Design and Architecture:
Third Generation Conservation, Post-Immersion and Beyond

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Introduction

Will zoos in the next fifty or one hundred years be as different from those today as today's zoos are from those a century and half century ago? Yes and no. Yes, some zoos will evolve so far as to no longer be considered zoos at all. Early examples of these transcended "unzoos" exist around us today, largely unregarded by the zoo profession. Much heralded personal virtual zoos and Jurassic Park-like theme parks for NeoGen chimeras will also be popular. No, some zoos in less developed regions of the globe will remain much as zoos were in the early 1900's with simple rows of pens and cages.

William Conway, David Hancocks and I, along with several other speakers today, remember zoo facilities of fifty years ago very well indeed, having both experienced them and played our parts in helping to transform them. Some older zoos have relics of their hundred year old past. So looking forward 50 and 100 years isn't too daunting. In fact science fiction writers have been describing believable future wildlife encounters for us. Examples include Ray Bradbury's "The Veldt" in the *Illustrated Man*[1] and David Brin's Uplift Series[2] which will figure into my predictions later.

While aquariums will also undergo dramatic change, especially in response to energy conservation, I have reluctantly left them out of this paper in order to focus on land-based developments.

My title, "Design and Architecture: *Third Generation Conservation, Post-Immersion and Beyond*" is a little misleading. As a zoo designer I was asked to speak about the future of 'zoo architecture' (I suppose academics lump all professional facility design as 'architecture'). But as a landscape architect I believe zoos should be much more about landscape in both the ecological and metaphoric sense than about architecture as generally practiced. Also, since my friend and colleague David Hancocks was asked to discuss the future of "immersion design," I volunteered to cover other design philosophies. Although 'design' is a limited field in the complexity of zoo enterprises, it touches upon nearly all other fields, and so my comments and predictions will be very broad ranging.

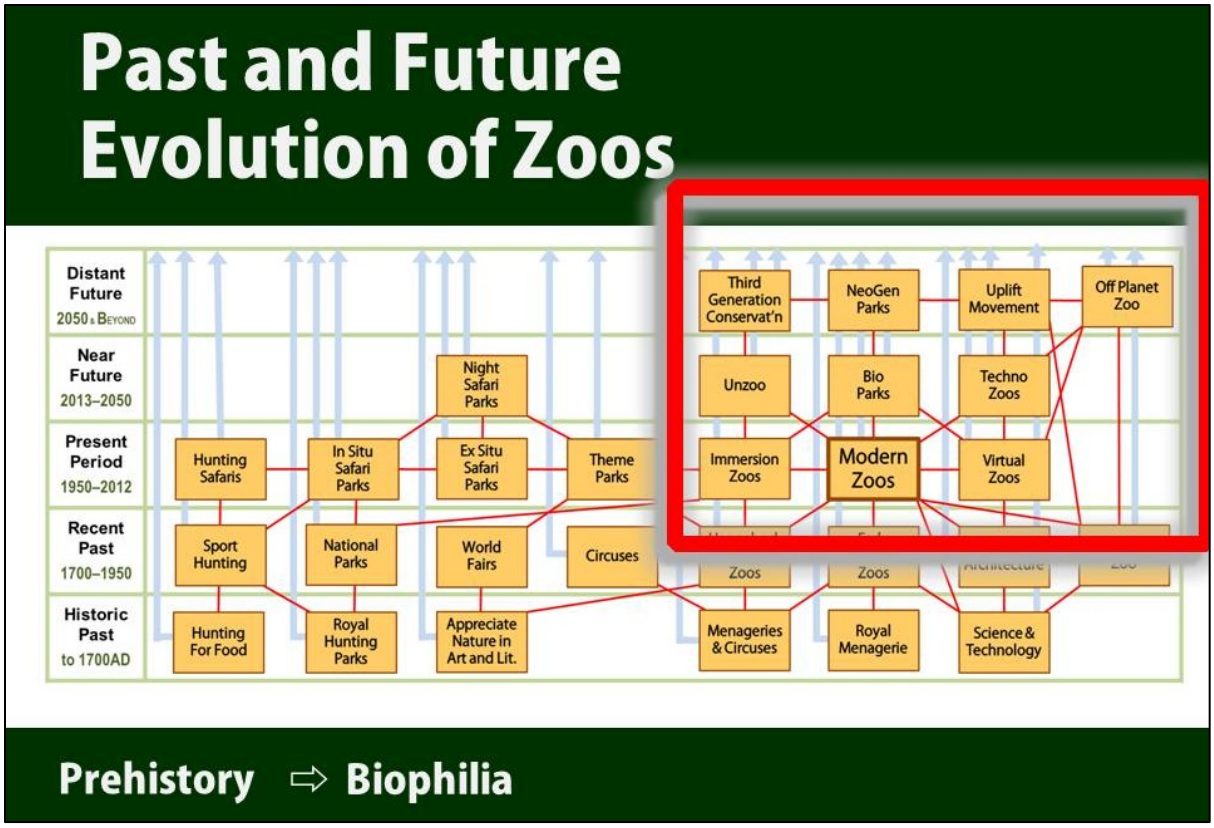
Before presenting my predictions for the future of zoo design and zoos in general, let me consider some assumptions implied in the organization of this symposium.

