

architecture

How to exhibit a bullfrog: a bed-time story for zoo men¹

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Bad exhibition is a recurrent nightmare in zoos as well as in museums. Whenever I am asked to speak on the subject, I have misgivings and even dreams. And so it was when I found myself scheduled to discuss the exhibition of wild animals at the 1967 Annual Conference of the American Association of Zoological Parks and Aquariums.

A shadowy figure dominated my reverie; a man in a long red cape wearing a curious double-pointed hat. He represented himself as the second of the fallen archangels and one of the seven devils and he spoke with precision and authority. He inaugurated my dream with a question. I shall simply call him 'M'.

'How is it', he asked, 'that you are trying to buy a pygmy chimpanzee for \$5,000 when you don't have a proper exhibit of bullfrogs?'

'Bullfrogs!' I replied. 'What in the world will common bullfrogs do for the Zoo?'

'Oh', said M. 'You want to do something for the Zoo! I thought you might want to do something for the zoo visitor. But no, you would prefer to spend thousands on a creature that only another zoo man will appreciate rather than present an educational exhibit of a fascinating creature who lives in your own back yard; one that is, moreover, good to eat. As a matter of fact, the pygmy chimpanzee is not even a particularly well marked form.'

Naturally, I responded by elaborating upon the importance of arousing the public's interest in wildlife by exhibiting exotic rarities—and I did win some slight concession from M. on this point. But I lost the few points I had gained when I introduced the word 'conservation' into the discussion.

'Conservation!' M. roared. 'If there is anything that makes me belch smoke and fire, it is the silly

bleat "conservation" by some zoo director who has purchased one or two animals of some rare species. If he had any serious intentions, he'd acquire at least half a dozen animals of any species he really hopes to breed over a long period. And he would have built decent facilities for maintaining large groups. What are you going to do with one or two pygmy chimpanzees? Why is it only within the past five years that you zoo people have even begun to make serious attempts to exchange and breed some of the rarest animals you have? And they call *us* devils! You have said absolutely nothing to excuse your failure to establish a proper exhibit for bullfrogs.'

Well, I pointed out that a zoo man can't expect to provide much in the way of education or recreation, or to excite the public's interest in wildlife and understanding for natural history with a damned bullfrog. But that was the wrong thing to say.

'Education, recreation, excitement!' M. shouted. 'Why, the bullfrog has unlimited possibilities. You zoo people put the poor fifty-cent bullfrog, one or two at a time, in a half-full glass and steel aquarium, then put up a badly worded three-line label and consider your exhibit complete; your responsibility to child, student, and, yes, the bullfrog, satisfied!'

'Of course, this is hardly surprising from people of such diminutive imaginations that they exhibit tree-loving orang-utans in concrete and tile bathrooms or in medieval concrete pits with not even a vague suggestion of a tree. How can you expect to excite or educate by exhibiting an animal, that looks like a man, slumped in a concrete bathroom that provides him so little space and variety that he can do no more than men do in bathrooms?'

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'Oh yes, you make a great deal of noise about barless moated exhibits and then put the poor animal right back in that concrete bathroom on the other side of a hole on the ground. You show forest animals on plains exhibits, swamp animals in deserts. You conduct so little research on your animals that only a pathologist can happily associate with your programmes. Most of your exhibits prevent their animals from exercising any sizeable portion of their behavioural possibilities. But in this area, at least, you are consistent for you provide so little information, and that so badly, that the viewer is unlikely to be disturbed by what he is missing.

'How can you afford to put up a two-dollar label on a \$5,000 animal? How can you afford unimaginative exhibits for rare wild creatures? Why, the lack of creativity in zoo display is such as to reinforce my confidence in the future of my Hell as opposed to your Limbo.'

By this time I was beginning to grow a bit angry myself. I pointed out that M. had exaggerated the weaknesses of zoo exhibition and underrated the imagination which goes into its planning. 'Besides', I added, 'despite the fact that you look like the devil, you are not a zoo man and you have little understanding of the zoo administrator's problems. It is all very well to say that bullfrogs have great possibilities and that zoo men lack imagination; but the fact is, bullfrogs are hardly inspiring.'

'That', M. replied, 'is precisely the problem. Zoo men don't have any inspiration. Why, an entire zoo could be devoted to the bullfrog; a major building is hardly adequate to present the excitement. The lessons this animal has to teach – if only the zoo man had imagination!'

