

## ZOOS AND AQUARIUMS

The Zoological Society of London, founded in 1826, and its Zoological Gardens, opened in 1828, both had considerable influence on the development of animal research and collections throughout the world. The traditional role of zoological gardens (for education and scientific research) has become increasingly important because of the accelerating decimation of wildlife stocks. Zoos have expanded into breeding and preservation of different species as well as the return of animals to the wild. Many important specialist collections have recently been formed by private owners.

The following list shows examples of area requirements:

Cologne	20 ha	1860
Nuremberg	60 ha	1939
Sao Paulo	250 ha	1957
Healsville	175 ha	1964
Brazilia	2500 ha	1960
Abu Dhabi	1430 ha	1970
Berlin	34 ha	1983
Frankfurt	63 ha	in construction
Naples	300 ha	in construction

The main entrance of the zoo has: window displays; cash desks and information kiosks; WCs; large parking areas for cars and coaches; stops for public transport. It is also usually the location for: administration; all departments serving the public; function/lecture rooms plus a high-class restaurant overlooking the zoo area (all with separate entrances from outside for evening business). Other restaurants, self-service cafeteria, WCs and picnic areas can be sited within the zoo.

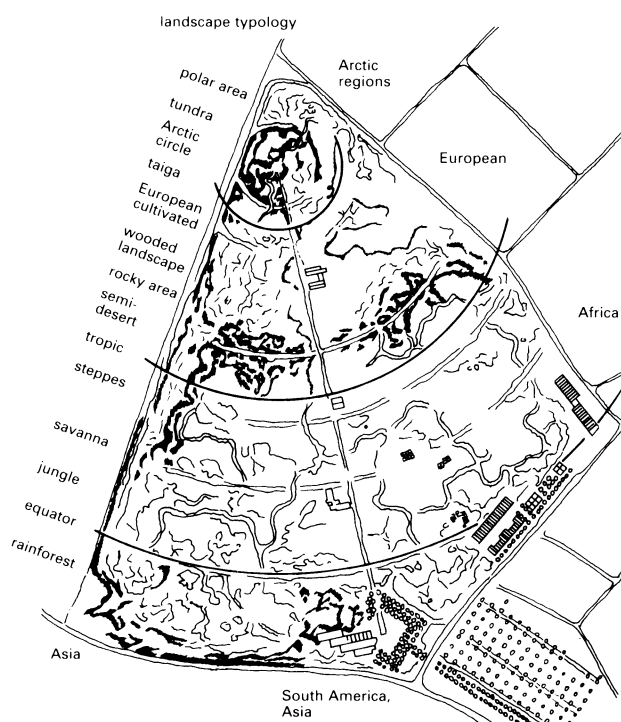
Operations departments should have separate entrances and be shielded from public view; they need large external areas for storage of feed, litter materials, hay, straw, sand, gravel, soil, building materials, etc. Within the buildings should be washing (plus disinfection) and changing facilities, cafeteria, training and quiet rooms (night watchmen). Provision should also be made for central and local feed preparation, water treatment, waste disposal, sheds for accommodating and servicing cleaning machines, transport units, low-loaders, transport cages and gardening equipment. Workshops are needed for carpenters, fitters and painters, including the necessary storage space. Other facilities include an animal hospital, quarantine stations, research laboratories, settling and rearing areas, carcass storage (cold stores) and disposal. Heating, air-conditioning and ventilation for all need to be planned.

Main paths, 5–6 m wide, for the public should form loops linking the main buildings and animal enclosures; secondary routes, 3–4 m wide, give access to the individual groups of animals. Paths and buildings should all be accessible to wheelchairs. It is important to create a feeling of seclusion by planting and sculpting the landscape. Service routes, for supplying and transporting animals to the enclosures, should cross the main routes as little as possible. Public transport systems: consider electric trolleys using the main paths, or miniature trains/cable railways with their own tracks or routes.

An important consideration is the means of separating the animals and the public: wire and steel netting (black), chains, water-filled and dry ditches, glass and plastic barriers, electrified fences.

The native climate/geography and social/territorial needs of the animals must always be taken into account, although some acclimatisation may be possible. The design should allow enclosures to be split (either in or out of public view) for reproduction and rearing. Equipment for catching and transporting animals must be accommodated. For open-air enclosures scents and wind direction are important criteria governing locations and fencing.

