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General Information

Badges

Delegates are requested to wear their name badges at all times during the course of the conference and at all the social events. This will allow access to all the conference sessions and social events.

Any person not wearing a name badge may be denied access to session and social events.

Paper Sessions

All paper sessions will be held at the Songbird Terrace Jurong Bird Park.

Posters

Posters will be on display for the duration of the conference. Poster authors will be required to stand by their posters during the afternoon break on Monday 10 September and also during the morning tea break on Wednesday 12 September.

Buses

Buses will be available for delegates to travel to and from Jurong Birdpark and from Sunday evening onwards. The buses will be leaving and returning to and from The Hangout Mt Emily, The V Hotel Lavender and the Miramar Hotel as per schedule available at registration. Buses will not wait for late comers due to strict time requirements.

Workshops

Workshops will be held on Tuesday afternoon and Wednesday afternoons. Delegates will be required to select one from each time slot to attend. These will be held at Singapore Zoo. Transport will be provided from Jurong Bird Park. It is requested delegates move to the buses quickly following the lunch break.

Discounts

WRS will be extending all the ICZ delegates during the conference period a 10% discount on purchases made at all our WRS F&B and Retail outlets [applies for only house brand goods only] and a better discount for guest who purchase in bulk (20 pieces and more).

Sunday 9th September

- 14:00 – 18:00 *Registration – Jurong Bird Park*
18:00 – 20:00 Icebreaker Jurong Bird Park – Penguin Coast Area
20:15 *Buses depart for Singapore Hotels*

Monday 10th September – Paper sessions are in Songbird Terrace

- 8:00 – 12:00 *Registration – Jurong Bird Park*
8:45 Opening Ceremony and Group Photo – Pools Amphitheatre
9:45 **Break** – Songbird Terrace
10:30 **Keynote** - Professor Leo Tan, Singapore
11:00 Euthanasia in zoos and wildlife parks - Can we agree on a policy position? Graeme Phipps, Australia
11:15 Asian rhinos in Singapore, and their survival in the region. Dr Kees Rookmaaker, Singapore
11:30 Medical Husbandry Training for a zoo. Nicki Boyd, USA
11:45 Free-ranging Orangutan Exhibits at the Singapore Zoo. Jackson Raj, Singapore
12:00 States of positive welfare. The concept of 'Flow'. Amanda Pemberton, Australia
12:15 Working together – Save the Drill in Cameroon. Kathrin Paulsen, Germany
12:30 **Lunch**
13:30 **Keynote** - Connecting With Our Audience, Steve Martin, Natural Encounters Inc
14:30 The Nest Step: Breeding and Management of Proboscis Monkeys at the Singapore Zoo. Perumal Manivannan, Rachel Yeo, Singapore
14:45 Zoo New England's Keeper Training Program. Amanda Kamradt, USA
15:00 The management of black-capped squirrel monkeys in Apenheul Primate Park. Rudy Berends, Netherlands
15:15 **Break and Poster Session.** Poster presenters to be beside their posters.
15:45 Indigenous Programs at Taronga Conservation Society Australia. Rodd Stapley, Australia
16:00 Captive husbandry, breeding, and handrearing of Fairy Bluebirds. Greg Bockheim, USA
16:15 Intergrated Animal Management, Bear Care in China & Vietnam. Nicola Field, China
16:30 One step closer, Auckland Zoo and the red panda initiative. Anneke Haworth (presented by Karen Simpson), New Zealand
16:45 Behavior Management. Valerie Hare, USA
17:00 Breeding captive Palm Cockatoos at Zoos South Australia: Past, present and future. Trena Carney, Australia
17:15 Training and Conditioning of Spotted Hyenas at Monarto Zoo. Anna Bennett, Australia
17:30 *Buses to Singapore Zoo for Dinner at Forest Lodge followed by **Night Safari Evening.** Includes meal and soft drinks. Cash bar.*
22:45 *Buses leave for Singapore hotels*



Program - 11 September 2012

Tuesday 11th September – Jurong Bird Park

- 8:30 **Keynote** - The SECRET of Animal Training. Steve Martin, Natural Encounters Inc
- 9:30 Role of Zoo Keepers in conservation education. Rengasamy Marimuthu, Sally Walker, India
- 9:45 Problem-Solving Behaviour of a White-Bellied Sea Eagle. Dondee Penera, Philippines
- 10:00 **Break**
- 10:30 Choosing Mr Right: mate choice increases captive breeding and conservation success. M Parrott, L Selwood, P Watson, Australia
- 10:45 Maternal Behavior of a Female Clouded Leopard. Joe Ong and Cecilia Tang, Singapore
- 11:00 The Introduction of Camels to an African Elephant at Taronga Western Plains Zoo. Glenn Sullivan, Australia
- 11:15 Planning Enrichment. Valerie Hare, USA
- 11:30 Walking the Walk, Auckland Zoos' journey to become palm oil free. Carly Day, New Zealand
- 11:45 Artificial Incubation and Hand Rearing of Great Pied Hornbill. E V Gabayoyo, M Bongco-Nuqui, Singapore
- 12:00 Bonds between Zoo Professionals and their Animals. Geoff Hosey, Vicky Melfi, UK & Australia
- 12:15 **Lunch**
- 12:45 *Buses depart for Singapore Zoo*
- 13:15 **Workshops** (choose one)
1. Exhibit Design. Cham Tud Yinn. Zoo Training Room
 2. Problem Solving. Valerie Hare, Bianca Espinos. Forest Lodge
 3. Animal Welfare. Graeme Phipps and Liz Romer. Ulu Court, Night Zoo
- 15:00 **Break** (on own)
- 15:30 **Workshops** (choose one)
1. Amphibian & Reptiles. Dr. Luis & Dr. Abraham. Zoo Training Room
 2. Work Safety. Leo Khong Gain. Ulu Court, Night Zoo
- 17:30 Buses leave for Jurong Bird Park and evening event. **Silent Auction and dinner.** Includes meal, soft drink and cash bar.
- 22:15 *Buses depart for Singapore hotels.*

Program 12 September

Wednesday 12th September – Jurong Bird Park

- 8:30 Roars like a lion or TWEET like a twitter! Wendy Husband, Indonesia
- 8:45 Maternal sex determination and its potential effects on avian conservation initiatives. Clancy Hall, Australia
- 9:00 The Endangered Primate Rescue Center (EPRC). Elke Schwierz, Germany
- 9:15 African painted dog hind leg amputation and re-introduction to pack. Sophie Dentinos, Australia
- 9:30 Monitoring rhino health through bleeding at the Uganda Wildlife Education Centre. Alex Droma, Uganda
- 9:45 ZSL's Successful Breeding Management of White-naped Mangabeys. Andrea Payne, UK
- 10:00 Successful treatment of unioocular pyogranulomatous keratitis in a captive dugong. Dwi Wisnugrahani, Indonesia
- 10:15 **Break and Poster Session.** Poster presenters to be beside their posters.
- 10:45 The ASZK Husbandry Guidelines Registry – are wikis the way to go? Graeme Phipps, Australia
- 11:00 Environment enrichment & breeding program of proboscis monkey at Surabaya Zoo. Sri Pentawati, Indonesia
- 11:15 AICAS Animal Welfare Group: a tool for everyone. R Cabrera, N Moreno, A Pazos, B Sinués, Spain
- 11:30 Captive Management and Breeding of King Bird of Paradise (*Cicinnurus regius*) at Jurong Bird Park, Singapore. Ivan Choo Wei Kiat, Singapore
- 11:45 Feeding the lemurs. Herma Kamphorst, Netherlands
- 12:00 Quarantine Animal Enrichment and Training: An Intricate Task. Anil Bisht, Singapore
- 12:15 **Lunch**
- 12:40 *Buses depart for Singapore Zoo*
- 13:15 **Workshops** (choose one).
1. Going with the Flow. Vicki Melfi, Margaret Hawkins and Amanda Pemberton. Forest Lodge
 2. Primates. Mani and Rachel. Zoo Training Room
 3. Malayan Tapir. S R Nandakumaren. Ulu Court, Night Zoo
 4. Hornbill. Dr Minerva. BDC Jurong
 5. Animal Training. Elly Neuman. Auditorium
- 16:00 *Buses leave for Singapore hotels*
- 18:30 *Buses pick up from The Hangout Mt Emily and VHotel*
- 19:00 **Gala Dinner – Miramar Hotel**
- 23:00 *Buses leave for The Hangout Mt Emily and VHotel*



Program 13 September

Thursday 13th September – Jurong Bird Park

- 9:00 A study on Behaviour & Effective Enrichment Utilization by Blind Bears. Baiju R, Kartick S., Geeta S., Prerna S, India
- 9:15 Breeding and Weaning of Malayan Pangolin. Vijay M, Gerard Wan, Singapore
- 9:30 Dreamnight at the Zoo. Dreamnight at the Zoo Foundation, Netherlands
- 9:45 The Dreamnight at the Zoo in daylight. Hiroyuki Takahashi, Japan
- 10:00 Moving forward in conservation though keeper training a curators responsibility. Tim Husband, Indonesia
- 10:15 The need for an evidence based approach to captive animal management. Vicki Melfi, Australia
- 10:30 **Break**
- 11:00 Zoological Horticulture. Brad Walker, Australia
- 11:15 Orangutan infant hand-rearing and reintroduction to an orangutan group. Taide Pérez, Spain
- 11:30 Free Flight Challenges. Felicity Evans, Australia
- 11:45 Selecting and preparing animals for the various programs of Saint-Petersburg Zoo. Olga Volkova, Russia
- 12:00 Enrichment & Training In Reptiles. Grant Kother, UK
- 12:15 Husbandry of American Paddlefish in the tropics. Jayce Chua, Singapore
- 12:30 **Lunch**
- 13:30 Lwiro Primate Sanctuary (CongoDR) and our involvement with Wildlife. Raúl Cabrera, Spain
- 13:45 Oriental Small-clawed Otter. Introductions: When things are taken out of your hands! Sheila Roe, Australia
- 14:00 How seal rehabilitation and release can be a good presentation medium. Janine Bahr, André van Gemmert, Germany
- 14:15 Brought by the stork. Dennis Appels, Netherlands
- 14:30 Positive Reinforcement as a training method in elephant camps in Thailand. Gerardo Martínez, Mexico
- 14:45 Emerging and Re-emerging Zoonotic Diseases in Zoos and Wildlife Sanctuaries in Malaysia. Dr. Vellayan Subramaniam, Malaysia
- 15:00 Zoo Leipzig, host of the 2015 ICZ Conference - an impression. Sebastian Schorr. Germany
- 15:15 **Conference Sum up and close**
- 16:15 *Buses depart for Singapore hotels*

A study on Behaviour & Effective Enrichment Utilization by Blind Bears

Baiju R., Kartick S., Geeta S., Prerna S

Wildlife Biologist & Administrator

Agra Bear Rescue Facility, India

baiju@wildlifesos.org, baijuwildlife@gmail.com

A study was carried out for the behaviour & effective enrichment utilization by the blind bears in Agra Bear Rescue Facility in Uttar Pradesh, India. The facility is housing 270 rescued sloth bears (*Melursus ursinus*) in 14 different enclosures. The study was carried out on the blind bears and partially sighted bears of enclosure number 1. Total 10 bears were studied as they are all housed in one enclosure and some of the blind bears show extensive stereotypic behaviour like pacing, swaying etc. The study is ongoing from 2010. The main objective of the study is to completely end the abnormal behaviour and to enrich the species with more natural enrichment. The duration of the pacing, swaying their heads or abnormal behaviour was studied and recorded. The time was recorded like maximum 99% was recorded before feed. The feeding for the bears in the facility is 3 times a day and the enrichment in the evening. Initially the feeding time was altered with +/- 30 minutes. The behaviour after 30 min was more compared to before time. In both cases the abnormal behaviour was continued with 10 % +/- from the initial state. The enrichment pattern was changed from after feeding to before feeding was the successful and defective method which made a drastic change in the behaviour of pacing and swaying. The blind bears started foraging on the enrichments before food and the pacing was reduced from 90% to 30%. The enrichments was mainly successful was olfactory (sensory) fruits essence, hiding the enrichments inside the pits etc with less eatables to also to avoid them skipping the main feed. The study is continued and more enrichment methods are practiced to minimize the stereotypic behaviour and to make them normal.

Key words. Wildlife Biologist, Co founders, Wildlife SOS, Student, Forestry & Environment Management, Pacing.

"AICAS Animal Welfare Group: a tool for everyone"

¹Raúl Cabrera, ²Nuria Moreno, ³Aurora Pazos*, ⁴Belén Sinués.

¹Primate Keeper Barcelona Zoo, ²Mammal Keeper Barcelona Zoo, ³Environmental Educator, Barcelona Zoo, ⁴Senda Viva Park, Navarra, Spain.

bienestaranimal@aicas.org

Animal Welfare definition: "is a state of complete mental and physical health, where the animal is in harmony with its environment" (Hugues, 1976).

The Animal Welfare Group was established in August 2009 by a group of people who belonged to AICAS (Iberian Association of Wild Animal Keepers), who were concerned about the increasing levels of the misuse of wild animals in different activities.

Those activities share common characteristics: they are not educational to the public or person who watches the activity, they do not help the preservation of the species used in the activity and, in all cases, they attempt to the animal welfare. In short, they are used in an improper and wrong way.

Some examples of these activities are:

- Circus, television programmes, advertisements, private parties, events or businesses promotions in which these animals are used.

In the geographical action frame in which AICAS works, basically Spain and Portugal, there is not much awareness or respect to the fauna in general, when we compare it to the rest of the European countries.

The use of wild animals in the above mentioned activities is an increasing problem, as there is no legal cove, therefore it is a difficult task to prove that there is a wrong treatment to the animal, as well as to the ethics in this misuse, having as direct consequence the complete impunity of the offenders.

The wild animal keepers have to be aware of this situation and provide the help needed as well as contribute with our knowledge to stop it.

The action plan of the group is as follows:

- A letter describing the "offence" is written and sent to the different members which might be involved in the offence (i.e: advertising firm, advertising producer,...). The outcomes will be shared amongst all the AICAS members, the keeper's forum, the association publication and the ICZ community.

During the oral communication we will read some cases.

Other actions taken:

AICAS held us responsible to suggest conservation projects to which assign the small economic aid in order to administrate the association.

In this way we will promote the work we do in the centres and we will be able to promote their development through spreading their demands and needs, whether they are material or human resources, amongst others.

Similar groups to this one should be created, in case of none existence, in the different keepers associations that integrate the ICZ.

African Painted Dog (*Lycaon pictus*) Hind Leg Amputation and Re-introduction to Pack

Sophie Dentrinos

Carnivore Keeper, Perth Zoo, Australia

sophie.dentrinos@perthzoo.wa.gov.au

During a period of aggression within the male ranks of our African Painted Dog pack, a six year old male sustained an injury to his left hock. Veterinary staff diagnosed that the male had sustained a torn achilles tendon and surgical options had to be considered.

This paper will discuss the circumstances and treatment of the injury, the criteria used in making the decision to amputate the leg, the surgical recovery and the re-introduction process.

Artificial Incubation and Hand Rearing of Great Pied Hornbill (*Buceros bicornis*)

Elden Venus Gabayoyo¹, Minerva Bongco- Nuqui² and Richelle Tamayo Avila

¹Junior Avian Management Officer, ²Curator

Jurong Bird Park, 2 Jurong Hill Singapore 628925

elden.gabayoyo@wrs.com.sg; minerva.bongco-nuqui@wrs.com.sg

The great pied hornbill, *Buceros bicornis*, also known as the great Indian hornbill, is one of the largest species of hornbill in the world. It can a size of 37.5 in to 41.5 in and achieve a wingspan of 120 cm. The species can be found in India, Indonesia, Malay Peninsula and Sumatra. It is listed as Near Threatened under the IUCN Red List of Threatened Species and the population is declining. This can be attributed to habitat destruction, mainly caused by logging and clearing of forests. They are also hunted for their casques which are kept or sold as trophies. At the Jurong Bird Park, a breeding pair of great pied hornbill was successfully bred three times. During the breeding season in 2010, the female great pied hornbill laid three eggs, but all three hatchlings did not survive as they were cannibalized. This was observed on infrared cameras used to monitor the birds. During the breeding season in 2011, three eggs were removed from the nest and artificially incubated at the "Breeding and Research Centre" at Jurong Bird Park. Two out of three eggs were successfully hatched. The two chicks were hand raised and subsequently released into the "Hornbill and Toucan" exhibit. In 2012, another great pied hornbill chick was removed from its nest and successfully hand-raised until it was weaned. Artificial incubation and hand-rearing of this species can contribute to higher breeding success in captivity.

Asian rhinos in Singapore, and their survival in the region

Dr Kees Rookmaaker,

Chief Editor, Rhino Resource Center, Singapore

rhinorrc@gmail.com

The first rhinoceros kept in Singapore lived in the Botanic Gardens in 1875. It was a Sumatran rhino (*Dicerorhinus sumatrensis*) caught in Malaysia. Two other specimens of the same species followed in 1900 and 1901, both of which were shipped to the Vienna Zoo, where one of them lived for eighteen years. Singapore Night Safari now has Indian rhinos, but it is unlikely that examples of either the Sumatran or javan rhinos will become available for public exhibition in the near future. Javan rhinos have been rarely seen in captivity, and less than 25 animals have ever been recorded in a zoo or other captive environment. The conservation emphasis is now largely on semi-in situ situations, where the animals can be monitored while they remain close to their original habitat, avoiding problems of climate and food supply. The emphasis of zookeepers interested in these Asian species should now be to assist the efforts of projects currently based in Indonesia and Malaysia (Sabah). The current situation of rhinos in South-East Asia will be explored and possibilities of involvement by zoo personnel around the world will be highlighted.



Behavior Management

Valerie J. Hare

The Shape of Enrichment, Inc, USA

shape@enrichment.org

Over the last 20 years, I have watched the concept of environmental enrichment blossom around the globe. Today, most zoological institutions are aware of the importance of providing enrichment to our animals. In the developed world, enrichment is not only encouraged but required by many organizations and legislation.

The acknowledged importance of providing enrichment for our animals is based on enhancing their psychological and physical health through behavioral management. Yet, all too often, enrichment is provided randomly or according to a required schedule, rather than with a behavioral focus.

To achieve optimal behavioral health for each animal under their care, it is important that today's zookeepers understand and appropriately utilize all 3 cornerstone components of behavior management — environmental enrichment, animal training, and behavior problem-solving. Behavior management was first presented as a concept by Desmond in 1994. For over 10 years, I have successfully used this integrated concept in many institutions and workshops around the globe.

This presentation will review each component of behavioral management, highlighting the similarities, differences, and application of each.

Bonds between Zoo Professionals and their Animals

Geoff Hosey¹ and Vicky Melfi²

¹*School of Health and Social Studies, University of Bolton UK*

²*Research & Conservation, Taronga Zoo, Australia.*

gh2@bolton.ac.uk; v.melfi@zoo.nsw.gov.au

Some human-animal relationships can be so positive that they confer particular benefits in terms of emotional well-being to both partners in the relationship, and can thus be viewed as bonds. Although we are familiar with bonds with our companion animals and other animals, the possibility that zoo professionals form bonds with any of the animals in their care has been largely unexplored. The aim of this study is to identify whether zoo professionals believe that they have established bonds with any of the animals they are in contact with; whether any demographic or occupational variables correlate with perceived bond formation; which species zoo professionals report bonding with, and what they believe the benefits of these bonds to be, both for themselves and their animals. A total of 130 questionnaires were completed by delegates at three different zoo research and training events. Respondents were asked for information about their professional work in the zoo and whether they believed they had established bonds with any animals. They were also asked to indicate agreement or disagreement with several statements about human-animal bonds. Results showed that many zoo professionals consider that they have established bonds with some of their animals; 103 respondents believed that they had a bond with at least one animal, and 80 of these identified that the bond was with a zoo animal. The most frequent bonds reported were with primates (n=24) and carnivores (n=19), although several also reported bonds with marsupials (n=8). Perceived benefits of these bonds to the respondents included both operational (animal easier to handle, easier to administer treatments to) and affective (sense of well-being, enjoyment at being with the animal). Identifying benefits to the animals is more difficult, and several respondents said that they did not know. Most, however, identified similar benefits for their animals as for themselves, i.e. operational (animal responded more calmly,

appeared less stressed) and affective (animal appeared to enjoy contact with respondent, seemed more content). This suggests that bonding between zoo professionals and their animals could have profound consequences for the management and welfare of the animals, not to mention the job satisfaction of the people involved.

