riches, Rival and Radicals: 100 Years of Museums in America*. Washington DC: American Association of Museums.

Dioramas figure in the chapter of this history of museums in the United States devoted to the evolution of exhibitions.

Schwarzer, M. (2009). "Shotgun Wedding." *Exhibitionist*.

The California Academy of Sciences' African Hall is reviewed.

Schwarzer, M. (2010). "Butterflies in the Basement: A Requiem for the Snow Museum of Natural History," in forthcoming Oakland Museum of California catalog for museum re-opening.

Schwarzer's essay discusses the current OMCA gallery hall's predecessor, the Snow Museum of Natural History.

Scott, M. (2007). *Rethinking Evolution in the Museum*. London: Routledge.

The researcher conducted four extensive studies (500 visitors total) in front of natural science dioramas in museums in New York City, Kenya, and London. Her goal was to determine how visitors from different cultural backgrounds view their evolutionary heritage. She "found that museum visitor perceptions overwhelmingly defy quantification and reduction." Qualitative research was far more revealing. Scott found that all visitors "internalize" different Eurocentric racial stereotypes implied in dioramas. She recommends that museums expose their process of creating dioramas more fully, and pose questions about them to visitors to encourage them to think more critically.

Solnit, R. (1997). *A Book of Migrations: Some Passages in Ireland*. London and New York: Verso.

Steller, T. (2007), interview conducted by Marjorie Schwarzer at Oakland Museum of California, recorded on audiotape.

Ward, H. L. (1909). "Modern Exhibitional Tendencies of Museums of Natural History and Ethnology Designed for Public Use." reprinted in Genoways, H. & Andrei, M. eds. (2008). *Museum Origins: Readings in Early Museum History & Philosophy*. Walnut Creek: Left Coast Press.

Ward, son of a director of the Milwaukee Public Museum, argues “against the use of systematic exhibits in favor of taxidermy groups” with labels “that answer questions that would likely occur to an intelligent, non-scientific person.” He believes dioramas are more appealing to children and have artistic merit. “The scenic backgrounds of some groups are worthy of exhibition as works of pictorial art.”

Wonders, K. (1989). “Exhibiting Fauna – from Spectacle to Habitat Group,” *Curator* 32/2.

Wonders, K. (1990). “The illusionary art of Background Painting in Habitat Dioramas,” *Curator* 33/2.

Wonders focuses on the people—curators, donors, artists, taxidermists, museum directors—involved in the sponsoring and direct creation of dioramas, their intentions and methodologies used in creating these naturalistic displays. With an art historian’s perspective, Wonders draws similarities between the public sculpture in Gothic cathedrals and dioramas in their breadth of ambition for telling stories within an artistic tradition. She provides evidence that techniques from sculpture and advances in taxidermy, and other new techniques in representing nature played an essential role in the development of dioramas.

Woods, J.G. (1887). “The Dulness [sic] of Museums.” Reprinted in Genoways, H. & Andrei, M, eds. (2008) *Museum Origins*. Walnut Creek: Left Coast Press.

“Oh! The dullness of museums!,” begins this essay, which argues for the value of habitat groups as a way to display specimens in a more interesting, scientifically-accurate way.

Olalquiaga, C. (1998). *The Artificial Kingdom: A Treasury of the Kitsch Experience*. New York: Pantheon.

The author describes dioramas as “enclosed spaces where moments are captured for visual delight.” She believes that their educational intent is secondary to “their impact as voyeuristic spectacles – that uncanny feeling of secretly watching what is forbidden or impossible.” It is the details – the backdrops, the props, the scenery, the animals in various poses – that creates both a spatial and temporal narrative.

Quinn, S. C. (2006). *Windows on Nature: the great habitat dioramas of the American Museum of Natural History*. New York: Abrams.

This beautifully illustrated documentation of the history of the wildlife dioramas at AMNH depicts them as “windows on nature,” artistic and technical treasures. Dioramas are complex structures, painstakingly-created, to inspire a love of nature and growing awareness of the fragility of the wilderness. Although their popularity has waned, Quinn claims they are making a comeback because of their power to “provide a compelling illusion of nature in real scale and time.” Quinn goes into great detail about the collecting and fabrication processes and the specific artists involved in the making of the AMNH dioramas.

Yanni, C. (1999). *Nature's Museums: Victorian Science and the Architecture of Display*. Baltimore: Johns Hopkins University Press.

