ISSA Proceedings 2002 – She Blinded Me With Science: Material Argument In The Indianapolis Children's Museum

Children's museums, which have been in existence for just over 100 years, are the growth sector of the museum industry. While other museums and tourist attractions have struggled to sustain attendance, children's museums have welcomed record numbers of visitors. In 2000, the 400 children's museums in the United States attracted 33 million visitors (Sangiorgio 2002: 70). The popularity of these museums is so high that the Association of Youth Museums reports that 100 new Children's museums are currently in the planning phase (Atkin 2000: 15). While these museums naturally attract children and their parents, there is also a close association between children's museums and educational institutions. Thus, the children's museum serves not only as a place of play, but also a place of serious intellectual activity. Critics of children's museums have complained that they are "frivolous; lacking content, rigor or standards; and dangerously blurring the lines between playgrounds, Disneyland, and museums" (Schwarzer 1998: 66). Yet, few scholars have closely examined the types of materials that are being offered to children in these museums. Despite these criticisms, there is no doubt that exhibits presented in children's museums are carefully planned and executed, and that much pedagogical theory is involved in the implementation of the displays offered to visitors. This very careful attention to display begs for critical scholars to analyze the types of arguments that are being presented to visitors in these museums, especially given the power that these institutions have in formulating claims about the importance of culture and science to very impressionable audiences.

This paper will investigate how the Indianapolis Children's Museum, recently ranked by *Child Magazine* as the top children's museum in the country, creates arguments about science in its displays. While children's museums include much more than science alone, science is usually given a preferred position within the

museum. In fact, the Indianapolis Children's Museum devotes nearly half of its exhibition space to scientific exhibits. Scientific discovery and the knowledge of science are two themes that resonate both in contemporary children's museums and in the development of the children's museum, so it seems apropos to investigate what types of arguments these sites make about science and scientific discovery to their audiences. *1. Children's Museums*

The first museum intended especially for children was established in Brooklyn, N.Y. in 1899 by the Brooklyn Institute of Arts and Sciences. The Brooklyn Children's Museum was envisioned as a place that would explore "every branch of natural history, attempt to delight and instruct the children who visit it, and stimulate their powers of observation and reflection" (Alexander 1997: 133). This vision statement, which emphasizes both the content of the museum and its pedagogical goals, is notable for its prescience. Contemporary children's museums define themselves as an educational institution with a particular emphasis on science and culture. Indeed, children's museums define themselves as audience rather than artifact centered; their mission is not academic, but pedagogic (Lewin 1994: 77).

The Brooklyn Children's Museum was a resounding success and soon visitors from a number of cities that wanted to start their own children's museums were making pilgrimages to the site. In 1924, Mrs. Mary Stewart Carey visited the Brooklyn museum and brought back to the Indianapolis Progressive Education Association her vision of establishing a similar institution in Indianapolis. Mrs. Carey, a wealthy, well-connected civic and social leader, was able to use her considerable influence to create a board of directors and to begin collecting materials and monetary donations to open the museum.

The Indianapolis Children's Museum officially opened in January 1926 in a building located in Garfield Park, south of downtown Indianapolis (Kriplen, 1982). The museum's collections were a haphazard mix of donated items that had been begged from the families of children enrolled in the Indianapolis public schools**[i]**. Interest in the museum was extraordinary, and the museum soon linked with the public schools to create educational programs intended to supplement the schools' curricula. As public interest in the museum grew, so did its collections. The museum would move twice in order to find a space that would allow for suitable display areas before finding a permanent home on Meridian Street, north of downtown Indianapolis.

The current museum is the largest children's museum in the United States. It fills 356,000 feet of gallery space (Children's Museum 2001c), and at any one time it can only show about 1/10th of its collection (Sangiorgio 2002: 71). Its collections have both extraordinary depth and breadth, the museum can and does rotate its exhibits regularly. One example of the museum's ambitions is the plans now underway to construct a Dinosphere to take advantage of the museum's impressive array of dinosaur relics (Sangiorgio 2002: 71). Thus the museum is a text that is constantly being revised; its structure is constantly changing. While there are certainly some parts of the museum that are fixed, even the fixed elements may be subtly changed depending on the time of day the exhibit is visited.

Most of the museum is devoted to science and culture; what little floor space is not dedicated to these two categories of knowledge is area devoted to play. In addition to the exhibit areas, the museum houses a room it designates as "Playscape", where infants and pre-schoolers are encouraged to play with adults. This area also includes "Babyscape", an area for children under the age of 2 to "explore with their senses" (Children's Museum 2002). The museum currently houses a planetarium on its lowest floor. Visitors to the planetarium are taken on a guided tour of the solar system several times a day. One space in the museum is set aside for rotating exhibits; during the time of the writing of this paper the two exhibits that were housed in this space were "Bones: A Look Inside You" and the "Science of the Circus."

