

Outstanding Shotcrete Project Award Winner

2006 Outstanding Architectural Project

Asia Quest

Columbus Zoo and Aquarium



17 ft tall (5.2 m) tiger sculpture and entry portal to Asia Quest

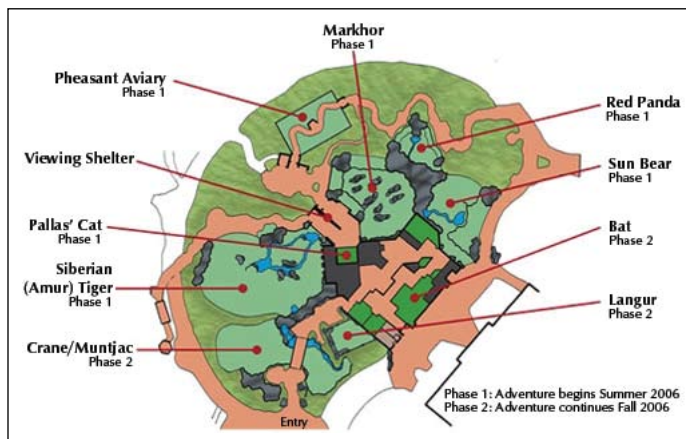
A sun bear lies in a tangled nest of tree limbs while a red panda relaxes high in a tall stand of bamboo. A rocky cliff outcropping is dotted with a group of markhor (a member of the goat family). An endangered Siberian tiger—the largest cat in the world—rests in a shallow stream as a second cat bounds from a large boulder.

Southeast Asia, with its wildlife and lush landscape, is breathtaking, and that's what Asia Quest, the new \$14.8 million exhibit at the Columbus Zoo in Ohio, captures for visitors.

Located along the banks of the Scioto River in northwest Ohio, the Columbus Zoo and Aquarium (CZA) is home to more than 700 wildlife species including hundreds threatened with extinction such as bald eagles, black rhinos, and Asian elephants. Its popular Zoo Director Emeritus, Jack Hanna, has earned national recognition for CZA from his regular appearances on *Good Morning America* and *The Late Show* with David Letterman.

CZA describes Asia Quest as an expedition that “begins in Southeast Asia, and then meanders back across the Himalayas to the harsh Amur River Valley of eastern Russia. Throughout the trek, the magic of cultures steeped in history and the interconnectedness between humans and all other life forms is revealed.”

Asia Quest was designed by Seattle, WA-based PJA Architects + Landscape Architects, p.s., a leader in zoo and botanical garden design,



Asia Quest Map

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interpretives, entertainment, and interior work. The objective was to create an immersive experience that takes zoo visitors on a journey across the largest continent in the world to explore its diverse habitats and cultures. “Because Asia is so big, one of our challenges was to subtly transition visitors through the different lands without creating culture shock,” said Pat Janikowski, AIA, a Principal at PJA with nearly 18 years of zoo design experience. “One of the primary ways we accomplished this was by varying the rockwork architecture from land to land.”

Woven into the visitor experience is a message of conservation. CZA believes it is important to communicate the harmful effects of Asia’s highly concentrated human population on the continent’s wildlife, and the harmful effects of all global human activities, resulting in the fastest period of extinction known to man. Asia Quest is “a great place for visitors to learn about wildlife in Asia and what they can do to help,” explained CZA’s Executive Director Jerry Borin.

The task of fabricating Asia Quest went to The Nassal Company in Orlando, FL. “The project would prove to be a complicated themed environment,” said Karen Huebel, Exhibit Design Manager for CZA. “While our animal exhibits had the standard fabrication elements of trees, rockwork, mud banks, waterfalls, and pools, we were also looking for a company that could replicate the temple architecture of Cambodia and the simplistic rock architecture of Far Eastern Russia. The Nassal Company provided craftsmen who could balance all these elements and continue to keep the needs of our zoo keepers, animals, and visiting public a priority.”

Nassal has a well-known track record for building authentic immersive environments, exhibits, and habitats for zoos, aquariums, museums, and entertainment venues worldwide. With its roots in general construction, the 23-year-old company consists of more than 100 project managers, field superintendents, master artists, and craftsmen. Services include theming, rockwork, and exhibit fabrication and installation.