Breeding and Weaning of Malayan Pangolin (*Manis javanica*)

Vijay Madhavan¹ & Gerard Wan²

¹ Head Keeper, ² Junior Animal Management Officer

¹ River Safari, ² Night Safari, 80 Mandai Lake Road, Singapore 729826

vijay.madhavan@wrs.com.sg

The Night Safari has maintained a collection of Malayan Pangolin (*Manis javanica*) in captivity, with successful breeding. There is currently very limited information on the breeding and weaning characteristics of this species. We documented observations on the breeding and weaning of pangolins at the Night Safari. Two breeding females were first introduced to a breeding male consecutively for a period of three months. We observed behaviours related to successful mating and conducted regular ultrasounds to confirm any signs of pregnancy and as indication on whether to continue with the mixing and courtship process. We observed the weaning behaviour of two newborn pangolins. Neonates were observed to take captive solid diet in small quantities approximately three to four months after birth. By approximately seven months after birth, neonates were fully weaned and independent of their mothers. Two methods were used to separate the weaned pangolins from their mothers, with similar success achieved. One involved separation during the day where the mother was removed and not returned to the neonate. Another method involved separation during the night. This method required the gradual increase in separation time between mother and neonate. After separation, observations were continued on the growth patterns of the two neonates to ensure that their growth was stabilized after separation from their mother.

Breeding captive Palm Cockatoos, *Probosciger artemimus*, at Zoos South Australia: Past, present and future directions.

Trena Carney BSc, Kate Barclay BBio. Cons.

Zoos South Australia, Australia

tcarney@zoossa.com.au; kbarclay@zoossa.com.au

The currently recognised three sub species of Palm Cockatoos are distributed through Far North Queensland, Torres Straits and up into Papua New Guinea. At present they are classed on the IUCN red list as least concern however, more research on wild populations is needed to ensure that they are managed appropriately in the wild and in captivity within Australia. Although relatively common in captivity outside Australia, Adelaide Zoo holds the only captive Palm Cockatoos in Australia. The Australian captive population originated from birds collected from Papua New Guinea by Sir Edward Halstrom in the late 1930's and into the 1940's. It is not known how many individual specimens were collected and due to poor breeding success, only a single female remains from this original source of founders. The only other captive specimen is a young male sourced from Queensland National Parks and Wildlife Service in 2002 who was rescued from the wild as a fledgling, with a broken wing. After being reared by a carer and given a poor prognosis for survival in the wild, he was transferred to Adelaide Zoo for Palm Cockatoo socialisation. Although severely imprinted, once the male reached maturity, the old female started laying eggs and courtship and mating were observed. Due to poor incubation history several eggs were removed for artificial incubation and hand rearing. This resulted



in four successful hatches with one female chick being reared to independence. The pair were then given the opportunity to practise incubation and rearing and in 2011 they succeeded in fledging a chick. The skills we are developing at Adelaide Zoo will potentially enable a much larger captive population to be managed, in the event that an insurance population is required to support Palm Cockatoo conservation in Australia.

Brought by the stork

Dennis Appels

Bird keeper, Stichting Vogelpark Avifauna, Netherlands

Vogelverzorging@avifauna.nl

The hatching of four oriental white storks (*Ciconia boyciana*) in Vogelpark Avifauna is not only a great success for Avifauna but also a boost for the EEP programme for a species that suffers from poor breeding results. In 1995 a pair of oriental white storks arrived from Tianjin Zoo in china. The female is wild born (1991) and the male was captive born in Shanghai Zoo in 1992. Over a three-year period they laid several clutches of eggs, each infertile. Although the birds were believed to

have been sexed in china before they came to Avifauna, the keepers were becoming sceptical. With good reason! DNA analysis revealed the birds were actually two females, rather than a pair. It took till March 2005 before a suitable male was found to introduce to these two females: he came from

Niendorf in Germany (non-EAZA). By early April 2007 a clutch of three eggs was laid and it was decided to give them to a reliable breeding pair of white storks (*Ciconia ciconia*) to stimulate the

Oriental white storks to lay a clutch. Two out of the three eggs hatched with the white storks and the pair proved successful foster parents. The second of the oriental white stork clutches, however, was infertile. In 2008 Avifauna decided to leave the oriental white storks to incubate their own first clutch of three eggs, and one chick hatched on 20 April but died two days later. More infertility occurred in the following two years. In 2011 many copulations were observed and it was decided to take the first clutch of 4 eggs to an incubator to stimulate the storks to start a second clutch. Two eggs hatched in the incubator and the chicks are growing rapidly. Of the second clutch, left with the parents, the first hatched on 4 May and on the following day the second chick was seen, although the two other eggs turned out to be infertile. Both chicks are being fed by the parents very well so the keepers have decided to leave them on the nest, confident that they will reach adulthood with the good care of their parents. In 2012 the first two chicks from 2011 moved to Dierenpark Planckendael in Belgium en the other two will move to Edinborough. In the mean time the parent laid a first clutch for 2012 which was removed and placed in the incubator but unfortunately all four eggs were unfertile, the parents are now incubating the second clutch and that will take another 20 days.

Captive husbandry, breeding, and handrearing of Fairy Bluebirds

(Irena puella)

Greg Bockheim

Executive Director, Virginia Zoological Park, USA

greg.bockheim@norfolk.gov

The focus of this presentation is to review the husbandry and management techniques used in this off exhibit successful breeding program for fairy bluebirds. The fairy bluebird was once a bird that was relatively common in Zoological institutions, numbering more than 500 individuals just 10 years ago, but is now quickly disappearing. Less than 92 (46 males and 36 females) fairy bluebirds exist in

zoological collections in the U.S. at this time, and less than 6 pairs are known to be housed in private collections.

The fairy bluebird management and breeding experience to be discussed in this presentation include: Species general characteristics, indoor & outdoor enclosures, husbandry & flock management, manipulation of environment & triggering reproduction, influencing behavior, nutrition, optimal aviary components, capture & handling, parent rearing & handrearing, veterinary care, long-term sustainability and more.

The presentation will also include an extensive audio & visual component that clearly shows and demonstrates the topics discussed.

Captive Management and Breeding of King Bird of Paradise (*Cicinnurus regius*) at Jurong Bird Park, Singapore

Ivan Choo Wei Kiat

Junior Avian Management Officer

Jurong Bird Park, 2 Jurong Hill Singapore 628925

ivan.choo@wrs.com.sg

The King Bird of Paradise (*Cicinnurus regius*) is the smallest in the Paradisaeidae family. All three species in the genus *Cicinnurus*; King Bird of Paradise (*C.regius*), Wilson's Bird of Paradise (*C.respublica*) and the Magnificent Bird of Paradise (*C.magnificus*) are sexually dimorphic has blue legs and feet. Due to its widespread habitat range in Papua New Guinea and its surrounding islands, the King Bird of Paradise is classified as least concern in the IUCN Red List of Threatened Species. The birds are housed in an off-exhibit breeding aviary inside the Windows on Paradise exhibit. Upon reaching sexually maturity in 2010, the bird park stepped up their efforts in breeding them as only a small number of institutions managed to breed them in captivity. Jurong Bird Park managed to hatch two chicks this year through natural incubation and parent rearing. The general characteristics of the bird, population management, diet, breeding methodology and the morphological changes of the chicks will be presented.

Choosing Mr Right: mate choice increases captive breeding and conservation success

*Marissa Parrott^{1,2,3}, Lynne Selwood² and Paula Watson³

¹Wildlife Conservation and Science, Zoos Victoria, Australia

²Department of Zoology, University of Melbourne, Australia

³Threatened Species Department, Healesville Sanctuary, Australia

mparrot@zoo.org.au

Maintaining an animal's natural behaviours is critically important in captive breeding programs, particularly when breeding threatened species for reintroduction. Allowing animals to choose their own mates not only preserves behaviours that are essential for successful release and re-establishment of wild populations, but can increase the number and genetic quality of young, the genetic viability of a population and improve the success and survivorship of young. It can also decrease stress and aggression in the animals and reduce the likelihood of fighting, injuries and deaths in captivity.

Research into a small carnivorous marsupial, the agile antechinus (*Antechinus agilis*), in the wild and in captivity, showed that females chose mates based on olfactory cues and genetic dissimilarity, but male size did not affect female choice. Furthermore, males that were genetically dissimilar to females sired significantly more young than genetically similar males. The use of female mate choice and male scent storage was then investigated to improve breeding success in a long term colony of another small marsupial, the stripe-faced dunnart (*Sminthopsis macroura*) and a range of other species, including the critically endangered Mountain Pygmy Possum (*Burramys parvus*) at Healesville Sanctuary, Zoos Victoria.

Trials were conducted in captivity using olfactory cues from males to determine the mate preference of females. In each 10 minute trial, females were simultaneously offered used bedding or scent-marked objects from multiple males in their familiar enclosure and their behaviours and movements were recorded and timed. Female dunnarts paired with males chosen during scent trials had significantly more matings and sperm in their urine per oestrous cycle than females paired on the basis of genetic pedigree alone. Pairings following mate choice resulted in more than twice the number of pregnancies than pairs assigned using pedigrees. Prior familiarity between mates did not affect female preferences, but significantly decreased the levels of aggression and minor injuries between mates. Storing a male's scent at -20°C for up to 40 days did not affect female mate choice and may be a powerful tool for enabling mate preference between captive breeding institutes.

Techniques derived from work in dunnarts have been applied at Healesville Sanctuary, where the critically endangered Mountain Pygmy Possum is being bred to produce animals for augmenting the wild population at Mt Buller. One crucial aim of the captive colony is to hybridise possums from Mt Buller with individuals from a genetically distinct population to increase their genetic diversity and perform a 'genetic rescue'. Research was conducted using olfactory cues from males as described above to determine the mate preference of females and examine their interest in males of differing genetic provenance. Animals were placed in breeding groups based on their preferences and genetic background. Along with concurrent research into hibernation and diet requirements, this has resulted in the successful production of young in captivity, including the first hybrids between different evolutionary significant units of the Mountain Pygmy Possum. The results show that female mate choice can significantly increase breeding success in captive breeding programs.

Connecting With Our Audience

Steve Martin

President, Natural Encounters, Inc. USA

SteveMartinNEI@aol.com

Education is a key component in the mission statement of most zoological institutions. However, many educational programs are little more than downloads of natural history information that often exceed the attention span of the audience. Even keeper talk programs conducted at exhibits often fail to inspire caring and conservation action as keepers recite mundane information in front of placid animals. Producing a truly effective program involves several key elements including; emotion, intrigue, anticipation, action, humor, entertainment, and conflict and resolution. Teaching animals to perform species-appropriate behaviors in exhibits is not only enriching for the animals, it provides a perfect stage for an inspirational education program. This paper will share strategies for creating truly engaging and inspirational public programs.

Dreamnight at the Zoo

Hanck van Bakergem

Dreamnight at the Zoo Foundation

info@dreamnightatthetoo.nl

An interruption in the ICZ Conference program by Hanck...

Who is he and what does he want...?

Apparently he wants to share a kind of addiction with us... and... he has a question...

He says it's all about a global "zoonami" as he calls it...

I'm afraid we just have to wait and see...

Emerging and Re-emerging Zoonotic Diseases in Zoos and Wildlife Sanctuaries in Malaysia

Dr. S. Vellayan

Associate Professor, Lecturer in Medical Parasitology and Coordinator of Laboratory Animal Care Unit, Universiti Teknologi MARA, Malaysia

vellayan@tm.net.my; vellayans@yahoo.com

Emerging & re-emerging infectious diseases have received attention since the end of the 20th century in Malaysia. The majority of the emerging infectious diseases for humans are zoonotic in nature. Wildlife reservoirs have long been recognized as causes for several important zoonotic diseases.

Infectious pathogens of zoo animals and wildlife affect not only human health and agricultural production but also wildlife economics and conservation. In Malaysia zoonotic pathogens that infect zoo animals and wildlife hosts are emerging. The close contact with wild animals and exotic pets puts us at risk for exposure to zoonoses.



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Emergence and re-emergence of zoonoses are related to human encroachment on wildlife habitats. Deforestation and development for human habitation are the risk factors while human activities may serve as sources of wildlife infection, which could create new reservoirs of human pathogens.

The outbreak of Nipah virus infection in Malaysia during 1998-1999, which caused 265 human cases of viral encephalitis and a 38% mortality rate, was also the result of several major ecologic and environmental changes associated with deforestation and expansion of non industrial pig farming in association with production of fruit-bearing trees. Such combination led to infection of pigs, which developed respiratory and neurological symptoms after indirect exposure to infected fruit bats that shed the virus in the faeces. The sick pigs were a subsequent source of human infection.

Farming of wild animal species led to re-emergence of tuberculosis in Sambar deer (*Cervus unicolor equinus*) and Javan deer (*Cervus timorensis*) and food-and-mouth disease in Seladang (*Bos gaurus hubbacki*).

In 2007, outbreak of Avian Influenza (H5N1) in bird aviary in northern Malaysia was a major concern. *Plasmodium knowlesi* was first reported in Malaysia in 1965. Currently it is noted extensively in all states of Malaysia with the exception of the state of Perlis. Human infection is rapidly increasing. In 2004, 106-120 patients were reported in Malaysian Borneo.

The bacterial diseases of concern are: Melioidosis; Brucellosis; Tuberculosis; Leptospirosis; Salmonellosis; Pasteurellosis; Psittacosis and Ornithosis. The fungal diseases are: Aspergillosis and Cryptococcosis. There are numerous parasitic diseases such as: Babesiosis; Trypanosomiasis; Balantidiasis; Cryptosporidiosis; Giardiasis; Simian Malaria; Sarcocystosis; Toxoplasmosis; Filariasis and Strongyloidiasis.

The viral diseases include: Foot-and-Mouth Disease; Avian Influenza; Japanese Encephalitis; Nipah virus infection; and Severe Acute Respiratory Syndrome (SARS). Since 2008, Dengue and Chikungunya is epidemic among the macaque in the wild.

The zoos and wildlife sanctuaries have a great challenge to face in checking the spread and to control these emerging and re-emerging diseases in Malaysia. Therefore interdisciplinary collaboration is needed with wildlife biologists, zoo veterinarians, zoo directors, curators, health professionals, veterinary and medical research institutions and local universities. It is time to form a joint expert committee to develop and test more effective disease surveillance methods and management practices in zoos and wildlife sanctuaries in Malaysia.

We must also maintain healthy animal populations in the zoos and wildlife sanctuaries. There must be a better integration and coordination of national surveillance system, improved reporting systems and international sharing of information. There should be an effective training of zoo and wildlife veterinarians, biologists, zoo and wildlife health management systems and establishment of collaborative multidisciplinary teams ready to intervene when outbreaks occur.

This lecture will highlight the zoonotic diseases of zoos and wildlife sanctuaries since 1957 to date with emphasize on the re-emerging zoonoses and attempt to share my 30 years of field and zoo experience in this area.

Enrichment & Training In Reptiles

Grant Kother

Herpetology Department, ZSL London Zoo, UK

grant.kother@zsl.org

Training and enrichment create an unpredictability that enhances captive animals' world and welfare. Many people perceive training and enrichment beneficial mainly to mammals, and to a lesser degree, birds. The aim of my presentation is to highlight training and enrichment techniques that are used in ZSL London Zoo's Herpetology Department on a wide range of reptiles and their many benefits. The techniques used in the enrichment and training of reptiles is not only important for animal welfare, but they also assist management in a number of ways, such as:

- daily routine/non-routine husbandry tools
- keeper and animal safety
- decreasing captive stressors
- providing proactive medical care
- research
- guest experience
- emergency response
- physical and mental stimulation.

The presentation features focal species within the collection with which training and enrichment are used, illustrating the benefits for both the animal and the keeper. The enrichment section of the presentation covers ideas and techniques that go beyond environmental enrichment. It also includes an outline of the techniques we use to train, which behaviours we are training and the reasons why. The list of enrichment and trained behaviours is ever expanding and all of the techniques used can crossover in some way to other species.

The field of behavioural management in reptiles is extremely under-represented and this presentation will cover the variety of work undertaken at ZSL London Zoo. Promoting how behavioural management, husbandry training and enrichment has changed the lives and welfare of many captive reptiles is an important message to convey to peers in order to bring forward these techniques as standard protocol amongst herpetological collections worldwide.

Environmental enrichment and captive breeding program of proboscis monkey at Surabaya Zoo

Sri Pentawati

Curator, Surabaya Zoo, Indonesia.

kbsurabaya@yahoo.com

Introduction

Proboscis monkey is a species endemic to Indonesia. According to the IUCN Red list are categorized as endangered species and included in CITES Appendix I. It has scientific name *Nasalis larvatus*. The main characteristic of the proboscis monkey is the long nose, this is found only in males. They have reddish brown fur. Proboscis monkey is also known as Monyet Belanda or Bangkatan.



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They are found only in Borneo island and in all three countries that share the island namely Brunei, Indonesia, and Malaysia. This species is arboreal and they are good swimmers, they live in group between 10 to 32 bekantans, which is dominated by a big and strong male. They are folivorous and frugivorous. Vegetation are there such as padada leaves (*Sonneratia alba*), ketepeng leaves (*Terminalia catapa*), gondang leaves (*Ficus faraeigata*), mango leaves (*Mangifera indica*) and combined with some fruits.

Surabaya Zoo has an exhibit of Proboscis monkeys that support breeding management, social behavior, and various feeding resources. Behavior, food, and activities are recorded for captive breeding program. The female pregnancy is 166 days, and only one offspring its time. We also put other animals in the enclosure: Bawean deer (*Axis kuhlii*), the green peacock (*Pavo muticus*), and double wattled cassowaries (*Casuarius casuarius*). They live peacefully and do not interfere with one another.

Material and Methods

At present Surabaya Zoo has 47 proboscis monkeys. They were divided into 4 groups: first group consist of 21, the second group are 11, the third group are 8, while the fourth group has 7. They live in the open enclosure. Each group consisting of one adult male, some adult females and their offspring, except for the fourth group that are solitary, most of which are males.

We designed an open enclosure, two small islands surrounded by water, lush vegetation, shelter that made the islands as close as their natural habitat.

Environmental Enrichment and Captive Breeding

At Surabaya Zoo, the Proboscis monkeys come from Kaget Island in Southern Borneo. They live in an open enclosure around 750 m². Each group has its own territory. Their behaviour is such that during the day they may play around together but at night they will always stay within their group. They hardly go down except if they need to drink or get something.

Three years ago, we designed an open enclosure, two small islands surrounded by water, lush vegetation, shelter that made the islands as close as their natural habitat. The various trees there are ketepeng (*Terminalia catapa*), trembesi (*Samanea saman*), nyamplung (*Callophyllum inophyllum*), johar (*Cassia siamea*), asam belanda (*Pithecellobium dulce*), gempol (*Nuclea grandifolia*), beringin (*Ficus benjamina*), mengkudu (*Javanony noni*), trenggulun (*Protium javanicum*), mangga (*Mangifera indica*), Kesambi (*Schleichera oleosa*), pandan berduri (*pandanous scratching*), etc. Some of those are their favorite, but unfortunately one of the enclosures become dry and damaged. That was because of extreme dry weather and also by the Proboscis monkeys themselves. The Proboscis monkeys like to jump around the branches that was not strong enough to support their body weight and the monkey use to eat the young leaves or fruits. The remaining plantations are trembesi, johar, and pandan wangi that are not edible for them.

Feeding time is twice a day: Besides some leaves from the enclosure itself, we supply some various local vegetable (mangrove leaves (*Rhizophora mucronata*), snake bean and snake bean leaves, spinach, carrots, peanuts, bananas, and papayas).

In the last 3 years we have done well in a our breeding program. The baby Proboscis monkey is usually carried by its mother and also by other females in the group. They will take turns in doing so. Females become sexually mature at 5 years old.

Results and Discussion

Since the condition of the enclosure is getting down so we need to improve the exhibit and to maintain the survival of Proboscis monkeys in captivity, good record keeping is essential. To minimize the stress factor and for easy identification we are trying to train them in using night dens. Improved the environment, grow more vegetation: trees, leaves and also fruits strongly disliked by Proboscis monkeys so the trees will grow well.

Something that is happening right now, due to the environment is damaged, then in the afternoon when they came out of the cage environment and damage the surrounding environment. Although the

next day they would return to the cage. Besides that, it should also consider how it should be done in order to be clearly recorded the results of his offspring, so the smallest possible inbreeding. Currently we are definitely difficult to record because they live in a free ranging.

For the identification, we can use microchip, so will be easy observation if every individual can be known his signs. In this case the observation and recording system which regularly is very important. We hope, there is no inbreeding for their offspring in order to have a high conservation value.

Conclusions

- Until now, We haven't repaired the environment successfully because some leaves have been eaten by Proboscis Monkeys, before the plants are strong enough to settle in the ground.
- We have problem about pedigree because they live in open space, so it is difficult to track their individual record.

Keywords : Bekantan, Behavior, Food, Exhibit, Captive Breeding

Euthanasia in zoos and wildlife parks - What should be the keeper response? Can we agree on a policy position?

