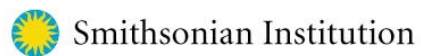


**A Case Study of**  
*Nature's Jewels: A Living Exhibit of Orchids and Butterflies*



**Office of Policy and Analysis**  
**Smithsonian Institution**  
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## FOREWORD

In January 2003, the Smithsonian captured a moment of tropical splendor with the exhibition: *Nature's Jewels: A Living Exhibit of Orchids and Butterflies*. The exhibition consisted of a range of resplendent orchids from the Smithsonian and the United States Botanic Garden and 86 unique species of gorgeous butterflies.

The Office of Policy and Analysis (OP&A) completed a study of visitors' reactions to the exhibition prior to publishing this case study that focuses on the process of making the exhibition. Andrew J. Pekarik conducted initial interviews for this case study. Zahava D. Doering conducted the majority of the interviews and wrote this report. The rest of the OP&A staff assisted in the study either by accompanying interviewers and taking copious notes or reviewing drafts of the report. The efforts of Cynthia Kaufmann deserve special mention.

The case study benefited greatly from the feedback of Nancy Bechtol, Director, Office of Facilities Management; Barbara Faust, Supervisor of the Horticulture Services Division, and exhibition developers, Horticulture staff, facilities managers, and representatives of central units. I appreciate their assistance. Like other OP&A case studies of exhibitions, this look at exhibition making provides practical guidance on how to improve exhibitions at the Smithsonian.

Carole Neves  
Director  
Office of Policy and Analysis

# **A Case Study of *Nature's Jewels: A Living Exhibit of Orchids and Butterflies***

## **INTRODUCTION**

The Office of Policy and Analysis (OP&A) undertakes studies in order to help Smithsonian Institution (SI) units improve the quality of their public offerings, as well as the processes that create them. Whenever possible, studies of exhibitions include surveys of visitors as well as interviews with exhibition developers. This case study of *Nature's Jewels: A Living Exhibit of Orchids and Butterflies* accompanies the recently distributed results from a survey of visitors to the exhibition.<sup>1</sup>

The Director, Office of Facilities Management, and Supervisor of the Horticulture Services Division (Horticulture) that spearheaded the development and implementation of the exhibition, requested these studies. The purpose of both studies is to provide baseline data against which to assess future exhibitions, and to provide suggestions for planning the next orchid presentation at the Smithsonian in 2005.

## **Background**

*Nature's Jewels: A Living Exhibit of Orchids and Butterflies* (*Nature's Jewels*) was presented in the East Wing of the Arts and Industries Building (A&I) from January 18 through May 26, 2003. During this period, a total of 310,000 visits were recorded to the A&I Building. A majority of visitors viewed the exhibition.

The exhibition featured hundreds of orchids, in a full range of colors, shapes, sizes and adaptations; the orchids were complemented by hundreds of colorful butterflies in an adjacent enclosure. The 4,000 square foot (sf) orchid garden was designed to suggest a tropical jungle, with features such as tropical vegetation and the sound of water. The exhibition also incorporated benches and simple interactives. Staff and docents led behind-the-scenes tours of the orchid garden. Over the course of the exhibition, about 2,500 visitors (including school groups) participated in the garden tours.

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<sup>1</sup> The visitor survey is reported in OP&A (2003). For other studies see OP&A (2001, 2002 and 2003).

The butterfly house occupied about 1,000 sf adjacent to the orchid garden. It provided both the controlled climate and containment required for live butterflies. This area, which also contained tropical plants and orchids, had a glass wall so that visitors could look into the enclosure from the main orchid garden. Docents were stationed in the butterfly house to answer questions and provide information to visitors. A total of about 137,000 visitors entered the butterfly house. On occasion, attendance was limited by space constraints and safety considerations. Over the total exhibition run of *Nature's Jewels*, the types of plants, orchids, and butterflies on display were regularly replaced or changed.

In conjunction with the exhibition, a series of special activities were held on Saturday, February 22, *Nature's Jewels Festival Day*. The event included family activities, art demonstrations and illustrated talks.

In late March and early April, when visitors to *Nature's Jewels* were asked to rate their visit to the exhibition, over two-fifths (44%) of visitors indicated that they were “more than fully satisfied,” and another two-fifths (40%) said that they were “fully satisfied.” The top category, “more than fully satisfied,” indicates an unqualified high level of satisfaction (OP&A 2003). The visitor study also shows that the most important factor influencing visitors’ satisfaction was whether or not they entered the butterfly house.

Because of its complexity and its new role in this regularly scheduled exhibition, the butterfly house became an important focus in this case study, although some of the lessons learned can be applied more generally to overall exhibition planning and management.

This case study is divided into two main components: an evaluation of the strengths and weaknesses of the *Nature's Jewels* exhibition process, and recommendations for improvements. Sections deal with concept development, the exhibition collection, design and production, attendance and promotion, and the shop. The last section contains observations and suggestions for future exhibitions.