Architecture and design set a context for how we construct knowledge. It took museums a long time to realize the power of dioramas in helping to frame knowledge about the natural world. This is because museums were torn between presenting specimens as “spectacle” or as “science.” “Museums capture the history of nature, not natural history.” They cannot compete educationally with zoos or wildlife movies; but they can show us nature as morphology.

Young, A.M. (1989). “The Rain Forest in Milwaukee.” *Curator* 32/3, 229 – 244.

This article documents the five year (1983 – 1989) process of renovating the Milwaukee Public Museum’s biology gallery into an immersive Rain Forest (which included dioramas.) The most useful nugget in the appreciation of the team process.

Section 9

Summaries of Visitor Studies Reports

These reports are listed alphabetically by museum. In some cases, the data was unavailable or incomplete.

American Museum of Natural History, New York

Study #1

Dates conducted: 2001

Investigator(s): Edward Chittenden

Source: Spitz and Thom (2003) *Urban Network: Museums Embracing Communities* (Chicago: Field Museum of Natural History).

Goal: evaluate community-based model that developed gallery-based activities for Head Start children and their families (including dioramas)

Audience researched: children 3 – 9 years old, plus their caregivers

Methods: interviews

Findings: **Parents have strong interest in hands-on science activities for young children;** it is important to use correct science vocabulary and not “dumb information down.”

Conclusion: Children can “learn real science” and hone their observational skills in **guided museum activities** using exhibitions.

Study #2

Dates conducted: 1994

Investigator(s): Ellen Giusti

Source: AMNH files

Goal: Evaluate labels in the Akeley Hall of African Mammals

Audience researched: Total sample size = 745. 570 adult and children were observed. 80 were ‘timed and tracked’ and 95 were interviewed.

Methods: observation, timing and tracking, interviews

Findings: About 7 percent of visitors read the labels. Visitors spent between 1 and 20 minutes in the hall. Spread between dioramas visited was about equal (in other words, no one diorama held special attraction power over another diorama), but when asked, “elephants” were the most frequently mentioned animal. Parents wanted to know the names of animals in order to tell their children. **Favorite feature of the hall was the animals.** Second was the “realism.” Third was the habitats. Visitors wanted: a) names of animals (25%) b) maps (for geographical context) (15%); and c) information on animal

behavior (“What do they eat?” and “How do they mate?”) (15%). Most frequent criticism about the labels was small text, poor lighting and too much text.

Conclusion: Make sure labels are easy to spot and read, and include the animals’ names, information on their behavior and a map.

Study #3

Dates conducted: 1995

Investigator(s): Ellen Giusti

Source: AMNH files

Goal: Investigate visitor behavior in North American Mammal Hall to understand use of a nonlinear exhibition and the educational effectiveness of dioramas.

Audience researched: 130 visitors.

Methods: timing and tracking

Findings: Groups with children spent more time than adult-only groups in the hall. Children were more likely to stop at dioramas with familiar animals (eg, a squirrel) than adults. They were also attracted to big cats (lion) and hunting scenes (lynx hunting a hare). The Lynx Hunting a Hare elicited conversation in 30% of visitors. Maps increased visitors’ understanding of the habitat presented.

Conclusion: Large animals, action stories attract visitors the most and elicit conversation. Other interpretative devices, like maps, are also effective in communicating information.

Bell Museum of Natural History, Minnesota

Dates conducted: 2005

Investigator(s): Jeff Hayward and Brian Werner, People, Places and Design Research

Source: “Public Expectations and Perceptions about Nature”

Goal: Front end study

Audience researched: 49 participants took part in eight focus groups, recruited from a variety of public places: art and science museums, nature centers, the zoo, boat launches and a college campus.

Methods: Focus Groups

Findings: Mentions dioramas briefly in the context of having a small strongly dedicated fan base but a majority of people did not think of them as very contemporary or attractive beyond their first visit.

Boston Museum of Science (renovated gallery, 1987 – 88)

Dates conducted: early 1990s?

Investigator(s): Beverly Serrell

Source:

Goal: determine if enhancements designed for people with disabilities were effective

Audience researched: unknown

Methods: unknown

Findings: Repositioned labels and added activities greatly increased understanding of exhibitions' main messages for all visitors, not just those with disabilities. Before the enhancements only 19% of visitors could name an adaptive feature of an animal. After the enhancements, 100% could.

Conclusion: Universal design is valuable for increasing understanding in visitors of all abilities.