PJA and Nassal had to address several design and construction considerations in the process of achieving CZA’s objectives for Asia Quest. The first and foremost issue was animal containment, particularly how to safely confine the animals in their exhibit habitat without diminishing the visitors’ viewing experience.

The park’s zoo staff conducted research with organizations such as the Taxon Advisory Group, which examines the conservation needs of entire



Tiger Viewing Bridge and 19 ft (5.8 m) tall waterfall



Siberian tiger overlooks a pond and faux trees



Shotcrete and hand-sculpted rock formations among habitat elements in Sun Bear exhibit

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Cambodian Temple in the Langur Exhibit



Russian highland viewing shelter



Shotcrete and hand-sculpted rock formations among habitat elements in the Markhor Exhibit

groups of related species, and the Association of Zoos and Aquariums' Species Survival Plan, to determine what each animal was capable of in terms of leaping, climbing, and digging. The zoo staff then worked closely with PJA and Nassal to design and fabricate walls and moats that exceed the limits of each animal's ability, constantly measuring and remeasuring the rockwork structures during installation to make sure both the visitors and animals would be adequately protected.

It also was essential for PJA and Nassal to build a realistic-looking exhibit that provided both a comfortable living environment for the animals and a satisfying experience for the zoo's visitors. Using photographs of Asia's various regions as a reference, Nassal's craftsmen sculpted intricately detailed trees and rocks by hand-shaping reinforced steel, covering it with metal lath, and then applying fresh shotcrete. Once the shotcrete was cured, the rockwork detail was completed using colors and stains. Nassal also replicated ancient Asian architecture, including a Cambodian temple and a Russian highland viewing shelter, by applying shotcrete to cast-in-place and block walls to resemble stacked stone and hand-carved brick. The \$3.2 million rockwork project involved more than 300 yd³ (230 m³) of themed concrete and 82,500 ft² (7670 m²) of shotcrete surface area.

A variety of design elements were incorporated into the fabricated rockwork to encourage animal interaction. Some of the trees include nesting or seating areas. Other trees hide crevasses where zookeepers can put peanut butter to feed the animals. Self-replenishing drinking stations keep the animals in the viewing area instead of going back to their pens for water. Heat mats placed in

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Viewing area and rockwork in the Red Panda exhibit

the shotcrete near viewing areas encourage the animals to lay where visitors can see them better.

One of the more breathtaking rockwork features is a giant 19 ft (5.8 m) tall waterfall that runs through the exhibit at more than 300 gal./minute (1364 L/min) creating a moat system that helps contain the animals and separate the different exhibit areas. Another spectacular feature is a 17 ft (5.2 m) tall rockwork replica of a tiger sculpture in a ruin that serves as the entry portal for visitors to Asia Quest.

After more than a year of construction, Asia Quest opened to the public in June 2006, successfully offering visitors an immersive and authentic quest through the different habitats and cultures in Asia. More than 1.3 million visitors are expected annually.



Hand-sculpted stacked stone and scenic elements at Red Panda Exhibit

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<i>Project Name</i> Asia Quest, Columbus Zoo and Aquarium	<i>Construction Manager</i> Thomas & Marker Construction Co.	<i>Area of Shotcrete</i> 82,500 ft ² (7670 m ²)
<i>Project Location</i> Columbus, OH	<i>General Contractor</i> RS Smoot Incorporated	<i>Shotcrete Elements</i> Nassal's craftsmen hand-shaped reinforced steel, covered it with metal lath, applied fresh shotcrete, sculpted, and then scenic-treated intricately detailed trees, boulders, rock formations, retaining walls, termite mounds, ponds, rock outcroppings, mudbanks, a moat system, a 19 ft (5.8 m) tall waterfall, a Cambodian temple, a Russian highland viewing shelter, and a 17 ft (5.2 m) tall rockwork replica of a tiger sculpture in a ruin that serves as the entry portal.
<i>Shotcrete Contractor</i> The Nassal Company Project Manager: Matt Brown Superintendent: Ken Tucker	<i>Project Start Date</i> June 1, 2005	
<i>Project Owner</i> Columbus Zoo and Aquarium	<i>Project Completion Date</i> June 1, 2006	
<i>Architect/Engineer</i> PJA Architects + Landscape Architects, p.s.	<i>Project Cost</i> \$3.2 million	
<i>Material Supplier</i> Buckeye Ready-Mix, LLC	<i>Volume of Concrete Used</i> More than 300 yd ³ (230 m ³)	