## THE EXHIBITION PROCESS

### Concept Development

*Nature's Jewels* was a joint effort of the Smithsonian's Horticulture Services Division (Horticulture) and the U.S. Botanic Garden (USBG) located at the eastern end of the

Mall.<sup>2</sup> This was the eighth time the two organizations collaborated on an orchid exhibit. Horticulture and USBG alternate venues and the hosting institution picks a theme for each exhibition. The orchid exhibition has been at the Smithsonian four times, three occasions in A&I and once in the Ripley Center. Most recently, the sixth annual orchid exhibition, *The Artistry of Orchids*, was held in the A&I Building from January 22 through June 4, 2000.<sup>3</sup> USBG hosted the exhibit three times at its Conservatory and once off-site during major facilities renovation.<sup>4</sup> Horticulture initiated this collaboration with USBG as a way of ensuring an orchid exhibition that would be open for several months. As the SI collection is not large enough to support an exhibition of several months' duration, Horticulture needed a partner who could provide additional specimens. From the start, USBG has been enthusiastic about combining the collections and joining efforts for a yearly exhibition rotated between the two venues.

Under the current cooperative agreement, the host venue's staff assumes responsibility for design and planning the exhibition. The non-hosting institution contributes plans and some maintenance. A core team within Horticulture developed the concept for the 2003 orchid show. The team began planning late in 2001. According to team members, they discussed various ideas and debated various themes. One suggestion was to develop a show centered on the decimation of the South American rainforests and the impact on orchids. Another suggestion was to show how orchids relate to insects and pollination. Yet a third idea involved an exhibition of orchids and toy trains, illustrating the role of trains in horticulture.<sup>5</sup> In November 2001, senior SI management decided to develop a butterfly house in conjunction with the orchid exhibition. The impetus for this direction was partly an unsuccessful attempt to fund and build a permanent butterfly house at the Smithsonian in 2000-2001. Considerable effort had gone into research for that initiative, and management made the decision to use that research "and do something we could afford." In the end, a decision was made to integrate the two components, orchids and butterflies. "The scope of this exhibition [was] pollination biology tied to orchids." The script, subsequently translated into interpretive panels and labels, reinforced this theme.

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<sup>2</sup> The Garden is administered through the Office of the Architect of the Capitol.

<sup>3</sup> The 2000 exhibition displayed, also within a tropical garden setting, the vast orchid collections of both institutions. The work of 17 artists, whose work was inspired by orchids, surrounded the living orchids display. Included were 46 paintings, drawings, photographs and illustrations, 16 metal and glass sculptures, Raku tiles, and jewelry.

<sup>4</sup> The 1999 exhibition, *Romance of the Orchid*, was held at the Brookside Garden Conservatory in Wheaton, Maryland. USBG cancelled the 2001 exhibition due to construction.

<sup>5</sup> The popularity of *Smithson Land Express*, Horticulture's holiday exhibit of miniature trains in scaled landscapes created around the A&I rotunda garden, led to this idea. *Garden Train* was on view from November 2001-March 2002.

The Exhibition Staff. The core team for the exhibition included an entomologist and orchid curators, as well as staff with experience in floral display and maintenance. In the words of one interviewee, “the gardens we [Horticulture] care for, e.g. the Haupt Garden or the Mary Livingston Ripley Garden, are our permanent exhibitions.” Horticulture does not have dedicated staff to work on the development and implementation of its indoor exhibitions and participation in flower shows. Rather, individuals are drawn from other duties or are assigned exhibition activities as additional responsibilities. For example, the entomologist’s primary responsibility is monitoring the Smithsonian’s insect pest management programs. Staff from the greenhouse was asked to provide help: “So a guy that’s usually involved with taking care of tropical plants out of the greenhouse comes down on Thursdays to take care of the one exhibit.”<sup>6</sup>

In past years, both SI and USBG worked together on everything from the concept to the installation. According to one Smithsonian staff member, “In the years that the exhibition is presented at USBG, USBG staff does most of the work and all of the maintenance. When it is at the Smithsonian, USBG supplies us their orchids and we do the major maintenance. When it is at USBG we have three staff engaged in planning it, and when we do it here—it is 13 staff planning it.” Because of “different styles of doing things, different processes, different personalities, it was very complicated,” and both organizations decided to try a different strategy starting with the 2003 exhibition. The new approach is that “when it’s in your venue, your institution plans it, does everything, except providing the plant material.” In reality, neither organization “does everything,” as staff gets involved in helping each other with the research and editing text. While a formal assessment of the new approach is still forthcoming, Horticulture staff believe that this approach worked well.

Staffing was another big change in the 2003 exhibition. For the first time, volunteers staffed the exhibition. The United States Department of Agriculture-Animal and Plant Health Inspection Service (USDA-APHIS), the agency that issues permits for butterfly enclosures, requires staff at the entrance and exit of the butterfly house as well as inside it. This meant coordinating about 75 volunteers, seven days a week, from 10:00 a.m. to 5:30 p.m. Staff at the Visitors’ Information and Reception Center (VIARC) helped Horticulture recruit the volunteers with less than six months notice. There were two weekend orientation classes for volunteers. The volunteers performed extraordinarily well, in an environment new to them. By all reports, “[VIARC] was heaven to work with.”

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<sup>6</sup> The Horticulture greenhouse is located about five miles north of the Mall.