California Academy of Sciences, San Francisco

Study #1

Dates conducted: 1997

Investigator(s): Lisa Mackinney

Source: Unpublished baseline observation

Goal: To understand behavior in gallery in terms of dwell time for whole hall and special elements and number of stops per element. 9,175 square foot hall.

Audience researched: Adults (N=49)

Methods: Timing and tracking study

Findings: Visitors spent 23 to 54 seconds at dioramas. 38.6 seconds on average. 22-55% of people stopped at dioramas.

Study #2

Dates conducted: 1997

Investigator(s): Lisa Mackinney

Source: Unpublished baseline data

Goal: Determining what was liked/disliked about the bushbuck diorama in the African Annex before dismantling of exhibits was to take place.

Audience researched: Adults (N=57)

Methods: Front-end interviews

Findings: 32% of visitors, when asked what changes they would like to see in the future for the African Annex, suggested **“information on labels.”** 24% of visitors, said there was nothing more they would like to know more about the

bushbuck diorama. 13% of the visitors wanted the dioramas in this hall to be kept as is.

Study #3

Dates conducted: 1996

Investigator(s): Lisa Mackinney

Source: Unpublished baseline observation

Goal: To prototype hands-on multimedia modules to be added to the African Hall.

Audience researched: Adults (N=51)

Methods: Front-end interviews

Findings: 52% of visitors thought a **map** of Africa should be placed near the entrance of the hall. **71% of visitors wanted the map to show where the animals live.** 32% of the visitors thought **more animals** should be featured. 30% of the visitors liked the dioramas and did not want changes to occur.

Study #4

Date: 1996.

Investigator(s): Lisa Mackinney

Source: Unpublished report.

Goal: Determine behaviors in the African Hall before & after addition of hands-on & multimedia modules.

Audience researched: Adults (N=110)

Methods: Subjects were systematically selected, tracked and timed when they entered the African Hall and African Annex. Half of the observations took place before and half after the modules were added. The results were then compared.

Findings: Average time spent in African Hall increased with the addition of the modules. The average number of stops at elements other than the modules also increased.

Study #5

Dates conducted: 1999

Investigator(s): Lisa Mackinney

Source: Unpublished baseline report/Black Lechwe

Goal: Determining if proposed topics were of interest to visitors.

Audience researched: Audience (N=50)

Methods: Subjects were systematically selected as they stopped or glanced at the Lechwe diorama. Open-ended responses and report on ratings of card sort topics were recorded.

Findings: Visitors didn't want to know if animals are "real" or "models." They assumed animals were real. They also didn't want to know whether the animals were killed for display: "I don't care; I'm sure they didn't die of old age" and "Oh, God, I don't want to know. I don't like stuffed animals; I only come to this part because the kids like it."

Chicago Academy of Sciences

Study #1

Dates conducted: 1995

Investigator(s): Deborah Perry, Cecilia Garibay, Gail Edington

Source: Selinda Research Associates

Goal: To gain insight into how dioramas create meaningful museum experiences, and to identify key factors in their success.

Audience researched: Researchers analyzed 24 interview transcripts from 1991 study (below).

Methods: "Naturalistic"

Findings: Dioramas elicited strong **memories** of time spent in natural history museums as well as specific animals and plants. One visitor commented, "I have my own memories of wild places in nature." **Realism and level of detail** were also mentioned. Visitors appeared to have connected in three ways with the dioramas: a) **social** (dioramas provided impetus for social interaction and sharing); b) **place** (dioramas were specific to the area in which they lived); c) **education** (identifying the names of animals and observing interactions between predator and prey, as well as larger ecological concepts was appealing to visitors). Visitors associated dioramas with ecology, nature and the outdoors. The opportunity to view nature "up close" was also appealing.

Conclusions: Dioramas can function as "icons" for a museum visit that will provide a sense of familiarity and attachment for repeat visitors. Learning needs to be facilitated with additional interpretation. Identification, observation and communication skills can be encouraged in a variety of ways and formats. Immersion experiences – such as going under a river to experience an underwater environment – can be especially effective. Visitors are attached to dioramas.

Study #2

Dates conducted: 1991 - 1992

Investigator(s): Carol Fialkowski, Janet Siska, Gail Edington, Bonnie Cook Roe

Source: Original document

Goal: conducted as part of a nine-site study (Museum Impact and Evaluation Study) to study the strength of visitor attachment to the Academy's dioramas and the effect of these attachments on future changes.

Audience researched: 33 interviews

Methods: 80% done over the phone; 20% in person at the museum.

