

The Small Animal Facility at the Conservation and Research Center of the National Zoological Park

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The Conservation and Research Center of the National Zoological Park is a 1276 ha reserve located in the foothills of the Blue Ridge Mountains near Front Royal, Virginia. Established in 1975 for the conservation of wildlife, the Center is devoted to the captive propagation of selected species of birds and mammals; its research, breeding and training programmes are carried out in collaboration with other zoological institutions nationally and internationally. In acquiring the land, the National Zoo also acquired hay fields, pastures, operational utility systems, roads and more than 80 buildings constructed earlier by both the United States Army and the United States Department of Agriculture. The first task was to renovate and repair several large barns and former office buildings to make them suitable for housing exotic ungulates, small mammals and birds. The Small Animal Facility, completed in 1984, was the first new building on site which was designed and constructed specifically to house small mammals and birds. The efficiency of the design and ease of servicing are major improvements over the renovated animal facilities. Here we report on details of the structure because they could be successfully incorporated into public animal facilities in urban zoos.

THE BUILDING

Flexibility and efficiency were the key words guiding the design phase of the construction project started in 1981. The staff required a building with two wings, one capable of housing small to medium-

sized fossorial, terrestrial, arboreal, aerial or semi-aquatic mammals from semi-tropical or tropical regions, and the other to provide housing for small to medium-sized upland or aquatic birds from warmer climates. The incorporation of adequate food preparation and storage space, as well as enough general storage space to support both animal wings, was essential.

The general shape of the facility is that of a boomerang with the two animal wings on either side of a central support core (Fig. 1). It is located on a south-facing hillside and orientated for maximum exposure to the winter sun; its shape is the result of the need to maximise southern exposure on a contoured slope. The building, its outside enclosures and drive-through 'safe' areas encompass c.3248 m², excluding parking areas and lawns.

The building is constructed of concrete masonry units. Exterior walls are insulated with c.5 cm of polystyrene insulation board covered by Dryvit, a troweled-on synthetic plaster exterior texture finish with an insulation rating of 9·80. The roof design for each wing permits sunlight to enter direct into inside enclosures on both sides of a central hallway/work area (Fig. 2). The flat roof over the central core is covered by a Trocal's unballasted elastic membrane and contains a drain system; all roof surfaces are insulated with 5 cm styrofoam sheet insulation. Double-walled Sunwall I solar panels are used and when the winter sun is low on the horizon, overhangs above the solar panels

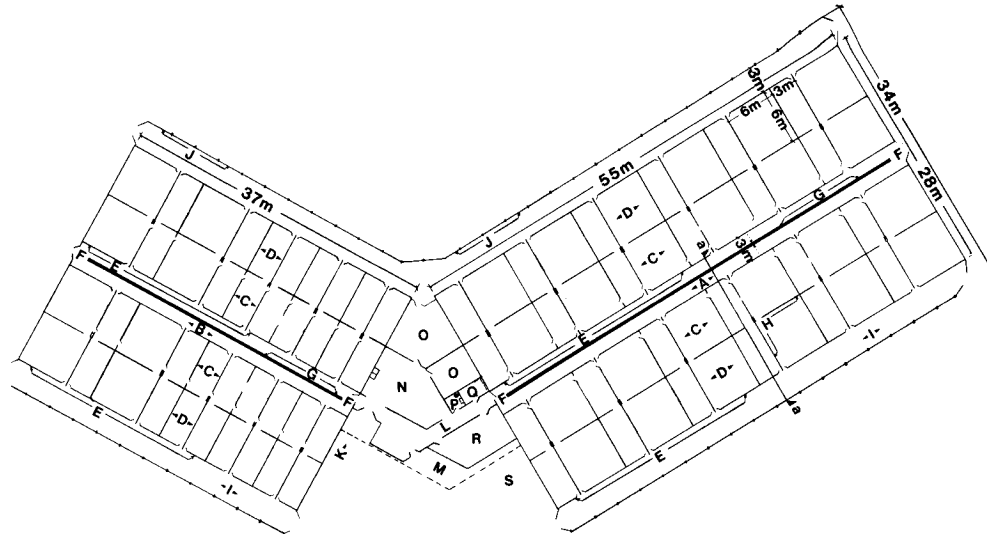


Fig. 1. Ground plan of the Small Animal Facility at the Conservation and Research Center of the National Zoological Park. A. east wing (mammals); B. west wing (birds); C. indoor enclosures; D. outdoor enclosures; E. removable cage fronts; F. interior corridor; G. trench drain; H. 20 cm concrete masonry units; I. drive-through service area for outdoor enclosures; J. chainlink; K. loading dock; L. entrance hallway; M. porch; N. kitchen; O. storage; P. lavatory; Q. utilities; R. office; S. parking space. The section a — a showing details of an indoor and an outdoor cage arrangement is shown in Fig. 2.