While the Smithsonian has staff with training in entomology, both at the National Museum of Natural History (NMNH) and at Horticulture, no one had practical experience with the care of tropical butterflies or with interior butterfly habitats. Horticulture's only previous butterfly experience focused on butterflies native to the Washington, D.C. area in the outdoors Smithsonian Butterfly Habitat Garden (Butterfly Garden), an 11,000 sf area located on the east side of NMNH.<sup>7</sup>

### **The Exhibition Collection**

The Smithsonian's orchid collection began with five plants in 1974. Mary Livingston Ripley started it for display purposes. Over time, the collection has evolved into a conservation project as well, and many orchids have been donated to the Smithsonian for "safekeeping" and propagation. Currently, the SI collection has over 10,000 plants of 256 genera. From the SI and the USBG collections, a range of different orchids was selected. Orchid specimens were changed three or four times each week, in the exhibition. USBG changed their specimens once or twice each week and SI changed their specimens twice each week.

Butterflies for the exhibition were purchased from dealers in London and Costa Rica. The butterflies came in as chrysalis, the stage between a caterpillar and an adult butterfly. In the course of the exhibition, 86 unique species of butterflies were displayed; on average, about 35-40 different types were flying at any one time.

To showcase the diversity of species and colors, shapes, sizes of the orchids and butterflies, the design called for hundreds of plants:

... They come from three sources, the SI greenhouse, the USBG (where we could choose tropicals from their amazing collections), and nurseries down in Florida. We told them [Florida nurseries] we need spectacular plants and they sent two tractor-trailers of plants, including the palms with their 36" pots...

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<sup>7</sup> The original Butterfly Garden was built in 1995. The garden's success encouraged Horticulture to work toward tripling its size. The current urban garden contains native plants found in wetlands, meadows, and wood's edge, and emphasizes butterfly-attracting plants. It was built with partial funding from the Smithsonian Women's Committee. The Garden Club of America assisted with funding for the year 2000 expansion of the butterfly garden and outdoor classroom.

<sup>8</sup> She was the wife of the eighth Smithsonian Secretary, S. Dillon Ripley.

## Exhibition Design and Production

Design. Horticulture designed the overall exhibition, including the butterfly enclosure. Horticulture staff sought the necessary background information primarily from visits to both permanent and temporary butterfly habitats and from consultations with experts in designing butterfly enclosures. The visits and consultations had taken place a few years earlier, when Horticulture was developing the proposal for the permanent butterfly exhibition.<sup>9</sup> “We had been working on bringing a butterfly house to the Smithsonian, so we had multiple sets of plans from different places and different times. And we had an idea of what we thought we needed to do and thought that we were absolutely ready to go when we started out.”

The original design underwent some changes in response to both the location in A&I and USDA regulations. Initially the whole exhibition was to be in A&I’s West Gallery, but was shifted to the East Gallery in February 2002. The East Gallery was thought to provide the best circulation of people, even though the A&I loading dock is located on that side of the building. Horticulture decided to place the butterfly house against the north wall of the East Gallery, closing the north pedestrian corridor of the Gallery. In addition, this location afforded the butterfly enclosure easy access to utilities.

According to USDA-APHIS regulations, a butterfly enclosure requires both entrance and exit vestibules. The Horticulture design accommodated this requirement. The design also had to take into account the physical proximity between the plants and the butterflies in both the selection and handling of the plants. The tropical plants in the orchid section of the exhibition had to be separated from those that went into the butterfly section,

... because all the plants that went into the butterfly section could not be treated with pesticides, to protect the butterflies. We couldn’t use pesticides on them for three months. Within the butterfly exhibit we exchange the flowering plants often, because they are very susceptible to insect infestation.

The development of the interpretive materials (panels, directionals, interactives) was undertaken cooperatively with the Office of Exhibits Central (OEC). OEC received predominantly scientific text from Horticulture and shaped the materials into a script and

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<sup>9</sup> *The Butterfly Pavilion Marketing Survey*, dated August 12, 2000, includes comparative data for 14 butterfly facilities. A more complete document, *Butterfly Pavilion* (undated), includes a report from a world-renowned butterfly expert based on a meeting held in January 2001 to explore the feasibility of an interior pavilion in the South Hall of the A&I Building.



interpretive strategy. As one Horticulture participant described it at the *Smithsonian Live!* forum:<sup>10</sup>

... Along with ... others on the committee, I was assigned to come up with a script, and this is one of our initial scripts [slide]. You can see that whole first paragraph is the definition of biodiversity. Of course Exhibits [OEC] hated that. That's way, way too big. This was just a description of one of the types of diversity. Our idea was to have these [panels] throughout the show and to have sections where we talk about biodiversity and we'd have orchids to represent each one of those. This text is all about pollination [slide]. That's 160-plus words, and when it ended up—it was 52 words. And they're not in the exhibit; they're on the back wall. So things kind of got moved around on us. It's amazing how 60 pages of text can become 10 text panels. But that's what happens when you do exhibits. We're writing scientifically. We're putting all the information out there and then Exhibits boils it down and tells you, "They won't understand." So you've got to make it simple.

NMNH entomologists assisted in the development of the interpretive materials in the exhibition. They reviewed various versions of the Horticulture script and subsequently reviewed the OEC-crafted panels.

Two Horticulture interns, working under the guidance of a Horticulture staff member, drew the design drawings, sketches of the entrance, and the plant installation plan. The 2002 Folklife Festival "used lots of bamboo and we [Horticulture] captured their bamboo." The design included an artificial tree so that orchids could hang on it.

Design Review. In addition to the reviews of exhibition plans that the units themselves undertake, the Smithsonian also requires external reviews. Smithsonian Directive 410 (SD-410) establishes requirements and guidelines for the review of planning, design, and construction projects. The purpose of this review is to "ensure that all construction is of the appropriate quality to:

- Protect, preserve, conserve and secure the artifacts in the collections in perpetuity;
- Support the special needs of scientific programs;
- Preserve the buildings and their historic integrity; and
- Ensure the safety, health and welfare of Smithsonian visitors and staff.