- **North American Bias:** Most speakers are from North America, only one is from Europe and two are from Australia with a significant North American zoo perspective. Where are the zoo leaders from India, China and Latin America? These regions will be economic leaders during the next half century. Their cultures are very different and our western standards are unlikely to be directly transferable to these areas. For example, how will quiet reflective immersion exhibits or tightly managed zoo tram networks function when 30,000 visitors arrive at the zoo on traditional holidays and there is no native tradition of orderly queuing or staying on designated pathways?

- **Economic Bias:** The gulf between rich and poor in all countries will widen. Are we only considering the future of zoos for people like us, the relatively wealthy? How will zoos, long considered popular attractions with mandates for popular conservation education respond to vastly increased numbers of poorer people?

- **Elite Zoo Paradigm:** The invited speakers are leading zoo thinkers associated with successful zoo programs. This could lead to consideration of the futures of only elite zoos, those with the philosophical and financial resources to advance through innovation. While the elite have disproportionate influence on the evolution of their professions, my international work has lead me to believe the great majority of zoo officials in the most populous nations remain unaware of innovations in western zoos. While elite zoos can roughly measure their positive impact in areas of conservation education and action, what is the combined impact (negative or positive) of 700 million zoo visitors worldwide (WAZA estimate) attending perhaps over a thousand popular traditional zoos in places like Indonesia, Palestine, Peru, Congo and Pakistan? The measure of excellence should not only be the achievements of elite zoos, but also the collective impact of all of the world's zoos, good, average and bad, present and future.

- **Linear Evolution Paradigm:** There is a tendency to think evolution means only the survival of the most advanced, while in fact many ancient organisms continue to prosper. In terms of zoo evolution this means that a few pioneering zoos may assume far different configurations in the future while some evolve to intermediate levels and most remain largely unchanged. Zoo evolution should be considered as a continuum where past, present and future zoo trends, rather than succeeding each other, will continue to coexist far into the future.