Findings: Repeat visitors enjoyed "hunting for details" and seeing new details previously not noticed. 24% of visitors were interested in animal interactions and relationships. 21% wanted to "learn something." . 12% wanted the names of the plants and animals. When asked what memories or recollections they had of dioramas, 98% of visitors said evoked a childhood memory: a) for 40% dioramas reminded them of an outdoor activity done as a child; b) 45% were reminded of being on a nature walk. 33% of visitors remarked how dioramas felt "safer than being in nature;" one can look more closely at the animals and not worry about being attacked. Adults see visiting the museum as valuable for kids. Common questions were: How is it done? How is it made?

Conclusion: The evaluators were struck by these common responses: "it's so realistic," and "it gives a sense of being outdoors." They also were interested in how the discovery of details evolves with each exhibit.

Corpus Christi Museum of Science and History, Texas

Dates conducted: 1985 – 87

Investigator(s): Jane E. Deisler-Seno and Judith Reader

Source: Cato, P. and Jones, C: (1991) *Natural History Museums: Directions for Growth* (Lubbock: Texas Tech University Press).

Goal: Build school group visit program by better aligning exhibition program to state curriculum standards.

Audience: 4th grade students and their teachers.

Methods: Focus groups, surveys, interviews with 20 teachers + district administrative staff and curriculum development professionals.

Findings: Students said they thought the museum was "boring" and they wanted to spend the majority of their time in the gift shop. Teachers wanted organized pre-and-post visit materials, including vocabulary words and a video program outlining what to expect at the museum. Program was developed directly from state curriculum standards. Two units were developed using

dioramas: a) *animal adaptation to environments*, using a diorama of local

shorebirds; and b) *food chains and food webs*, using a diorama of coyotes and ground squirrels on a local Texas beach. At both dioramas, children were given specific activities including close observation, making lists of their observations using new vocabulary words, and discussing their observations with a docent. End result was that 100% of teachers said the new field trip design was effective; school visits increased by 62%.

Conclusion: Organized curriculum tied to state standards will increase teacher use of field trips to dioramas. Dioramas can effectively promote state curriculum standards. (NOTE: Houston Museum of Natural Science conducted a similar project in 2002 with 4th and 5th grade teachers, with similar results).

Denver Museum of Nature and Science

Dates conducted: 1998

Investigator(s): Margie Marino and Mary Fitzpatrick

Source: Gargiulo (2005)

Goal: Informal study of Denver's Bear and Sea Mammals Hall.

Audience researched: unknown

Methods: unknown

Findings: 58% of visitors favored removing the dioramas for new exhibits; 18% said they should remain, and "aggressively pleaded" with curators not to change anything." Interactives increased dioramas' attracting and holding power.

Draper Museum of Natural History, Cody, WY

Dates conducted: 2003

Investigator(s): Randi Korn & Associates

Source: Unpublished summative evaluation

Goal: Identifying possible improvements and/or enhancements to existing exhibitions after the museum had been open for one year.

Audience researched: 800 adults

Methods: exit questionnaires to 680 drop-in visitors aged 16 and older, timing & tracking studies of 113 drop in visitors aged 9 and older, 38 uncued exit interviews with 67 visitors.

Findings: Nearly all observed visitors (97%) looked at the dioramas. They visited a median of 11 of the 23 exhibits. Dioramas had the highest visitation of all exhibit types. Visitor feedback was very positive; they praised the immersive and multi-sensory aspects of the habitat displays as well as the taxidermy. Called out for special praise were: nonglassed diorama and "nature scenes," audio & video (80% watched the videos); cultural objects and "issues"

panels; and “**realism** of the taxidermy.” High interest in three-dimensional objects, children’s discovery box activities. Touchable specimens were not as popular; “only” 38% of visitors used them. Nearly all visitors were able to identify cultural and environmental issues associated with the exhibition themes. Most said that exhibitions reinforced their existing views on conservation. Some asked for more identification labels for certain plants.

Field Museum of Natural History, Chicago

Dates conducted: 1992?

Investigator(s): Beverly Serrell

Source:

Goal: Front-end, Formative, Summative for renovations

Audience researched:

Methods: Serrell compared a diorama gallery enhanced with maps graphics and activities to one without such features

Findings: Visitors’ average dwell time at dioramas increased with enhancements such as hands-on or visitor activated audio elements. Serrell also confirmed that visitors’ understanding of the intended educational message increased when visitors used enhancements. With the augmentations, they were able to notice more complex environmental content in the exhibition. Visitors wanted to know: the specific place a diorama depicted, the names of the animals and what they were doing.