The permanent scientific displays are spread throughout the museum. The top floor is largely occupied by "Scienceworks" which opened as a state of the art science gallery in 1996 (Brown 1996: 34). This room is primarily focused on biological and environmental science; it includes a rock wall that children are invited to climb through (so that they may witness what lives inside the rocks), a habitat for birds, a water habitat populated by turtles, fish, and insects, and two large areas where children can play with water. Of the water play areas, one is devoted to teaching children about how the water table influences population and the other teaches children how water can be navigated, with a focus on tides, locks, eddies and water flow rates. There are two exhibits in this area that do not focus on the natural sciences. The first is a Rube Goldbergesqe machine that uses gravity and acceleration to shoot pool balls through an array of passageways. The second is an exhibit that invites children to build structures, appropriately named

the Construction Zone.

Visitors find the dinosaur exhibits housed on three separate floors. The museum displays a full size mastodon skeleton that was uncovered on a farm in Greenwood, Indiana (about 30 miles away from the museum), in a space adjacent to Scienceworks. Visitors are encouraged to touch a "real" dinosaur bone attached to a display board located next to the skeleton, Visitors are also invited to watch as museum staff uncover the bones of other dinosaurs in the Dinolab. Here, scientists go about their work uncovering bones that have been packed for shipment to the museum. Twice a day the lab is opened to visitors who get to talk to the scientists and to feel the bones that are being worked upon

The lowest floor of the museum houses the "What If" gallery. This room, intended for children ages 4-8, includes another dinosaur exhibit, a coral reef, and a mummy. Children are invited to play games that help them to learn about the different aspects of discovering knowledge. In this area, and throughout the museum, the museum relies on staff and volunteers to engage with visitors about the displays. There is little written material to supplement the exhibits; instead visitors are encouraged to play, touch, and talk about what they see.
The Indianapolis Children's museum makes four claims about the function of its exhibits:
1. Education justifies every object, activity, and event. There is a purpose behind each display, a story to tell with each exhibit, an idea to unfold in each gallery.
2. Bright vivid colors and dramatic lighting effects are used to capture attention. Labels are written in easily understood, contemporary language.
3. Exhibits are placed carefully to afford even the youngest a good look, and materials are presented in identifiable sequence. Whenever possible, exhibits are 'hands-on' or participatory in nature.
4. No matter how sophisticated the exhibit, human contact remains the most important source of learning (Children's Museum 2001a).
These four principles clearly espouse the museum's value hierarchy; in most cases the needs of the audience outweigh the preservation of the collections. Additionally, these principles articulate how the museum views its audience: engaged, active, and participatory. Such a vision of audience explains why the museum creates the arguments that it does about science in its exhibits.

2. Visual Argument
In 1996, *Argumentation and Advocacy* published two special issues concerned

with the possibility of visual argument. Although one essay appeared that negated the possibility that visuals could serve as argument (Fleming 1996), it was clear from the editors' selections that the community of argument scholars accepted that visual argumentation was not only a legitimate form of argument, but that it was time for argumentation scholars to turn their attention to the critical evaluation of visuals. J. Anthony Blair concludes his contribution to the first of the special issues with the bold statement that, "visual arguments are not a particularly exciting conceptual novelty; they do not constitute a radically different realm of argumentation" (1996: 38).

In subsequent years, communication scholars have turned their attention to visual rhetoric as well. No archetype theory or method for the analysis of visual argument has yet emerged from these writings, but it is clear that the visual turn in argument and rhetoric has emerged as one of the dominant themes of contemporary theorizing. However, one troubling issue emerges from these texts. The focus of most scholarship seems to be on two-dimensional visual experiences; critics seem more comfortable equating the visual with the pictorial than with the material. This is especially true of the work of W.J.T. Mitchell, one of the pioneers in the field of visual analysis**[ii]**. His latest work on visual rhetoric, *Picture Theory*, compresses the broad scope of visual representations to the notion of the picture (1994: 7)**[iii]**. Certainly, the analysis of photographs and visuals that accompany mass media images are fruitful areas for study, but to focus on these images to exclusion of all other visual argument is to exclude some of the most influential visual argument possibilities.