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<sup>10</sup> *Smithsonian Live!* is an internal Smithsonian program at which staff with recently opened exhibitions explain what they did and why, discuss the challenges they faced, and answer questions from their colleagues. The *Nature's Jewels* program took place on March 20, 2003.

Interviewees made a number of comments about this SD-410 review, critiquing both the process and its implementation. In July 1998, the office then responsible for the SD-410 process, the Office of Physical Plant, established a pilot program that gave four units the authority to conduct the SD-410 review of their own exhibitions: National Museum of African Art (NMAfA), Arthur M. Sackler Gallery (Sackler), Freer Gallery of Art (Freer) and Horticulture. Each unit named a design reviewer who would be responsible for overseeing the process and signing a checklist. In establishing the pilot program, it was made clear to participants that they needed to abide by the codes, standards and guidelines required by the SD-410 process. The unit-designated design reviewer had the discretion to decide, on a case-by-case basis, whether the SD-410 process should be done in full or in summary form, and in writing or through personal contact. In all cases, the Office of Protection Services (OPS) and the Office of Safety and Environmental Management (OSEM) were invited to review all exhibition documents for security and life safety issues.

The A&I Building, houses a central exhibition space available to both internal and external exhibitors, its Office of Exhibits coordinates exhibitions, provides support to exhibitors, and is responsible for shepherding exhibitions in its spaces through the SD-410 process. According to staff, the process is more formal when the exhibitor is not a Smithsonian organization.<sup>11</sup> Because Horticulture's offices are in A&I and because it is included in the pilot program, a designated reviewer from Horticulture handled the review of *Nature's Jewels* without the direct involvement of the A&I Exhibits Office. Interviews indicate that the A&I Exhibits Office staff assumed that they would be kept informed about the process.

Interviewees described the SD-410 process for *Nature's Jewels* as "a little loose." Horticulture sent a partial package to the Office of Facilities Engineering and Operations (OFEO), the office responsible for the SD-410 process. Since Horticulture was using the pilot "checklist" process and monitoring the process itself, copies of the package were not widely distributed. Some individuals in OFEO who saw the package, presumably submitted at the 100% stage of the drawings, found it inadequate for review purposes and requested additional information.<sup>12</sup> It is not clear if the requested information was received, since the pilot program does not have firm documentation requirements. Other reviewers whom Horticulture contacted in person, as allowed in the pilot "checklist" process, indicated that they would give more thoughtful suggestions when they had time and "paper" to review. One reviewer felt he was asked to "bless" the exhibition at a point

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<sup>11</sup> Tangentially, staff noted that "first time exhibitors," external and internal, are more likely to adhere to the SD-410 information requests and resultant comments.

<sup>12</sup> Typically SD-410 packages are reviewed several times, at 30% and 50%, as well as at 100% of the completion of planning.

when it was too late to make changes. Another staff member remembers an “on board review.”<sup>13</sup> Ultimately, everyone interviewed felt that the design eventually met requirements, but some later problems might have been avoided through a more careful and formal SD-410 review process in this specific case.

One individual, in discussing this particular SD-410 process expressed the sentiments of several interviewees: “It seems a pilot that has never ended. While people in the museums have good intentions, you need someone on the outside to ensure that all the boxes are checked, that there is a record and paper trail, and that there is no temptation to take shortcuts.”

Another external review was required by USDA-APHIS prior to its issuance of a SI permit to have butterflies in the A&I Building. USDA-APHIS regulations’ “sole purpose is containment of butterflies, not their health.” The design of the butterfly enclosure, including the screening for the roof, was discussed with the USDA-APHIS and tentatively approved fairly early in the process. USDA-APHIS’ main review took place after construction of the butterfly enclosure began. At that time its primary suggestions were to improve some seals, “drop the ceiling, put more netting in.” USDA-APHIS also required that the chrysalis chamber be placed inside the butterfly enclosure, rather than outside of it as staff had planned.

At all stages of the exhibition development, Horticulture relied on the cooperation and collaboration of individuals and units (e.g., NMNH, OFEO, OEC, A&I Exhibit Office, Office of Historic Preservation, and Office of Facilities Management - South Group, etc.). It found that, “Some [units] are notoriously difficult and some [units] are always great.” One person suggested that collaboration works well when organizations have pre-established processes in place.

Another interviewee, in discussing the exhibition’s problems, commented, “It wasn’t a lack of review, but a matter of not questioning them [Horticulture] more.” Some of the individuals involved, from both Horticulture and other units, operated from assumptions, instead of involving knowledgeable colleagues. For example, the fluorescent fixtures ordered for the enclosure were wired for 277-volts. As it turned out, the building [A&I] could not support them, and 120-volt fixtures had to be substituted. Another example involved the exhibition entrance. At least one A&I office assumed that it could be moved, if deliveries to other parts of the building needed to be made. In fact, it would

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<sup>13</sup> This type of review takes place when there is a small job and a fast review is needed. Instead of sending packages, the people involved get together and discuss the job. The only written SD-410 related documentation shows the results of Office of Safety and Environmental Management, architectural and electrical reviews. Some responses to these reviews are transmitted verbally.

have taken many people to move it. A workable, but inconvenient solution was to open the South Door of A&I for deliveries under special circumstances.