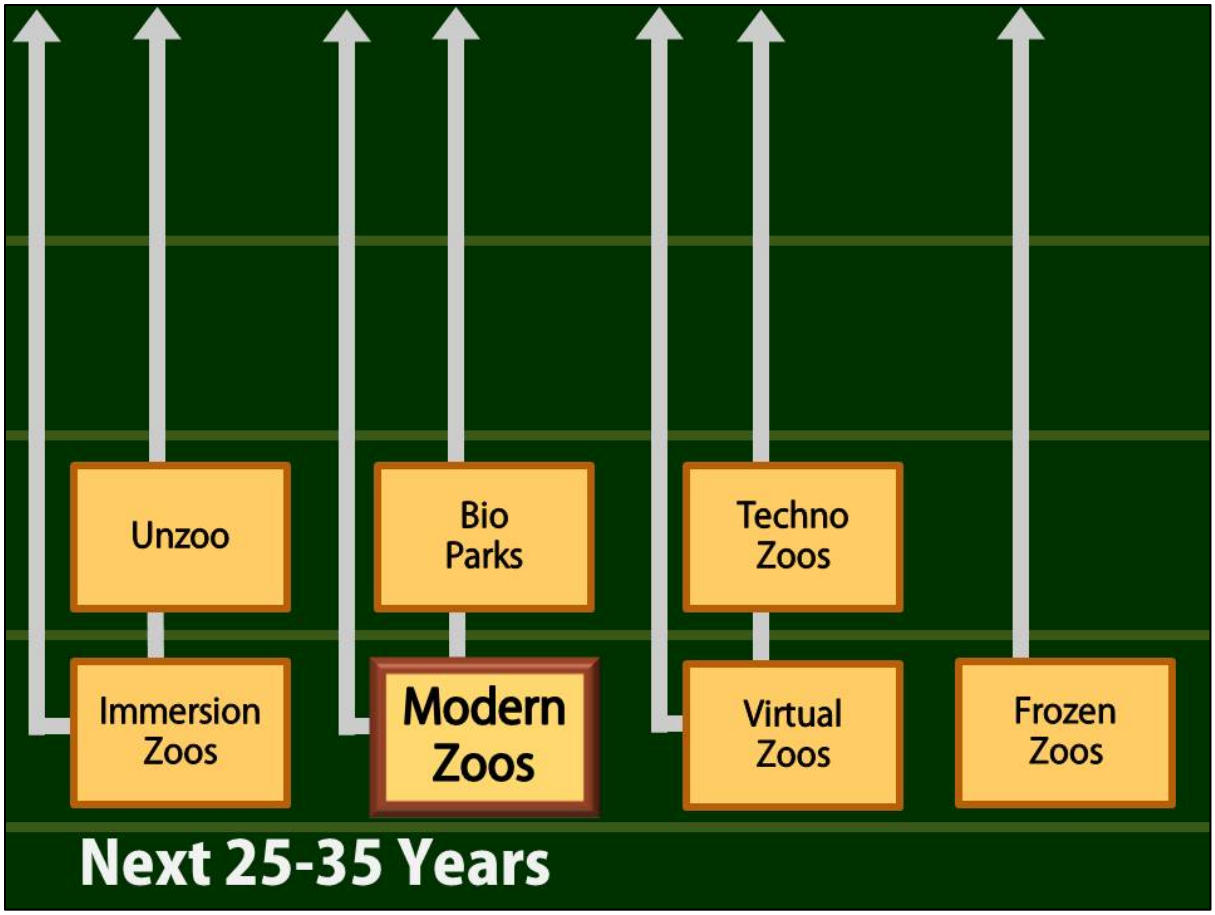
Past and Future Evolution of Zoos

Growing from prehistory and human's propensity toward Biophilia,[3] modern zoos resulted from a number of evolving trends as shown above. Most of these trends will continue into the far future as zoos continue to evolve along three major lines: 1) Becoming more inward and individually focused as virtual zoos merge into techno zoos and advanced virtual wildlife experiences; 2) Maintaining a broad popular appeal including bioparks and perhaps neo-gen parks; and 3) Becoming dispersed, regionalized and localized into a more universal accommodation of nature in everyday life, as suggested by the unzoo and third generation conservation movements. Varied responses to predicted severe global ecological and economic change will effect which of these path is followed. In all cases rapidly evolving science and technology will be a major driver of change.

Zoo Design in the Next 25-35 Years

Assumptions

- The end of the consumption-based development bubble of the last six decades (1950 to present day) forces a rapid and chaotic retreat to a low growth community-based lifestyle in the present developed economies.
- In these areas large urban zoos will decline and regional sanctuaries will spread.
- Consumption-based growth bubbles will grow in the new economies of China, India, Brazil, Russia, South Africa, Arabia, UAE, Turkey, and Indonesia.
- The west continues exporting zoo ideas and technology.
- Increasing global polarization between wealthy and poor will result in gated communities and gated economies.



Next 25-35 Years

Predictions and Discussion

Zoo design in the next two and a half decades will follow existing trends, but most zoo renovation and new construction will occur in the developing economies where American models will be transformed into culturally appropriate variations. Many North American ideals of immersion and 'wilderness' will be lost in translation. Future zoos in some developing economies will resemble past North American zoos.

Dingo Exhibit, Healesville Sanctuary

- **Immersion Design:** Symposium speaker David Hancocks will, I trust, predict the future of "Immersion design." Originally named "landscape immersion," it is now widely regarded as international best practice in exhibit design. However David may find that most zoo displays using the term no longer fit the original definition. Here are some of the main present and future alternatives to immersion design.

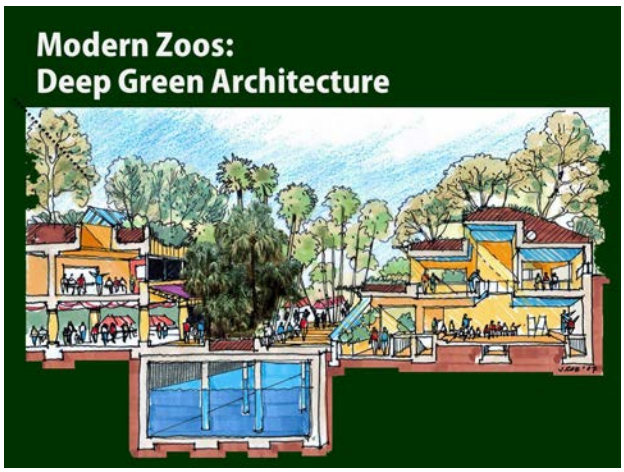
- "**Big Architecture" versus "Immersion":** Highly realistic immersion design originated as a revolution against inorganic "big," dominating architecture and abstraction dogmas of the modernist movement in art and architecture.[4] Yet the "big architecture" design philosophy still represents the primary pre- and post-immersion alternative for zoos. "Immersion" seems to have the advantage where specialist zoo designers are involved, mostly in North America, Australia, New Zealand and Singapore and is gaining ground slowly in European zoos. The Central Zoo Authority of India favors landscape-based immersion design, which is advantageous in this largely tropical country. But internationally the vast majority of zoo facilities are designed by generalist architects with little or no zoo experience who were trained in the big architecture philosophy. These general practice architects have the advantage in many European city zoos where municipal design competitions are judged by other architects and zoo staffs have little say in the selection of zoo designers. I see this European architectural bias continuing into the mid-future.