'That I must see', I snorted. And that, again, was an error. M. dissolved in a puff of smoke saying, 'Well, perhaps you can learn by example.'

After a moment I realised that a wood thrush was calling. A gentle breeze ruffled green leaves overhead and riffled the glassy surface of a pond at my feet. I stood among the reeds bordering the pond on a boardwalk. It was carpeted and for a minute I did not realise that M. had walked up beside me.

Further along the boardwalk an entrance sign proclaimed 'The World of Bullfrogs' and I gave M. a dirty look. Across the boardwalk below the sign was a gate which, for a moment, wouldn't

open. M. explained that the exhibit was programmed for an optimum number of visitors and that it must now be filled. It opened when two visitors left at the exit. This prevented overcrowding and enhanced the enjoyment and value of a visit as well as providing a sense of anticipation.

'Why not use mechanical conveyors to move the public through?' I asked, but M. explained that a regimented approach was inconsistent with the need to reach different levels of interest, age and education; that such a tour would lose if it had to be aimed at the lowest common denominator.

We walked through the now open gate along the boardwalk out over the pond. Pre-set binoculars attached to the rail brought close-up views of favorite bullfrog resting areas. I was fortunate enough to see one leap to avoid the stabbing beak of a great blue heron. M. pointed out that the heron was colour-banded and the bullfrog was toe-clipped for identification, that the value of any collection for any purpose was enhanced in direct proportion to the quality of its records. Other binoculars brought orb web spiders close up in their silken snares among the reeds, turtles sunning on logs and a wood duck nest in a distant hollow. A periscope gave a fish eye view of a small-mouth bass fanning its eggs in a pond-bottom nest below the boardwalk, while a closed-circuit television monitor revealed a coot, restlessly incubating her eggs, unaware of our scrutiny in a reed-concealed nest along the shore.

'Well', I asked, 'where is the bullfrog building?'

'Typical, a typical question', muttered M. 'There ought not to be any visible buildings in a zoo. When a visitor gets off the bus and enters your gate, he should be in a world of wild creatures. In so far as possible, your buildings should be concealed. Zoo construction should not simply provide some architect a chance to erect a masonry memorial to himself. If you must erect visible buildings, don't for heaven's sake – and I know that sounds funny coming from me – crowd them into some formal agglomeration that looks like a shopping centre. Surround your zoo-goers with plants and animals. Scatter the structures widely and plant lots of vines. If possible, build them so that they may be easily demolished in the hope that your professional descendants will have more imagination than you do.'

The boardwalk changed to stronger materials and acquired glass walls as it began to ramp down, tunnel fashion, under the pond. The glass sides provided an underwater view of the pond's life before the tunnel opened into the vestibule of an exhibit building.

The first hall, and M. explained that there were several, high-lighted two large bullfrogs at the edge of a pond. The display was glass-fronted and about 3 or 4 feet wide, the shadow-box front extended almost from floor to ceiling. With curvilinear walls and diorama background it placed the bullfrog clearly in relation to the biosphere; its earth, air and water. M. explained that the purpose of his first hall was to introduce the bullfrog close up and to place him among his relatives. But he needn't have explained for the exhibit spoke for itself. Besides, a prominent dispenser by the first display offered a self-guided tour in the form of a graphic brochure. It had been prepared by his own printer's devil.

Exhibits were confined, for the most part, to one side of the exhibit hall; there was no need to backtrack to see the displays in a logical fashion. Some of them had two levels of labels, the higher ones slanted so that children couldn't see them. They were arranged to encourage the parent to explain the exhibit to his child and to enhance the parent's image – and, consequently, his interest.

An alcove presented three simple displays. They housed a bullfrog, a goliath frog and a Cuban dwarf frog. Graphic signs showed the range of each and placed the bullfrog in perspective to his largest and smallest relatives. The next grouping of displays broached the subject of speciation and adaption. Large graphics on the soffit brought order to the grouping and showed the evolution of all frogs from a common ancestor while the living exhibits below displayed toads and spadefoot toads, tree frogs and poison arrow frogs, flying frogs and Surinam toads, clawed frogs and hairy frogs and horned frogs. The special adaptations of each were highlighted by strong graphics and few words while push buttons gave children the opportunity to test themselves and to see whether they could guess the frog's habitat by examining his adaptations. Micro-habitat displays were interspersed among the exhibits for some specialised forms while back projectors showed flying frogs gliding, a horned frog suddenly moving from a camouflaged position and slow

motion views of toads catching beetles with their lightning-quick tongues. Visitors who had picked up earphones in the vestibule could even tune in on the individual calls of each species.