For mammals in buildings and outside enclosures or a

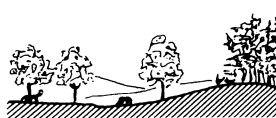


1 Frankfurt Zoo

Architects: G + T. Hansjakob & K. Schmidhuber



2 Taiga



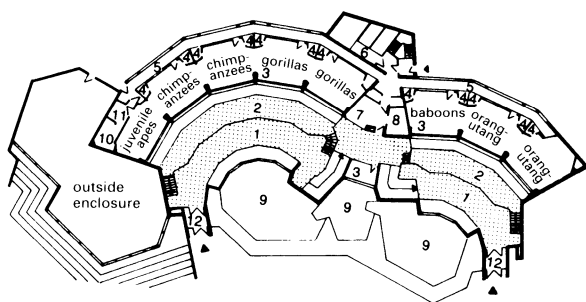
3 European cultivated landscape



4 Savanna, steppes

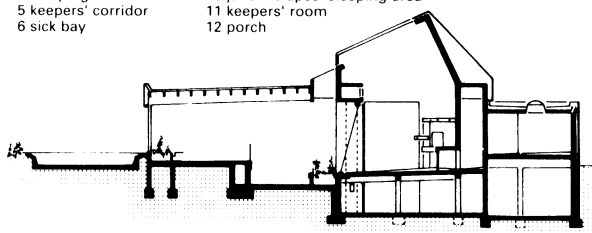


5 Rainforest



6 Anthropoid enclosure, Wuppertal Zoo

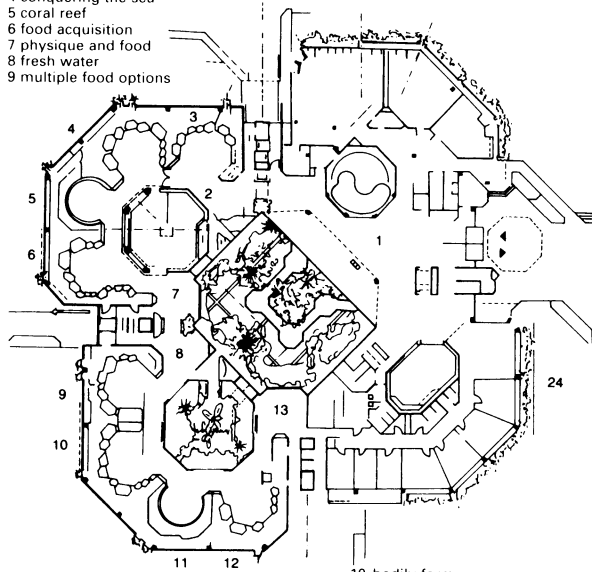
- 1 visitor level 1
- 2 visitor level 2
- 3 inside enclosure
- 4 sleeping booths
- 5 keepers' corridor
- 6 sick bay
- 7 feed kitchen
- 8 keepers' room
- 9 ponds
- 10 juvenile apes' sleeping area
- 11 keepers' room
- 12 porch



7 Section (6)

Building Department, Wuppertal

- 1 higher vertebrates in water
- 2 life clock of world history
- 3 from single cell to mammal
- 4 conquering the sea
- 5 coral reef
- 6 food acquisition
- 7 physique and food
- 8 fresh water
- 9 multiple food options



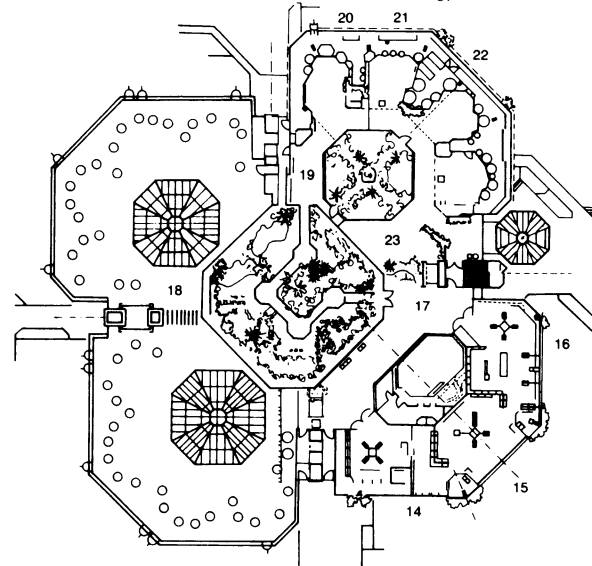
① Ground floor of the AQUAZOO in Düsseldorf

- 10 bodily form
- 11 spatial and swarming behaviour
- 12 native and foreign dwellers in our waters
- 13 tropical shores
- 14 mussels, snails and cuttlefish

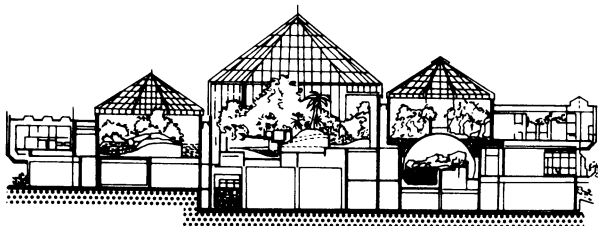
Architects: Dansard, Kahlenborn etc.