Graeme Phipps

Teacher and Animal Care Co-ordinator of Captive Animals, Richmond College, Australia

Graeme.phipps@gmail.com; Graeme.phipps@tafensw.edu.au

In response to industry approaches, Richmond is developing a skill set of several new units offered as 'Masterclasses'. They are called Masterclasses because they are designed to deliver mastery to keepers who already have qualification and experience but need specific upskilling in defined areas. The five Masterclasses are:

- Euthanasia for Zoos and Wildlife Parks
- Microchipping for Zoos and Wildlife Parks
- Clinical Pathology for Zoos and Wildlife Parks
- Chemical Capture for Zoos and Wildlife Parks, and
- Chemical Restraint for Zoos and Wildlife Parks.

The first Masterclass, euthanasia turns out to be even more useful for keepers because in the new Training Package for our Certificate 3 in Captive Animals, "Breed and euthanase food animals" has disappeared, so euthanasia both as an issue and a technique has evaporated. BUT, although confronting, as Keepers of the Kingdom we have to deal with it. I found this to be a difficult unit to put together. Let's say that PERCEPTION management is a really important matter!

Euthanasia scenarios covered in the unit include:

1. Small vertebrate animals bred for food for carnivores
2. Large animals as food for carnivores
3. Vermin and feral animals
4. Casualty wildlife
5. Problem animals in emergency situations



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6. Animals no longer able to display the broad range of their behavioural repertoire due to injury, old age etc, and

7. Animals as part of species management programs

Masterclass theory is delivered ONLINE, then followed with a practical workshop on the techniques themselves. Theory includes General Aspects of Euthanasia; then Methods/ Techniques of Euthanasia; then Scenarios of Common Application of Euthanasia linked to recommended euthanasia technique/s; then an online Chat Tutorial session ahead of the practical workshop.

My presentation will use the online toolbox in which the Masterclass is embedded.

Most keepers are fine with Scenarios 1-5, but the real issue that needs discussion relates to Euthanasia Scenarios 6 and 7 above and the ethics that surround these.

The topic tends to be avoided, mainly because of perceived public opinion/ media reaction – which suggests that the people taking this position are not comfortable with euthanasia. What is needed is a position that is of help to keepers who have to perform euthanasia; so something emanating from the ICZ would be of benefit.

A framework for discussion will be presented, - maybe a Forum or a Blog set up to go forward with leading to a policy position.

Feeding the lemurs

Herma Kamphorst

Keeper, Zoo Emmen, The Netherlands

marcotenhour@gmail.com

As we keep lemurs often in a restricted area in the zoo, problems like fighting lemurs and lemurs with obese occur regularly. Basically the group has to be built up around a family group of females. Therefore we keep up a family tree. Our group of ringtails has an average of 30 to 40 animals. So identification of the animals plays an important role. There are different methods helpful to remember the individuals (identification chip and exercise with chipreader, photo's, note different marks, give easy names).

This steady group needs food regularly to avoid hungerfights. That's why we feed the lemurs no less than 3 times per day with small parts of fruit, vegetables and pellets. So less sugar (from the fruits) and more fibres. They need a kind of satisfied feeling. Besides that they need enrichment and hiding places. You can think of enrichment with food, (big fruits, living insects, hiding raisins), environment, (change of enclosure, different branches), smell, warmth and cold. It very much helps when the group of lemurs has real trees to climb in, small bushes to play and hide, hidingboxes and extra flee-area. All these must-haves lead you to enjoy the group and gives you succes with offspring.

Free Flight Challenges

Felicity Evans

Birdshow Keeper, Taronga Zoo, Australia

fevans@zoo.nsw.gov.au

Taronga Zoo's Free Flight Bird Show displays the natural behaviours of a variety of birds in an open amphitheatre with a picture postcard backdrop of Sydney Harbour. The view from the theatre is astounding; incorporating the city skyline, Centrepoin tower, the Opera House and iconic Sydney Harbour Bridge. Logistically, this location presents a complex set of challenges for a Free Flight show. This paper describes those challenges and the strategies employed to recover collection birds after fly off events.

The theatre is entirely open air, the birds can, and do fly anywhere they choose or are carried in the wind. This allows for spectacular sights: the 3m wingspan of an Andean condor as "Leslie" banks past the Harbour Bridge over crystal blue water; a flock of red tail black cockatoos spiralling down to perch opposite the Opera House. However; in a matter of minutes any of our birds may take flight across the water and be lost from sight, landing in a location hours' drive away. We have tracking equipment to assist us in recovering our birds of prey, however even this has limited gain and sees interference from the sandstone cliffs. Parrots too frequently chew through telemetry and so are flown without it.

Sydney Harbour is home to many natural predators including white-bellied sea eagles and peregrine falcons that we have seen fly alongside our own collection birds. In some cases these wild encounters have displaced our collection birds and we have seen them flee the theatre. Strong southerlies push against the foreshore and create updraughts that can carry our birds to spectacular heights.

A 5km flight across the harbour may equate to a 20km drive for our keepers. We have recovered our birds from all directions as long as 3 days after the fly-off. This paper describes the complex challenges which keepers at Taronga Zoo face when Free Flying birds on Sydney Harbour. The local topography, weather, wildlife and the Harbour itself compromise the recovery of our birds during an "extended flight". The issues and strategies to overcome these challenges are discussed along with anecdotal stories of recoveries the author has experienced firsthand.

Free-ranging Orangutan (*Pongo spp.*) Exhibits at the Singapore Zoo

Jackson Raj

Head Keeper

Singapore Zoo, 80 Mandai Lake Road, Singapore 729826

jackson.raj@wrs.com.sg

The Singapore Zoo was established in 1973 and has been one of the fore-runners in the open zoo concept where immense efforts are made to showcase animals in naturalistic settings. Free-ranging exhibits are one of the concepts adopted to achieve this objective and are beneficial to animal well-being by providing more space, and more complex and novel environments for opportunities to display species-specific behaviour. Such exhibits can also increase visitor entertainment and appreciation for natural animal behaviour and provide for more conservation and education opportunities. Free-ranging of several monkey species at the Singapore Zoo had been implemented since 1985 but the first free-ranging of orang utans (*Pongo spp.*) was only implemented in 2006. There are currently two free-ranging orang utan exhibits at the Singapore Zoo, an island exhibit and a boardwalk exhibit. Both exhibits comprised of rows of tall trees connected by artificial vines, designed to encourage brachiation,



and interspersed with hammocks and platforms which serves as resting areas and simulates natural orang-utan nesting behaviour in the wild. The exhibits were designed in such a way that visitors could observe the orang utans from both the main walking trail and also from a raised boardwalk, up to proximity of three meters. There are two groups of orangutans rotated daily between the two exhibits. The groups consist of orangutans of varying ages. Only juveniles, adult females and their infants are used in the free-ranging exhibit and sub-adult and adult males are excluded to minimise social conflicts and aggressive behaviours amongst the group. The orangutans are habituated to remain within their exhibit through the use of hot wires installed along the trunks of inter-connected trees so as to prevent them from coming to the ground and directly contacting the visitors. Feeding sessions on a raised feeding platform are conducted for the free-ranging orangutans twice a day. During this time, the orangutans are allowed access to the platforms through a connected log that can be lowered to provide a connection between the trees and the feeding platform. During feeding sessions, visitors can get to observe the orangutans safely at proximity of one meter. Research on the free-ranging orang utan exhibits, with particular focus on visitor effects revealed that visitors have less negative effects on orangutans as compared to studies conducted in naturalistic exhibits in other zoos, with low levels of observed visitor-induced stress behaviour. The free-ranging orangutans were also observed to have grown in arm muscle mass due to the increased opportunities for brachiating. Free-ranging exhibit of orangutans is a feasible form of captive display and has benefits that deserve wider implementation in zoos.

How, the successful rehabilitation of orphaned and/or sick seals, and their subsequent release into their natural habitat can be turned into a good presentation medium

Janine Bahr¹, André van Gemmer²

¹Veterinary Surgeon, ²Zookeeper, Wildlife Management - Seal Centre Foehr

janine_insel@hotmail.com

The primary tasks of a wildlife and rehabilitation centre are taking on responsibility for and the caring of animals in need. However, raising public awareness and providing information about the animals in our care is another essential factor of our work.

The Seal Centre Foehr (on the Island of Foehr) has devoted its work to the protection of the local seal population and their rehabilitation, and also to making the local people and tourists, who choose to spend their holidays in the 'Wattenmeer' National Park, aware of these animals and their needs.

We show in some examples, how the rehabilitation of local seals can provide a perfect medium for raising the sensitivity of children and adults for these animals without actually disturbing them; this is the interface with zoological gardens. Visitors to rehabilitation and wildlife centres have usually seen our local seals before in zoos or animal parks, but here, in their 'natural habitat' on the German North Sea coast, they can learn much more about this species.

Relevant presentation of high quality is of vital importance; it may even be the deciding factor in shaping the perspective of an audience (or rather the participants) about the animals and their habitats during an event and/or on a guided tour.

The release of indigenous wildlife into their natural habitat is always a unique experience for all parties concerned.

We have adopted the responsibility for sharing this experience with others and through this making people more aware and more sensitive for these animals and their needs; to us, this is an integral part of successful rehabilitation.

Experiencing such a special event normally opens up peoples' minds on a subject that they might never otherwise have been interested in. During a release operation, the keeper and/or the guide have the important task of raising the sensitivity of the audience for the species concerned and their respective habitat, i.e. the local environment and its nature.

Another focal point of presentations should be cooperation with zoological gardens. For us, who have worked in zoological gardens in the past, close cooperation with these establishments goes without saying; in fact, it provides an excellent chance to further and promote the awareness of indigenous species and their habitats. Many zoological gardens and animal parks divide their commitment equally between exotic and indigenous wildlife.

A good and a relevant presentation of indigenous wildlife coupled with the chance of watching species in their natural habitat provide an excellent medium for wildlife education and experience.

Husbandry of American Paddlefish (*Polyodon spathula*) in the tropics

Jayce Chua

Aquatic Management Officer

River Safari, 80 Mandai Lake Road Singapore 729826

jayce.chua@wrs.com.sg

The American paddlefish (*Polyodon spathula*) is one of the largest freshwater fish species in North America. Also known as the spoonbill, this primitive ray-finned fish can grow up to 2.2 m and weigh up to 45 kg, with the largest American paddlefish recorded at 65 kg. Paddlefish are unique because of their long rostrum, an unusually large mouth which they use for filter feeding. In their natural habitats, water temperatures fluctuate with the changing seasons, ranging from 10 to 18°C. Captive-raised paddlefish are known to thrive in cool clean environments with high oxygen content. The River Safari, Asia's first river themed wildlife park, scheduled to open in 2013, will showcase some 450 species of fauna and flora from eight major rivers of the world. The American paddlefish is a key species representing the great Mississippi River and will be displayed to the public. There are immense challenges involved in maintaining this species in the tropics where normal water temperature ranges of 25 to 32°C, alternating between dry and monsoon seasons, is much higher than their normal habitat temperatures in the wild. Considerations in the design of quarantine, holding and exhibit facilities, as well as appropriate husbandry practices are important for successfully maintaining the paddlefish in a tropical setting.

Indigenous Programs at Taronga Conservation Society Australia

Rodd Stapley

Australian Fauna Precinct Manager, Taronga Conservation Society, Australia

rstapley@zoo.nsw.gov.au

Taronga Conservation Society Australia is a proud custodian of traditional country which includes significant sites across both Taronga and Taronga Western Plains Zoos.

Taronga Zoo, situated on Bradley's Head is on Cammeraygal Country. Early reports indicate that Bradley's head was called 'Booragy'.

Taronga Western Plains Zoo located in Dubbo NSW is the proud custodian of traditional Wiradjuri Country.



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Today, Taronga acknowledges the contribution that the local inhabitants made in developing a strong connection and respect of Australian animals and principles of sustainability and conservation.

For close to 20 years Taronga Zoo has actively developed relationships with Indigenous communities of Australia developing a solid framework of activities and programs across key areas of: Employment Strategy, Formal Education, Interpretation/Visitor Education and The Taronga Training Institute.

In 1989 the much loved Zoo Mobile started travelling to greater Sydney but also western NSW schools with Col Hardy (OA) to educate children on Native Wildlife and Aboriginal History through Aboriginal song and dance. On site Natasha Mooney and Nardi Simpson run the extremely popular and successful program "Animals of the Dreaming".

Since 2007 Taronga Zoo's Free Flight Bird Show has embraced NAIDOC week with a NAIDOC Bird Show presented by Aboriginal staff with Indigenous theme and messaging.

Specific joint initiatives between Taronga and the Department of Community Services followed to engage children with challenging needs in our community.

Taronga Zoo's Burbangana (a Dharug word meaning "take my hand and help me up") program and Taronga Western Plains Zoo's Walanmarra (a Wiradjuri word meaning 'to make strong now') programs are educational and cultural programs for young people in care with high and complex needs. These programs emphasise and conserve culture, connection and belonging and provide a safe, happy and supportive environment for children to grow stronger through knowledge.

More recently TCSA staff, Indigenous leaders and Reconciliation Australia formalised the Zoo's commitments by developing a Taronga Zoo Reconciliation Action Plan (RAP).

What is a RAP?

The Reconciliation Action Plan (RAP) program was launched in July 2006 as a forward looking action of the 40th anniversary of the 1967 referendum in which more than 90% of voters said "YES" to equality for Aboriginal and Torres Strait Islander fellow citizens.

The RAP program turns "good intentions into action" by encouraging and supporting organisations large and small, to blend relationships, respect and opportunities within their sphere of influence in the national effort to close the 17-year gap in life expectancy between Indigenous and other Australians.

- A RAP gives organisations a format for exploring how reconciliation can advance business / organisational objectives.
- A RAP formalizes an organisations commitment to reconciliation identifying clear actions and realistic targets, as well as lessons learnt.
- Each organization shapes their own RAP which is reviewed annually for public reporting on progress as well as an opportunity to update as necessary

Through this traditional owners and Taronga Zoo stakeholders aim to broaden our dedication and formalise our commitment to share Aboriginal culture with visitors, staff, volunteers and the community.

By Producing a RAP TCSA has intensified its commitment and respect for traditional culture, heritage and owners of the land we share. It is a leading example of Taronga Zoo's vision of "*Securing a shared future for wildlife and people*", and supports objectives of the Taronga Zoo strategic plan.

It is hoped that by publicising the commitment and successes of these programs that other leading Australian Zoo's will be as equally active in joining Zoo's Victoria and Dreamworld in driving equality for all Australians.

Intergrated Animal Management, Bear Care in China & Vietnam

Nicola Field, BSc, MSc

Bear & Vet Team Director, China¹

¹*Animals Asia Foundation, China Bear Rescue Centre, Longqiao, Chengdu, Sichuan Province, People's Republic of China*

[*nfield@animalsasia.org*](mailto:nfield@animalsasia.org)

Animals Asia Foundation is an international animal welfare organization committed to ending bear bile farming and addressing numerous animal welfare issues. Since 2000, Animals Asia has rescued nearly 400 bears from bear bile farms, providing extensive veterinary care and behavioral management at our two Moon Bear Rescue Centres in China and Vietnam.

At Animals Asia Foundation's bear sanctuaries in China and Vietnam, our goal is to provide our rescued bears with a safe, comfortable and stimulating environment. Our facilities allow these bears to extend their lives, free of the fear and pain associated with their previous lives on bile farms.

An extensive management programme has been developed, which plays an integral role in the bears' recovery and provides a stimulating and ever-changing environment. Extensive environmental enrichment, training programmes and observational work all play a part in the management of our bears and enhancing the quality of their lives.

For the last decade, our team has learned about accommodating bear behavior in a captive setting, especially those with special needs and those that have endured deplorable physical and psychological suffering. We have seen our management programme evolve and develop alongside enclosure & den designs and veterinary care. We have celebrated many successes in bear management and faced many challenges.

This will examine the holistic approach adopted by Animals Asia in managing bears and as an organization the involvement and contribution that is being made towards developing the welfare of captive wildlife in China through collaborative initiatives.

Lwiro Primate Sanctuary (CongoDR) and our involvement with Wildlife

Raúl Cabrera

Primate Keeper, Barcelona Zoo, Spain

[*rcabrera07@hotmail.com*](mailto:rcabrera07@hotmail.com)

Lwiro Primate Sanctuary (CRPL) is located at South Kivu in Congo Democratic Republic. Because of the great military and political instability, South Kivu is classified as one of the most dangerous regions of Africa. It is located nearby the Kahuzi-Biega National Park

CRPL was founded in 2003 by the Congolese Institute for Nature Conservation (ICCN) and the Natural Sciences Investigation Centre (CRSN) in order to fight against the illegal trade of primates.

It is managed by the Spanish ONGD Coopera (who gave me the opportunity to work in-situ) and it is co-financed by Venner av Lwiro, Friends of Lwiro Australia, and Rainfer Madrid.

Coopera is in charge of CRPL but also organizes important educational projects, helps local communities by contributing to the improvement of their economy and sanitary conditions, and participates on scientific investigation.



CRPL main goals are:

- **Rescue and Rehabilitation of Primates**
- **Cooperate with ICCN** for natural environment conservation
- **Environmental Education and Awareness**

Primates who live in the Sanctuary came from confiscation actions and represent the consequence from the illegal wildlife hunting for the jungle meat market (bushmeat).

CRPL built in an enclosure in a wooded area in order to increase the socialization among chimpanzees and the development of their typical behaviour on a semi-free environment.

There is a project aiming to reintroduce a group of Chimpanzees at the Kahuzi-Biega National Park, strictly following the IUCN specialists' group guidelines.

Veterinary assistance is provided by Dr. Carmen Vidal, who has large experience on releasing chimpanzees in their natural habitat.

Actually 51 chimpanzees and 69 Cercopithecus live in the centre.

Sometimes the centre receives other species (mainly reptiles and parrots), and administrates first medical treatments.

The oral presentation consists in an explanation of the work done by ONGD Coopera in the area, the daily work of CRPL, bushmeat troublesome and the available solutions to solve the problem. The different activities of environmental enrichment for primates done during my collaboration time at CRPL will also be explained.

Maternal Behavior of a Female Clouded Leopard (*Neofelis nebulosa*)

Joe Ong¹, Cecilia Tang²

¹Senior Keeper, ²Junior Animal Management Officer

Night Safari, 80 Mandai Lake Road, Singapore 729826

joe.ong@wrs.com.sg; cecilia.tang@wrs.com.sg

The clouded leopard (*Neofelis nebulosa*), with its numbers in the wild estimated to be less than 10,000 and projected to decline further, is classified as 'Vulnerable' by the IUCN Red List of Threatened Species. Being primarily nocturnal and arboreal, this makes it very challenging for researchers to study them in the wild. In particular, given that wild female clouded leopards are very protective over their cubs and have a tendency to hide them, it is extremely difficult to observe and study the maternal behaviours of this elusive species. At the Night Safari, we documented the maternal behavior of a hand-raised captive female clouded leopard Wandee who had given birth to two cubs on 3rd May 2011, and nursed them successfully until they were weaned. With the help of CCTVs installed in the dens, we studied the maternal behaviour of Wandee for a total of eight weeks. We documented the nursing behaviors exhibited by Wandee, her interaction with the cubs, as well as some interesting observations made on the behavioral changes which occurred in the two cubs as they grow. These information are important to complement the sparse knowledge of clouded leopard behaviour which are difficult to obtain from their conspecifics in the wild.

Maternal sex determination and its potential effects on avian conservation initiatives.

Clancy A. Hall

Wildlife Supervisor – Birds, Currumbin Wildlife Sanctuary, Australia.

chall@cws.org.au; clancy_hall@yahoo.com.au

With biodiversity being lost at an unprecedented rate, there has never been a greater need to understand species in more detail. Leading authorities on conservation such as the IUCN, have suggested that established conservation programmes include a captive component to help safeguard species. Although these captive populations are managed to promote sustainability, the long term captive management of certain avian species has revealed a significant sex bias in offspring.

The apparent ability for birds to determine the sex of their offspring has been observed in almost half of all avian Orders. The idea was embraced by science in the mid-eighties and since then, many publications have highlighted the potential mechanism or mechanisms involved. Although this research leaves little doubt that it does exist, the precise environmental stimulus for the adaptation is still unknown. What is known however is that it appears to be diverse across the Orders.

Maternal sex determination has already presented challenges for numerous avian conservation initiatives worldwide. For example, the critically endangered Spix Macaw shows a sex bias toward females while the captive environment infallibly produces a significant male sex bias in Columbiformes. Why do so many avian species exhibit a skewed sex ratio and what implications does this have for their wild counterparts? Unless we commit to understanding this phenomenon in greater detail, it could be the nemesis of achieving sustainable populations both in captivity and in the wild. Comparisons of captive populations that differ in husbandry, may offer insights into species adaptive response to distinct environmental stimuli.

There are many techniques to effectively manage species that exhibit maternal sex determination. In my presentation I will discuss a range of methods from basic changes in husbandry to a more invasive approach of sexing viable eggs.