Around the next corner in the intestine type circulation pattern, beyond a sign that said, 'The Bullfrog Has A Past', I found a progressive series of graphic displays that abbreviated the evolution of life from one-celled animals to man. Each living class was pictorially represented upon closed doors except for two, the Amphibia and the Mammalia. Of course, we took the open Mammalia door but it led only to two further doors marked 'MEN' and 'WOMEN'.

We retraced our steps to the Amphibia door between fish and reptile panels and passed into a small hall where, in addition to the ever-present bullfrogs, salamanders and caecilians dwelt in appropriate dioramas about a public space dominated by several fine bronzes of giant amphibians from prehistoric times. The burrowing caecilians were viewed in cut-away tunnels.

Appropriately awed by the venerable history and remarkable ancestors of the bullfrog (and with self-esteem diminished by the comparative graphics showing a man's brief history) we moved on through an entrance marked, 'The Bullfrog Theatre'. We took seats in a small playhouse behind a fat lady with three boys and a movie began. Its title was *The World of the Bullfrog* and it depicted the ecology and life history of a wild bullfrog from egg to death, through his growth and development and through the seasons. It highlighted his relation to other animals as food or as a predator, his susceptibility to drought and his eventual demise as a result of DDT sprays. The emotional impact of the bullfrog's death upon the audience attested to the interest of the movie. It lasted 12 minutes and during that time the boys in front of us made not a sound. After the movie as the lady arose to leave I saw that she was wearing a lapel button. It read, 'Stamp out ugly children, breed bullfrogs.'

As we left the theatre, we found ourselves faced with four modest habitat displays, each representing an identical portion of the pond we had observed from the boardwalk earlier. These enclosures displayed bullfrogs in the four seasons and that representing winter was especially notable, with hibernating frogs and a graphic treatment on the phenomenon of hibernation in

many kinds of animals. The real snow in the winter exhibit and the realistic rainfall in the spring display were quite compelling. The similarity of the four seasonal exhibits called my attention to the overall variety in display shapes, levels, sizes and lighting. This, combined with halls whose irregular walls opened to offer a vista and constricted to limit a particular presentation and whose floors changed in texture and even angle, gave the exposition an exploratory quality that would have delighted Professor McLuhan. Happily though, the result was a directed one and the medium was servant to the message. Yet walls were tilted and light levels varied. The visitor was given perspective by strong architectural treatment of one presentation then lost within a naturalistic exhibit which emphasised habitat or behaviour.

One large exhibit was separated in a darkened hall—its title was, 'A Spring Night at Bullfrog Pond'. The floors and walls of this public space were so densely carpeted that not a scuffing footstep could be heard, only the rustling cattails in the exhibit and its swelling frog chorus. A young visitor manipulated for himself a thin beam of light projected from swivel based binoculars, exhaling excitedly whenever he was able to pick up the startling red eye reflections of bullfrogs resting at the pond's surface. Artificial firefly flashes and a recorded barred owl call gave depth and distance to the exhibit. Visitors found themselves speaking only in whispers. This display introduced another hall devoted to reproduction, growth and development.

As you will have guessed, this next series of exhibits elaborated upon the function of frog calls, of territoriality; it presented displays of males and females, calling attention to sexual dimorphism, and offered displays of frogs' eggs and tadpoles at different stages of development. Social and agonistic behaviour was interpreted in three-dimensional graphics. A special alcove was given over to an educational push-button type exposition of population dynamics.

A most delightful feature was a series of telephone booth-sized alcoves with geographic place names over their doors. Entering one labelled 'Westchester, Early Spring', I heard the familiar sounds of spring peepers and redwings. A late Spring area produced the banjo-like sounds of green frogs and the thumpings of a bullfrog. A

'Southern Illinois' alcove delighted me with a mixed chorus of cricket frogs, bird-voiced tree frogs and the bell-like calls of the green tree frog. Signs compared the volume and pitch of the bullfrog's call with the calls of other animals in proportion to size and with the voices of several popular opera and pop singers as well!