Animal Care Centre, Healesville Sanctuary

- **Mega Structures:** In cold climates where indoor animal displays are required, we presently see an unhappy mix of limited landscape inside energy consuming mega-buildings. Even the best small forest animal displays such as "Jungle World" at Bronx Zoo and "Masoala Rainforest " at Zoo Zurich use large amounts of imported energy. Functional big architecture may give a better result where destructive species like orangutans and elephants are concerned (like it or not we will continue to see elephants kept indoors in wealthy cold climate zoos in the mid-future). However really big architecture, such as the domed spaces at the Eden Project in Cornwall offer promise for more energy efficient and aesthetically satisfying 'big architecture' providing sufficient volume for significant living landscapes while minimizing energy use

- **Deep Green Design:**[5] Five years ago I proposed zoos embrace a far deeper approach to sustainable design, going beyond materials technology and carbon

accounting to celebrate the community of all life, perhaps creating a 'bill of rights' for the animals and even plants in our care not unlike the philosophy of the "deep ecology" movement developed by in the 1970's.[6] Future zoos will certainly become far more 'green' in the immediate future. But will they continue to be 'shallow green' or embrace a deeper green philosophy and practice? Will they grow their own animal food, harvest their own water, and produce their own energy? A few may, especially smaller regional zoos and sanctuaries in subtropical and tropical regions. Within this period cool climate zoos will be forced to become far more energy self-sufficient or change their collections to hardy animal species.



- **Bioparks:** In 1986 I discussed the co-evolution and eventual merging of zoos, aquariums, botanical gardens and natural history museums.[7] Michael Robinson developed this idea further, coining the term 'biopark'.[8] Emmen Zoo in Holland is an excellent early example. This term and approach has been developed in a few North American and European zoos and at the Desert Park in Alice Springs, Australia. It will be expanded in the near future in a few new facilities being developed in the Gulf States such Al Ain Wildlife Park in Abu Dhabi and likely elsewhere, but I do not see that was a major future trend, although I wish it was. The bio parks I'm familiar with follow the immersion style.

Rotation Raceways like this "Treetop Traill will link all areas of the Philadelphia Zoo

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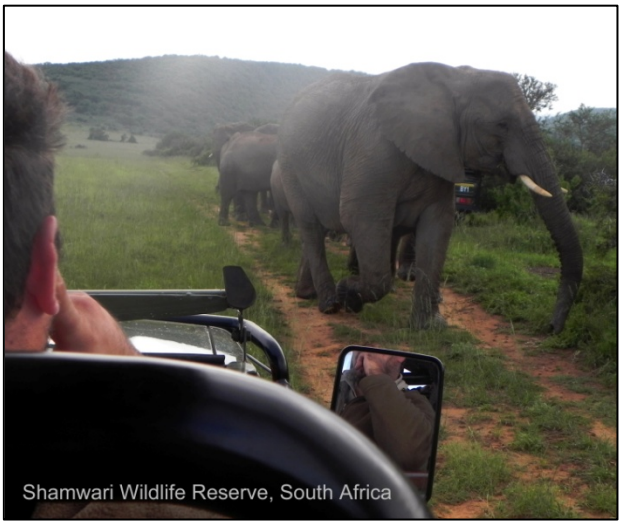
- **Zoo Entertainment:** Another post-immersion trend is the wide spread inclusion of public amenity and animal entertainment elements within the landscape, including animal rotation,[9] animal shows,[10] food and beverage venues and simulated safari rides. This trend is best represented by Disney's Animal Kingdom. I see this as a positive advancement, so long as the message of

respect for the natural environment and for other cultures is undiminished. In countries like China, Russia and Brazil, which are now leaping forward, this will become the likely future of immersion design. While the present zoo establishment in India favors the original pure version of immersion design, I predict the next generation of Indian zoos will embrace the more commercial post-immersion approach.

- **The Safari Experience:** Modeled after colonial era African hunting safaris, zoo safari parks are not new. But large commercial in situ safari parks in East and South Africa, Brazil and India are blurring the distinction between zoos and national parks and introduce a form of "unzoo" (more about this later). Purpose built ex situ safari parks and night safaris (like those in Orlando, Singapore and Bali) and in situ safari parks like Shamwari and others in South Africa will become a major growth area serving wealthy and security conscious animal lovers in the next two decades.


Shamwari Wildlife Reserve, South Africa

- **Beginnings of the "Techno Zoo:"** Computer based information and operating systems have already transformed zoo genetic management and will transform inventory, "smart building and infrastructure" operation and visitor flow and services. Ken Boschert created the first "virtual zoo" in 1994[11] and many examples exist today, mostly as computer games. As virtual reality technology grows it will be integrated into zoos and theme parks either as exhibits or added to their on-line offerings. Another speaker will discuss the emergence of the "robo-zoo" and the further evolution of the animatronic animals now seen touring zoos. I see this as another aspect of the techno zoo.