Schedules. Without exception, the major problem expressed by Horticulture staff was the tightness of the schedule during the last two weeks. The schedule contributed to the problems with the USDA-APHIS permit process. Although *Nature's Jewels* was scheduled to open on January 18, Horticulture could not take possession of the East Wing gallery until January 2 because another exhibition was in the space. According to staff, they “had a few days to dismantle walls and build a butterfly enclosure so that by January 9, USDA could say that, ‘yes, this meets all our criteria’.”

Horticulture staff met on a regular basis throughout the project and kept detailed schedules of “who, when and what.” However, the tightness of the installation schedule and lack of practical, daily experience in dealing with butterflies led to considerable difficulties. For example,

We had the butterflies over in Natural History squirreled away in a room. ... We had butterflies literally coming out of everywhere. We were getting chrysalis in and they were emerging, and we [were] trying to hold them and we were getting ready to get into that show on day nine like [ ] had told us we were going to. USDA came in and inspected and required additional work.<sup>14</sup> We had an enclosure. We didn't have a floor, we didn't have plants, we didn't have walls, and we didn't have anything ready yet. So our best laid plan wasn't quite there.

According to one interviewee, an additional delay was caused by the time it took to hang the lights in the enclosure. While Horticulture had a detailed internal calendar, schedules were not developed in concert with some of the other organizations that were impacted or that required information, such as the A&I Office of Exhibits and the Office of Facilities Management - South Group. When the A&I Office of Exhibits signs contracts with external organizations that bring in exhibitions, these agreements include a timetable, and formally assign responsibilities to the A&I Office of Exhibits and other parties involved (e.g., the Office of Facilities Management - South Group, the Office of Exhibits Central, etc.). The flow of requests among everyone involved is specified and monitored. A memorandum of understanding (MOU) is generally developed with some internal organizations, e.g., with the Smithsonian Institution Traveling Exhibition Service

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<sup>14</sup> “But they said, no you have to do more sealing in here. So we had to seal a few more things. Had to drop the ceiling, put more netting in and we continued and we were successful. Only then could we put the materials inside the show.”

(SITES) that spells out schedules and responsibilities. Neither of these procedures was followed with the Horticulture exhibition.

Construction and Installation. Horticulture does not usually use contractors for its exhibitions, but this time, because of the tightness of the schedule, it used contractors to build stonewalls with fountains in the exhibition and frame the room for the butterfly enclosure. By all reports, the contractor was cooperative and helpful.

Everyone thought it would take a few days to get the walls [of the previous exhibition] down. Well, the walls were actually down by 12 o'clock [January 2]. Because of historic reasons we had to cover the floor with masonite and in retrospect I wish we hadn't bothered to use that, but maybe another type of flooring. It doesn't work well when you get dampness with it.<sup>15</sup>

Difficulty in insuring sufficient heat and humidity plagued the butterfly enclosure during construction, the opening, and the first few weeks of the exhibition. Initially this led to serious butterfly attrition and therefore a dearth of butterflies on view in the enclosure, additional expenses and considerable stress on the staff. Depending on their organizational vantage point, interviewees gave different reasons for the heat and humidity problems. The most concise explanation of the problems and some of the solutions came from the entomologist working on the project when he addressed a *Smithsonian Live!* audience:<sup>16</sup>

... We open the exhibit and get everything in there, but these were all things we had to do in that first month to make it actually get to be where we thought it should be for the butterflies. To where we knew it should be for the butterflies. We had had some advice that didn't quite pan out in terms of conditions. The temperature in the Arts and Industries building is about 72° and 12% humidity. Butterflies like 80% humidity and [temperature] above 80°. So we had to get all that into this house. We had to add air filtering and gas phase filtering. The floor gives off gas. The rocks, the ceiling, the walls, the fake moss, the paint – all give off things that would kill the butterflies. Butterflies are environmental indicators. If you have butterflies, you have a healthy environment. If you don't have butterflies, look around, you probably have something giving off toxic gases or pesticides. We put up a reverse-osmosis water filter because DC has chloramines

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<sup>15</sup> The Office of Historic Preservation told Horticulture that it should not put tiles on the marble floor, even with water-soluble glue. So they put in a sub-floor and apparently underestimated the moisture coming off of the rocks, which buckled the floor.

<sup>16</sup> All indented quotes are from a transcript of the *Smithsonian Live!* program.

in the water and that is toxic to butterflies.<sup>17</sup> We were throwing pond detoxifier in the water until we got that in.

... We had to close the air intakes in there. They were sucking the butterflies in. We had to seal the entire roof with greenhouse plastic. The humidity just wasn't getting to where we thought it would get given engineering specifications. It just didn't happen. So we just had to do that. We got automatic humidifiers, so we didn't have to walk around all day squirting water out there. We still did that once in a while. You'll see volunteers going around squirting the plants. The butterflies are drinking that water. They drink water laying on surfaces, so they need that. ... We got some additional chrysalis cages, because we were getting more pupae than we thought we would.

... it [butterfly house] was inspected on day nine [by USDA], but we weren't ready for the butterflies. ... In fact, I was on the phone pleading, "Can I do it tomorrow?" "No," they said, "not tomorrow." And we stretched that and stretched that and released them [the butterflies] the day before, the evening of the 16<sup>th</sup>. Most butterfly houses take a month to have a soft opening, with nobody there and they release the butterflies, see if they fly, establish the environment, let things settle down. We had a day and a half.

