

The New Avian Propagation Building at North Carolina Zoological Park

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One of the most popular exhibits at the North Carolina Zoological Park is the R.J. Reynolds Tropical Forest Aviary. However this magnificent walk-through, free flight aviary building is rapidly approaching 20 years of use and is in need of major repairs. Therefore, a little over five years ago the zoo planned a major renovation of the structure. The scheduled repairs would take nearly two years but before any work could be performed on the exhibit, all of the avian inhabitants had to be relocated. Since the zoo had no suitable holding space, and rather than disposing of the entire collection, management decided to construct a modern off-exhibit facility for the nearly 70 birds comprising about 26 different species – The Avian Propagation Building.

The proposed building should be an asset to the zoo for many years instead of simply a place to hold birds for the duration of exhibit renovation. So the dual purpose function of the center was formulated.

First, the new building would house the collection during exhibit repairs. Later, the Avian Propagation Building would serve as a breeding center for the zoo's entire avian collection. Our new building would be an example of a recent initiative among zoo bird curators; to build larger and better off-exhibit facilities to promote sustainable captive populations and drastically reduce use of wild-caught birds for zoo collections.

In order to turn this idea into reality The North Carolina Zoological Society graciously donated half of the money

required to match state funds which were provided.

Three years ago construction began and then one and a half years later it was finished. During the past year the propagation building has been in use during the overhaul of the R. J. Reynolds Forest Aviary. So far, the building has been a great success. This success may be attributed to a great extent to the bird keepers who were involved in every step of the designing and construction process. The staff learned many basic principles of aviary construction which apply to any aviary regardless of size or cost. What the bird keepers learned is vital information for any aviculturist ranging from those with modest backyard aviaries to major zoo-

logical endeavors.

Perhaps the most important step in aviary or breeding facility construction is the first one. Where should you construct the new building? Fortunately our zoo is unique in that it has large parcels of undeveloped land. This enabled us to choose a secluded, wooded plot on a little traveled service road far from visitors and their vehicles. Our birds would have peace and quiet in this serene setting complimented by a stream and many native birds nearby.

Once a location was chosen, the design process began. Designing was the most complicated series of events. When many individuals have input in this process it will help immensely in the long term. For example, three keepers will have three different opinions of the ideal Ibis enclosure. So by combining everyone's ideas an optimum design can be reached. Not to mention the fact that an architect will not understand the husbandry requirements of a Scarlet Ibis *Eudocimus ruber* and a keeper can not draw the scale blueprint which the construction crew will need to build the Ibis holding pen. Basically, two heads are better than one in the design process.

Along with keeping an open mind and utilizing the input of several people, there are a few other items to consider when designing a propagation



The off-exhibit Avian Propagation Building at the North Carolina Zoological Park.

Photo by Jeff Claffy



Exterior view of the northwest side of the building showing the safety aisle and the outdoor flights.

building or aviary. First of all you must consider all of the uses of the building over an extended period of time. Most likely your bird collection will not stay the same indefinitely. Money will be saved long term if you do not need to rebuild aviaries to accommodate every change in your bird collection.

Secondly, know exactly what you want out of your building before it is built. It is nearly impossible to make-up and add details as construction moves along. In addition, try to keep designs as simple as possible. Complicated items take longer and cost more to build as well as costing more and taking longer to fix than their simpler counterparts. We also took our designer and architect to see other bird propagation facilities and had them speak with staff from those facilities who identified good and bad design features and why they were desirable or undesirable. Most importantly, we had animal care staff attend every design meeting and review every design drawing at every phase of the project.

In our situation at the North Carolina Zoo we were able to design an Avian Propagation Building that is very versatile. We have easily housed and cared for a diverse selection of birds from the diminutive Northern Parula *Parula americana* to the rambunctious African Spoonbill *Platalea alba*. Our staff achieved this versatility by incorporat-

ing the husbandry experience of curators and keepers in the design phase and also by considering current and future uses of the building. Allowing the people who will use the building to design it resulted in a very pleasurable animal environment filled with a variety of features to make the keeper's jobs easier – and, more importantly, the birds' captive lives better.

The general layout of the building is very simple and symmetrical. A central keeper work space consisting of the office, kitchen, bathroom, incubation and brooder/nursery rooms is joined by a northern and southern wing containing a series of individual aviaries or flights. There are bird enclosures on the left and right sides of a central service aisle. Each of the two wings is further divided in half for a total of four bays of flights. Two bays each in the southern and northern sections with the central keeper area dividing them. Twenty-two flights are in the north end whereas there are only 18 in the South. There are two sizes of cages throughout the building and each cage has an outdoor component equal to or greater than the size of the indoor portion. All indoor flights are either 5 ft wide x 10 ft deep x 8 ft tall or 10 ft wide x 10 ft deep x 8 ft tall.