When I said, 'Well I'll be damned!' at this last presentation, M. agreed and added that probably all zoo men would be and, when we were, we might experience the results of his imagination in another kind of lesson. 'Of course', he continued, 'I could have created something more elaborate but I am sure a zoo man wouldn't want to waste real imagination on a common bullfrog.'

That's all very well,' I replied, 'but it is also a zoo's responsibility to show many kinds of animals to give the zoo-goer some idea of the wonderful variety of animal life. We can't settle for fifteen species.'

'True, true', M. conceded; 'but do you need fifteen hundred?'

'What possible excuse have you for acquiring more animals than you can meaningfully exhibit? Is it your contention that it is better to show many single or paired animals miserably than to show large breeding groups well? Could it be that any zoo in this day of diminishing wild creatures is more interested in swelling its census than expanding its effectiveness? Come now, give the devil his due, you people must exhibit fewer species and exhibit them more meaningfully. If you fail, I can assure you that in the long run there will be the devil to pay.'

With that we entered the sixth hall under the announcement, 'Food and Enemies'. First to fall under our scrutiny was a composite exhibit in the centre of the hall; a series of free-standing displays arranged cartwheel fashion about a bullfrog in a simple tank. Signs explained that the large insects, small mammals, birds and frogs arranged around the bullfrog were all normal food animals for him. We learned among other things approximately how many such animals it takes to support the bullfrog for one year—and what it takes to support a man.

Behind the living frog menu a large habitat display presented some of the mammals, birds, reptiles and fish which prey upon the frog. Even predacious aquatic insects which feed upon tadpoles were displayed in a special tank. A giant

pinball machine was arranged to allow children to explore the frog's hazards as frog pinballs disappeared in the mouths of symbolic predators. Educational signs and back projectors exposed frog diseases and parasites. Finally, a living example of pond food chains was arranged down a long corridor. Exhibit linked to exhibit, from plants and barely visible crustaceans through bullfrog to heron, each animal was followed by its predator in the chain of life interrelationships. A wing of the hall offered, with a series of back slide and movie projectors, an overview of the frog's special adaptations and sensory equipment. One gave a frog's eye view of the hall itself, highlighting the frog's all-round range of vision, limited focusing apparatus and colour perception. A visitor's control lever allowed viewers to operate a back screen motion picture of a bullfrog leaping and landing at any speed from slow motion to normal. A large sound-proofed window looked in upon a portion of the frog laboratories where studies were underway on subjects from endocrinology to the evolution of frog calls.

By this time, with so much water about, we had grown thirsty. M. struck a devil-may-care attitude and said that his usual work often made him thirsty but he led the way from the Food and Enemies Hall to a nearby entrance marked 'Jug-O-Rum-Lounge'.

Here, tables and chairs were arranged on a terrace overhanging a 30 ft slough. The lighting was late evening in character and the open-air feeling was enhanced by a starlit planetarium type ceiling. Of course, the pond was filled with frogs and the background music was interspersed with exceptionally well chosen frog choruses. A waitress brought our drinks and several dinner favours in the form of lapel buttons. She wore a button which read, '*Rana goliath* is a fink'. I chose one which said, '*Rana catesbiana* is alive and well in Philadelphia'. When we left, I noticed that M. had chosen a slogan which promised, '*R. catesbiana* for director of the Bronx Zoo'.

I sensed that M. was devilishly pleased with my now subdued demeanour and I hastened to point out that, after all, he had started the discussion by demanding a proper exhibit for bullfrogs – but that this display offered a great deal more than bullfrogs. 'That', he rejoined, 'is what makes it a proper exhibit of bullfrogs.'

'I told you the possibilities of bullfrogs are

unlimited', he said. 'Why, I haven't begun to show you my displays on the bullfrog's economic importance, its relationship to man and its introduction by man in strange places. However, I am willing to skip all that. I'll even let you wake up without showing you my special displays on the bullfrog in art, music, folklore and research, although my friend Mark Twain will never forgive me for bypassing the exhibits on the bullfrog in literature, but you must glance at our ninth and last hall.'

With that we entered a hall under the questioning sign, 'Will There Be Bullfrogs In Your Ponds Tomorrow?' A great map of the United States dominated one wall, a lighted portion changed to show the extent of wetlands and bullfrog range as it was 100 years ago and then today. A series of pictorial, three-dimensional exhibits recorded the loss of such extinct forms as the passenger pigeon and the Carolina parakeet, while others recorded the status of various endangered species relating their plight to various aspects of the bullfrog's story. Our earphones told us that the bullfrog was in no immediate danger as a species, that he might, indeed, be among the last creatures to entirely disappear. But the implication was clear. Wild land is going and with it the excitement and wonder of wild creatures everywhere. Man might be lonely with only the bullfrog to divert him. Current conservation legislation was graphically summarised and factually reported within a small stand-up theatre.