Medical Husbandry Training at the San Diego Zoo

Nicki Boyd

Behavior Husbandry Manager, Animal Connections, San Diego Zoo, USA

NBoyd@sandiegozoo.org

This presentation will give guidelines for prioritizing a veterinary wish list of medical behaviors that allow animals to participate in their own health care. From the basic stationing and shifting to blood draws and everything in between, this talk will show the benefits of safety for both keepers and animals when operant conditioning techniques are used. The San Diego Zoo has around 4000 animals and with 6 full time veterinarians we are able to become more efficient in managing medical cases with reduced stress and less need for anesthesia. The San Diego Zoo's training program is based around a positive reinforcement system. We have trained the staff to utilize behavior management techniques to teach the animals what to do when managing this vast collection.

Monitoring of rhino health through bleeding at the Uganda Wildlife Education Centre

Alex Droma

Lead rhino keeper, Uganda Wildlife Education Centre, Uganda

alexdroma@hotmail.com; dromacoldplay@gmail.com

The future of rhinoceros world wide is highly threatened. Once roaming freely in Uganda and throughout Africa at large, the year 1979 saw the death of the last rhino in Uganda. Darkness befell this country in terms of wildlife conservation during the 70s and through the period of the 80s as the country went through a series of political turmoil and lawlessness.

Uganda Wildlife Education Centre was the first centre in the country to bring back the rhinos for purposes of conservation education and breeding. This was after more than two decades of local extinction. This marked the turning point in the reintroduction process of this flagship species. The first stage of the process was to bring a male and a female rhino to the Uganda Wildlife Education Centre for purposes of conservation education and breeding. The second stage was to establish a rhino sanctuary for conservation education, tourism, and breeding, and the last stage would be the final release of the rhinos in their natural wild, in the national parks where they once existed before becoming locally extinct.

This paper presents an intervention scenario in an ex-situ situation where an attempt has been made to monitor their health through bleeding.

Key words: Monitoring, health, ex-situ, bleeding.

Moving forward in conservation though keeper training a curators responsibility

Tim Husband

Curator Life and Science, Bali Safari & Marine Park, Indonesia

curator@balisafarimarinepark.com

The Bali Safari and Marine Park is part of the Taman Safari Indonesia group and as the name would indicate is situated in Bali. Covering some 43 hectares, it holds a collection of mammals, birds, reptiles plus countless fish. To care for this collection we have a keeping staff of just over 100. One problem that we faced was that because we hired many of our staff from the local village to work as keepers, the skill base was very low; this also meant that the understanding of the role that we play in conservation was not understood. This needed to be looked at and if possible a solution found and implemented. This is a problem that many zoos around the world have for a number of reasons whether it is because of the lack of trained people in the area or because of the movement of staff, with staff leaving and taking the knowledge with them. One thing is for certain, any curator that takes pride in their work should feel that they are responsible for the skill base of their park to always be improving. This paper looks at how we worked at overcoming this problem in Bali.

One Step Closer: Auckland Zoo and the Red Panda Initiative

Anneke Haworth

Keeper, Auckland Zoo, New Zealand (Presented by Karen Simpson).

anneke.haworth@aucklandcouncil.govt.nz

karen.simpson@aucklandcouncil.govt.nz

In late 2010, Auckland Zoo undertook an exchange of Red Panda with Padmaja Naidu Himalayan Zoological Park (PNHZ) in Darjeeling, India. Auckland Zoo bred female Khosuva was exchanged for an Indian-born male animal, Sagar.

This was the first exchange of Red Panda by an Australasian zoo since the species became part of an internationally managed programme. It not only created the opportunity for Auckland Zoo to develop an international relationship with PHNZ through the transfer and corresponding keeper visit, but it also provided the opportunity to participate in their Red Panda breed and release program (Project Red Panda in Singhalila National Park, India.).

Furthermore, the ex situ conservation support of this species by Auckland Zoo was complemented by the support of the in-situ Red Panda project to protect the future of the animals released through PHNZ's Project Red Panda. Red Panda Network Nepal is the first community based red panda research and monitoring program and

has received significant financial support from Auckland Zoo's Conservation Fund for its work. This Red Panda Network project was visited during the transfer process of the captive Red Panda.

Auckland Zoo's relationships with PHNZ and Red Panda Network are being established as a long-term support partnership, which serves to highlight the conservation outcomes that can be achieved through effective linkage of in-situ and ex-situ activities. This linking of in-situ and ex-situ activities by zoos is something highlighted as a key priority in the World Association of Zoos & Aquariums' 2005 Conservation Strategy.

In 2011, we introduced Sagar, the male from PHNZ, to our female Amber, as part of a recommended pairing for the species. Initial signs of their integration are encouraging and there are indications that she may already be pregnant.

This presentation will take you on the journey of our youngest female Red Panda to India to start her exciting new life and will show the conservation work being undertaken to help protect and save her wild cousins.

Orangutan (*Pongo pygmaeus*) infant hand-rearing and reintroduction to an orangutan group)

Taide Pérez

Primate Keeper, Barcelona Zoo, Spain

tyfarnes@gmail.com

Bornean Orang-utan (*Pongo pygmaeus*) is one of the two Orangutan species (the only Asiatic great ape) that can be found in Indonesia and Malaysia.

The Bornean Orangutan group in the Barcelona zoo comprises an adult male: Karl; two adult females: Locki and Jawi; and their infants: Sari and Jingga respectively. Nowadays, all the group lives together in the same enclosure, and both females take care of their infants. But it wasn't like this at the beginning.

On October 20, 2009, the 12 year old female Jawi, gave birth to her first baby: Jingga.

During the first days, Jawi showed a bad maternal behavior, abandoning Jingga for short periods time and carried her the wrong way. Therefore, a veterinarian check was carried out. During the examination, Jingga appeared well hydrated and her glucose levels and weight were normal. Those results indicated that Jawi was feeding Jingga, so we gave her a second chance to improve her behavior.

The following days, Jawi's maternal behavior looked better and several observations of Jingga being fed were made. But still, Jawi abandoned her sometimes and carried her in a wrong way.

Due to these deficiencies, on February 2010, Jawi provoked a fracture on Jingga's left humerus bone, by accident. In order to tend Jingga's injury, she had to be taken away from her mother.

While Jingga was recovering from the arm fracture, she was hand-reared by the primates team. The keepers, besides helping her to heal with "physiotherapy" exercises, also provided Jingga with play and stimulation, to allow a healthy development physically as well as psychologically. Also, visual and physical contacts with Jawi were permitted daily, to keep the bond between mother and baby.

Once Jingga's arm was totally healed, on June 2010, the reintroduction with Jawi was started.

The first attempt was a failure, Jawi showed the same bad maternal behavior, and Jingga rejected Jawi, screaming everytime Jawi tried to grab her. Besides, Jingga was not independent enough to be able to come by herself to the mesh to eat the bottle. For those reasons, we decided to separate Jingga and Jawi again and wait a few more months.

On September 2010, we made a second attempt. This time there wasn't rejection from Jingga to Jawi and Jawi seemed to have improved on her behavior. Jingga had access to the bottle without problems. So, from that moment, Jingga and Jawi were together again.

The following days, Locki and Sari were added, and the four orangutans lived together without a problem.

The last step of the process was reuniting the females with Karl, the adult male, on March 2011.

Until now, the whole group is living together and Jingga shows a normal Orang-Utan behavior.

Oriental Small-clawed Otter (*Aonyx cinereus*)

Introductions: When things are taken out of your hands!

Sheila Roe

Senior Keeper, Carnivore Department, Melbourne Zoo, Australia

sroe@zoo.org.au

Oriental Small-clawed Otters are notoriously difficult to introduce. Often members will only accept family members and it is recommended by the IUCN/SSC Otter Specialist group husbandry manual that any introductions of unrelated animals should be attempted before they are a year old. Unfortunately we did not have the right group composition to hope for a successful outcome as we have one single female aged 12yrs, two male brothers aged 11yrs and four two yrs old young females with their 10mth old male cub, but still thought we would try. An introduction plan was written up with two scenarios and photographic identifications produced to help identify individuals to monitor if and where the aggressive behaviour may come from.

Scenario one: To introduce "Tola" a single female to the four females and the cub successfully in their exhibit and have them share the otter exhibit cohesively with the absence of the males.

Scenario two: To introduce the male Otters to the four females and the cubs, then try and integrate "Tola" to the group then all individuals share the otter exhibit cohesively.

We decided to try scenario one first, which was to introduce our single female to the group of four females and the young male cub. This scenario was chosen because we felt that it was inappropriate to keep a single animal by herself for extended periods and if successful and the group accepted the single female we could then move onto introducing the two males.

It is recommended that the introductions occur under supervision. The veterinary team would be notified that introductions are taking place so they have the appropriate veterinary equipment on standby if necessary. Discussions regarding the introductions were both flexible and customised to meet the circumstances that may arise. The slow process of visual contact between the single female and the group of four was put into place. The group had visual access through a tunnel system which joined the off limit dens together. The two males were out on exhibit while these introductions went ahead. Introductions would be monitored for an hour or so then animals were separated visually again. This allowed all otters to have some time on exhibit. This is where things got interesting as the females from the group of four took things into their own small clawed paws.

Planning Enrichment

Valerie J. Hare

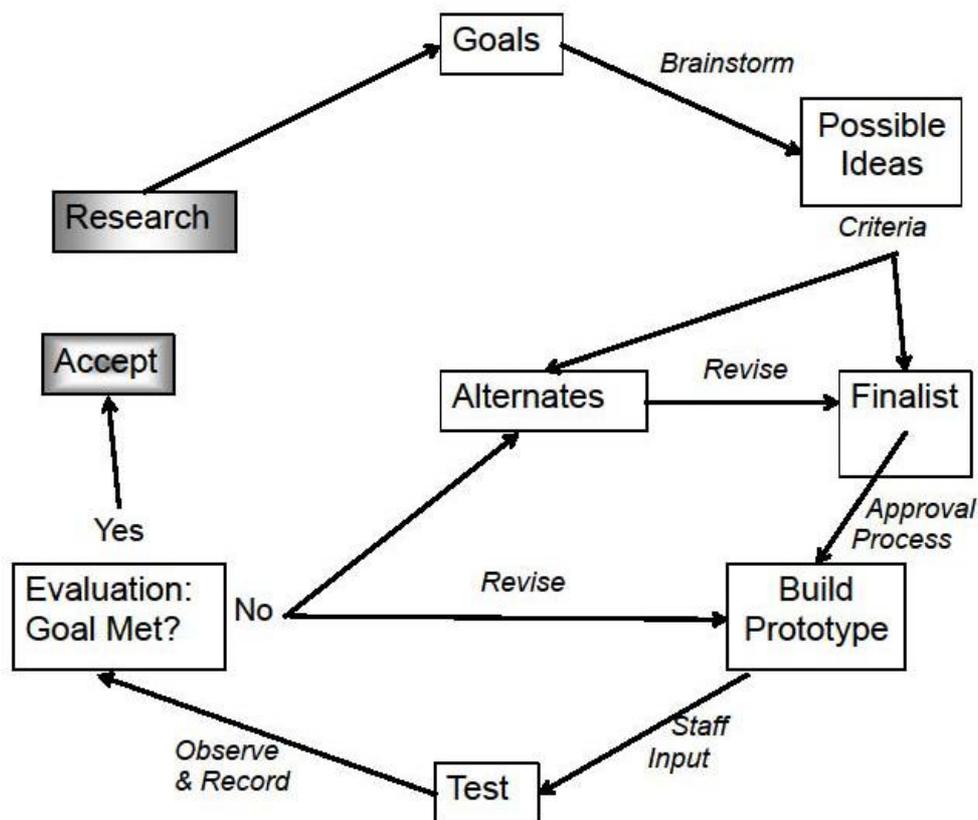
The Shape of Enrichment, Inc, California, USA

shape@enrichment.org

Environmental enrichment, as a concept, is now well recognized as an important consideration in the welfare status of any captive animal. Yet, many animal-care professionals remain unaware of the practical considerations important to creating and maintaining successful enrichment plans.

Because enrichment is specific to the individual, species, institution, and/or culture, understanding the **process** of creating and implementing enrichment plans is imperative. This process includes: setting behavioral goals; brainstorming possible strategies; testing prototypes; and an introduction to safety and scheduling considerations. Using this process, animal caretakers may create successful enrichment plans for any and all of the animals in their care.





Positive Reinforcement as a replacement of the antique training methods in elephant camps in Thailand

Gerardo Martinez

Chief of Animal Behavioural Management, Africam Safari, Mexico.

gmartinez@africamsafari.com.mx

Animal training has become one power full tool used by many institutions that invest time and resources in searching for viable and responsible ways to provide optimal conditions for the animals they take care of in order to enhance their wellbeing.

Nowadays, the positive reinforcement and Protected Contact methods have demonstrated that there are simple and practical ways to handle, train, and provide treatment for animals without the need to cause pschical or psychological harm. However, these methods and techniques are far from being a best-practice standard used around the globe.

In many Asian countries the elephants have been trained, among other duties, to do physical work and to participate in the tourist industry. Likewise the training that they receive has always been a matter of discussion because of the aggressiveness that is sometimes involved. The "mahouts", are the people that train, take care of and very often are the owners of the elephants. They use ancient training methods that involve not only free dangerous contact but mournfully, sometimes, also the necessity to impose a certain level of firmness, intimidation and aggressiveness directed towards elephants so they can work and interact with them. What is surprising though is that this practice of intimidation has not changed throughout the years despite the long list of injuries and fatalities of mahouts, passersby,

and elephants alike. Arguably these are attributed directly to the use of these practices. If that were not enough when some of these elephants are not doing “their job” they spend long periods of time confined or chained for days or even weeks at a time, without anything to do, or anyone to interact with.

This presentation is aimed at sharing and demonstrating the field work that I have been doing at elephant-camp rescues in northern Thailand during the last 18 months. During that time, I have been teaching mahouts how to take better care of their elephants using safe and non-harmful methods. The Golden Triangle Asian Elephant Foundation (GTAEF), through its Anantara Golden Triangle Elephant Camp, was the first organization to believe in and adopt this project and given the circumstances. The Training Program that we implemented had to be quick, convincing, and effective, so that the mahouts could see the progress and allow us to continue working with their elephants, which are their most valuable possession.

After just a few months there have been important changes within the camp and we achieved remarkable results. The mahouts can note that by applying positive reinforcement they can improve the welfare of the elephants by giving them better physical and psychological conditions. Now they can offer them occupancy therapy with the training sessions, the use of protected contact reduce exponentially the risks when doing veterinary and dangerous procedures to the elephants and that also help us to perform more effectively the veterinary care, a point which the mahouts appreciate a lot. Perhaps the most difficult element was teaching young and old mahouts who have been working with elephants as a lifestyle for many centuries and have been told how to do it generation by generation that there are different alternatives for taking care of the elephants and more important, that they can enrich their techniques by using non imposes ways, preventing animal abuse. The mahouts now really enjoy the use of the positive reinforcement and they are opened to adopt it as a new and better training method.

Problem-Solving Process Addressing Self-injurious Behaviour of a White-Bellied Sea Eagle (*Haliaeetus leucogaster*) at Wildlife in Need Rescue Center

Dondee Penera, Bryan Millanes, Reyna Prongco, Leo Jonathan Suarez, Mariel Flores, Gail Laule*

Ocean Adventure and Wildlife in Need Foundation, Philippines

leo_sj@yahoo.com

On May 3, 2010, an adult White-Bellied Sea Eagle (*Haliaeetus leucogaster*) was transferred to the Wildlife In Need (WIN) Rescue Centre from the Laguna Wildlife Park. Historical accounts of the animal included some training for educational programs. It was decided to continue this training, so the bird was fitted with leather jesses and began working on a glove. However, three days later, the bird removed the jesses by biting through the leather and in the process inflicted some wounds on its tarsus. The wounds were treated but the bird developed a self-mutilating behaviour and continued to pick on its tarsus, and then its talons. Bandaging of the tarsus and talons were necessary to prevent the bird causing more harm to its self. However, each time the wound becomes completely healed and the bandage removed, the bird would start picking on its legs shortly after, causing serious wounds this time. This developed into a behavioural pattern of self-biting the wound area, the tarsus, and talons. Many attempts were made to address this self-injurious behaviour including adjusting the type of bandage and how long it was left on, and how and where the bird was housed. The problem was finally resolved when a thorough assessment of the problem was conducted and a comprehensive plan developed which addressed both the animal's physical and mental states. This paper describes the problem-solving process applied by WIN's keepers and animal care staff and the successful results.



Quarantine Animal Enrichment and Training: An Intricate Task

Anil Bisht

Quarantine Management Officer

Singapore Zoo, 80 Mandai Lake Road, Singapore 729826

anil.bisht@wrs.com.sg

At the Singapore Zoological Gardens, new animals entering the collection are first quarantined for health checks and for them to adapt to the new environment. These animals include imports and exchanges with other zoos, as well as confiscated and donated animals from local agencies like the Agri-food and Veterinary Authority of Singapore, the Singapore Police Force, the National Parks Board, Singapore and members of the public. Animal species usually consists of different species of primates, small to medium sized mammals, birds, reptiles and amphibians. These newly acquired animals are placed in the Quarantine and Rescued Wildlife Centre (QRWC) and taken care of by a team of quarantine staff and veterinarians according to strict quarantine protocols and guidelines. Enrichment of captive animals is vital for maintaining good physical, physiological and psychological well being. As new animals have to overcome settling into a different environment, with changes in diet, husbandry and housing conditions, the task of enrichment and training for new animals is highly challenging. This is further complicated by the short but mandatory quarantine time period and strict husbandry protocols which certainly make enrichment programmes for animals in quarantine more complicated as compared to animals housed within exhibits. Detailed planning for enrichment and training programmes during quarantine is important as appropriately implemented enrichment can help new animals better acclimatise to their new environment and also facilitates the conduct of routine quarantine medical examinations.

Roars like a lion or TWEET like a twitter!

Wendy Husband

Education Manager, Bali Safari & Marine Park, Indonesia

education.manager@balisafarimarinepark.com

Animals communicate in so many different ways; either through vocalization, scent marking or facial expressions, not so different from humans you might say. If wildlife could speak to us, what do you think they would say? We all probably know the answer to that, we need to use our voice to speak up about the impacts from human activities that threaten their habitat today and do what we can to conserve the planet we all call home?

Today, zoos and parks play an important role in WILDLIFE management, in-situ and ex-situ, and also have a responsibility to provide up to date, honest, useful and educational information to all their visitors and be proactive in some way towards wildlife and environmental conservation.

Zoo visitors come from all walks of life; zoological gardens attract the young and old, from families bringing their kids to see real animals, students wishing to learn about wildlife, zoo volunteers share their knowledge with other park visitors and many people visit, purely to enjoy a lovely day of recreation in the beautiful gardens many zoos have today.

What they all have in common, is that all visitors are part of a network or several networks; either through family, school, business, sport, social media or other community groups; the power of networking is unlimited and is most certainly the best way to get your message clearly out there with the most IMPACT!

Education and learning is everything and using all platforms of communications is vital in providing excellence for all your zoo visitors through clear and concise information; from marketing & sponsorship programs to directional signage, help through changing perceptions about animals in captivity including education programs, excellent wildlife management and successful conservation and breeding programs; every aspect of ZOO life, depends on excellent communication.

Well that is IF you want to be heard and IF you have important information you want people to know about and IF you want to make a difference in any way, but most of all, that is IF we WANT or NEED to communicate on behalf of WILDLIFE! That's our job, right? Aren't we the many voices for the future of all animals?

As zoo professionals we need to find the best ways to share our thoughts and ideas, in ways that can be easily heard and understood about the threats animals and wildlife are facing today, with the aim of positive action being taken to reduce those threats. Time has run out for some species and many are critically at risk of rapid extinction.

Zoos have MANY voices and truly ONE calling....To care, protect, preserve and conserve WILDLIFE!

Taman Safari are at the frontline of wildlife conservation in Indonesia and are actively involved in ensuring the future survival and wellbeing of many Indonesian animal species through engaging education programs in Indonesia.

Role of Zoo Keepers in conservation education

Rengasamy Marimuthu¹, Sally Walker²

¹Senior Education Officer, ²Founder/Director, Zoo Outreach Organization, India

marimuthu@zooreach.org; sallywalker@aol.com

In the latter part of the 20th and in the 21st century, there have been big developments throughout the zoo profession. Now, in many countries zookeepers are accountable for day-to-day care and welfare of wild animals in zoos and like facilities, wildlife or safari park, aquarium or special collections. Zookeepers are responsible for reporting problems of health, behavior, enclosure, accommodation of the animals and many other things. They are highly educated, often with Ph.D. degrees that help them rise in the zoo hierarchy.