The physical arrangement of the facility is appealing from an animal management standpoint. Yet the items

responsible for the versatility of the Avian Propagation Building are the husbandry related details.

Each of the specific features that the staff requested were put in place because of the intrinsic benefit they would yield. These benefits fit into two significant categories:

- Directly or indirectly improving animal health and welfare by providing optimum housing conditions for maintenance and breeding.
- Increasing workplace efficiency.

Many of the details may, at first, seem frivolous. However it is the accumulated value of these features which makes our breeding complex so pleasurable for us and, I believe, for our birds.

Some of the special features, and ensuing benefits, of The Avian Propagation Building are:

- There is no exposed wood or wallboard in any animal area. All walls were covered with Fiberglass Reinforced Plastic (FRP) sheets to reduce harboring pathogens and to aid in total disinfection. These FRP sheets were caulked at every joint to make them watertight.

- Every bird has an enclosure with outdoor access provided by a full sized metal door and also by the two smaller translucent Plexi-glass doors built into it. An upper small door for perching birds and a lower medium size door for ground birds and waterfowl.

- A safety cage runs along the perimeter of the outside caging so that keepers may enter any enclosure from indoors or outside.

- Each bay of cages has four large translucent skylights which provide plenty of natural light. Supplemental lighting is provided by fluorescent fixtures above the cages. Five foot flights have one fixture, ten foot flights have two. All lighting is controlled by a single computerized timer. There are also many receptacles, controlled by wall switches, above flights. These outlets are used mainly for heat lamps and night lights. In areas where keepers frequently hose, outlets were placed higher on the wall to prevent the hassle of shorted circuits. Throughout the entire building we have an extraordinary number of electrical outlets, thus

eliminating the need for strands of extension cords.

- Four of the flights have water pools indoor and outdoors. Four other flights are plumbed and ready for additional outdoor pools if needed. Each pool inside or outside, installed or not, has a water spigot immediately adjacent to it so that long hoses never need to be drug through enclosures.

- Extra wide aisles in the cage corridors allow for ease of maneuvering during cleaning and feeding. Wide aisles also allow for the placing of multiple potted plants to provide foliage cover for secretive species. Four of the large indoor cages have partial wire partitions that form "Shift" areas. This configuration allows keepers to enter enclosures of flighty birds in order to clean even if the weather prevents birds from having outdoor access. Birds simply fly into the shift area while the worker cleans the primary containment.

- Aside from shift areas, our best feature is our system of sliding and modular cage panels. All enclosures on the indoor east side of the building have sliding cage panels separating them. Outside, removable wire panels are utilized. These specially designed panels are held in place with just two screws. Essentially the staff has the ability to make two very big aviaries, or any combination of smaller aviaries, on the east side of the Avian Propagation Building; one each in the north and south corridors. This system simplifies animal introductions and transfers. In many cases, birds can be moved into different cages simply by opening and closing a series of cage panels, eliminating the need to catch and handle specimens.

- Since our zoo plans to "Propagate" birds, staff put a lot of thought into designing the egg incubation area. Specifically, our incubator room was built with separate heating, air-conditioning, and dehumidification systems from the rest of the building so that we can easily control environmental conditions. This helps our incubators to operate more efficiently and incubate effectively.

- Lastly, the kitchen was designed for ease in diet preparation and clean-up. Foremost, the kitchen is large

enough so that three keepers can work side by side without knocking each other over. There are countertops and cabinets along three walls to provide plenty of workspace and storage. There is also a large triple compartment sink and automatic dishwasher for cleaning dishes. The kitchen floor even has floor drains so that it can be mopped thoroughly.

All of the hard work imagining, designing, building, and implementing these unique building features paid off extremely well. The staff loves the building where they work and the activity of the animals is looking promising. In short, the birds have given their own seal of approval.

With the renovation of the R.J. Reynolds Tropical Forest Aviary now completed, birds are being moved back onto exhibit. Regretfully, the relocation of birds is occurring right in the middle of breeding season again. Originally, when the collection was taken off exhibit it was also in the middle of a breeding period.