Los Angeles County Museum of Natural History

Dates conducted: 2002

Investigator(s): Doris Ash

Source: *Curator*, 2004.

Goal: Analysis of family discussions in order to recommend design enhancements to dioramas

Audience researched: three English-speaking families

Methods: Qualitative

Findings: Parents pose different kinds of questions that elicit engagement from their children. Common themes in questions link an animal’s behavior to a human one – such as eating or being the ‘daddy bear’) which Ash calls “**personification**”. Personification is the mapping of human characteristics to animals according to the perceived degree of taxonomic closeness.

Conclusion: Ash believes personification is a possible entry point toward greater science understanding in a diorama. She also advocates raising the "alive versus dead" and "real versus not-real" issues in diorama settings. “It would be a useful design activity to determine how the same enduring idea,

such as "alive versus dead," can be **scaffolded** for learners of all ages at one diorama hall.”

Milwaukee Public Museum

Dates conducted: 1994 - 1995

Investigator(s): Mary Korenic

Source: file copy of full NSF-funded study

Goal: measure effect of augmenting a diorama in order to communicate science concepts.

Audience researched: Total of 489 visitors

Methods: 15 visitors were tracked; 475 were interviewed using three different interview instruments;

Findings: Visitors stop more and spend more time at dioramas than non-dioramas. Visitors could recognize concrete objects but could not apply or name a more conceptual idea. Visitors were most interested in: a) animals' names; b) reminiscing about a nature experience; c) appreciating the dioramas; d) animals "emotions;" eg, "the bird looks happy.". The most attracting elements were: a) large objects; b) bright colors; c) unusual objects; d) a familiar object. Augmentations increased dwell time. The most preferred augmentations were: a) manipulating something; b) audio. The least popular were: a) long labels; b) video footage.

Conclusions: "Many visitors appear to be using dioramas as a picture postcard and don't see interrelationships." Visitors appear to be visual and concrete and do not extrapolate larger themes. Interpretation is necessary.

National Museum of Natural History (Behring Hall of Mammals), Smithsonian Institution, Washington, DC.

Dates conducted: 2004 - 05

Investigator(s): Andrew Pekarik (with Zahava Doering and others)

Source: Report by Andrew Pekarik

Goal: Measure visitor responses to new Hall of Mammals: taxidermied animals displayed *without* diorama context.

Audience researched: 55 open ended visitor interviews; 100 observations; peer review panel of seven exhibition professionals + a teen review panel.

Methods: interviews, formal observations

Findings: Visitors were most drawn to **large animals**, especially the giraffe, lion and brown bear. 17% of visitors **took photos of themselves in the exhibition with the animals**. 67% of visitors used hands-on activities; the most popular were **touchable objects**. Also popular were **crawl spaces for small children**. Some text was rarely read. Visitors frequently mentioned

words like “realistic,” “lifelike,” and “natural.” Some animals were hung from the ceiling and visitors generally liked this. Use of audio in the galleries received mixed reviews but **one push button audio feature of animal sounds was the most popular interactive in the gallery.**

Visitors liked the fact that the galleries were well-lit. Some visitors (no percentage given) did not like the idea of “dead animals” and wondered how the museum had obtained the specimens.

Conclusions: **Size** of animals is an important factor in attracting visitor attention. Parents with children were especially interested in the Hall. Touchable objects, crawl spaces and audio were popular enhancements. Creating photo opportunities may be another draw.

Natural History Museum, London, UK

Dates conducted: n.d. (likely 2003)

Investigator(s): Sue Dale Tunnicliffe

Source: *The Informal Science Learning Review*, November – December 2007

Goal: Investigate meaning-making potential of the three Rowland Ward African dioramas at the Natural History Museum in London. (the dioramas had no labels and have since been dismantled).

Audience researched: 163

Methods: 10-minute interviews

Findings: Most common question asked by children: “What are the names of the animals?” Children also “fantasized” the animals’ emotional states: “I think the [giraffes] are friendly.” Teachers were more likely to connect the animals to their habitat: “This is a savannah.”

Conclusions: Visitors “make meaning” of the dioramas based on their prior knowledge and beliefs. They respond to concrete visual evidence. Signage is needed to further present information.

11. Oakland Museum of California

Study #1

Dates conducted: 1992

Investigator(s): Pat Morgan (JFKU intern)

Source: files

Goal: Summative evaluation study of visitor responses to the Aquatic California Exhibition

Audience researched: 52 visitors

Methods: Interviews and observations

Findings: Average time spent in gallery was 5.6 minutes; average stop at a single exhibit was 48 seconds. Media elements slightly increased dwell time.