In India and other South Asian countries, zoo keepers are not up to this level as they come from a sector of society that is, by and large, not highly educated or well paid. Still, many of the zookeepers are found to be very dedicated and take great interest in their animals and in learning new things about their care and conservation. Visitors who do not know English often turn to zookeepers for information. By speaking with them in local language zookeepers can make an immense contribution to conservation among the most numerous group of visitors. This paper will explain in greater detail about zookeepers in South Asian countries and how their colleagues in zookeeper chapters from other countries can assist them in developing and sharpening their skills.



States of positive welfare: The concept of 'Flow'

Amanda Pemberton, Vicky Melfi, Margaret Hawkins and Raf Freire.

Taronga Conservation Society of Australia and Charles Sturt University, Australia

yamoonda@hotmail.com; amandajunepemberton@gmail.com

In the past, animal welfare science has focused on reducing behavioural indicators of poor welfare which was deemed to result in acceptable welfare. Today, as our knowledge of animal welfare increases, we recognise it is necessary to not only reduce negative welfare states in captive animals as much as possible but also encourage positive welfare states.

The concept of 'flow' which was founded by Mihaly Csikszentmihalyi originated in the field of human psychology and has recently been suggested for use in improving animal welfare. 'Flow' is a process of consciousness in which the attention of an individual is focused on a specific challenge. The individual feels a sense of control as they complete a task if they have the correct skills to reach the end goal. 'Flow' results in 'Optimal experience', a state of peak enjoyment. Much research has been conducted in order to determine how to achieve flow in people and five essential steps have been identified. These include: 1) setting an overall goal and as many sub goals as is realistic; 2) establishing a way to measure progress i.e. task must have feedback; 3) task must hold ones concentration and have distinct challenges; 4) the individual must be able to develop the skills necessary to complete the challenge; and 5) once a goal is achieved, the challenge involved in completing the task can be raised. Using these five steps it is possible to implement husbandry practices that may lead to optimal experience in zoo animals.

This presentation will discuss further these concepts and how positive welfare states can be achieved and measured in captive animals and the upcoming research into the effectiveness of incorporating the concept of flow into husbandry practices at Western Plains Zoo, NSW, Australia.

Successful Treatment of Uricular Pyogranulomatous Keratitis in a Captive Dugong (*Dugong dugon*)

Dwi Wisnugrahani, DVM¹, Sumitro, DVM¹, Cucu Kartini, DVM². Gil-Ben Shlomo, D.V.M, Ph.D.²*

¹Sea World Indonesia, Jakarta, Indonesia

²24 Hours Veterinary Clinic, Jakarta, Indonesia

wisnu_cur@seaworldindonesia

A female dugong initially presented with four 2-3 mm diameter, raised nodules at the limbus of the left eye, which had spread centrally toward the cornea within two weeks. The first ophthalmic examination revealed a positive menace response, a normal pupillary light reflex, and a negative uptake of fluorescein dye on the cornea. The dugong was treated with subconjunctival injection of gentamycin and dexamethasone mixture and intramuscular administrations of vitamins A and E. Cytologic evaluation of fine needle aspirates from the limbal and corneal nodules demonstrated a pyogranulomatous inflammation. The limbal and corneal nodules had markedly regressed within two weeks after treatment; bacterial and fungal cultures performed at this time yielded a heavy growth of *Pseudomonas aeruginosa* and positive growth of *Candida albicans*, respectively. Eye lubricant and gentamycin eye drop were administered on the cornea for 10 days to aid in a complete healing of the eye.

Keywords: Dugong, keratitis, pyogranuloma, *Candida albicans*, *P. aeruginosa*.

The ASZK Husbandry Guidelines Registry – are wikis the way to go?

Graeme Phipps

Teacher and Animal Care Co-ordinator of Captive Animals, Richmond College, Australia

Graeme.phipps@gmail.com; Graeme.phipps@tafensw.edu.au

The ASZK maintains the Husbandry Manuals – Husbandry Guidelines Registry on behalf of the world zoo keeping community as a significant contribution to wild captive animal welfare.

Recently over 100 Husbandry Guidelines were loaded to the Registry, and there are perhaps another 50 soon to be uploaded.

Husbandry Manuals are produced by student keepers studying Captive Animals Certificate 3 at Richmond College of TAFE, Western Sydney Institute as part of their course. Keepers select a species, but there are certain conditions; for example the keeper must work with the species and it must not have already been published. Since Husbandry Manuals are primarily utility documents rather than literature reviews, there must be significant evidence of the keeper's experience and interaction with demonstrated in the Husbandry Manual.

Once selected, the keeper uses specific template – either Bird, Mammal, Reptile or Invertebrate which is based on Jackson's 2002 International Zoo Yearbook paper "Standardising Captive Management Manuals." The manual is produced over the course of the 18 month certificate, but is peer reviewed in the latter stages of production. If the Husbandry Guidelines score highly (80% or more) it is considered for publication on the ASZK Registry. Student keepers however are compilers of husbandry guidelines, not authors.

Copyright and other issues have plagued the publication of husbandry guidelines hitherto, so these have taken some time for them to be finally uploaded to the aszk registry, for which see any listed in the registry under 'Western Sydney Institute'. When you click on the title, you are linked to the website of the NSW Fauna and Marine Parks Association, who have very kindly agreed to host the actual manuals. They have also offered some financial support for the upload of the manuals.

This is a significant contribution as many manuals are large documents, and hence the internet traffic may be high and expensive. However the NSW FMPA has similar wild captive animal goals as the ASZK, and wishes to promote the availability of as many husbandry manuals as is possible.

When you are linked to the FMPA site, you reach a Disclaimer page, where you need to read and either Accept or Decline to go further. If you Accept, then the list of husbandry manuals in PDF format is available for you to access and download if you so desire.

However in the Disclaimer it clearly states that 'enhancements are invited' – so the issue becomes – how do you add anything to an uploaded PDF? One solution is to upload the Husbandry Guidelines as Word documents, however they could then be changed, but no-one would know about the changes. A superior approach is to upload the manuals as wikis.

Creating the manuals as wikis –especially for text, is simple. Image upload is also easy, however images should be kept to a judicious minimum. One thing is that they are very easy to edit, and thus build on – thus 'enhance' and keep current.

Why is the rate of recruitment of new Husbandry Guidelines to the registry low? One answer is that keepers are very busy and although there is an intention to produce a manual, the reality is that it is a MAJOR job to create one from scratch. At the very least, Richmond graduates have made a valuable contribution in 'filling in all of the boxes', thus making it possible for working keepers to just add in the



small pieces of information as they go – virtually as IMEs – ‘In My Experience’ pieces – which may be only a couple of sentences or paragraphs. Or make corrections.

Anyone can visit the wiki, but the question really becomes, who gets to change Husbandry Guidelines and who monitors them for their quality of information?

Since anyone can read the wiki, it is proposed that anyone can also offer changes – although in practice it may be that zoo keepers will be the main editors – but it is important to allow anyone who can make worthwhile contributions to so do.

Who monitors, and therefore approves the changes is another thing. It is recommended that only members of the various zoo keeping organisations globally should have this responsibility. Initially, if they are ICZ members, one member of the wiki monitor group would be the originating compiler, and then at least two other keepers form a group to oversee the species. This develops a network of people who are interested in the welfare of that species, and of course more than three people may become monitors...it's just that three might be a judicious minimum...

My presentation will include accessing the current Husbandry Guidelines Registry, looking briefly at Husbandry Guidelines for a selected species as a PDF and then how it might look as a wiki.

Keeper feedback is sought.

The Dreamnight at the Zoo in daylight – The case of Chiba Zoological Park

Hiroyuki Takahashi

Ungulate keeper, Chiba Zoological Park, JAPAN

[*htakahashi.czp@gmail.com*](mailto:htakahashi.czp@gmail.com)

The Dreamnight at the Zoo was held at Chiba Zoological Park, JAPAN in 2010 and 2011. Chiba Zoo does not have any night illumination, so first of all, we got permission from the executive office of the Dreamnight at the Zoo in Rotterdam, the Netherlands. Then we decided to implement this event during daytime hours. The first Dreamnight at the Zoo was held on Monday in August 23, 2010 and the second one was held on Monday in August 22, 2011. Because it is closed on each Monday, so we can give a free time to the chronically ill and disabled children and their family members without other public guests. We welcomed 240 members in 2010 and 161 members in 2011. The children and their families enjoyed touching small animals, eg. mice and guinea pigs, feeding time, eg. Californian Sea lions and reticulated giraffes, looking a target training to Asian elephant, and touching a lot of bird's eggs, wings, reindeer's horns, several animals' dung! They also had fun in listening an orchestral concert, seeing an animal panel theater – a kind of flannelgraph –, and trying an animal balloon art. Not only Chiba Zoo's staff but also the volunteers, a local university and a lot of companies cooperated on this project. We will continue this international project in the future.

The Endangered Primate Rescue Center (EPRC)

Elke Schwierz

*Former head animal keeper at Endangered Primate Rescue Center in Vietnam
(now working at Leipzig), Leipzig Zoo, Germany*

e.schwierz@web.de

The Vietnam Primate Conservation Program is a long-term project of Frankfurt Zoological Society in Vietnam and is comprised of several components to support the conservation of highly endangered primate species. The project focuses on the conservation of primate habitats and wild populations, which includes the support of forest protection activities and education for communities surrounding such areas. In the past the intensified management of ranger activities to combat poaching and illegal wildlife trade led to an increase in the confiscation of endangered primate taxa. The Endangered Primate Rescue Center provides housing for such animals and has also started breeding programs for further reintroduction projects.

The Zoo Leipzig, Germany, has been a supporter of the EPRC for many years already. In 2013 the Zoo Leipzig will take over the full responsibility for the Endangered Primate Rescue Center. Also currently, main financial support is allocated by Zoo Leipzig. In addition the zoo also provides one trained zookeeper that stays for a year at the rescue center to work with the Vietnamese staff, to help, manage and supervise the work.

The Endangered Primate Rescue Center, initialized in 1993 with the confiscation of two highly endangered Delacours langurs, is home to roughly 150 primates today, including langurs, gibbons and lorises. The animals are cared for by 20 local Vietnamese workers.

After a period for quarantine the newly confiscated primates are put into groups that mimic their family structure in the wild as closely as possible. This allows for successful breeding at the EPRC. The breeding program's goal is to later on reintroduce these primates into their natural habitat. There are three semi-wild areas that serve as a halfway house before releasing the animals into the wild.

In 2011, the first three Delacours langurs (*Trachypithecus delacouri*) were released back into the wild. The Delacour's langur is the flagship species of the project, and endemic to Vietnam. Only 200 animals still exist in the wild, and 15 Delacours langurs live at the EPRC.

Daily work at the EPRC is quite different from work in an ordinary zoo. Due to the fact that the EPRC keeps more than 100 langurs there is a need for large amounts of leaves, 300kg every day. The keepers have to cut the leaves, bundle more than 1000 bundle and feed them to the langurs every day.

Many primate species breed very well at the Center. The center has a high rate naturally raised infants and only interferes if there is no other choice. By having to hand rear some of the offspring workers at the EPRC have gained unparalleled knowledge of these endangered primates.

All this work couldn't be done without financial and staff support from many organizations and especially from Zoo Leipzig.

The experience of selection and preparation animals for their participation in social, educational and cultural programs of Saint-Petersburg Zoo

Volkova O., Astahova L.

Keepers, St. Petersburg Zoo, Russia

ladoganerpa@mail.ru

Our Zoo is 147 years old. In the year of its hundredth anniversary, the staff of the department conducting the educational activities suggested creating the group of animals which could be used as “alive illustrations” to the lectures. Before this the lectures about animals taking place out of the Zoo were accompanied by a slide-show that, certainly, was less attractive for people than the show of real animals. Children were the main part of the audience, so the show of the animals, which were mainly taken out of their cages, had a huge success. Because the topics of talks about animals varied greatly, the species composition of animals was also various. There always were small and middle-sized beasts and birds, primates, rodents, reptiles in the group. During last ten years the Zoo has greatly enlarged its activity in the sphere of the rendering different services to the population of the city. As a result the group of tame animals take part in different Zoo activities:

1. Educational

- Lectures about animals on the territory of the Zoo and out of it
- Enlightening programs for children between 3 and 17 years old
- Taking part in various TV programs

2. Taking part in entertaining programs

- Organizing the parties on the territory of the Zoo, connected with city and international events
- Celebrations of birthdays for children

3. Social program “Hello, we are coming to you”

- Different activities with disable children at hospitals and rehabilitation centers

The variety of programs in which our animals take part leads to the rise of demands to the work of the keepers of the department. The species composition of the group should be various enough to provide “illustrations” for lectures and programs on several subjects. The animals ought to be tame and friendly towards people.

While choosing the animals we follow some rules:

- The animals shouldn't be too big and threaten the visitors and keepers
- The animal should calmly bear with the closeness of people, don't be afraid of loud sounds, voices, new premises
- The animal must itself come to its transport cage
- The particular animal, bird or reptile should be interesting for spectators according to its appearance, behavior or kind.

While training our animals we pay the main attention on giving them the opportunity to show their natural qualities and skills. It can become possible only if they can feel themselves comfortable in any occasions, which vary according to the aim and place of the particular event.

During an ordinary lecture animals are situated in some distance from the viewers, in that case the direct contact between animals and people is impossible. On the other hand, during social and educational programs the main activity is the direct interaction between the animals and children.

According to the ways of preparation the animals to demonstration work, they can be divided into following groups:

1. Animals domestication of which demands from the keeper just time and skills of work with these particular kinds.
2. Animals and birds working with which it is important to pay attention on their character and habits, and using the simple methods of training the animal will carry out all necessary requests.
3. Animals which demand personal approach.

So, taking into account individual features of each animal, mammals, birds, reptiles and amphibia, it is possible to create a successful and efficient mobile group which will bring pleasure to children and adults both on the territory of the Zoo and out of it, giving them the joy of the union with the great mystery of Nature.

The Introduction of Camels (*Camelus dromadarius*) to an African Elephant (*Loxodonta Africana*) at Taronga Western Plains zoo, TWPZ

Glenn Sullivan

Senior keeper, Elephants, Taronga Western Plains Zoo, Australia

gsullivan@zoo.nsw.gov.au

TWPZ has exhibited African elephants since 1977. The zoo is now currently home to one remaining female African elephant and three Asian elephants. All are over 40 years old, with the Asian elephants approaching 60 years old and over.

Zoo's and circuses have kept elephants and camels together for hundreds' of years. Mixed exhibits with African elephants have been maintained for over 20 years, particularly in the northern hemisphere.

Staff of the elephant section suggested obtaining 0.2 camels in early 2011 to keep on the section to stimulate the African elephant via the protection of a barrier. It was then considered the possibility of introducing the 'odd trio'.

This presentation discusses the process of this unique introduction and current developments and a view to the future.

The management of a breeding group, black-capped squirrel monkeys (*Saimiri boliviensis*) in Apenheul Primate Park

Rudy Berends

Head Keeper, Apenheul Primate Park, The Netherlands

R.Berends@Apenheul.nl

Apenheul began in 1974. as a small but revolutionary zoo, At that time the first and only zoo in the world where monkeys live free in the forest but can also roam free between visitors.

The first squirrel monkeys (*Saimiri boliviensis*) arrived at Apenheul 1975. Since then, almost 550 viable births have been recorded, making Apenheul the most successful zoo in Europe with this species.



During the summer season (April-November) all animals have free access to both the inside and outside enclosures. The inside enclosure consist of 8 interconnected cages. The outside enclosure is a wooded area of more than 1 hectare)

At this moment the group count approx. 150 individuals.

Managing such a huge group for more then 35 years gave us a unique inside look to the unknown group dynamics in Squirrel monkeys. Something that is impossible to observe in the wild.

We found out that when groups becomes to large, it will split itself up in two or more subgroups. A subgroup consist of different family groups that are related through matriarchic lines.

In daytime all animals live together in the wooded area but they separate themselves during night and winter season. There is a considerable distance between the different entrees, and every evening each subgroup enters in the same cages. The subgroups rate themselves hierarchically. Individuals from the lower ranking subgroup will never enter a cage with animals from the dominant group, but they are, as a group, strong enough to defend their cage against dominant "intruders".

The family groups within the subgroups have their own hierarchic structure as well but are more tolerant to each other.

Breeding males are lowest in rank. They live in the periphery of the group and are "best friends" during the year. However in November, when the breeding season starts, friendliness is over and they has to be separated from each during the whole mating season to prevent serious fighting.

Other interesting observations that will be discussed are: forming of bachelor groups, babysitting behavior of female, and fertility-decrease by breeding males through the years.

Understanding the group dynamics better, Apenheul changed its surplus policy. Animals are only transferred to other zoos in complete "huddle groups" and not as individual animals. Breeding males have to be replaced every three years to ensure good breeding results and bachelor groups are formed at an early age.

The need for an evidence based approach to captive animal management

Vicky Melfi

Research & Conservation, Taronga Zoo, Australia.

v.melfi@zoo.nsw.gov.au

There are gaps in our knowledge, and thus approach to zoo animal welfare. Our knowledge of animal welfare is largely based on research undertaken to identify indicators of poor welfare. This means that we work towards managing zoo animals so that they do not exhibit these indicators. It is, however, over simplistic to presume that an absence of poor welfare equates to good welfare. Changes to housing and husbandry may improve conditions from impoverished to barely satisfactory, thus improving the animals' welfare but still not represent good welfare. An alternative approach, which could make a greater contribution to improving animal welfare, would be to manage zoo animals so that they express indicators representative of good welfare. This approach is currently hindered as there is a paucity of data which has identified indicators of good welfare.

Furthermore, our understanding of how the captive environment affects zoo animal welfare and the species studies are highly biased towards a small set of variables e.g. enclosure space, and great apes. There are many aspects of zoo animal management which have not been studied, or even recognized, as affecting animal welfare, e.g. climate, pinioning, keepers. Thus, their impact on welfare is not considered or understood, especially if animals do not express indicators of poor welfare. Finally,

there is a large taxon bias in our understanding of zoo animal welfare that we should acknowledge and work towards remedying.

The adoption of an evidence based framework would help fill the gaps in our knowledge about zoo animal welfare, and enable us to better meet the needs of zoo animals to ensure they have good welfare.

The Next Step: Breeding and Management of Proboscis Monkeys at the Singapore Zoo

Perumal Manivannan¹, Rachel Yeo²

¹Head Keeper, ²Junior Animal Management Officer

Singapore Zoo, 80 Mandai Lake Road, Singapore 729826

mani.perumal@wrs.com.sg; rachel.yeo@wrs.com.sg

For many years, zoos outside the natural range of proboscis monkeys (*Nasalis larvatus*) had experienced difficulties in maintaining and breeding the species in captivity. However for more than a decade, the Singapore Zoological Gardens has effectively maintained and bred proboscis monkeys in captivity. Currently, the Singapore Zoo collection consists of 15 specimens with 27 births since their arrival in 1998. The reasons for their successful maintenance and propagation can be attributed to the enclosures designed for their specific requirements, diet, and husbandry and management refined over the years. The two aviary type exhibits that house the primates for public display depict swamp habitats that are close to their natural habitat. The exhibits also provide enough space for the monkeys to retreat from visitors or from intra-group conflicts. The monkeys are housed in fully covered and secure night dens that protect them from the elements and predators. Squeeze and transport cages are also available to minimize stress during transfer and medical procedures. The monkeys are fed a staple diet of different plant species harvested daily from natural forests around the zoo, as well as vegetables, fruits and supplements. The breeding success of the pioneer proboscis monkey troop resulted in the creation of the bachelor group exhibit at Tree Tops Trail, creation of two separate breeding groups at the Primate Breeding Center and the transfer of three males to Apenheul Zoo, Holland in 2011.

The SECRET of Animal Training

Steve Martin

President, Natural Encounters, Inc. USA

SteveMartinNEI@aol.com

Animal training involves as much art as science. Though all good animal training has a solid foundation in the science of behavior, it is often the little things that we don't read in psychology or animal training books and papers that have the largest influence on our training practices. These are often things we do everyday in our training sessions but just don't talk about. Sometimes we don't even realize we are doing them at all until someone points them out. Sometimes we keep them to ourselves because they are not in the training protocol and we are not sure if we are supposed to do them or not. This paper will explore some of the most important, but often overlooked, elements of animal training.