Museums are more than just visual, two-dimensional spaces; they are decidedly material. This is especially true for a children's museum that not only displays visual objects, but also encourages visitors to touch, i.e. to feel the object's materiality. Michael Herschensoh, Director of the Children's Museum in Seattle, notes, "The focus of our museum and most other children's museums is interactive, hands-on, play-based learning" (Farmer 1995: 168). Thus, traditional visual rhetoric templates, while useful in some respects for the analysis of material rhetoric, have not been developed to deal with the complexities of sites such as museums. What can be taken from the study of visual argument are issues dealing with the context and audience of the argument.

Visual argument analysis has two dominant foci: one concerned with the substance of the argument, the other with the interaction that the argument has

with the audience. Shelly (1996) and Blair (1996) are both concerned with understanding the substance of the argument. Shelly's work creates a schema for identifying the different functions of visual argument; she distinguishes two types of visual appeals: the demonstrative and the rhetorical. While Shelly cautions that her categories are not mutually exclusive and should not be viewed as a closed system of categorizing, her primary concern is with understanding the purpose of the visual in an argument system. Blair's task is much more fundamental; he asks what should count as visual argument. To this end, he provides criteria that determine what constitutes visual argument.

Blair and Goarke (1996) and Finnegan (2001) investigate the intersection of the visual form and audience assent. Blair and Goarke argue that in order to understand how a visual argument works on an audience, a critic must examine three types of context, "immediate visual context, immediate verbal context, and visual culture" (1996: 6). The first two contexts are interpreted in relation to the visual being studied; the third requires a critic to understand how the public reads the visual in relation to its interaction with other visuals. Blair and Goarke (1996) note: "The meaning of a visual claim or argument obviously depends on a complex set of relationships between a particular image/text and a given set of interpreters" (5).

Finnegan (2001) argues that audiences are likely to respond to pictorial representations because they construct naturalistic enthymemes when they view pictorial representations. In other words, an audience will give credibility to a photograph or other visual because they participate in the enthymeme being made by the photographer about the nature of the pictorial representation by granting that the visual they are seeing is real (143). Finnegan's work may be applied to material argument as well in that audiences are more likely to view a claim as true when material objects presented by an institution make it. Thus, the view of science presented by the Children's Museum must be true because it is supported by material objects that are "real" and displayed by a curatorial staff that has "knowledge."

Although argument scholars have yet to conceptualize how material objects work to create argument, Carole Blair (1999), in her theorizing on how to understand material rhetoric, posits five questions that a critic should ask about a material site:

1. What is the significance of the text's material existence?

2. What are the apparatuses and degrees of durability displayed by the text?
3. What are the modes or possibilities of reproduction or preservation?
4. What does the text do to (or with, or against) other texts?
5. How does the text act on person(s)?

These five questions are extremely useful for a critic who is interested in understanding texts that involve multiple senses. Blair's questions go beyond the simple issue of how visuals represent and ask how audience members interact with a material site. What makes museums powerful arguers is the audience's action; when a visitor chooses to play in an exhibit, they are taking a role that the museum wishes for them to assume. Thus Blair's final question addresses the power that museums have in gaining the assent of the audience.

In order to assess the power of the Indianapolis Children's Museum's argument, I will analyze both the content of the exhibits and the ways in which visitors are engaged by the materials exhibited. It is my claim that the Indianapolis Children's museum constructs arguments about science and scientific discovery that invite children to participate with knowledge from a multiplicity of perspectives. Although I do not claim that the text presented by the museum is polysemous, it certainly does not create a singular vision of science.

3. Arguments about Science in the Museum

The Indianapolis Children's Museum advances two claims about scientific discovery:

1. science is wonder and
2. science is play.

Rather than making essentializing claims about what science is and how it should be practiced, the museum chooses to emphasize that science is welcoming to any number of perspectives. While the museum certainly neglects much scientific inquiry in its choice of exhibits, it does develop exhibits that respond to the preferences of audience members. As an example, the Dinosphere came about because visitors suggested that the dinosaur exhibit be enlarged.

The natural sciences dominate the museum. In the largest permanent science exhibit, Scienceworks, most of the floor space is devoted to ecological exhibits. Visitors are encouraged to play with a watershed, climb through a passageway that will reveal "what lives in the dirt," view the life that exists in an Indiana pond, and interact with live animals that museum staff display at regular intervals. Visitors also encounter three different dinosaur areas within the

museum. On the top floor, adjacent to Scienceworks, is a mastodon skeleton. Down one floor is the "Dino Discovery Lab" where visitors can interact with paleontologists who are in the process of uncasing the bones of the 7 different dinosaurs who will inhabit the new Dinosphere. The bottom floor includes the "What If" exhibit, which invite children to discover dinosaurs. As visitors walk into the display, they are encouraged to pick up a check sheet that asks "How do you know if you've found a dinosaur?" Children are encouraged to critically examine bones, skeletons, and geography as they uncover fossils in a sandpit.