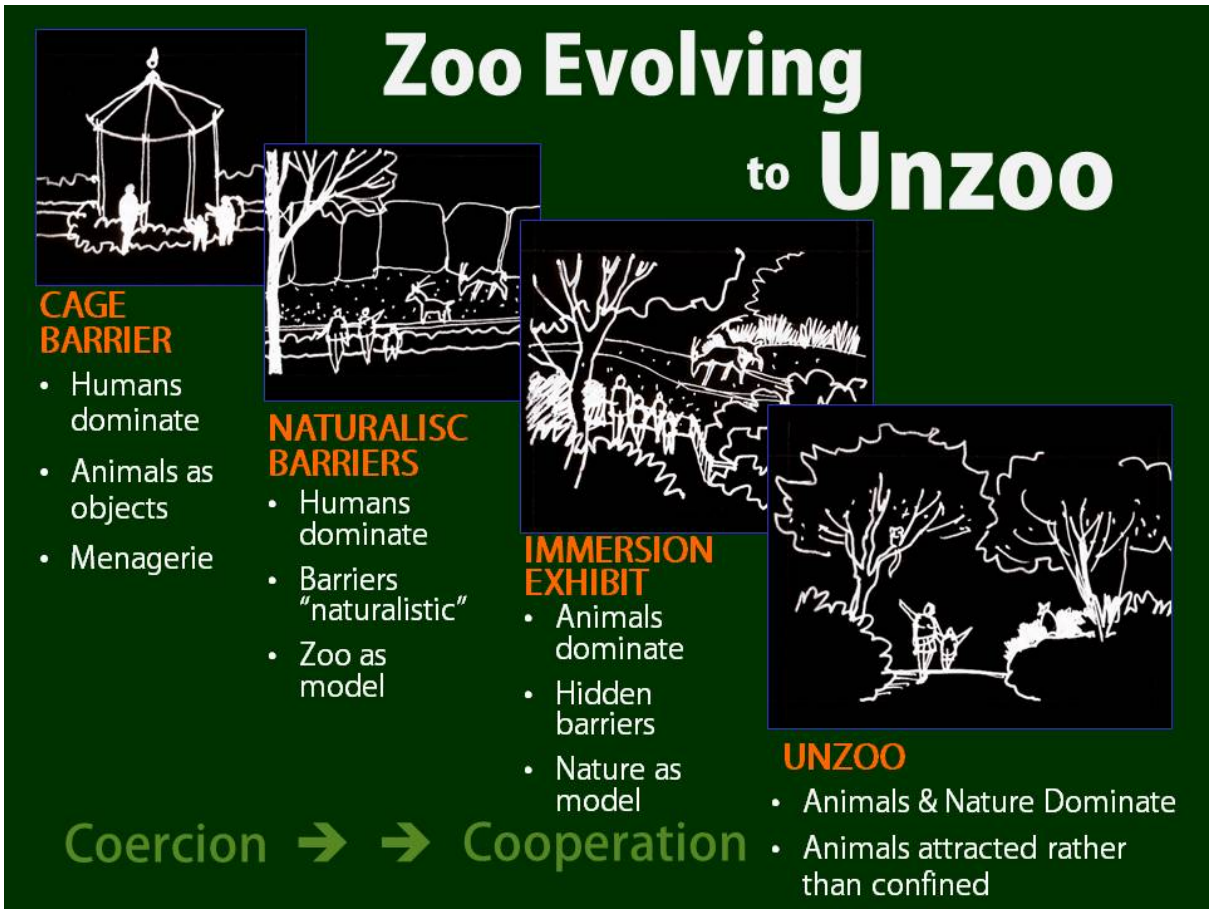
Five years ago I predicted the use of visitor's personal smart phones to access zoo information and operate interactive zoo devices.[12] Today some apps are available with easily available information for San Diego. London and Dallas Zoos and the American Museum of Natural History are experimenting with interactive uses of smart phones. This will become a common zoo feature in the coming

decade and provides real opportunities in tech savvy developing economies. Interpretive and exhibit design will be transformed. Ten years ago I suggested using animal identification microchips to allow animals themselves to activate gates, feeders and fans while recording data points for research and alerting keepers and viewers to animal's activities and whereabouts.[13] Hopefully this approach to giving animals more control over their environments will be picked up in the next decade. "Real time" video links to zoo-supported in situ projects as well as in-zoo nursery areas will become very common. Thus electronic technology will not only help future non-zoo animal lovers (virtual zoos) and zoo visitors' but also will improve the choices and well-being of future zoo animals.