Study #2

Dates conducted: 2002-2004

Investigator(s): Dana Neitzel

Source: Unpublished internal reports

Goal: Formative evaluations for label revisions for nine dioramas.

Audience researched: Adult visitors (N =18)

Method: Cued interviews.

Findings: 83% preferred the new labels with “friendlier” language.

Study #3

Dates conducted: 2003

Investigator(s): Dana Neitzel

Source: Internal files

Goal: Formative test study of whether new graphics prompted visitor use of activities.

Audience researched: 14 groups of adult visitors

Method: Visitors were timed trying to find the 10 specimens.

Findings: 100% of the visitors liked using diagram keys to species in the cases

Study #4

Dates conducted: 2004 - 2005

Investigator(s): Dana Neitzel

Source: Institutional files, unpublished data

Goal: Investigate visitor responses to dioramas, without benefit of reading label copy

Audience researched: ?

Methods: Visitors were asked to look at the dioramas, not to read the label, and that the interviewer would ask a few questions afterwards.

Findings: When asked what they noticed first in a particular case without reading the label and what were they wanted to know about the display, visitors frequently noticed the **main animals** featured, or commented on possible reasons for or outcome of the dramas depicted. A great majority asked “where is this place?” or wanted to know **names** of specific animals or what they were doing. Common questions: **Are they real? Are they dead? Are the colors natural?**

Conclusions: “Mysteries” (unknown details?) encouraged close observation, comparison. Displays sparked many questions, ranging from desire to know

more about eggs of particular birds (e.g. mockingbirds, eagles) to food-related, to conservation-related, to questions about their context. Interest in information about location. Way-finding needs to be more clear.

Study #5

Dates conducted: 2008

Investigator(s): Garibay Group

Source: Unpublished report – Summative Exit Survey

Goal : Gauge visitors' perception of current gallery and their connections to nature.

Audience researched: Repeat and first time adult visitors (N=240)

Methods: Exit Survey: Visitors ranked aspects of their visit to the gallery.

Findings: 67% of respondents gave answers that suggested they recognized that the gallery involved California-specific content. 33% saw it as being about nature in general. High percentage mentioned affective response to nature, e.g., beauty, serenity, “it’s relaxing”, “it’s engaging” and memories. There was a range of opinions on the environmental message:

“It’s so important to educate people about the problems in California. It is your responsibility as the museum to do this.”

“I don’t want to think of anything bad when I come to a museum. We get enough of that in the real world. I wouldn’t want to see anything that reminds me about global warming or what’s harmful to us.”

What visitors liked the most:

Animals (37%), immersive feel, specific exhibits, good for children, real animals, artistry, audio and realism: “It looks like it would if we were outside.” Color and light were also mentioned.

What visitors liked the least:

Labels (or lack of), looks aged, needs maintenance, dead animals, glassed in exhibits, passive, lack of interactivity, mildew, sounds, dead animals (how were they killed?). Dioramas are sometime characterized as “dead zoo” and visitors periodically ask “did you kill it? (10%)” Eleven percent of visitors surveyed in the gallery survey at OMCA mentioned “the dead animals in the displays were disconcerting.” Other interesting responses:

“It has a ‘70’s vibe, looks dated, looks old. Not the good ‘70’s either.”

“Funky odor (mildew), concrete is oppressive, gives me the impression that natural history is regulated to a basement.”

Study #6

Dates conducted: 2008

Investigator(s): Cecilia Garibay

Source: Garibay Group

Goal: Front-end interviews to understand how family visitors from diverse cultures perceive dioramas, especially those who do not typically visit OMCA.

Audience researched: Twelve families from three cultural communities (African American, Chinese, Latino) who had either never visited the museum or hadn't visited in the past 12 months.

Methods: purposive sampling, in-depth open-ended family interviews after families had spent 30 minutes in the gallery. Several interviewers were bilingual/bicultural.

Findings: Visitors responded positively to the hall but “nobody was wowed.” They were most positive about the animals and settings, and the realism. They desired short, informative labels with basic information like an animal's name or what was going on in a specific scene, or “why was it killed?” They wanted more activities and liked the “fish activity where pushing a button lit up to identify fish). They did not perceive that the dioramas represented “present day” scenes and very few were aware the places depicted are all in California. Parents felt this was a good place for their children to learn about wildlife. Adults had more general observations about nature while children tended to focus on specific animals.