Training and Conditioning for Improved Management and Enrichment of Spotted Hyenas, *Crocuta crocuta*, at Monarto Zoo

Anna Bennett

Acting Team Leader of Ungulates and Carnivores, Monarto Zoo, Australia

abennett@zoossa.com.au

Spotted hyenas (*Crocuta crocuta*) are one of the most misunderstood and misrepresented species; portrayed in documentaries as a scavenging, dirty and cowardly animal. They are found in various habitats throughout sub-Saharan Africa and live in matriarchal societies. Spotted hyenas are highly intelligent and this has been demonstrated in the Serengeti with 'puzzle boxes' (Holekamp et al. 2007) and 'cooperative problem solving' (Drea et al 2009). It is understandable that to the un-initiated, they may seem like an unworthy animal to be visited in a zoo. Monarto Zoo currently houses 2.2 spotted hyenas; however one year ago the zoo was home to 6.2. This meant that the facility was at capacity with 4 separate groups /individuals. Keepers began to have management issues of the species; mental and physical stresses on individuals, difficulties moving animals through raceways as well as some destruction of the facility. A training and conditioning program was established to combat some of these problems. The intelligence level of the hyenas became apparent when individuals offered new behaviours by only observing training sessions. Priority training behaviours were 'leg presentation' for hand injection, 'crate' training for upcoming transfers and gate and race desensitization. However it was not long before 22 behaviours had been established and keepers began to see changes in the way the species could be managed. Where previously a nervous animal would not readily move to a new area, now a more confident animal would cooperate with the keeper, saving time and stress. Wounds that occurred during recent introductions between new clan members were easily treated because of the training that had been put in place. In addition to husbandry and veterinary related behaviours, training for enrichment purposes has also been successful. Any opportunity for the general public to observe these training sessions has been encouraged. Watching the hyenas retrieve items or create 'paw paintings' has transformed their perception of the species forever.

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Walking the Walk;

Auckland Zoos' journey to become palm oil free

Carly Day

Senior Keeper Primates, Auckland Zoo, New Zealand

carly.day@aucklandcouncil.govt.nz

Not only are modern zoos essential centres for breeding programs, husbandry research and education, it has become increasingly important for us to start speaking out as advocates for the animals that we are safeguarding.

Modern zoos are supporting *in situ* conservation projects that are relevant to their animal collections, and in doing so are taking on the responsibility of protecting habitats for those animals.

Auckland Zoo in New Zealand holds several key species from South East Asia including Bornean orang-utans, Sumatran tigers, Asian small-clawed otters and Siamang Gibbons. We also hold Asian

elephant and white rhino, which act as ambassador species for their endangered counterparts in Sumatra, Borneo and Java.

In 2006, through discussions with individuals and organisations working *in situ* in Indonesia and Malaysia, primate keepers identified the production of palm oil as a significant conservation problem for orang-utans. A small working group of staff was established with the purpose of investigating this issue and attempting to make a difference by educating zoo visitors and partners and encouraging them to make informed choices.

With further investigation involving travel to Sumatra and building relationships with other institutions and conservation organisations, the urgency of the crisis facing orang-utans became apparent, and from the small beginnings of the palm oil committee came a passion that expanded zoo-wide to become one of the main focuses and campaigns run by Auckland Zoo.

Auckland Zoo is now on the journey to become a 100% palm oil free site, and aspires to spread this intention throughout partner organisations and other zoos nationally and internationally. We invite people to come on this journey with us.

Via petitions, online involvement, visitor encounters, targeted zoo events and seizing opportunities to engage media, Auckland Zoo has had a large impact on the awareness and empathy of the New Zealand public.

This paper talks about the set-up and growth of this advocacy program and how it has become part of Auckland Zoo's ethos, as well as serving as a "how to" guide for other institutions wishing to achieve the Palm Oil free goal.

Working together – Save the Drill in Cameroon

Kathrin Paulsen

Assistant head keeper, primates, Hanover Zoo, Germany

kathrin_paulsen@web.de

My name is Kathrin Paulsen.

I am the second head keeper of the ape and monkey section, which include drills (*Mandrillus leucophaeus*), at Hanover Zoo / Germany, where I've worked for the past 20 years.

There are only around 80 Drills in 19 Zoos outside of Africa.

The population is managed by Carsten Zehrer responsible for Europe, the SSP included 3 Zoos in USA and 2 in Japan is coordinated by Dr. Andreas Knieriem, both are located at Zoolog. Park Munich / Germany.

Drills are living in Nigeria, Southwest Cameroon, and on Bioko Island in groups of up to 30 or more members, consisting of several adult males, females, sub adults, and juveniles.

Logging, establishment of new settlements and hunting for "bushmeat" are the main reasons for the threat of extinction of the Drill.

Infants ("bushmeat orphans") are often purchased as pets.

Today, there are only approx.3000 individuals left in the wild and this population is continually critically endangered.

In 2004, some friends of the drill founded the Association "Save the Drill".



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Our goal is the promotion and preservation of drills in their natural environment.

One of the projects, which is supported by "Save the Drill" is the Limbe Wildlife Center in Cameroon. It is managed by the non profit organization "Pandrilus" and the government.

The center is home to more than 300 apes and monkeys in 17 domestic species – including a group of more than 80 Drills.

In this wildlife rescue and rehabilitation center, education, conservation and integration of the human population in environment plays an active and important role.

Hunting as well as keeping primates as pets is illegal in Cameroon. All the primates are confiscated by the government or "donated" from people, who are no longer able to keep sub-adult or adult primates as pets.

An important aspect for the center is the provision of information to the local people. There are a lot of educational possibilities for schools or interested groups. They teach lessons on a regular basis in schools and make excursions.

The center is a leading employer in this region. There are about 30 native workers with permanent jobs as keepers, veterinarians, gardeners, teachers and craftspersons.

Furthermore, the food for the animals is bought at the local market.

I visited the center in Limbe in March 2012 and I was part of an international team (from USA, Belgium, Spain and of course Cameroon).

I brought with me a donation of working clothes from Hanover Zoo, so that we could wear the same outfit and look like a real team.

Our main work was to rebuild a look-out tower, where visitors could watch the drills.

All the daily cleaning and feeding work with nice colleagues was a great experience.

Also, the veterinarians were more than happy with all the donations of medical products from my Zoo.

I took part in the schools outreach program on a day when more than 300 pupils visited the LWC.

At the end of my journey I was able to visit an area where drills could probably be released one day.

We hope and work on it together, that our dream will come true and the drills from the Limbe Wildlife Center will be back in their own habitat one day.

Zoo Leipzig, host of the 2015 ICZ Conference - an impression

Sebastian Schorr

Keeper, Zoo Leipzig, Germany

[*sebastian.schorr@gmx.net*](mailto:sebastian.schorr@gmx.net)

Zoo Leipzig, one of the oldest zoos in Europe, houses more than 850 species and covers 26 hectares. I want to introduce you to some of the most interesting animals and enclosures. We start in the oldest part of the zoo called Founder's Garden. Here you can find the Congress hall, venue of the ICZ 2015. Nearby you'll also find the aquarium. The next exhibit is the combined sloth bear and rhesus monkey enclosure, one of the first steps to the zoo of the future. By the way, Zoo Leipzig is one of the most successful breeders of these critically endangered bears and coordinates the EEP, as well as the ESBs for White Naped Crane and Dwarf Crocodile. Zoo Leipzig also publishes the International studbooks for Tiger, Anoa and Maned Wolf. When you continue your way through the park you'll pass some other interesting species such as Hyacinth Macaw, Palm Cockatoo, Giant Cloud Rat and King

Vulture. Next point of interest, with some stunning innovations like the underwater view of bathing elephants is „Ganesha Mandir”, the elephant-house. If you are lucky, you can catch here a glimpse of the only living Chinese Pangolins outside of Asia. Further on in the north-west corner of the zoo is the biggest ape-house in the world, Pongoland, covering more than 3 hectare and home to all 4 great ape species. Pongoland marked not only the beginning of the chance to the „zoo of the future”, it is also a world famous place for researches, due to the fact of the cooperation between Zoo Leipzig and the Max Planck Institute for Evolutionary Anthropology. More rare and notable species, living in Zoo Leipzig are Black Rhino, Musk Deer, Okapi, Lion-tailed macaque, Visaya Warty Pig.

Latest attraction, opened in 2011, is the Gondwanaland, a hall with the incredible size of 1,6 hectare for tropical animals and plants. Here you can observe a lot of inhabitants of the tropical rain forest such as Komodo Dragon, Tomistoma, Eastern Quoll, Giant Otter, Hamlyn’s monkey, Arapaima, Malayan Tapir, Southern Tamandua and Horseshoe Crab.

Zoo New England’s Keeper Training Program: One Example of a Successful Zookeeper Professional Development Program

Amanda Kamradt

Zookeeper, Zoo New England, USA

akamradt@zoonewengland.com; amanda.kamradt@aazk.org

As the profession of zookeeping continues to evolve, both keepers and managers alike are recognizing the value of standardized approaches to keeper training and education. Such approaches include professional workshops, classes, seminars, and conferences that help keepers develop the skills and knowledge necessary to execute their jobs effectively. These professional development opportunities provide a valuable complement to the learning experiences that keepers encounter in their daily jobs, and help to foster professional pride and excellence.

Zoo New England of Boston, Massachusetts has an award-winning zookeeper training program that provides staff with such professional development opportunities at their place of employment. The program has been praised for being both comprehensive in subject matter and convenient for staff participation. The core of the program is a three-level curriculum consisting of 36 classes. Each class is two hours in duration and consists of both lecture and interactive, hands-on activity. It is designed so that a keeper can graduate from all three levels in a three-year time period by attending just one two-hour class each month.

This presentation will include a descriptive overview of the program, as well as information on its development and execution. It is the author’s hope that this presentation will inspire delegates to explore possibilities for professional development at their institutions, as well as provide practical advice on how to initiate and execute such a program.

Zoological Horticulture

Brad Walker

Part-time Teacher, Richmond College of Tafe, Australia

brad.walker@tafensw.edu.au

This is a new course and a new opportunity for keepers of the plant and animal kingdom. Zoological Horticulture will bring many people of different backgrounds and many voices together. This combined knowledge and experience can contribute with one calling for Conservation.

At first light, temperatures slowly climb to reach an optimum to see the fluttering of the Richmond bird wing butterfly as it feeds on a Birdwing Vine *Aristolochia praevenosa*. During the day a high speed Scarlet honeyeater indulges on an oversupply of Grevillea nectar *Grevillea juniperina*. Late afternoon a slow moving Blue-tongue lizard takes shelter in a safe hide away after snacking on succulent berry like fruit of the twining herb *Einadia nutans*. After nightfall the busy Ring-tail possum majestically weaves a beautifully constructed dray (nest) in a large Swamp oak *Casuarina glace*. These are just a few wonderful relationships between plant and animal.

With increasing pressure on world resources, destruction of global habitat and decline of plants and animals all over the planet. More than ever, plant and animal enthusiasts need to come together and pool our knowledge in playing an equally important role towards looking after an ever increasing fractured Biodiversity.

Richmond College of Tafe NSW Australia understands the need to address these very issues. That is why we have created Zoological Horticulture. This is a course about the relationships and inter-relationships between plants and animals. This will be an online course that can be offered to plant and animal enthusiast through-out the world.

This presentation is an overview, course outline and describes the benefit for those participating.

ZSL's Successful Breeding Management and Reproductive Research Of Captive White-naped Mangabeys, *Cercocebus atys lunulatus*

Andrea Payne

Senior Keeper, ZSL London Zoo, UK

andrea.payne@zsl.org

In 2007 as part of ZSL flagship exhibit 'Gorilla Kingdom' a new group of primate species arrived at Regents Park – the critically endangered white naped mangabey.

The white-naped mangabey is listed as critically endangered according to the International Union for Conservation of Nature (IUCN). The species population, found in West Africa, is rapidly declining due to the pressure of hunting and habitat loss. The IUCN state the population has reduced by 50% if not more in the last 27 years. Therefore the species must turn to captive populations as a means of survival.

The ZSL group was formed of a female from Barcelona – Bella, a female from Germany – Leonie and a male – Lucky - from the Endangered Primate Centre in Accra Ghana.

As a captive species, the rate of neonatal death is threateningly high therefore successful breeding was paramount for ZSL. Recording methods were designed and implemented and keepers undertook careful and concise monitoring of the animals oestrus cycles. Using the recording methods keepers

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were able to predict due dates and monitor pregnancy – making informed decisions regarding husbandry, diet, management and veterinary decisions maintaining the highest welfare for the animals.

Keepers believe the use of such monitoring is a key factor in how such a successful group the ZSL white-naped mangabey group have now produced 4 offspring in the last 4 years and Bella having a 100% successful births, the only female in Europe to do so.

The reliability of this monitoring came into use most prominently in 2008 when Leonie was due to give birth. Keepers had calculated her birth date and around this date early morning checks were being carried out. It was at this point keepers observed Leonie in distress. In the knowledge that Leonie was pregnant and being left could be fatal to her and the unborn infant the decision was made to intervene and c-section was performed. Unfortunately after surgery Leonie rejected the infant. Due to the IUCN status, Conchita was hand reared.

The delicate process of handrearing was successful and Conchita was reintroduced back to the group after 3 months. She made excellent social progress and in October of this year was transferred to her own breeding group in Germany where she has already been accepted and mated. Germany is now following ZSL's recording methods and will hopefully have the same success London has had with Conchita.

Without this knowledge, other veterinary advice may have been given and both Conchita and Leonie could have become another statistic. Therefore a ZSL keeper has for the past 4 years been conducting a pioneering research project across Europe to investigate the high rate of neonatal deaths in captivity and promote effective record keeping.

Preliminary data was collected from 6 zoological collections; studying 9 females across Europe. Data collected examined a number of factors which could cause high rates of neonatal death. The data from all females was compared and correlated and theories were discussed as to a common cause. A number of hypotheses were ascertained which now ZSL intends to explore further incorporating all European collections as well as ex-situ projects with the West African Primate Conservation Action in West Africa.

This ZSL project aims to promote collections, keepers and management, working together, sharing information and data in order to improve the overall welfare of the animals in their collections and also increase the breeding rate and ultimately improve the chance of the white-naped mangabey surviving in captivity.

Keynote Presenter Biographies

Guest of Honour at the Fourth Conference of the International Congress of Zookeepers, hosted by Wildlife Reserves Singapore



Ms. Claire Chiang, Senior Vice President, Banyan Tree Holdings, is a co-founder of Banyan Tree Hotels & Resorts, a leading developer and manager of premium resorts, urban hotels and destination spas around the world. She pioneered the group's retail business in 1996 and has since overseen the launch of more than 80 retail outlets worldwide.

As part of Banyan Tree's strategic focus on human capital development, Ms. Chiang assumed two new roles in 2010 – chairperson for China Business Development, where she primarily focuses on the acquisition of new management contracts, and chairperson of the Human Capital Development Task Force, where she oversees key strategic issues in organisational and human capital capability.

Ms. Chiang is also the chairperson of Banyan Tree Global Foundation which was established in early 2009 by Banyan Tree Holdings. Her role involves directing and guiding the evolving process of the group's commitment to corporate social responsibility and its mission to "Embrace the Environment, Empower the People". She also sits on the Global Governing Board of Caux Round Table (CRT) - an international network of principled business leaders working to promote sustainable capitalism - where she is Vice-Chair for Asia.

Ms. Chiang is married to Mr. Ho Kwon Ping, Executive Chairman of Banyan Tree Holdings. She is the mother of three children aged 29, 26, and 17.

Ms. Chiang was an Arts and Social Sciences graduate (Honours) at the University of Singapore (1971-74), the present day National University of Singapore. In the early 80s, Ms. Chiang conducted intensive sociological fieldwork on factory workers and industrial relations in Hong Kong while completing her Master of Philosophy (Sociology) degree. During 1982 - 1990, she lectured in the Sociology Department of the National University of Singapore and continued research work in the Centre for Advanced Studies from 1990 to 1994.

She co-authored the book "Stepping Out: The Making of Chinese Entrepreneurs" which was published in 1994 by Simon and Schuster and translated into Chinese and Japanese. The publication garnered a National Council Book Award and spawned a 30-chapter Chinese-language television drama in Singapore that won five broadcast awards.

Ms. Chiang was one of the first two women in 89 years to be elected to the Board of the Singapore Chinese Chamber of Commerce and Industry and was awarded in 1998 as a "Woman of the Year" for her contribution to the community. She served as a Singapore Nominated Member of Parliament for two terms (1997-2001) where she raised many policy issues related to the social service sector, women, family, education and the disadvantaged. In 2009, she was recognised by The International Alliance for Women's "World of Difference 100" Awards for championing village-based entrepreneurship.

Her government portfolios include chairing the Employer Alliance and being a member of the Tripartite Committee on Work-Life Strategy, appointments made by the Singapore Ministry of Manpower to encourage work flexibility and new workplace practices. She was also the Co-Chairperson for the Pro-Family Business Council (2005 – 2011), the Partner Connection Fund (2006 - 2011), and an Advisor for Romancing Singapore (2003 – 2005) under the charge of the Ministry of Community Development, Youth and Sports.

An interested learner and educator, Ms. Chiang is a member of the Board of Governors of Raffles Girls' Secondary School. She continues to serve as a volunteer with Help Every Lone Parent (HELP), Rotary Club of Suntec City and People's Association (PA) in Singapore. She is a member of the Singapore General Hospital Medifund Committee, and serves as a mentor for the Young Women's Leadership Connection mentorship programme which engages young female leaders in mentorship, networking, leadership development, and community engagement.

Keynote Presenter Biographies

She was also appointed Director and Non-Executive Chairperson of Wildlife Reserves Singapore, and chairperson of Wildlife Reserves Singapore Conservation Fund.

In 2008, Ms. Chiang was awarded a Pingat Bakti Masyarakat (Public Service Medal) during Singapore's National Day Awards and was the inaugural Singapore Innovation Park Fellow Award. In the same year, she was formally appointed as a Justice of the Peace by Singapore President SR Nathan to exercise such powers and to perform such duties as may be conferred on them by any law. This was followed by her appointment to the Board of Visiting Justices in 2010.

In April 2009, Ms. Chiang, together with Mr. Ho Kwon Ping, was a joint recipient of the Hospitality Lifetime Achievement Award at the annual China Hotel Investment Summit. The award was presented to honour outstanding individuals for a lifetime of extraordinary leadership, accomplishments and contributions to the hospitality industry.

In 2011, Ms. Chiang introduced her biography, "My Journey and After," a 768-page book in Chinese that profiles her journey as a woman from childhood through adulthood, marriage, motherhood, community engagement, politics and business. Written with notable Singaporean journalist Poon Sing Wah, "My Journey" is peppered with black-and-white and colour photography and Chinese calligraphy, and is an engaging, instructive read on Asian values, Singaporean history, and one woman's passage through various seminal phases of her life. Following an initial print run in late 2011 which promptly sold out, the book was re-printed in early 2012. All proceeds go to the National Book Development Council of Singapore to support the Asian Festival of Children's Content, which encourages Asian writers and publishing professionals from first-time authors to seasoned professionals.

Ms. Chiang's affiliations include:

- Appointment by the President, S R Nathan
- Justice of the Peace
- Appointment by Ministry of Home Affairs
 - o Board of Visiting Justices and Board of Inspection
- Appointment by Wildlife Reserves Singapore
 - o Director, Non-Executive Chairperson, Wildlife Reserves Singapore
 - o Chairperson, Wildlife Reserves Singapore Conservation Fund
- Appointment by Ministry of Education (MOE)
- Member, Board of Governors of Raffles Girls' Secondary School
- Appointment by Ministry of Manpower (MOM)
 - o Chairperson, Employer Alliance
 - o Member, Tripartite Committee on Work-Life Strategy
- Member, Singapore General Hospital Medifund Committee, SingHealth Group
- Member, People's Association
 - o Talents Advisory Council 2009-2011
- Mentor, Young Women's Leadership Connection mentorship programme 2010 – 2011, part of the People's Association network
- Chairperson, Shirin Fozdar Trust Fund (SFTF), Wee Kim Wee Centre, SMU
- Patron and Advisor, Help Family Service Centre (HELP)
- Member, Advisory Council, National Committee for United Nations Development Fund for Women (UNIFEM), Singapore
- Honorary Council Member, Singapore Chinese Chamber of Commerce and Industry

Keynote Presenter Biographies

Her awards include:

- **Louis Féraud Les Honours 1996**

Outstanding Achievements in the Business category

- **Her World “Women of the Year” 1999**

- **Rotary Club of Suntec City “Rotarian of the Year” 2000/2001**

- **2003 PATA Gold Awards**

Gold Award - Heritage (Banyan Tree & Angsana Gallery)

- **2004 PATA Gold Awards**

Grand Award – Heritage (Museum Shop by Banyan Tree)

- **2006 Friends of MCYS Award**

by the Ministry of Community, Youth and Sports, Singapore

- **2006 MCYS Contribution Award**

by the Ministry of Community, Youth and Sports, Singapore

- **2008 Pingat Bakti Masyarakat (Public Service Medal)**

by the government of Singapore

- **Global Leadership & Mentoring Congress 2008 “Leader Mentor Award”**

- **Singapore Tatler Leadership Award 2010**

Joint recipient of “Leadership for the Environment” award with Mr Ho Kwon Ping

- **Outstanding Volunteer Award 2011**

by the Ministry of Community, Youth and Sports, Singapore

Professor Leo TAN Wee Hin

Keynote Speaker at the Fourth Conference of the International Congress of Zookeepers, hosted by Wildlife Reserves Singapore

Academic/Professional Qualifications

Tertiary level : 1968 University of Singapore BSc

1969 University of Singapore BSc Hons

1974 University of Singapore PhD

Specialisation : Marine Biology & Ecology

Honorary Degree: 2003 Loughborough University DSc

Professional Organisations/Activities

Prof Tan sat on several Boards and International Organisations including the National Parks Board (Chairman, 1998 - 2007), National Institute of Education Council (Member, 1994 - 2006), Nanyang Technological University Council (Member, 1993 - 2006), Federation of Asian Scientific Academies and Societies (President, 1999 - 2003 and now Immediate Past President), Pacific Science Association Committee on Science Communication and Education (Chairman, 2003 -) and the Science Council of Asia (Founder Member, 2000 - 2003). He is President of the Singapore National Academy of Science (1992 -), Chairman of the National Youth Achievement Award Council (1995 -), Chairman of the

Keynote Presenter Biographies

Singapore Garden City Fund (2006 -), Chairman of Singapore Technologies Endowment Programme (2007 -), Chairman of the National Science Challenge Steering Committee (2007 -) and Chairman of the Science Sub-Commission of the Singapore National Commission for UNESCO (2007 -). He represents Singapore as Governor on the Asia-Europe Foundation (2009 -).