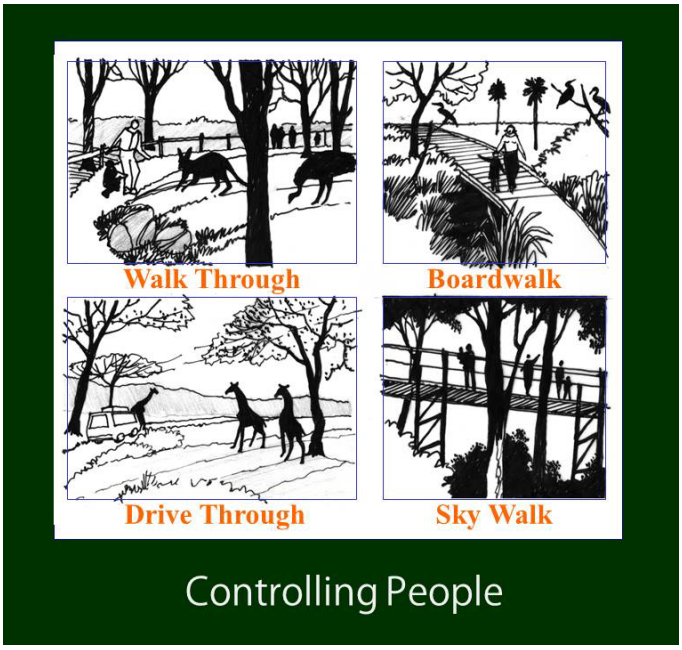
- **Zoo Conservation Action:** Greatly increased land development will result in increased zoo activity in both ex situ and in situ conservation resulting in a greater proportion of zoo space and effort being dedicated to programs including more in situ field zoos as well as major growth in ex situ animal sanctuaries.

Fund raising for in situ conservation programs

- **Unzoo The "Unzoo" Alternative:**[14] Modern zoos, no matter how advanced, are founded on the captivity and coercion of generally tamed wildlife. Animals are reduced to absolute dependence upon their keepers, resulting in learned incompetence in many of the most basic skills of their free ranging cousins. But western zoos have made wonderful advances in reward-based training and environmental enrichment and have begun to think about giving animal's greater control over their environments.[15] We can work towards a totally new zoo paradigm, "the unzoo", where animals collaborate with humans mutualistically. Many unzoo examples surround us today. Hundreds of thousands of annual visitors to Penguin Parade near Melbourne, Australia pay admission to watch wild little penguins come ashore nightly with proceeds going to penguin habitat protection and research. Swim-with wild dolphin programs and whale watching tours support cetacean conservation through firsthand recruitment of whale and dolphin lovers. Polar bear safaris are another example. Wild platypuses are regularly observed by patrons in a Tasmanian riverside beer garden. Wild maned wolves are attracted for tourist viewing at the Santuario do Carasas outside Belo Horizonte, Brazil.



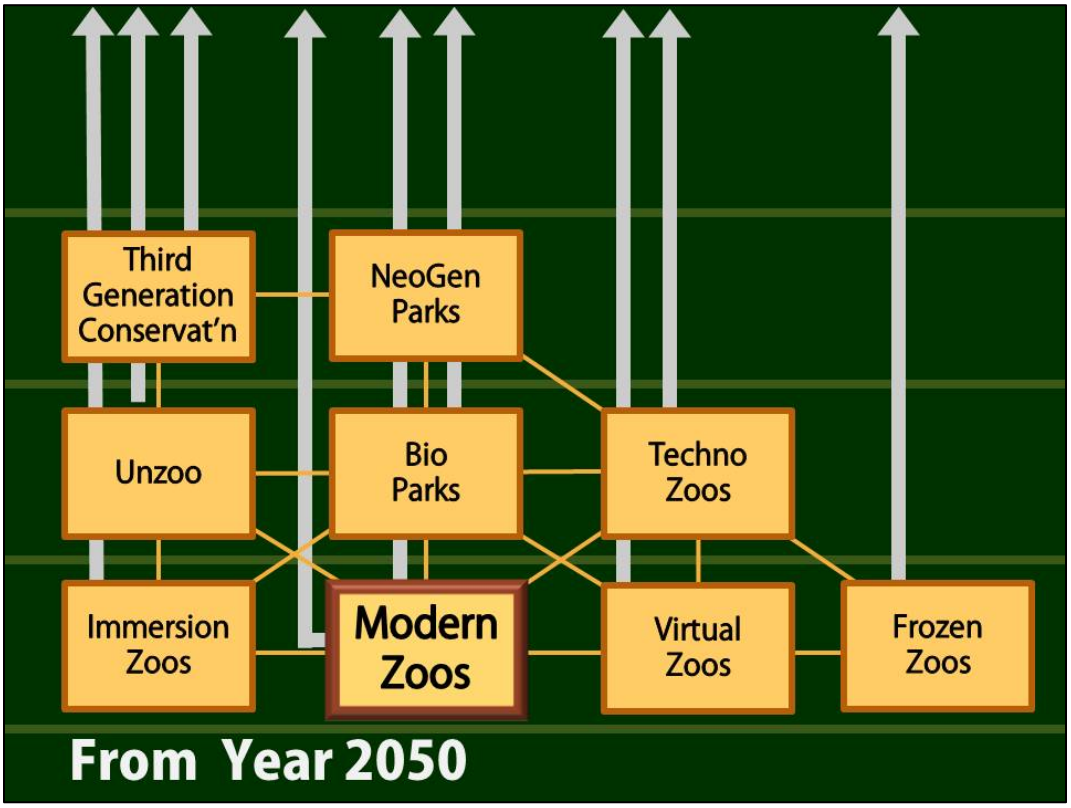
Purpose-built African safari parks with free-ranging but managed wildlife like Shamwari Wildlife Reserve are unzoo examples. All of these examples are open to abuse of course, just as zoos are, and the same duty of care should apply. Future zoos can and should condition free-ranging wildlife to be active contributors to positive "nature" experiences while maintaining the same level of care for the free-ranging species they provide for collection animals. In time these conditioned free-ranging animals, together with rescue animals may make up the unzoo's entire collection, as indeed happens today in a growing number of sanctuaries in New Zealand and Australia.