Conclusions: Visitors want more information and overall felt that the Gallery needs to be more current with updated photos, better labels and “state-of-the-art techniques.” They were strongly attracted to the animals and some scenes “sparked their imagination” and allowed them to imagine themselves within a particular scene. The Dioramas elicited memories about places visitors had seen or heard of. They were interested in the craftsmanship of the dioramas and the details. A small number found the dioramas disconcerting.

Some trends included:

- strong attraction of the animals in the overall experience
- high degree to which prior experiences with real nature fit into their perceptions of dioramas
- use of both place names and more general terms by people to describe “natural places.”
- the positive effect of seeing the ‘nature’ in the gallery
 - visitors’ desire to go out into real outdoor nature a result of their gallery experience
 - Provided opportunities to see animals up close in ways not typically possible.
 - Scenes sparked the imagination

- Provided a chance to see a place they had heard of but not visited

Questions arose about context:

“We have no idea if it is nature now, or 200 years ago.”

“It would be great to get stats on these animals today. The bobcat, the ram, does it still exist? Is it extinct?”

Reactions to gallery labels

“It had background information about animals, but not what was going on in the scene.”

“Should explain what’s going on in the scene. Why is the deer so high in the mountains? Is that why they were killed?”

“The labeling made me angry. Inconsistent. Some had labels, some didn’t, all different types of information.”

Recommendations from Garibay Group:

The team may want to consider what types of experiences may help visitors more readily connect to places close to home and ways to engender skills that visitors may use to notice nature in their daily lives.

It will be important to explore appropriate entry points to this topic [place/environment] and start there rather than beginning with an overarching environmental message. In other words, the experience that allows visitors to personally connect with the content and with what they are seeing—rather than the environmental message—must be what leads the experience and is at the forefront.

Provide info—in plain language—on what is so special about a particular place

Cultural issues

- No major differences emerged between cultural groups included in this study
- Accommodation of physically challenged visitors is important

Royal British Columbia Museum (Canada)

Dates conducted: 1981

Investigator(s): Bob Peart and Richard Kool

Source: *The International Journal of Museum Management and Curatorship*. (1988). Volume 7. 117 – 128.

Goal: Evaluate visitors’ knowledge gain in *Living Land, Living Sea* exhibition, including open dioramas of forest environments and closed dioramas of Mammoths, Ice Age mammals and river delta habitats.

Audience researched: 112 first-time visitors to museum

Methods: questionnaire

Findings: Average time in gallery was about 14 minutes; only 65% of visitors looked at the exhibitions. 78% of visitors indicated that their visit was a positive experience. Visitors did not indicate any change in attitude toward “more respect for nature” after their visit.

Conclusions: Attraction to exhibits depended on: placement in the hall (exhibits in cul de sacs attracted less attention), presence of crowds, size (large = more attraction), concrete exhibits (as opposed to ones about abstract concepts). “Stopping visitors and educating them” was not linked. Previously held beliefs determined attitudes on nature more than their direct experience in the gallery. Large dioramas “wow” visitors but don’t necessarily “teach them anything.”

Appendix A

Diorama Definitions

By Gail Binder

A miniature, three-dimensional group consisting of an arrangement of small modeled and colored figures and specimens, with accessories, in an appropriate setting, and in most instances artificially lighted. The scale and size of the groups is variable: there is no limitation as to subject matter, which may be realistic or imaginative, according to what the creator of the groups wishes to portray.

-Irene Cypher, "The Development of the Diorama in the Museums of the United States," Ph. D. dissertation, 1942

Habitat dioramas are natural history scenarios which typically contain mounted zoological specimens arranged in a foreground that replicates their native surroundings in the wild. Ideally, the three-dimensional foreground merges imperceptibly into a painted background landscape, creating an illusion—if only for a moment—of atmospheric space and distance. More interpretively, the habitat diorama expresses man's effort to classify, define and generally comprehend the natural world by means of an ecological model. Some of the major controversies hidden in the diorama concept are: taxonomic versus ecologic understanding; art versus science; popular education versus scientific documentation; culturally biased perception versus "objectivity;" and "Omni-max" versus Diorama.

-Karen Wonders, "Habitat Dioramas," 1993, p.9

The history of the term "diorama" is a very different one from that of the habitat diorama itself. In fact, the type of museum display which we now refer to by the name of diorama had been in existence for several decades under the name "habitat group" before its current name became internationally accepted.