In 2003/2004, he was Chair of the Task Force to establish the School of Physical and Mathematical Sciences for Nanyang Technological University.

Scholarships

1969-72 Graduate Research Scholarship, University of Singapore

Working Experience

Oct 1973 Mar 1974 Senior Tutor, University of Singapore

Apr 1974 Dec 1981 Lecturer, University of Singapore

Jan 1982 Oct 1986 Senior Lecturer, National University of Singapore

Apr 1982 Feb 1991 Director & CEO, Singapore Science Centre

Feb 1991 Dec 1991 Associate Professor, NIE/NTU

Mar 1991 Jan 1994 Head, Biological Sciences Dept, NIE/NTU

Mar 1991 Jun 2000 Foundation Dean, School of Science, NIE/NTU

Jan 1992 Nov 2008 Professor, NIE/NTU

Feb 1994 Oct 2006 Director, NIE/NTU

Nov 2006 Nov 2008 Professor, Natural Sciences & Science Education Academic Group, NIE/NTU

Nov 2008 on Professor, Department of Biological Sciences, NUS

Nov 2008 on Director (Special Projects), Faculty of Science, NUS

Research Interests

A marine biologist by training, Prof Leo Tan has a 40+ year career that covers biology, ecology, museum science, education and administration. His teaching and research interests include marine aquaculture and ecology, science communication and education and environmental studies. He has numerous publications in learned journals, including SCIENCE and NATURE. Because of Prof Tan's broad knowledge, expertise and being well regarded in the education circle, he has been regularly invited as either a Keynote or Plenary Speaker at International Conferences.

He is now involved in a three-year research study on Singapore's first landfill at Semakau to survey the biodiversity of the mangroves, intertidal zone, seagrass beds and all the flora and fauna therein. This work is spearheaded by the Raffles Museum of Biodiversity Research (RMBR) of the NUS. This study is funded by HSBC and supported by the National Environment Agency.

Passion for Education & Youths

Prof Leo Tan's interest in the education of school teachers and students began in the University of Singapore where he conducted marine ecology courses (on a voluntary basis) for teachers. This interest continued at the Singapore Science Centre (SSC) where as Director and CEO, he promoted consciousness and understanding among students and the general public of the relevance of science and technology in their everyday lives, through non-formal science education and experiential learning. By the time he left the Science Centre, it was hailed one of the top science museums in the world by the International Council of Museums.

As a full-time teacher educator and administrator, Prof Tan had overall responsibility for the training of teachers from initial to in-service, including the flagship research and leadership programmes in NIE. He now serves as a consultant to NIE external projects both in Singapore and abroad. Under his



Keynote Presenter Biographies

leadership, NIE grew to become a teacher education institution of distinction, regarded by many of its peers in countries such as the UK, USA and Australia as one of the top such institutions in the world. NIE became turnkey consultants to Abu Dhabi (2002) and Bahrain (2007) to establish Colleges of Education based on the NIE model.

Prof Tan has been involved with youth and in youth activities for almost four decades as an educator of youth at NUS (1973 to 1982), at SSC (1982 to 1991) and at NIE (1991 to 2008); and as a facilitator/supporter of youth in the Annual Singapore Youth Science Fortnight for all Singapore school students and Asia Pacific participants (1982 to 1991); National Youth Service Awards Panel (1982 to 2007), the Sunburst Youth Camp for ASEAN and Asian participants(1999 to present) and the National Youth Achievement Award Council (1992 to the present).

He now promotes the importance of science communication to teachers, journalists and all who have to explain science and technology to their respective audiences and the public through a unique joint Master degree from the NUS and the Australian National University. The Science Centre Singapore is a partner.

Awards/Fellowships

- UNESCO/JAPAN Marine Sciences Fellowship, Hokkaido University
- UNESCO/ROCKEFELLER FOUNDATION Marine Sciences Fellowship, Duke University
- ICRO/UNESCO Biotechnology Fellowship, Indian Institute of Science
- Australian Government Cultural Award in Scientific Exchanges
- NZ-ASEAN Exchange Programme Award (Academic)
- 1985, 1992, 2002 French Government Scientific Exchange Award
- Singapore National Day Award, The Public Administration Medal (Gold)
- Singapore National Day Award, the Public Service Medal (PBM)
- Singapore Ministry of the Environment Green Leaf Award
- The NSTB (A*STAR) National Science & Technology Medal
- The Singapore Institute of Biology Fellowship
- Singapore National Day Award, the Public Service Star (BBM)
- The French National Order of Merit (Officer)
- The Singapore Institute of Biology Honorary Fellowship
- The Japanese Chamber of Commerce & Industry Singapore Foundation Inaugural Long Service Award
- Singapore Ministry of the Environment and Water Resources, Singapore Green Plan 2012 Award
- The National University of Singapore Distinguished Science Alumni Award
- “Distinguished Friend of Ngee Ann” Award
- Singapore National Day Award, The Public Administration Medal (Gold)(Bar)
- The President’s Award for the Environment
- NUS Faculty of Science Outstanding Science Entrepreneur Award
- Singapore National Institute of Chemistry Distinguished Service Award

Steve Martin
President, Natural Encounters, Inc. Florida, USA

Keynote Speaker at the Fourth Conference of the International Congress of Zookeepers, hosted by Wildlife Reserves Singapore

s.martinnei@me.com

Steve Martin is President of Natural Encounters, Inc. (NEI), a company of over 30 professional trainers who produce and present educational animal programs at zoological facilities in the US and internationally. He has served as an animal behavior and visitor experience consultant for over 85 zoological facilities around the world. Steve is an instructor at the AZA Animal Training School, an instructor at the Elephant Management School in Hamburg Germany, a Trustee with the World Parrot Trust, President of the International Association of Avian Trainers and Educators, and President of Natural Encounters Conservation Fund, Inc. a company dedicated to raising money for in situ conservation programs. Steve Martin has a strong commitment to conservation and helping people understand their relationship with the living earth. The Mission Statement of NEI is "Connecting Humans With The Natural World" and Earth Day is an official holiday for all NEI employees.

AICAS Animal Welfare Group

(Asociación Ibérica de Cuidadores de Animales Salvajes)

bienestaranimalaicas@gmail.com or bienestaranimal@aicas.org

Raúl Cabrera

Is a Biologist by Barcelona University (UB) and works with primates since 1997.

He has been working in different zoos and primate rehabilitation centres, both in captivity and in the wild.

He has also participated on different primate conservation and educational activities such as workshop courses, conferences, amongst others..., and is constantly implicated on fundraising for different primate conservation projects.

Related to AICAS, he is involved since the beginning, as a Vowel of Magazine Editing Committee for several years.

Núria Moreno

Is a Biologist by Barcelona University (UB) and has coursed studies on Environmental Technical Management. She practiced at Barcelona Aquarium, Water Catalana Agency and Waste Regional Company.

She has worked as Enviromental Educator for 4 years on the Natural Reserve of Llobregat's Delta River (Barcelona), and since 2005 works at Barcelona Zoo (BCN Zoo) as a Mammal Keeper.

She collaborates with diving centres teaching Mediterranean Marine Biology, and is involved with AICAS since 2006 in different groups as Magazine Editing Committee and Congresses.

Aurora Pazos

Is a Biologist by Barcelona University (UAB), coursed a Master Course in Biodiversity and got licensed as CAP (Pedagogical Aptitude Certification).

She is working in the Education Department of BCN Zoo since 2001. Also she has worked as keeper volunteer with primates at Mona Foundation during 3 years.

She collaborates with AICAS since 2005, as vowel of Education Group, member of Magazine Editing Committee and Secretary of Learning Group.

Also working with the Zoological Department of UAB on studies of Geometric Morphology and Modularity in domestic mouse.

She has participated in different training activities and congresses, also involved on preparation of them.

Belén Sinués

Is a Biologist by Navarra University, where she also got licensed as CAP. She got her practices in Madrid, zoo-Aquarium and Lille Parc Zoologique (France).

Also has got licensed as Veterinary Assistant at ISED.

She has worked as animal keeper at Faunia (Madrid) and from 2003 she is working at Senda Viva Park (Navarra).

Also volunteering collaborations at Wildlife Rescue Centres of Grefa (Madrid) and Ilundain (Navarra) and assisted several congresses, talks and conferences related with fauna, management and conservation.

She is a member of AICAS since 2005 and currently Navarra's region AICAS representative. Also member of its Magazine Editing Committee.

Alex Droma

Lead rhino keeper, Uganda Wildlife Education Centre, Uganda

alexdroma@hotmail.com; dromacoldplay@gmail.com

I was born at Nsambya hospital on the outskirts of Kampala which is the capital city of Uganda to Mr. Kasamba Abelu Moses, and Mrs. Amara Janet on 3rd March 1974. We lived in Kampala for two years before my parents moved to Entebbe which is 41km south of Kampala on the shores of Lake Victoria. My father was in the Army and my mother was a house wife during the regime of Idi Amin. My father was polygamous and had many wives. I'm the only child of my mother. I grew up with my late step brother whose mother died when he was one year old and he was brought to my mother to be taken care of and therefore, we were very close.

In 1979, Idi Amin's government was overthrown by a combined force of the Tanzanian Army and that of Ugandans living in exile. Our family was forced to flee back to our ancestral home in the West Nile district of Arua. I had barely completed my second year at kindergarten. This was my first time in my village as everything seemed very strange to me. There was no electricity, tap water, flush toilet, sugar, television, and all the good things associated with city life.

Our family was continuously being persecuted by the Obote government that took over from the Idi Amin regime, and this forced us in to exile in the neighboring country, then Zaire which is now known as the Democratic Republic of Congo (D.R.C). My life then kept revolving around running between DRC and Uganda. Life in the Congo was even worse. Finally my father gave in to the Obote government and was arrested and jailed in 1981 so his family could return and live peacefully at home.

While in jail, my father contacted my uncle who was living in Entebbe to pick me up from the village and take care of me. I enrolled back in primary school and my uncle paid my school fees and my dad offered him cows in return since my family did not have cash. My uncle took care of me throughout my school life. My mother lived in the village while my father was away in jail. I missed my mother and step brother who remained in the village so much and of course my dad. My uncle was a conservationist who was in charge of all wildlife reserves in Uganda which inspired me to love animals and nature.

I'm married to Ayikoru Molly who graduated with a bachelors degree in education and she is a high school teacher specialized in History and Divinity while I'm a graduate of wildlife and natural resource management, and currently a third year student of environmental sciences and management. God blessed us with two beautiful daughters, Nicole Droma, who is 3 years and Zilla Droma who is 7 months old. Unfortunately I'm a person who did not grow up with my parents from the age of eight and so did not experience much of parental love and would therefore; dedicate all the love I missed from childhood to Nicole and Zilla. I'm currently working for the Uganda wildlife Education Centre as an Animal care giver/ biologist.

While away from work, my wife and I provide water filters to schools and communities on the country side who have no access to safe and clean drinking water. I get the filters from an American friend who works for an NGO called "Rain Catcher". The company buys these filters and distributes them free of charge to most of the developing countries including Uganda. I also support disabled children from my village to access hospitals for medical attention, and also provide them with second hand clothes from friends in the United States. I also organize tours and safaris to the major tourist destinations in Uganda and personally get involved in the guiding and interpretation component.

My hobbies include playing and watching soccer games, bird watching, travelling, listening to music, reading magazines and news papers, watching movies, making friends and I love to hang out with my family and friends.



Presenter Biographies

Amanda Kamradt

Zookeeper, Zoo New England, USA

akamradt@zoonewengland.com; amanda.kamradt@aazk.org

Amanda has been a zookeeper since 2006, and has worked for Zoo New England since 2009. She has been an active member of the American Association of Zoo Keepers for the duration of her career, serving as founding Co-Chair of its Conservation Committee since 2007, as a member of its Bylaws Committee since 2010, and as the current Treasurer of the New England Chapter. Amanda has previously worked at the Lincoln Park Zoo in Chicago and at the Houston Zoo in Texas, and has worked with a variety of animal taxa throughout her career. She is a native of the Chicago area, and holds Bachelor's degrees in Zoology and Psychology from Southern Illinois University.

Amanda Pemberton

Taronga Conservation Society of Australia and Charles Sturt University, Australia

amandajunepemberton@gmail.com

Amanda Pemberton obtained her bachelor of Animal Science from the school of Animal and Veterinary Science at Charles Sturt University in 2011. She is currently a Ph.D student under the supervision of Rafael Freire, Vicky Melfi and Margaret Hawkins. Her Research is centred on animal welfare with particular interest in positive emotional states in animals.

Andrea Payne

Senior Keeper, ZSL London Zoo, UK

andrea.payne@zsl.org

A Senior Keeper at London Zoo, Andrea has been working at ZSL since 2005 as part of the large Mammal section, looking after hoofstock; (Camels, pygmy hippos and bearded pigs), Primates; (Spider monkeys, Macaques, Diana monkeys and White-naped Mangabeys) and big cats; (Sumatran Tigers, Asiatic Lions and Servals).

Andrea has many responsibilities within her section. She partakes in a number of animal behavioural training programmes, including the conditioning of a Diana monkey to receive insulin injections to manage the animals diabetes treatment. As well as working with the tigers to obtain conscious blood samples from the tail. She mentors visiting students who are studying animals on section and is a point of contact for most primate related matters.

Andrea monitors the reproduction on the section and completes monthly reports for management so that informed decisions can be made on animal issues, this includes highlighting surplus animals and those that need to move as part of the EEP.

One of Andrea's career highlights came when she completed the delicate task of hand rearing an endangered White-naped Managbey. Not only was the animal successfully accepted back into the group in London through a careful reintroduction process but also as part of the EEP the individual moved to Germany, which Andrea oversaw, to form a new breeding group. Andrea regularly continues to give advice to others who are hand rearing and on the management of the reproduction of this species.

Presenter Biographies

Andrea is involved with the EAZA OWM Taxon Advisory Group and has recently been involved with the updating of the Mangabey Husbandry Guidelines.

Andrea has completed research examining neonatal deaths in captive White-naped Mangabeys. This has involved collecting data at a number of collections in Europe as well as spending a month in Ghana at the WAPCA Endangered Primate Centre. Andrea continues to work on this project and hopes to complete it as part of a Phd.

Andrea has been awarded the ZSL Conservation Fund and was short listed for the BIAZA Conservation Fund.

In 2012 Andrea was part of a television documentary about the zoo, she was followed by a camera crew for 8 weeks filming her work. She also has a number of You Tube videos following her hand rearing story.

Anil Bisht

Quarantine Management Officer

Singapore Zoo, Singapore

[*anil.bisht@wrs.com.sg*](mailto:anil.bisht@wrs.com.sg)

Born and raised in India, I was given the opportunity to reveal the wonders of the forests to people from all around the world in 1993 whilst working as Naturalist for the first Asian national park – Corbett Tiger Reserve. After a decade or so of service, and upon completion of my Masters in Tourism Administration, another opportunity came along, this time, with Kanha Tiger Reserves in 1999, where I was given the chance to develop the company's community-based projects. My passion for wildlife then brought me, to South Africa, where I was the first Indian who was selected for the CC Africa (now known as and beyond) ranger training course in 2002.

Finally, in 2004, I migrated to the tiny red dot of Singapore, and called it home. As a self-confessed general naturalist with a strong interest in Birding and Animal Behaviour, I continued my learning journey by joining the Singapore Zoo in 2006. Despite the many years of service in the games reserves and zoo wildlife tourism industry, my passion for nature has never ceased, and my job has always been my biggest hobby.

Anna Bennett

Acting Team Leader of Ungulates and Carnivores,

Monarto Zoo, Australia

[*abennett@zoossa.com.au*](mailto:abennett@zoossa.com.au)

- Studied a Bachelor of Natural Resource Management at Adelaide University in 1999
- Worked at Adelaide Zoo for 5 years, mostly in the Reptile Department
- Began work at Monarto Zoo (Open Range) in 2005 and began working in Carnivore Section.
- Became Senior Keeper of Carnivores, Monarto Zoo in 2009
- Became Team Leader of Ungulates and Carnivores, Monarto Zoo in 2011
- Spent time in southern Namibia, Africa, collaring Brown Hyenas in the desert in 2011. Volunteering with The Brown Hyena Project.



Presenter Biographies

- Lives in the Adelaide Hills in her 'Owner Built' house (took 18 months to design and build). Enjoys travelling, reading, gaining greater understanding on animals and their wellbeing, training and conditioning and in situ conservation programs.

Baiju Raj

Wildlife Biologist & Administrator,

Agra Bear Rescue Facility, India

baiju@wildlifesos.org, baijuwildlife@gmail.com

Educational Qualification

- Bachelor of Science in Zoology – Govt. College Kasaragod, (Kannur University)
 - o Specialization- Fisheries and Aquaculture
 - o Project work - *Snakes of Kasaragod District*
- Post Graduate Diploma in Environmental Science- Mangalore University Campus (Mangalore University Year 2002- 03) Specialization- Wildlife
 - o (Project work - *Birds of Kudremukh National Park*)
- Master of Science in Marine Geology- .Mangalore University Campus (Mangalore University Year 2003-05) Specialization- Oceanography

Currently working

- Wildlife Biologist- Administrator - Agra Bear Rescue Facility which is having a population of 270 rescued sloth bears and over 70 staffs.

Duties & Responsibilities

Agra Bear Rescue Facility is situated inside Soor Sarovar Bird Sanctuary covering an area of 120 Acres. Centre is home for 270 rescued sloth bears, snakes, monkeys, hyenas, langurs etc. Elephant rescue centre have 4 rescued elephants.

- Coordinating day today activities of both the Bear Rescue Centers as well as Elephant Rescue Centre (Overall management).
- Routine check of all the enclosures as well as the projects once in a day, keeper management, purchase coordination, coordination and design of construction including dens, towers and animal enrichments.
- Wildlife Rescue in and around Agra, Mathura and neighboring Districts in coordination with Forest Department, Administration Department, Police Department and Public.
- Public relation coordination with all the higher officials of the District including Commissioner, District Magistrate and Senior Superintendent of Police.
- Print and Mass Media coordination for news coverage and wildlife awareness.
- Coordination and facilitation of all officers visit to the centre.
- Monitoring of community development programs for the ex bear dancers (Kalandars), the snake charmers.
- Awareness programs / lectures for the State forest officers including IFS officers.
- Conducting awareness programs for the colleges and schools

Presenter Biographies

- Conducting hands on training for Forest Ranger trainees for reptiles and other animal rescues. {Both theoretical & Practical}
- Designing skills in Photoshop. (for leaflets, hoarding, boards etc)
- Conducting surveys for Forest department like GPS Mapping, Area survey, Species diversity.
- Scientific proposal drafting for the projects with budget and break down estimates.

Skills & Talents

- Involved with wild animals and snakes from the age of 3 as father was a herpetologist who had conducted several snake awareness programs in India and many countries.
- Rescued and handled majority of the non venomous and venomous snakes including king cobras in the wild and captivity.
- Organized and had conducted reptile awareness programs and hands on training in many states across the country for forest officials, zoo keepers, corporate, colleges, schools and public.
- Hand reared (foster care) wild animals like crocodile, jungle cats, jackals, civets, birds, snakes at home for forest department and biological parks.
- Hand reared hyena and bears for the organization.