The butterflies went in at 72°, actually it was more like 76-78° and about 20% humidity and they sat. We didn't have a lot flying at first.

Consistently, interviewees emphasized that the special requirements for heat and humidity were *not* discussed during informal consultations or the more formal reviews. For example, one person who saw the drawings early in the process explained to Horticulture that the A&I Building is generally at 75° and 50-55% humidity. Furthermore, in the winter, it is more like 72° and 25% humidity because the higher levels are not maintained. Thus, this person concluded, some additional heating would be required, and, in fact, some additional heating was added in the design to maintain a somewhat higher temperature. Interviewees also stressed that if Horticulture had clearly spelled out the special temperature and humidity requirements, it might have been

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<sup>17</sup> There are differences among butterfly experts about whether this is necessary or not.

suggested that the A&I Building could not meet those requirements without specially designed systems.<sup>18</sup>

According to others, Horticulture staff had assumed that a temperature of 75°F would be sufficient for the butterfly species it would acquire for the exhibition. The staff couldn't predict with certainty the seasonal availability of butterflies and that they wouldn't necessarily be getting the butterflies suitable to that temperature.

In contrast to the butterflies, the installation of the plants and orchids went smoothly despite the severe time constraints and the small working area(s). Horticulture staff had about two or three days to install all of the plants. They had to determine how to cover the huge 36" pots that the plants were in and then how to space the orchids. About half the orchids were from the Smithsonian collection and half from the USBG. During installation,

We put ours in one day and theirs in another. We were on top of one another, but got it done in time. We tried to group them [orchids] to complement the informational material in the exhibition, whether it was seed production, epiphytic growth habits, pollination. We did it pretty successfully. But the orchids change all the time. We have installation twice a week. One day we [Smithsonian] come down and one day they [USBG] come down. The blossoms last at most ten days to two weeks, so we are constantly challenged to stay in line with the themes.

The fabrication and installation of the exhibition graphics and the interactives (the butterfly boxes) also went smoothly. The Office of Exhibits Central (OEC) worked closely with Horticulture. One person commented that small jobs are difficult to schedule, but "OEC is always wonderful. ... fantastic, very creative, and talented." On some elements OEC did more work than originally planned, on others less. For example, OEC built the "What's Flying" panel with plaques showing different butterflies. One of the problems for OEC in designing this panel was that Horticulture could not specify the kinds of butterflies it was getting. To cover all contingencies, Horticulture suggested 60 plaques. In the end, based on discussions with Horticulture, OEC made 27. OEC also did all of the image research and ended up with over 200 images, as it needed to have images for the plaques and other materials in a timely fashion. Originally Horticulture had plans for more interactives, which OEC was going to handle.<sup>19</sup> It had to eliminate

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<sup>18</sup> The consultant's report prepared in January 2001 discusses the requirements for operating temperatures between 75°F. and 80°F. and a humidity level of 70% for the permanent Pavilion envisioned for the South Hall.

<sup>19</sup> Horticulture has the design drawings for the interactives and believes it will fabricate them for a future exhibition.

some due to a budget reduction, and OEC ran out of time to make some others. In the end, OEC implemented one interactive idea, the butterfly boxes, and built eight versions, each slightly different. OEC also retrofitted four exhibition cases, purchased and helped with the lighting, and helped with the installation. “We installed the banner; we put up panels and art work. ... We determined the location of panels, signs, and the boxes [interactives].”

## **Attendance and Promotion**

In spite of limited promotion (see below), difficult times (the economy and Iraqi war), and an unusually cold winter, a total of 310,000 visits were made to the A&I Building during *Nature's Jewels* presence. As mentioned earlier, a substantial (137,000) entered the butterfly enclosure. Based on this count of entrants to the butterfly house, by Horticulture volunteers, and the survey of visitors, we estimate that 190,000 visits were made inside the exhibition area, and probably additional passer-bys enjoyed the orchids from the rotunda.<sup>20</sup>

A comparison of the 2003 and 2000 visits to A&I, during the time of the Horticulture orchid exhibitions, shows that the 2003 *Nature's Jewels* did very well in the environment of decreased visitation at the Smithsonian. In 2000, *The Artistry of Orchids* was open six days longer than the 2003 *Nature's Jewels*. After adjusting for the difference in length to establish the same number of days for the two exhibitions, there were 377,000 visits to the A&I Building in 2000, compared to the 310,000 in 2003. While these data indicate an 18% decrease in A&I Building visitation, this is about half the percentage decrease (38%) in visitation at the Smithsonian as a whole between the two years.<sup>21</sup>

Several senior SI staff expected larger crowds and expressed the opinion that greater promotional efforts would have increased attendance. Information from the OP&A survey suggests, however, that some visitors noticed crowding and others commented on the small exhibition space. More people within the exhibition perimeter may have had a negative impact on the visitors' experience.

The survey also indicated that about half of the audience to A&I came specifically to see *Nature's Jewels*. No data are available showing how they learned about the show. Some undoubtedly were individuals who come to the orchid show every year and hear about it

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<sup>20</sup> Estimate based on the fact that 73% of surveyed visitors reported entering the butterfly enclosure. Horticulture reports 137,000 visits to the enclosure.