allow sunlight to penetrate indoor enclosures. During the warm summer months, however, when the sun is higher in the sky the overhangs shade the solar panels and allow only indirect sunlight to enter the building. A roof overhang of

this design should be sealed and insulated at the base to prevent heat from escaping from the building via this area during the winter. The overhang must also be adequately ventilated on the underside surface otherwise during cold weather air

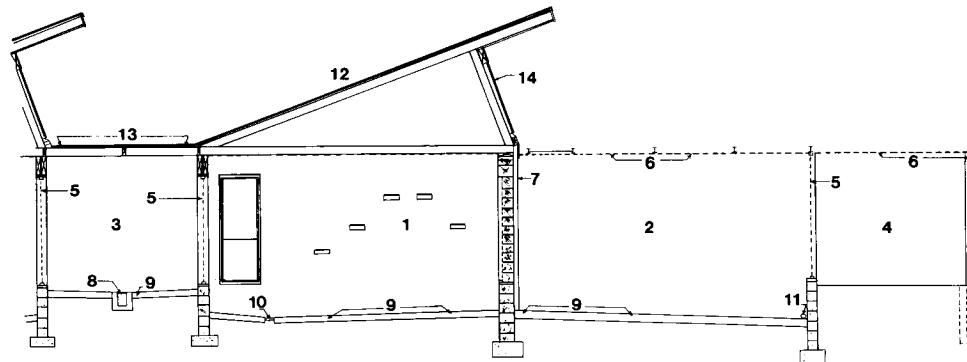


Fig. 2. Section a — a through the Small Animal Facility showing how the roof design allows sunlight to enter the indoor enclosures, the location of the solar panels and removable cage fronts. 1. indoor enclosures; 2. outdoor enclosures; 3. interior corridor; 4. drive-through service area for outdoor enclosures; 5. removable cage fronts; 6. chainlink; 7. stucco finish on 5 cm rigid insulation; 8. trench drain; 9. concrete slab; 10. floor drain; 11. porous drainpipe; 12. shingle roof on 5 cm rigid insulation; 13. elastic sheet roofing on 5 cm rigid insulation; 14. passive solar panels.

trapped in the overhang will be warmed by the sun hitting the roof and the resultant condensation could cause structural damage or seepage problems.

The central core includes a food preparation area, storage areas both for bulk food and general items, office space, lavatories and utilities (Fig. 1).

Since the Center is not open to the public, emphasis could be placed on manageability, ease of access and adequate space rather than on exhibit requirements in the animal wings. The mammal area contains 24 indoor and 24 outdoor enclosures (Fig. 1). Half of the indoor enclosures measure $c.6 \times 6 \times 3$ m and the others measure $c.6 \times 3 \times 3$ m, the larger alternating with the smaller. The bird area contains eight of the larger enclosures and 32 of the smaller ones. In both wings the outdoor enclosures are of the same dimensions as the indoor ones. All the interior concrete walls are painted with epoxy-based paint.

The 3 m wide service aisle/work area for the indoor enclosures (Plate 1) has double end doors to provide access to the entire wing via small trucks so that large amounts of enclosure decorating materials can be delivered direct to the front of the enclosures, thus eliminating considerable labour. The outdoor enclosures are serviced from 3 m wide by 3 m high 'safe' areas around the outside of the building that are completely enclosed in 2.5 cm chainlink (Plate 2). The area is also accessible by truck and functions as a containment area should an animal escape from one of the outside enclosures.