Zoo Design from Year 2050

Assumptions

- Consumption-based new economies will collapse.
- World population peaks and declines.
- This is an era of unprecedented global migration and conflict.
- Most global economic empires and some multi-ethnic nations collapse into a loose network of decentralized low growth and community-based economies linked by social media networks.



From Year 2050

Predictions and Discussion

- **Advanced Technozoo:** Beginning with today's "animatronic" simulations of dinosaurs, this direction is advancing toward a "robo-zoo", which will be the subject of another paper in this symposium, as will a sci-fi vision of fully functional virtual reality animal experiences.

- **Neogenesis:** Genetic material stored in the modern 'Frozen Zoo' will be used to recreate extinct species and even chimeras of extinct species displayed in theme parks reminiscent of Jurassic Park.[16]

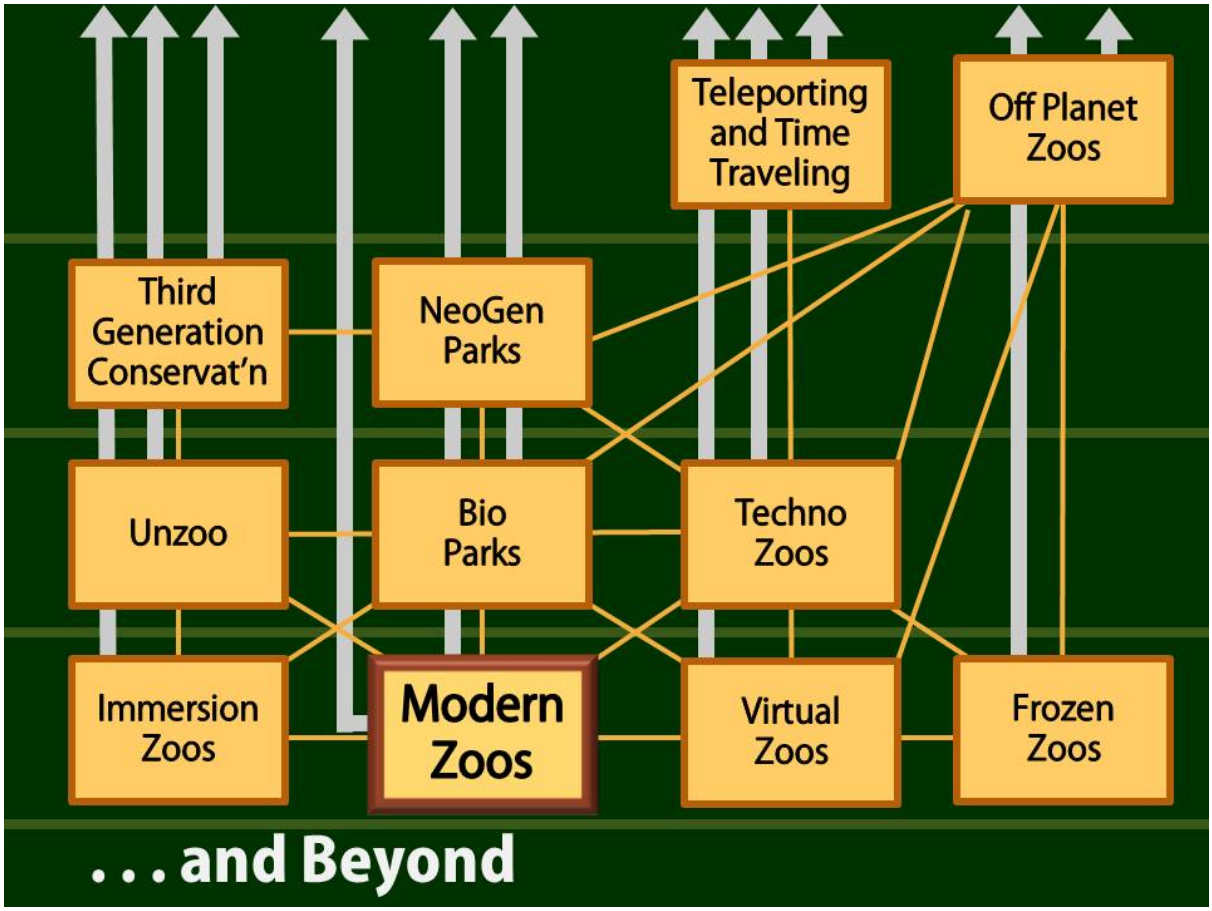
- **The "Uplift Concept:"** Another science fiction concept, explored in David Brin's "Uplift" book series involves human genetic engineering of other species to optimise their ability to prosper along with humans. Such developments could lead to another version of the "unzoo" (safe wildlife?) as will as the third generation conservation approach which follows.