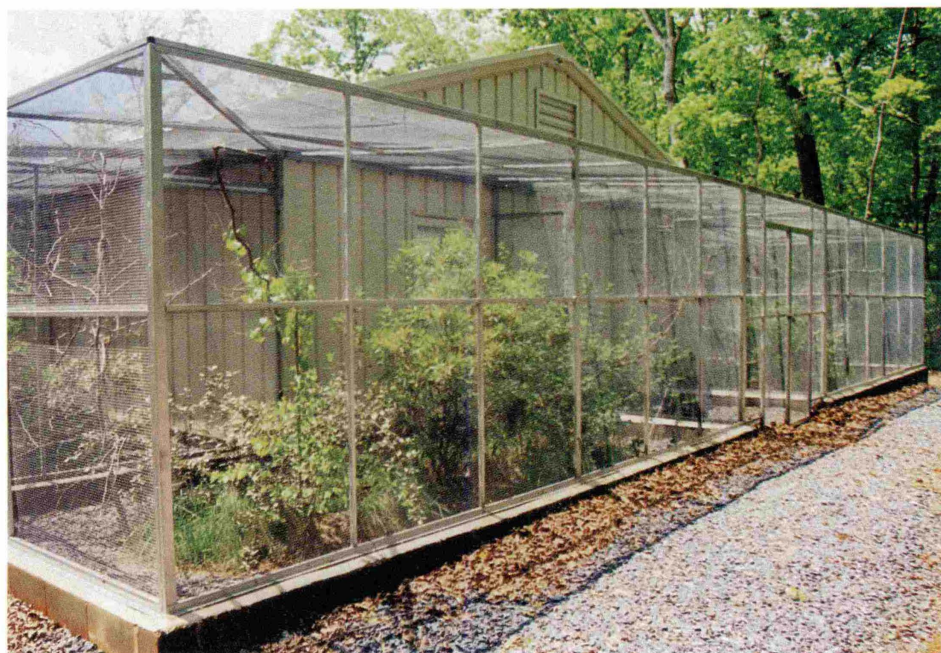
Despite being annually disrupted, or possibly because of it, our bird population demonstrated a flourish of breeding activity. Although keepers only succeeded in breeding and raising multiple clutches of Pekin Robins *Leothrix lutea* and Fairy Bluebirds *Irena puella*, many other species

exhibited breeding behaviors and nest building activities. Several additional species that we do not allow to raise young laid eggs which were removed and discarded.

Regardless, in the first year of operation of The Avian Propagation Building, and after interrupting the birds' breeding cycle, the following species demonstrated various breeding, nesting or nest building behaviors: Red Faced Mousebird *Urocolius indicus*, Silver-eared Mesia *Leothrix argentauris*, Roul Roul *Rollulus roulroul*, Palawan Peacock Pheasant *Polyplectron emphanum*, Indian Shama Thrush *Copsychus malabaricus*, Snowy-Headed Robin Chat *Cossypha niveicapilla*, Amethyst Starling *Cinnyricinclus leucogaster*, Blue-grey Tanager *Thraupis episcopus*, Blue-winged Leafbird *Chloropsis cochinchinensis*, Grey-headed Kingfisher *Halcyon leucocephala*, African Pygmy Goose *Nettapus auritus*, Victoria Crowned Pigeon *Goura victoria*, and finally Lesser Green Broadbills *Calyptomena viridis*. ?

Obviously the versatility of our propagation complex did nothing to discourage breeding – most likely it provided an environment which encourages reproduction. Our goal now is to refill the building with a new, non-exhibit collection and continue producing avian offspring.

The last two years have been



The northern end of the building showing two outdoor flights.

Photo by Jeff Clardy



Note the large walk-through metal doors and the smaller low level plexi-glass doors that permit the birds to enter their outdoor flight.



Indoor enclosures and wide central service aisle.

extremely hectic, aggravating, exciting, and fun. Moving one's entire collection is a dreadful task but at the same time, an incredible learning process. An unlikely lesson derived from our experience is being prepared for a process today's designers call "Value Engineering." This refers to the inevitable cost-cutting all projects go through when the budget does not support all of your design features.

As is usually the case, construction costs rose higher than projected. Consequently several features of our building were eliminated. From the start, four flights were subtracted from the south end of the building. Next to be canceled were the plans for air conditioning in all of the animal areas. Lastly, our highly anticipated closed-circuit video monitoring system was deemed too expensive. The frustration did not stop with cutting fabrication costs. A construction error led to several floor drains becoming partially clogged forever, the mistake buried under inches of cement flooring.

Nevertheless, bird keepers of every type everywhere will relate to innumerable aspects of our project at the North Carolina Zoological Park.

Whether you are about to build an aviary for one pet bird or a breeding facility for your entire zoological collection, it will help to keep the following in mind: Have patience. Be willing to compromise. Involve all pertinent people and genuinely listen to their input. Choose the best location for your birds' new home that is economically feasible. Weigh current versus future uses of the structure. Keep designs and features as simple as possible. And be prepared for the possibility of some cost cutting.

Hopefully you, the reader, can apply information from our recent experiences and concepts from the Avian Propagation Building into your own avicultural practices.

In conclusion, Good Luck and Much Success on your next aviary building project... and if you get tired and need a break, be sure to come and visit the newly renovated R.J. Reynolds Tropical Forest Aviary at the North Carolina Zoological Park in Asheboro, NC. 