- 15 history of life, the story of mankind
- 16 changing exhibition
- 17 tropical house
- 18 adaptation of crustacean form
- 19 amphibian form

- 20 reptile form
- 21 desert habitat
- 22 camouflage and warning
- 23 mankind and the environment
- 24 mineralogy



② Upper floor



③ Section → ①-②

## ZOOS AND AQUARIUMS

combination of these, with and without water, the height is often more important than the ground surface area.

Buildings to house birds must allow sunlight to enter, particularly for tropical birds; outside enclosures for waterfowl must give protection from predators.

Most reptiles and marine mammals require temperatures between 15 and 27°C. They should have an adequate volume of water and allow sufficient 'haul-out' space.

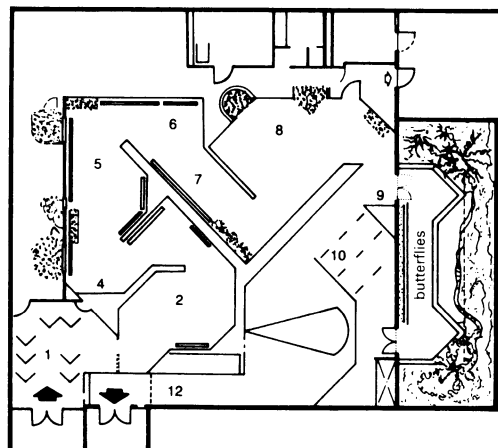
Fish and invertebrates must not come into contact with water containing metal particles. Mains water must first be filtered with carbon. A distinction is made between 'open systems' with single throughflow (1-2 water changes per hour) and 'closed systems' with filter and recirculation (6-20% water renewal in two weeks). Fresh and sea water reserves of 30-50% of the total volume should be held. Lighting of aquariums requires particular care to harmonise with the creatures' natural habitat and to avoid reflection in the display tank surfaces.

Terrestrial invertebrates (insects) in aquariums or terrariums require extensive safety precautions to avoid eggs or larvae being introduced into the local environment.

A children's zoo and play area gives urban families direct contact with animals and an understanding of their behaviour and eating habits.

Future trends will be improvements in meeting the natural needs of the animals being housed and giving the public an improved, more authentic view.

- 1 entrance
- 2 information
- 3 the successes of insects
- 4 eat and be eaten
- 5 defence and flight
- 6 insects in movement
- 7 four x life
- 8 how they live
- 9 distribution
- 10 mankind and insects
- 11 projection screen
- 12 special exhibitions



④ World of Insects

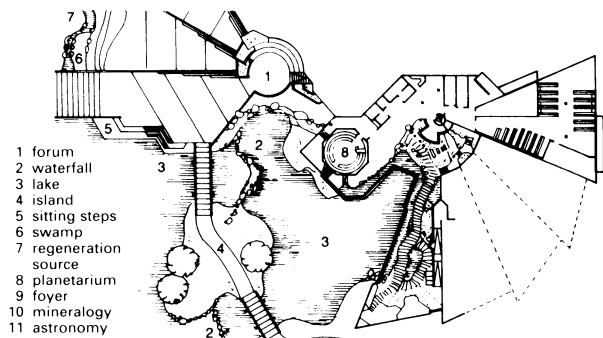
Architect: Johnson

# ZOOS AND AQUARIUMS

The preservation of animals, together with their renaturalisation, is a key concern. Peripheral zoo areas should also include exhibits which help to explain the interrelationships between humankind and nature, bordering on the educational function of natural science museums.

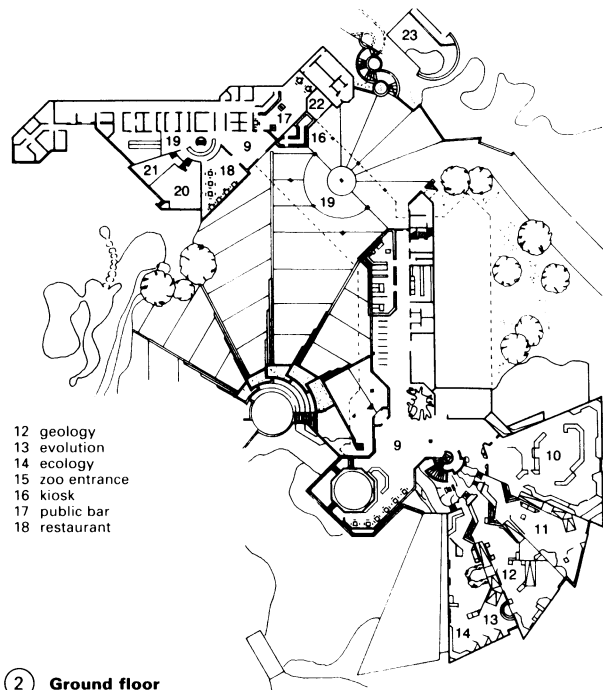
For the medical care of animals, plus research and reproductive support, zoos have developed clinics and hospitals not open to the public → ④ – ⑤. External enclosures support the healing process, acclimatisation and quarantine. Elements include:

- padded stalls for recovery, acclimatisation and observation (inside and outside)
- separate access routes to the building, including isolated paths for transport cages
- quarantine rooms
- refrigerated rooms for animal carcasses; dissection room and carcass disposal; intensive care and operating rooms
- research laboratories and lecture theatres for teaching animal medicine
- food store and feed preparation
- special personnel rooms with disinfecting equipment
- air conditioning and ventilation with 12–15 air changes per hour (separate for quarantine rooms)
- water treatment facilities and filters
- cleaning equipment (often using steam).

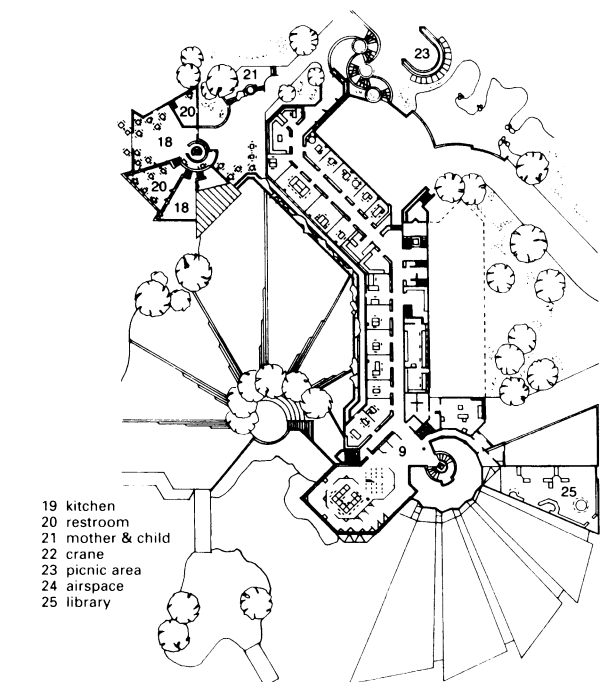


① Lower floor of the natural science museum/zoo entrance in Osnabrück

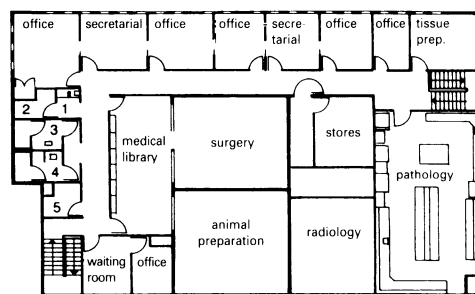
Architects: C. + B. Parade



② Ground floor

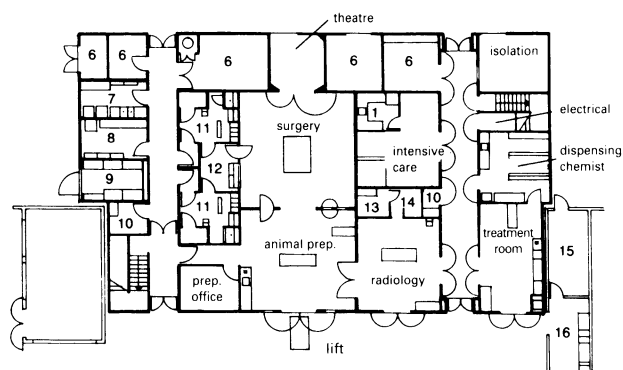


③ Upper floor



④ Upper floor of the animal hospital zoo in San Diego

- |           |                    |                     |
|-----------|--------------------|---------------------|
| 1 kitchen | 7 laundry          | 12 washroom         |
| 2 stores  | 8 sterilization    | 13 dark room        |
| 3-4 WC    | 9 deep freeze room | 14 inspection       |
| 5 porter  | 10 porter          | 15 entrance store   |
| 6 stores  | 11 changing        | 16 entrance kitchen |



⑤ Ground floor of → ④