- **Third Generation Conservation:**[17] The first generation of wildlife conservation began in the 19th Century and was dedicated to **preservation** of outstanding natural landscapes and ecosystems, and this trend will continue into the future, but with a community-based approach. But in situ protected areas are highly vulnerable to climate and political change. The second generation of conservation action in my definition is landscape **restoration** which emerged on a large scale in the fourth quarter of the 20th Century. This trend includes not only bushland and wetland restoration, but also reintroduction of zoo and sanctuary raised endangered species. The purpose-built South African safari parks mentioned previously are also examples. This trend will hopefully expand in the long term future when world population is predicted to level and decline. I see third generation conservation as **accommodation**, where societies make room for wildlife in their midst and there are no longer boundaries between nature and civilization. The beginnings of this trend are seen in today's backyard bird feeders, bat hotels and frog ponds and towns like Banff, Alberta where coyotes, bears and elk are common visitors. This admittedly utopian vision is consistent with the somewhat Arcadian philosophy of return to small, self-sustaining communities and a balanced sustainable-growth world economic model.

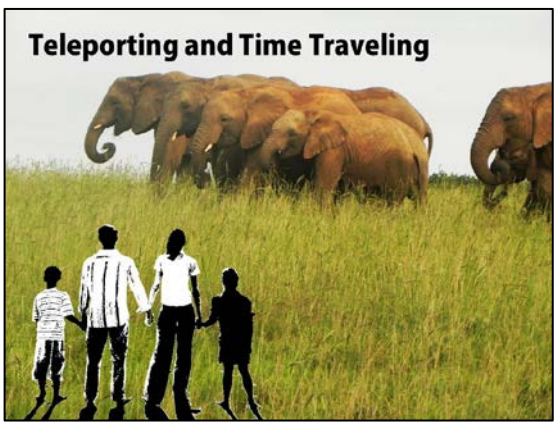
… And Beyond

Assumptions

- Space Travel Advances
- New growth bubbles emerge on resource rich extra-terrestrial colonies
- Teleportation discovered and progressed
- Time travel discovered and progressed
- Virtual zoo, frozen zoo ark, NeoGen and all three conservation types develop in human colonies off planet.
- And many unimagined things…



Now we enter the realm of science fiction, and an amazing world it will be. Technology is always the unpredictable wildcard. Today's technology won't save us from overpopulation, climate change and economic chaos, but future technology, together with wise and farsighted leadership may soften our landing. Economic bubbles with follow resource booms off-planet.



- **Outward Bound Zoos:** While most of earth's human population in the next century is apt to live sustainable but rather boring lives, pioneers will seek opportunity and adventure in extraterrestrial settlement,[18] taking frozen zoos with them and establishing Earth-like immersion wildlife experiences in bioparks on artificial ring worlds as sci-fi author Larry Niven predicts in his Ringworld series.[19]

Conclusions

Zoos have many futures. Most types of zoos seen today will still occur somewhere in the world fifty and one hundred years from now. The economic equivalent of royal menageries will still exist on some wealthy estates using the same computer management systems that provide amazing virtual zoo experiences. However, most energy importing urban public zoos will fail while others will be transformed. Areas of zoo development and expansion will follow shifting economic fortunes around the globe. Eventually growing desperation spurred by the perfect wave of over-population, resource depletion, collapse of the consumption economy and resulting financial insecurity will force societies into low growth, self sufficient and community based populations.[20] Some will have comfort and ease; some will have desperation and poverty. Peace will not be in our future. Resilient species and feral animals will return to the fringe lands left by economic collapse, as they have in areas of the former Soviet Union. And while much of today's wilderness and highly socialized and fragile animals will be lost, so will most dense metropolitan populations. "Nature" will return to backyards and farm edges as third generation conservation, accommodation with nature, spreads. Exotic animal collections will greatly decline, replaced by virtual safari experiences and perhaps chimerical hybrid species. Eventually even uplifted families of bonobos or dolphins may become your friends and neighbors.

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