In both indoor and outdoor enclosures the region fronting the service area consists of several weldmesh panels, each set into a 2.5 cm angle iron frame to make it rigid, bolted into a 6.4 cm angle iron frame that is attached to the top and bottom of each cage. The bolt-in panels are easily removed and replaced for

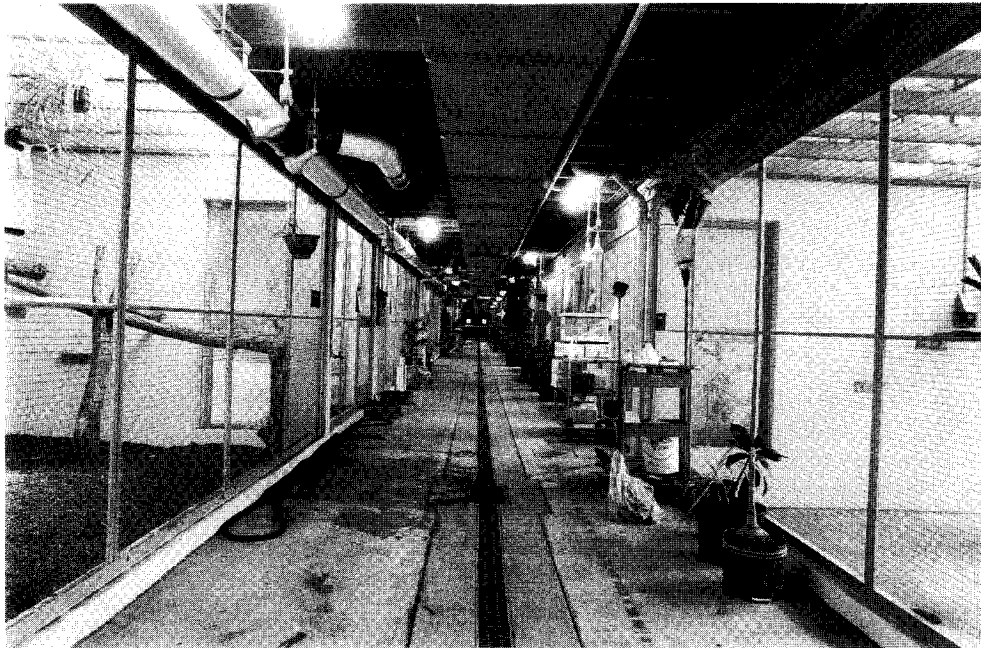


Plate 1. Central corridor in the mammal wing of the Small Animal Facility at the National Zoological Park Conservation and Research Center. Note the removable cage front panels. *Jessie Cohen, National Zoological Park.*

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REFERENCES

- SETTLE, G. A. (1978): The quiddity of tiger quolls. *Aust. nat. Hist.* **19**: 164–169.
 RIDE, W. L. D. (1970): *A guide to the native mammals of Australia*. Melbourne: Oxford University Press.

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The new complex for big cats at Boråssparken Zoo

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Boråssparken Zoo is renowned in Sweden for its large pride of Lions *Panthera leo*, magnificent specimens with dark manes extending along the whole of the ventral midline. Prior to 1984 the Lion exhibit consisted of a 1000 m² outdoor area and a 45 m² indoor enclosure. It was in need of renovation, however, and was no longer considered satisfactory since larger indoor accommodation was required as well as a modern kitchen and storage area to replace the small downstairs room used for the preparation of food which had to be transported there from another building. Thus plans were made to enlarge the lion house and to incorporate an additional outdoor enclosure.

Construction took place in two phases. First, in the off season of 1983/1984 a new exhibit structure was built attached to the original one at an angle. It contained an 1800 m² outdoor enclosure, 120 m² indoor exhibit and 150 m² public area decorated with plants and including a few small aquaria and roosts for free-flying birds. The Lions were moved in. During the next off season the old building was partly demolished and what

remained was completely refurbished and enlarged to include a 100 m² indoor exhibit, with access to the old outdoor enclosure, a 100 m² public area, decorated in a similar fashion to the new section, and a large storage room and kitchen. The two buildings now formed a single complex capable of housing and supporting two separate groups of animals. The whole facility was designed, as was the rest of the zoo, by architect Tage Hedlund.

During the second phase of construction the zoo was offered two adult ♀ Tigers *P. tigris*, one with two cubs and the other in an advanced state of pregnancy. These animals were housed in the building which was still undergoing renovation and given access to the old Lion enclosure outside, to which further decoration in the form of tree trunks and live trees was added.

EXHIBIT AREAS

Visitors enter the big cat exhibit along a pathway which takes them past the old outdoor enclosure, into the main building via an entrance in the newest part, then