The word "diorama" has undergone a number of transformations, from its patented definition in 1822 by Daguerre to its current museological usage. Derived from the Greek *dio* "through," and *horama* "what is seen," the literal meaning of diorama is "through sight."

-Wonders, p. 12

Habitat dioramas as we see them in natural history museums today are not only successful as visual spectacles, they are well-orchestrated environmental tableaux that illustrate the plant communities and geomorphology of specific regions, animal adaptations and relationships, and landscape transformation.

- Wonders, p. 18

Wildlife diorama: a type of exhibit medium, which includes taxidermied animal specimens, real and/or simulated plants and rocks, in front of a curved, painted background scene. Wildlife dioramas may be **closed** (encased behind glass) or **open**

(lacking a glass barrier and sometimes, but not always, allowing museum visitors to walk through a portion of the diorama). Habitat group and diorama will be used as alternate terms for wildlife diorama throughout this master's project.

-Laura Bjork, , 2000.

A diorama is a re-creation of a natural setting and a rendering of a specific moment in time. It represents the geography, geology, flora, and fauna of that place as accurately as possible, using hidden lights to simulate the light at that time of day, and invisible wire to capture the illusion of flight or movement. The work-famous dioramas in the Museum (AMNH) depict actual sites, like the bighorn sheep's habitat high in the Rockies, or the Mexican landscape, where jaguars roam.

-Lisa Breslof, supervising Museum Instructor, AMNH.
"Observing Dioramas" Musings, Spring 2001

A diorama is a careful positioning of a number of museum objects in a naturalistic setting, and typically combines preserved organisms and painted or modeled landscapes. Natural history dioramas have four seminal design characteristics. First, the appropriate species of animals and plants are shown together; this is in biogeographical terms as well as representing natural relationships such as food chains.

Second, animals are usually depicted doing something interesting which is not necessarily the case when making *in situ* wildlife observations.

Third, dioramas of museum animals have a distinctive calm and stillness about them.

Fourth, even though they may depict acts of predation, natural history dioramas often have a 'Garden of Eden' feel to them. There is no disease or malnutrition – animals are inevitably shown in the prime of health and physical fitness.

-Sue Dale Tunncliffe, "The role of natural history dioramas in science education,"
Informal Learning Review, Nov-Dec 2007.

Natural history dioramas typically combine preserved organisms and painted or modeled landscapes. They were historically designed to evoke feelings and to promote an ethic for the preservation of species and their habitats.

-A. Scheersoi, S. Tunncliffe, "Science inquiry at the natural history dioramas?"
Institute of Education, University of London

Habitat Group Definitions

The habitat group does not copy nature slavishly, even though an actual scene forms the background: it aims to give a broad and graphic presentation of the conditions under which certain assemblages of birdlife are found, to bring home to the observer the atmosphere and vegetation of some typical part of the country.

-Frank Chapman, AMNH curator, 1914. Quoted from "Habitat Dioramas" by K. Wonders.

The habitat group is the life-size, life-scale, three dimensional group erected as a fixed part of the exhibits in a museum, for the purpose of displaying materials and specimens against a painted background which depicts, or is a composite approximating an actual locality, and with accessories so arranged as to form an integral part of the group and usually artificially lighted.

-Irene Cypher, "The Development of the Diorama in the Museums of the United States,"

Ph. D. dissertation, 1942. Quoted from "Habitat Dioramas" by K. Wonders.

Appendix B

The visitor studies summaries in Section 5 are drawn from studies from the following seventeen museums:

- 1) American Museum of Natural History, New York
- 2) Bell Museum of Natural History, Minnesota
- 3) Boston Museum of Science
- 4) California Academy of Sciences, San Francisco
- 5) Chicago Academy of Sciences (now the Peggy Notebaert Nature Museum)
- 6) Corpus Christi Museum of Science and History, Texas
- 7) Denver Museum of Nature and Science
- 8) Draper Museum of Natural History, Cody, WY
- 9) Field Museum of Natural History, Chicago
- 10) Kenya National Natural History Museum*
- 11) Los Angeles County Museum of Natural History
- 12) Milwaukee Public Museum
- 13) National Museum of Natural History (Behring Hall of Mammals), Smithsonian Institution, Washington, DC.
- 14) Natural History Museum, London, UK
- 15) New Delhi Museum of Natural History (India)*
- 16) Oakland Museum of California
- 17) Royal British Columbia Museum (Canada)

* findings not summarized in Section 9.