Physical sciences are the second most common types of materials displayed. As visitors enter Scienceworks, they are confronted with a giant gravity maze in which pool balls are shot, dropped, and careened from various trajectories. The museum also houses a two-story tall water clock that is placed in the atrium of the museum immediately before visitors enter the inside exhibit areas. Each day at 1 p.m. when the clock empties itself to reset, visitors are invited to hear a physicist explain how the clock works. Unlike the natural science exhibits, these displays only give visitors limited hands-on experience. Visitors may only gaze upon the water clock; there are no opportunities for interaction with this exhibit. Although the ball maze is not a perpetual motion machine, visitors only interact with this exhibit in so far as they turn a crank that pushes the balls into the maze or feed balls into two other slots in the machine. A third physical science exhibit is an IRL racing car that visitors are encouraged to climb into along with two racing video games. This exhibit was heralded as an "exciting program that introduces physics principles through auto racing" (Carlson & Mintz 1993: 101).

The significance of these exhibits is their ability to excite visitors about the possibility of science. Carole Blair asks, "What is different as a result of the text's existence?" (1999). In answer to this question, the Children's Museum creates a unique space for visitors to experience science. Unlike the typical science classroom, there are no right or wrong answers. Visitors may enter the exhibit at multiple points and are encouraged to think about exhibit materials in multiple dimensions. Signs positioned around the exhibits encourage parents and children to discuss the material that they have seen. The museum creates discourse about science that would not exist otherwise; it takes science out of the classroom context and turns it into play and wonder. Exhibits create wonder by their material apparatus; visitors are amazed that they are playing with "real" artifacts.

In a museum, especially one devoted to the audience, the material of the exhibits

announces a particular viewpoint. The Children's Museum makes three important choices in its exhibits that create an argument about scientific knowledge. Initially, the museum has made a conscious choice to display genuine artifacts rather than replicas. Visitors are told that they are touching "real" bones, sitting in an "actual" Indy 500 racecar, and interacting with live animals. Each of these experiences heightens the audience's appreciation of the wonder of science. The paleontologist who was working on the day of my last visit confided that the most frequent question he is asked by visitors is "Is it really real?"

The second choice the museum makes in the construction of its exhibits is to offer minimal supporting written material to explain its displays. For example, there are two written pieces that accompany the mastodon skeleton: one is a posterboard that has a bone attached and asks visitors if they have ever "felt one of these before". No other information about the bone is given; it is unclear what type of dinosaur, if indeed it is a dinosaur leg, this bone came from. The second written piece placed by the skeleton contains three short paragraphs of text. The first paragraph asks children to imagine that they are living among the dinosaurs in Central Indiana; the second explains that the dinosaur had to be carefully excavated and pieced back together; the third tells some of the ways in which paleontologists learn from these bones. This lack of authoritative text allows the visitor to create a narrative about the artifacts displayed that fits with his or her current ability to think about science. The argument that emerges from these supporting materials is not a specific claim about the purpose of science, but a general claim about the wonder of scientific discovery. Worth noting is that one specific claim is almost always forwarded by the supporting material that accompanies the artifacts: the museum wants its visitors to know that the artifact they are seeing or playing with is "real."

The third way that the museum frames its arguments is to emphasize human interaction between children, parents and museum personnel. The museum employs 188 full time and 200 part time staff members, and relies on over 300 volunteers (Children's Museum 2001c). On any given day, visitors will be greeted in the galleries by experts in early childhood education, physicts, chemists, paleontologists, and biologists. Both the staff and the volunteers are responsible for engaging visitors in conversations about the exhibits; each interaction that a visitor has with a museum staffer will be tailored for the needs and interests of that visitor. Clearly this is a risky strategy; many visitors are uncomfortable being

approached by the museum staff. Many of the employees I interviewed recounted stories of visitors walking away from them as they attempted to engage in conversations. Children, however, are far more likely to talk to the staff; especially because the staff is quick to point out the games and puzzles that accompany many of the exhibits. Additionally, the museum has posted at adult eye level, signs that ask parents to talk to their children about what they see at the museum.

Human, rather than textual support, ensures that the museum is constantly in transition, even the permanent exhibits may change depending on how the museum staff or the visitors choose to talk about the exhibits. In any material display, the materials that are used to make an argument change over time; they may break, loose their luster, be re-arranged, or simply be viewed differently depending on the angle that the visitor takes on the exhibit. In the "What If" room, a visitor who decides to dig for fossils in the sand pit will have a much different view of the argument than one who quickly walks through the rooms. The museum's obsession with displaying the real also radically changes the text. Taken together, these two choices reinforce the primary claims being made about science; it is play and wonder. No specific claim about what constitutes science is made by the museum, nor does the museum reinforce the scientific method. Visitors are left with the overwhelming impression that science is what they make of it.