<sup>21</sup> For the same time periods as the exhibitions, at the Smithsonian as a whole 7,710,000 visit were recorded in 2003 and 12,384,000 in 2000.



through various horticulture sources. Others may have heard about it by word-of-mouth, while still others responded to Smithsonian promotion efforts.

The Office of Public Affairs (OPA) has a media specialist to work with exhibitors in the A&I Building, since many of the SI A&I Building exhibitors (e.g. Horticulture) and external exhibitors do not have their own public information officers. OPA, however, does not have an advertising budget for A&I exhibitions and its promotion relies on press releases, Public Service Announcements (PSAs) and contact with media.

Before an exhibit opens, OPA provides the appropriate media with news quality images and a calendar listing written for long-lead publications and magazines, including *Where* magazine, *Washingtonian*, travel publications, airline magazines, and various calendar listings. The photos are also put on an ftp site so the media can download high-resolution pictures for their articles.

OPA also distributes PSAs and press releases. When there are special events, e.g., the *Orchid Festival* (Feb. 22) in conjunction with *Nature's Jewels*, OPA does separate releases. In addition, OPA pitches the media, encouraging them to do stories with specific angles. OPA followed this pattern on a somewhat expedited schedule, with a PSA on January 9, a press release on January 11, and another press release emphasizing the *Orchid Festival* on January 15, 2003. However, the dearth of butterflies during the first weeks of the exhibition led OPA to delay pitching the butterfly component of the show to the press. By the time the butterfly problems were solved, the show was not “newsworthy;” other events such as the war in Iraq and code orange alerts were priority news and press was not available to visit the exhibition.

As mentioned, since OPA does not have an advertising budget; exhibitors are responsible for paid advertising to promote and market their exhibitions. The office only handles publicity for the exhibitions in A&I and approves any ads done by their exhibitors and/or sponsors. Horticulture bought one quarter-page, four-color advertisements in *Orchids*, a journal of the American Orchid Society. OPA understood that funds were not available in the Horticulture budget for additional mass media advertising to pull traffic into the exhibition. There are conflicting comments by interviewees about whether or not Horticulture understood OPA’s service limitations or even if Horticulture was asked to develop a budget for advertising and publicity or try to obtain additional funds.

## The Shop

Increasingly, shops are associated with special exhibitions as a revenue source. For *Nature's Jewels*, Smithsonian Business Ventures (SBV) added limited special merchandise to the shop in the A&I Building—an exhibition-specific T-shirt, tote bag, notepad and pencil. SBV stated “more extensive development did not take place because SBV did not have information on specific content in time, plus the exhibit was short.” From the SBV perspective, “we have to get involved when they [exhibitor] have content and when everything is finalized; otherwise, we don't know if we are going to have the right product mix.” Suppliers require minimum orders in order to produce specialized products. SBV can place such orders, “if we have content early and there is a long exhibit it makes sense to do that.” Other interviewees indicated that, in fact, the shop was given considerable lead-time and information. Furthermore, it had worked with Horticulture in the previous exhibition.

Horticulture provided SBV with a list of artists that would have prints in the exhibit and that also displayed prints in the 2000 *The Artistry of Orchids* exhibition. SBV decided that some artists were too expensive for the shop to carry, and many artists chose not provide prints on consignment. The reproduction prints that were in the shop sold very well, and “... we might do more if artists could keep up with us.”

The shop sold live flowers during the weekend that included the *Orchid Festival* as an amenity for visitors. The sale was not, however, an income generating activity and the shop staff did not think it was worth their time and energy. SBV approached two orchid growers that agreed to provide orchids and be responsible for the plants. Eighty percent of the sales went to the growers, the same percentage that the growers get when they sell at USBG exhibitions.

As of the exhibition's closing date, the shop sold 85% of the merchandise it ordered; the balance is still available in the shop.

## OBSERVATIONS

Based on attendance and visitor satisfaction, *Nature's Jewels* was a very successful exhibition; Horticulture was able to solve the difficulties that affected the first weeks of the butterfly component.

The exhibition, with a total cost of \$160,000 (excluding labor) was designed by staff that has other full-time responsibilities. The careful internal planning, over one year,

undertaken by Horticulture proved invaluable in the two weeks available for installation in the A&I space. A complex installation, planned in one-year, was in place in two weeks. The exhibition was maintained throughout the four-month period with continual replacement of orchids, plants and butterflies. Almost all of Horticulture's staff was involved in either the planning or maintenance of the exhibition. The care of the exhibit itself required two staff members to work 6 hours each day, seven days a week. Care of the butterfly exhibit portion took the same amount of time. Both portions benefited from the dedication of the staff that was heavily invested in the success of the project.

The case study offers some useful lessons for future Horticulture exhibition projects, especially in central spaces such as the A&I Building. The sources of the main obstacles were Horticulture's lack of practical experience in dealing with butterflies indoors, a hurried SD-410 process, a too-tight time frame for installation, and a failure on the part of some individuals to ask the hard questions or to listen to the few who raised them. These are some of the factors that contributed to the learning curve phenomenon that Horticulture experienced.