Finally, as we headed toward the exit door, a last prominent sign caught my eye. Its text is worth quoting, 'The bullfrog is but one species in your zoo and now you know a part of its fascinating story. Every animal in the zoo has its own story.'

As M. led the way up the glass-walled ramp onto the board walk over the pond again, we fell into discussion. 'Well', I said, 'you may be right about the importance of bullfrogs, at least in part, but why your preoccupation with this particular creature? You could have developed the same sort of exposition with almost any common animal.'

'Ah', M. sighed, 'you are capable of learning after all. Of course, I could have used *any* common animal for the way the animal is exhibited; the effectiveness and imagination of the exhibit in terms of human understanding and appreciation and its suitability in terms of animal well-being is

the best justification for removing an animal from the wild. A poor display can destroy the wonder of the rarest most marvellous creature.

'Our urban populations have expanded so rapidly that whole generations are growing up without any natural contact with wild creatures; a new public opinion concerning wildlife and wild environment is arising unfettered by fact and unguided by experience. Except at the zoo, the opportunities to know or even become interested in living wild creatures are largely vicarious ones for many city dwellers. Yet it is the Bronx bus driver and corner pharmacist whose votes will determine the fate of the Adirondack wilderness, the Everglades, of Yellowstone Park. You must give your visitors a new intellectual reference point, meaningful and aesthetically compelling; a view of another sensory and social world; a feeling of personal interest in

diminishing wild creatures and collective responsibility for their future which is so closely linked to that of man. Zoos must be natural history and conservation centres for the future.

'But to answer your question, you must understand that I chose bullfrogs on an entirely logical basis. Every devil must have some advocacy. (Although I do like bullfrogs – you know they really are very lovely and graceful, no matter what anybody says.) They fascinated me as a child but now there aren't any where I live. Perhaps the water is too hot . . .', he whispered as he seemed to drift away.

By now some of you may suspect that I am pulling your leg; that I really haven't had such a dream about the exhibition of bullfrogs; but if you think that, you would be wrong. To develop such an exhibit in the Bronx Zoo is one of our fondest dreams.

African Enclosure at the Cotswold Wild Life Park

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Showing animals behind ditches or ha-has is not a novel exhibition technique. At the Cotswold Wild Life Park ha-has have been in existence for this purpose for 150 years. Until fairly recently the property was maintained as an agricultural estate. Already we have utilised the existing ditches to contain llamas *Lama glama* and rheas *Rhea americana*. It has always been our intention to expand into the larger grass areas of the Park using this form of barrier and so, in late 1971, it was decided to introduce some of the larger and more popular animals to the collection. Up until this time the largest animals kept have been puma *Felis concolor*, tapir *Tapirus indicus* and llama.

An African Enclosure was planned utilising a very long stretch of existing ha-ha along the front of a rather irregular shaped paddock covering about 2 ha. Around the remaining perimeter of this enclosure we constructed our new moats. Although an expensive job, we considered it essential, for fences would have spoiled part of the natural beauty of the estate. The retaining wall is 1.40 m high with angle iron set on top of the wall,

reaching into the paddock at a 45° angle. Through these are run straining wires. The total depth of the barrier wall therefore from the tip of the angle iron to the ground is approximately 1.82 m. On the animal's side the ditch has been graded, sloping gently back into the paddock over a distance of 6 m. One of the problems in housing several kinds of animals together of varying sizes is, of course, providing a barrier versatile enough to contain each species. White rhinos may be kept perfectly well behind a low wall; gazelle however would clear it with no trouble. The above method has so far worked extremely well.

The building which will house Grevy zebra *Equus grevyi*, ostrich *Struthio camelus*, Thomson's gazelle *Gazella thomsonii* and Ankole cattle *Bos taurus* is situated at one end of the enclosure, while the White rhino *Ceratotherium simum* house is situated at the other. The Zebra Building consists of seven loose boxes each measuring 3.66 × 4.27 m. All the boxes inside connect with a sliding door worked from outside. This means that even the centre bay which is used as a feed store can be