To this point, the museum's argument has been evaluated based on its substance; both in terms of what the museum presents (real artifacts that are available for play) and what is absent from the exhibits (directive written material). While the substance of the argument clearly articulates claims about the nature of science, perhaps the most influential aspect of the museum's argument is the way the exhibits act on the persons who visit. Visitors are encouraged to play, to experience the exhibits from multiple perspectives, to crawl under, into and on top of the artifacts. Almost every display invites action; visitors are invited to use their entire being with the exhibits, to crawl, climb, dig, or start the balls through the gravity maze. The museum invites children to "pretend to be earthworms as they crawl through the 'dirt' and explore habitats of 12 different underground animals" (Children's Museum 1999). Children can experience the Indiana pond from a variety of perspectives; they may crawl underneath the exhibit, look through a microscope at the pond life, or simply approach the pond and gaze at

the flora and fauna at eye level.

Positioning visitors within the exhibits functions as a potent naturalistic enthymeme. The museum invites visitors to play with science, to experience it with multiple senses. As a result, visitors are left with a vision of science as involving. Rather than participating as a spectator, visitors join in with the exhibit and engage with it in whatever way they are able.This engagement reinforces the power of the museum's vision of science; science is not something one observes, it is something one does. Science is fun!

4. The Wonder of Science and the Materiality of Arguments
Children's museums are powerful arguers; they engage with audiences that are particularly open to their visions of the world. Strong alliances between educational institutions and museums reinforce the museum's authority.Thus, an examination of what types of arguments are being made is important to understanding how audiences are engaged by these powerful rhetors. My analysis of the Indianapolis Children's museum reveals that this museum creates an inviting argument about the nature of science by constructing strong interactive exhibits. Caulton notes, "A hands-on or interactive museum exhibit has clear educational objectives and encourage individuals or groups of people working together to understand real objects or real phenomena through physical exploration which involves choice and initiative." (1998: 2). Interactive exhibits reinforce the arguments made by the museum by positioning visitors within the exhibit. Visitors leave the museum with a sense of wonder and awe. The Indianapolis Children's Museum offers a powerful emotional argument about the nature of science.

On the whole, the Indianapolis Children's Museum is an exemplary rhetor; its staff and leadership are cognizant of its power and its responsibility to the publics that it serves (Children's Museum 2001b). This museum has always been a leader in the children's museum movement, and it is refreshing to be able to state that this site creates visions of science that are not closed, forbidding, or unwelcoming. Although much more research needs to be done on the audience response to children's museums, this work serves as a good first step in understanding how these museums create their arguments.

While it is valuable to understand the types of arguments made by material sites, much more attention needs to be paid to developing methods for understanding

the impact that material sites can have in creating and maintaining the arguments they offer to the public. The credibility of material sites is rarely questioned by their audiences and the argument being offered by the site may not be clearly articulated or explained. This work is a case study of one important site, much more could be learned with about how to interpret sites with more case studies or systematic comparisons of sites that would ultimately lead to a greater understanding of the apparatus used by these sites.

My work only begins to address the issue of how audiences are affected by the material presented in the exhibits. Perelman and Olbrechts-Tyteca's (1969) concept of the universal audience would be extremely useful to scholars who are interested in expanding both the theory and method of material argument. Much could be learned by examining what types of audiences the curators and educational staff of children's museums envision. Clearly, the Indianapolis Children's Museum has identified for itself a powerful universal audience, one that is able to learn from experience and is willing to interact with other human beings in the educational process. Additionally, the museum expects to educate audiences who enter its site with different experiences and expectations; Perelman and Olbrechts-Tyteca's schema may be useful in understanding why the museum is able to effectively appeal to such diverse visitors.

NOTES

[i] Most of the impetuous and funding for the museum involved the public school system. Students were rallied to become members of the museum by donating 25 cents for a pin shaped like a seahorse that was the emblem for the museum.

[ii] Mitchell's work, Iconography is identified by Birdsell and Goarke's review essay on visual argument as "the best single volume exploration of the broad sweep of intellectual history on these (visual) issues" (1996, 10).

[iii] Three articles have been published in Argumentation and Advocacy that are identified as dealing with visual argument. All three articles are concerned with the evaluation of pictures. (Shelly, 1996; Barbatsis, 1996; Finnegan, 2001)

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