In the case of *Nature's Jewels*, Horticulture dealt with several external organizations—USBG, USDA-APHIS, and staff at various butterfly houses. Within the Smithsonian, it called upon NMNH and many central units such as OFEO, OPA, VIARC, the Accessibility Office, the A&I Exhibit Office, OEC, Office of Historic Preservation, and Office of Facilities, Management - South Group. Cooperation from and communication with different organizations varied substantially. It appears to OP&A that some units and individuals operate in a culture that promotes service, while others are turned inward. Where service was paramount, individuals went beyond the formal definition of their jobs to question and inform. In other cases, the extra questions that might have prevented problems were not forthcoming.

It seems apparent to us that many of the difficulties associated with this exhibition were the result of poor communication among internal groups. Messages were frequently unclear to their recipients, and communication channels were not well established. Contact requirements, staff shortages, geographic separation of units, individual personalities and interests, and different terms of reference all served to make communication difficult. Many problems could have been avoided if more attention had been given to laying out a system of communication—what needs to be accomplished, who needs to be contacted, how will messages be timed and delivered, and so on.

A few suggestions that may lead to smoother processes for the next orchid exhibition as well as for other exhibitions, especially in central spaces such as the A&I Building, are provided below:

- Horticulture has extensive experience with orchids and encountered few problems with this part of *Nature's Jewels*. It did not have similar expertise with butterflies. While staff made many field trips a few years before the current design was developed, the staff would have benefited from having someone on the team with practical, applied experience who could review the design from the perspective of the well-being of the butterflies. Ideally, that person could have actually worked on the project from its beginning so that she or he could have assisted in the planning and decision-making from the start. More generally, OP&A encourages units to include outside experts in their exhibition planning for various reasons, including having basic expertise about one component of an exhibition.
  
- As part of future planning processes, Horticulture may wish to recruit an exhibit developer who can become an invaluable asset during the planning stages and serve as a resource person during the implementation phase. Collaboration with a developer or a larger Smithsonian unit, especially one with considerable exhibition experience, might have also relieved Horticulture from some responsibility and have required less time from its own overworked staff. In addition, partnership could bring different perspectives to the concept development of future exhibitions, with or without butterflies. A willingness to collaborate and coordinate efforts could also result in greater innovation as well as greater fluidity in the entire process.
  
- Based on the weaknesses in the pilot SD-410 program that emerged in this exhibition, OFEO may wish to determine whether the pilot program requirements should be adjusted. One area, for example, would be to explore the feasibility of using the web-based eMarc System more extensively. (This system allows everyone to view comments from reviewers as well as responses, and can also be an effective educational tool).
  
- Since some of the problems involved schedules and communication, the A&I Office of Exhibits should consider requiring additional documentation or memoranda of understanding with SI units using space in the A&I Building.

- Misunderstandings about schedules, commitments, roles and responsibilities led to some difficulties between Horticulture and other units. The Office of Public Affairs (OPA), to avoid scheduling slippages, should undertake careful sequencing and scheduling with each A&I exhibitor. The development of a critical path for OPA activities and the related exhibitor responsibilities would avoid most misunderstandings and conflict, especially in the opening stages of an exhibit. Exhibitors also need to understand what OPA supplies and what additional promotional services they may wish to purchase on their own. A briefing, with each A&I exhibitor, outlining OPA resources might prove helpful. Similarly, exhibitors and Smithsonian Business Ventures should understand each other's agendas better. While the former is especially concerned with providing amenities for visitors, the latter also has to consider the "bottom line."
  
- Finally, there are examples throughout the case study of individuals and units who exceeded basic expectations in order to guarantee a successful exhibition. Thought should be given, perhaps at the Under Secretary level, to establishing a simple system through which "exceptional service" across units is acknowledged and rewarded.

## References

- Office of Policy and Analysis. 2001a. *A visitor study of Fast Attacks and Boomers: Submarines in the Cold War - An exhibition at the National Museum of American History*. Washington, DC: Smithsonian Institution, Office of Policy and Analysis. <http://www.si.edu/opanda/reports/htm>.
- . 2001b. *Studies of visitors at The American Presidency*. Washington, DC: Smithsonian Institution, Office of Policy and Analysis. <http://www.si.edu/opanda/reports/htm>.
- . 2002a. *The cost and funding of exhibitions*. Washington, DC: Smithsonian Institution, Office of Policy and Analysis. <http://www.si.edu/opanda/reports/htm>.
- . 2002b. *Developing interactive exhibitions at the Smithsonian*. Washington, DC: Smithsonian Institution, Office of Policy and Analysis. <http://www.si.edu/opanda/reports.htm>
- . 2002c. *Exhibition concept models*. Washington, DC: Smithsonian Institution, Office of Policy and Analysis. <http://www.si.edu/opanda/reports/htm>.
- . 2002d. *Exhibition development and implementation: Five case studies*. Washington, DC: Smithsonian Institution, Office of Policy and Analysis. <http://www.si.edu/opanda/reports/htm>.
- . 2002e. *The making of exhibitions: Purpose, structure, roles and process*. Washington, DC: Smithsonian Institution, Office of Policy and Analysis. <http://www.si.edu/opanda/reports/htm>.
- . 2002f. *Three studies of Explore the Universe: A new exhibition at the National Air and Space Museum*. Washington, DC: Smithsonian Institution, Office of Policy and Analysis. <http://www.si.edu/opanda/reports/htm>
- . 2003. *A survey of visitors to Nature's Jewels: A Living Exhibit of Orchids and Butterflies*. Washington, DC: Smithsonian Institution, Office of Policy and Analysis. <http://www.si.edu/opanda/reports/htm>.