Involvement in Wildlife field

- State Science Fair – (In 9th Standard) a study on the effect and symptoms in blood when snake venom is induced or injected.
- Voluntary service to Kerala and Karnataka forest department for wildlife rescue in and around the state.
- Rescue and release of all wild animals (mainly reptiles) to minimize man animal conflict in and around the district.
- 2004- Rescued Crocodile from a School pond in Kottayam District, Kerala in coordination with Wildlife SOS

Joined Wildlife SOS in 2005 as Field Biologist

- Rescue coordinator of Wildlife SOS Wildlife rescue cell.
- Dancing Bear survey and surrender including microchipping of the Bears.
- Setting of Bear Rescue Facilities
- Forest department surveys
- Antipoaching operations in collaboration with Forest Department and Special Task Force.
- Survey and Microchipping of Captive elephants of New Delhi.
- Survey, Study and control of animal menace in Indira Gandhi International Airport, New Delhi. Rescue and translocation of animals including Blue Bulls, Jackals, Civets, Mongoose, Snakes etc to their natural habitats.
- Coordinated and surrendered more than 150 bears for Wildlife SOS from the Gypsies through out India.

Achievements

- Brave Child Award from President of India- 1980.
- Appreciation certificate from Mr. Anil Salunke, Director & CPIO, Government of India, Ministry of Communication & IT Department of Post, New Delhi for Rescuing Snakes.- 2007

Presenter Biographies

- Appreciation certificate from Dr. G. Sudhakar Deputy Conservator of Forests, National Chambal Sanctuary Project for helping Forest Department in Gharial mass death crisis in Chambal River, Uttar Pradesh- 2007
- Appreciation certificate from Wildlife Institute of India for a lecture on *Marking of Animal*- 2007
- Appreciation certificate from Wildlife Institute of India for a lecture on *Wildlife Rescue and their Management in Captivity*- 2011
- Appreciation certificate from Wildlife Institute of India for a lecture on *Captive Management of Rescued Bears*- 2012

Research & Publications

- *A study on Impact & Disturbances of Flood on the Reptilian Habitat* (Snakes & Monitor Lizards) 2011
- *Hand rearing of a hyena pup in Rescue Facility* in International Wildlife conference held in Chennai in 2010.
- *A Study on Rescue and translocation of Wildlife* within Indira Gandhi International Airport- 2006-2007
- *Survey on Snake Charmers of Agra District* for Uttar Pradesh Rural Development Department & Forest Department. – 2006
- *Status Distribution and threats of Himalayan Black Bear and Musk Deer in Govind Pashu Vihar Sanctuary and National Park* Uttarakhand- 2005

Recent Activities

- Visited Phnom Tamao Zoological Park and Wildlife Rescue Centre, Cambodia to attend Enrichment and Animal Training Workshop for 10 days.
- February 2012- In Tamao Zoological Park and Wildlife Rescue Centre, Cambodia Helped Fauna and Flora International, captured (physical restrain) 15 Siamese Crocodiles from enclosures for Blood sample analysis and tagging.

Brad Walker

Part-time Teacher, Richmond College of Tafe, Australia

brad.walker@tafensw.edu.au

Over the past 5 years Brad has contributed to the Animal Care Department at Richmond College of TAFE as a Teacher/Trainer of Animal Studies Certificate II and Captive Animals Certificates III and IV.

Brad has an extensive herpetology, reptile keeping and private zoo background. Brad has been a private reptile keeper and breeder for 25 plus years. A distinguished Author writing a chapter in Australian Pythons of Australia by Mike Swan. He has assisted Debbie Andrew from the Threatened species unit of New South Wales National Parks & Wildlife Service in the publication of the Captive Management of the Tiger Quoll *Dasyurus maculatus*. Brad was the Senior Curator at Featherdale Wildlife Park NSW for 18 years. He has completed a Diploma in Landscape Design and has a fascination for plants. Brad has been running his own business, AFS, Australian Fauna Supplies where he designs and constructs exhibits for the Zoo industry and for private individuals. A Member of the Society of Frog and Reptiles Inc NSW. A Member of the Australasian Society of Zoo Keeping.

Brad and his family have owner built their own solar passive mud brick home and all strive to live a sustainable life on acreage in the Hawkesbury region, North West of Sydney, NSW Australia.

Presenter Biographies

Brad is a passionate Naturalist that delights in the pleasure of filming, reflecting and teaching students and the public about nature. Brad is an experienced Zookeeper/Curator and has a specialised knowledge in Australian native plants and animals.

Carly Day

Senior Keeper Primates, Auckland Zoo, New Zealand

carly.day@aucklandcouncil.govt.nz

After working as a Veterinary Nurse in domestic animal private practice, Carly joined the Auckland Zoo team in 2004 on the Exotic Birds Section. After two years working with a range of exotic bird species and Australian mammals, Carly rotated to the Primates Section where she has worked for the last 5 years. With a particular passion for Orangutans, she became involved in Auckland Zoo's Palm Oil committee and is now chair of this initiative within the zoo. As an active member of Auckland Zoo's Conservation Fund committee, Carly is involved in both ex situ and in situ conservation, and was lucky enough to spend a month in Sumatra in 2009 working with the Sumatran Orangutan Conservation Programme.

Cecilia Tang

Junior Animal Management Officer, Night Safari, Singapore

cecilia.tang@wrs.com.sg

I was given the wonderful opportunity to carry out my Final Year Project at Night Safari Leopard Trail during my university days, observing the behavior of the pair of elusive and beautiful *Neofelis nebulosa*. I then returned to the Night Safari family in September 2011, this time as a Junior Animal Management Officer. I enjoyed every bit of my eight-month rotation, learning about all the animals in our collection. I love it that I am able to see our animals on the days I work, to take care of them, spend time with them, learn about them and bond with them. Being given the freedom to come to work in t-shirts, bermudas and slippers is one other reason why I love this job. Embarking on this career which plays a proactive role in wildlife conservation and education thus far had been both enriching and meaningful for me, and I definitely look forward to many more sweet returns.

Clancy A. Hall

Wildlife Supervisor – Birds, Currumbin Wildlife Sanctuary, Australia

chall@cws.org.au husbandryconsultant@gmail.com

Clancy Hall is an avian husbandry consultant with over 20 years of hands on experience. Raised in Brisbane, Australia with a biologist as a father, Clancy was exposed to a diverse range of animals from an early age. It is this innate interest in wildlife that led her to a fulfilling career as a Zookeeper and post graduate study in Ornithology.

Throughout her career, Clancy has worked and advised on in-situ and ex-situ projects in Australia, USA, England, South Africa, Trinidad and Costa Rica. However, it was during her employment with the San Diego Zoo in California, USA that she found her main interest – solving avian husbandry problems. Clancy holds the Zoo Aquarium Association (ZAA) regional studbook for Southern Cassowary (*Casuarius casuarius johnsonii*) and serves as the bird taxon representative for the Queensland Species Management Program (QSMP). Clancy is currently employed as a wildlife supervisor at Currumbin Wildlife Sanctuary on the Gold Coast, Australia.



Dennis Appels

Bird keeper, Stichting Vogelpark Avifauna, Netherlands

Vogelverzorging@avifauna.nl

Hi, I'm Dennis Appels and currently working for Vogelpark Avifauna. In 1998 when I was 13 years I started as an assistant zookeeper at Apenheul Primate park. In the mean time I did a study to become a zookeeper with several interns national and international in Zoos (Rotterdam Zoo, Berlin Zoo and Zoo Zürich). After the study for zookeeper I did a bachelor in Animal management and had two interns. One was a intern at EAZA where I was helping cleaning-up data within in studbooks so they are prepared for ZIMS. After that I did a three months intern at the BCEAW (Breeding Centre for Endangered Arabic Wildlife) in the UAE. In 2008 I started working in Avifauna and now I'm responsible for the Pheasants, Parrots/ Macaws, Kiwi's and Owls. And when necessary for all other birds that we have.

Dwi Wisnugrahani

Sea World Indonesia, Jakarta, Indonesia

wisnu_cur@seaworldindonesia

Name : DWI WISNUGRAHANI, DVM
Country : INDONESIA
Zoo/institution : SEA WORLD INDONESIA
Position held : UNIT HEAD OF ANIMAL HEALTH
Contact details : PT. SEA WORLD INDONESIA
Address : JL. LODAN TIMUR NO. 7, ANCOL
NORTH JAKARTA - 14430
Email address : wisnu_cur@seaworldindonesia
Phone (including country code) : OFFICE : +62216410080
: CELL PHONE : +6281331061718

Elden Venus Gabayoyo

Avian Management Officer

Jurong Bird Park, Singapore

elden.gabayoyo@wrs.com.sg

Elden Venus Gabayoyo started his career in the Jurong Bird Park in April, 2007 as an avicultural officer. He is promoted as an Avian Management Officer and was tasked to head the Breeding and Research Center of the park. The Breeding and research center is a facility wherein the conservation efforts of the park to breed endangered species is being carried out. The center also supports the exhibits in the field in terms of artificial incubation of eggs and hand rearing of chicks.

In his stewardship of BRC, parrots like Hyacinth Macaw. Blue eyed Cockatoo, Palm Cockatoo, Blue

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throated Macaw, Red fronted Macaw, lorries were bred. He had also pioneered the artificial incubation and hand rearing of Great Pied Hornbills. BRC also helps to augment the population of the birds in the park by artificial incubation of eggs from flamingos, lorries and other passerines. If Elden is not busy with his chicks, he conducts an egg and chicks program together with the education team, teaching the children the development eggs and chicks.

Elke Schwierz

Former head animal keeper at Endangered Primate Rescue Center
in Vietnam (now working at Leipzig),

Leipzig Zoo, Germany

[*e.schwierz@web.de*](mailto:e.schwierz@web.de)

Elke is a zoo keeper at the Zoo Leipzig, Germany.

- 1974 born in Rostock, East-Germany
- 1998 -2001 training to become a zoo keeper in Zoo Berlin
- May 2002 – August 2007 work at the Endangered Primate Rescue Center in Vietnam,
- Position as the head animal keeper
- November 2005 –May 2006 half year interruption: trip to Australia and work for West African Primate Conservation Action (WAPCA) in Ghana
- September 2007- August 2010 Zoo Leipzig (keeper of okapi, deers, cranes)
- September 2010- December 2011 again EPRC in Vietnam
- Since January 2012 back in Zoo Leipzig

Felicity Evans

Birdshow Keeper, Taronga Zoo, Australia

[*fevans@zoo.nsw.gov.au*](mailto:fevans@zoo.nsw.gov.au)

I am a keeper and trainer at Taronga Zoo, Sydney, in the Bird Show unit. I have been working at Taronga Zoo for around five years, in the Bird Show, Carnivores and Great Southern Oceans units. Prior to appointment at Taronga, I worked at Sydney Aquarium primarily with dugongs, at Macquarie University (Biological Sciences museum) and as a volunteer at the Reptile Park, Somersby. I have a keen interest in animal behaviour and studied a B. Marine Science, Honors (1st) at Macquarie University, Sydney. My honours research centered on the function and morphology of genitalia in praying mantids.

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Geoff Hosey

School of Health and Social Studies, University of Bolton UK

gh2@bolton.ac.uk

I was Principal Lecturer in Biology at the University of Bolton, UK, until I retired in 2005, and am now Honorary Professor in the Psychology Department there. This means that my interest in zoo research is now a hobby rather than part of my job. I'm interested in all animals, and have published papers on gulls, centipedes, deer, wallabies and other animals in the past, but now limit myself to zoo and primate research. My main current research interests are in human-animal interactions in the zoo, in which I collaborate with Vicky Melfi at Taronga Zoo, and in the use of zoo records for answering research questions, in which I collaborate with Sonya Hill and Dave Brunger at Chester Zoo. I am a member of the BIAZA research committee, and the captive care committee of the Primate Society of Great Britain, and one of the authors (with Vicky Melfi and Sheila Pankhurst) of the text book *Zoo Animals: Behaviour, Welfare and Management* (2009, OUP).

Gerard Wan

Junior Animal Management Officer, Night Safari, Singapore

Gerard.wan@wrs.com.sg

Former Engineering graduate; I took Zoology because I am extremely passionate about animals. My interest is in all animal related research. Does the right thing for those who cannot speak. Enjoys the outdoors and all things related to the outdoors, especially rock climbing. I have worked with mostly hoofed stock and the endangered Malayan Pangolin, *Manis javanica*. I have no favourites as all animals have different personalities and have to be treated differently.

Gerardo Martinez

Chief of Animal Behavioural Management, Africam Safari, Mexico

gmartinez@africamsafari.com.mx

Gerardo Martinez, a Doctor in Veterinary Medicine, also:

- Chief of Animal Behavioral Management Department and Supervisor of African and Asian Elephants, at Africam Safari in Puebla, Mexico, since 2000.
- Elephant Training Adviser at the Golden Triangle Asian Elephant Foundation in Chiang Rai, Thailand.
- 15 years of experience in animal training for medical purposes in more than 30 different species including elephants, hippopotamus, rhinos, giraffes, marine mammals, big carnivores and great apes.
- 10 years as key note speaker about animal behavior and animal training at more than 80 conferences and symposiums in over 18 countries in the Americas, Europe, Africa and Asia, and advisor at 45 different zoos and animal holding institutions around the world.
- 18 publications about animal training in Mexico, USA, Uruguay, Spain and Peru.
- Professor of "Wild Life Medicine Practice" course at The Autonomous National University of Mexico (UNAM)

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- Professor at La Salle University in Leon, Mexico for the “Animal Training Certificate”
- Professor of Ethology course at the National University of Costa Rica, for the Masters in Conservation Medicine
- Professor at The Autonomous University of Zacatecas, México, for “The Evaluation Exam for Veterinary Degree”
- Tutor of college thesis and master degrees about animal behavior in 17 occasions.

Memberships:

- The Elephant Managers Association (EMA)
- Association of Zoos and Aquariums (AZA)
- The Animal Behavior Management Alliance (ABMA)
- Mexican Ethology Society (SMEV)
- Mexican Association for Specialized Veterinarians in Zoo, Wild and Exotic Animals (AMMVEZOO)

Glenn Sullivan

Senior keeper, Elephants, Taronga Western Plains Zoo, Australia

gsullivan@zoo.nsw.gov.au

My name is Glenn Sullivan. I am currently a Senior Keeper at Taronga Western Plains zoo, working on the elephant section. My career in the zoo industry began in 1987 when I was employed at ‘Notredame’, a private zoo in Western Sydney. From this platform I worked at Taronga Zoo, Taronga Western Plains Zoo, Perth Zoo, Dreamworld, and Mogo Zoo on the south coast of NSW. During this time I have worked with primarily exotic mega fauna including primates, carnivores, hoof stock and elephants. In 1999 I left Australian shores and worked in the USA followed by the UK until 2011.

My career in elephants began in 1992 at Perth Zoo, and I have been fortunate to work with elephants in the USA and UK until recently relocating to Taronga Western Plains Zoo.

Graeme Phipps

Teacher and Animal Care Co-ordinator of Captive Animals, Richmond College, Australia

Graeme.Phipps@tafensw.edu.au

Graeme Phipps has an extensive avicultural, bird keeping, teaching and general zoo background. He has always been around wild animals, but with birds as his primary passion and strength. Graeme began with breeding ornamental pheasants and has personally kept over 140 species of birds ranging over all avian captive management groups from park birds to softbills. He has ever been interested in the contribution that captive animals can make to the survival of threatened species.

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Graeme joined the Avicultural Society of NSW, created AVIDATA a magazine of the Society as well as the Avicultural Review. He is a Life Member and currently President of the Society. Some career highlights include behavioural insights gained from working with Green Catbirds, Black-breasted Button Quail, Blue-faced Honeyeaters, Noisy Pittas and Kakariki Parrots – plus involvement with the Norfolk Island Green Parrot Recovery Program and the Lord Howe Island Woodhen Recovery Program.

Graeme studied zoology at The University of Sydney, and became a research assistant in ornithology at the university's Macleay Museum of Natural History.

He went to Taronga Zoo firstly as Curator of Birds, then Curator of Birds and Gardens (creating Life Sciences at the zoo by including plants in the equation); then General Curator before rising to Principal Curator. He was awarded the ARAZPA (Australasian Regional Association of Zoological Parks and Aquaria) 2006 Award for Professional Excellence in recognition of long-term, outstanding achievements in the zoo and aquarium profession, in particular for the design and development of REGASP - the Regional Animal Species Collection Planning database system. REGASP is now part of ISIS and is used by zoos throughout the world as a tool for planning for small population management.

Graeme's interests have always included caring about and for wild animal habitats, and he takes the view that the Conservation Frontier is right where you are standing – locally, not just somewhere on the other side of the world. On Australia Day 2008 he was made City of Parramatta Citizen of the Year in recognition of 30 years of environmental work especially relating to bushcare and habitat restoration and management and particularly with saltmarshes of Sydney harbour and the Parramatta River.

Ever supportive of zoo keeping and the ASZK, in 2011 Graeme was elected a Life Member of the Australasian Society of Zoo Keeping.

He currently teaches nationally accredited Certificates 3 and 4 in Captive Animal (Management), offering face-to-face, blended and online modes at Richmond College of Technical And Further Education in Sydney. The On-The-Job Distance online mode offers online support including weekly online Chat tutorials, has been very successful and demonstrates that it is completely feasible to CONNECT KEEPERS WORLDWIDE. Graeme holds post-graduate qualifications in adult workplace learning and delights in training people in intensive wildlife management techniques.

Graeme thinks that trained professional zookeepers are extremely important to the welfare of wild animals – firstly, because there is possibly nothing as dangerous out there as well-meaning but clueless people working with wild animals; and secondly, because trained zookeepers are particularly important when they apply their intensive wildlife management skills to the fragments that the 'wild' in the world is becoming. Zookeepers can help wildlife survive in these fragments.

Finally, Graeme's students include a group of Australian aboriginals from Muru Mittigar who are currently training in Captive Animals, with an accent on applications relating to Care for Country rather than normal zoos and wildlife parks. Project areas relating to this include managing munge in wild wombats, and management of kangaroos and wallabies in fenced areas, which are thought of as 'wild' situations, but the animals within them are actually captive, so intensive wildlife management techniques are needed.

Graeme has two children Amber and Alexander, both currently studying at uni. He lives in Richmond, an outlying suburb of Sydney, with his partner Debra and enjoys life immensely.

Grant Kother

Keeper, Herpetology Department, ZSL London Zoo, UK

[*grant.kother@zsl.org*](mailto:grant.kother@zsl.org)

Grant Kother is a keeper in the Herpetology department at ZSL London Zoo. He works with a variety of reptiles and amphibians including venomous and non-venomous snakes, lizards, tortoises, turtles, crocodylians and a plethora of amphibians. He has a strong interest the area of animal behaviour, specifically enrichment and training in reptiles and amphibians. Since beginning his career in 2009 he has developed various and sometimes pioneering enrichment and training plans on section for a variety of species which have significantly improved the captive environment for many of the departments focal species. Grant has played a pivotal role in the wider enrichment and training activities at ZSL. He currently is the primary editor of a quarterly newsletter showcasing the work of ZSL in the area of behavioural management entitled 'Enriching ZSL'. He is the co-chair of the Behavioural Management Committee at ZSL London Zoo.

Greg Bockheim,

Executive Director, Virginia Zoological Park, USA

[*greg.bockheim@norfolk.gov*](mailto:greg.bockheim@norfolk.gov)

Greg Bockheim has been involved in private aviculture from the time he was 10 years old and has worked in the Zoo business for 28 years. An aviculture hobby which began with doves and expanded through psittacines at home has led to a zoological career involving a wide range of birds. For the last 15 years he has maintained a variety of softbills specializing in fairy bluebirds for the past six. This past year, 2011, has been his most productive year during which he raised seven bluebird chicks hatched by two breeding pair. The spring of 2012 is planned to be another important bluebird production year and will add even more to the body of information and experience that will add to this significant presentation.

Herma Kamphorst

Keeper, Zoo Emmen, The Netherlands

[*marcotenhor@gmail.com*](mailto:marcotenhor@gmail.com)

Herma Kamphorst is a keeper in Zoo Emmen, The netherlands. After a period of 2 years working and learning in Zoo Emmen and graduating for the study Animal Management I started working in Zoo Emmen in 1990. The first year as an all round keeper, later as keeper of baboons, kangaroos, colobus monkeys, gibbons, ringtailed lemurs, marabouts, pelicans and emus. I'm also working as stand-in with the predators like lions, tigers, panthers, servals, bears, otters and meerkats. Because of the dynamic in the groups of monkeys and lemurs I do like working with them the most.

Hiroyuki Takahashi

Chiba Zoological Park, Japan

[*htakahashi.czp@gmail.com*](mailto:htakahashi.czp@gmail.com)

Hiroyuki Takahashi is an ungulate keeper such as Reticulated giraffe, Scimitar-horned oryx and Grevy's zebra. He has worked as a primate keeper such as Japanese macaque, purple-faced leaf monkey, eastern black and white colobus, ruffed lemur, and Geoffroy's spider monkey until 2010. He has also worked as a children's zoo keeper before. After completing a bachelor degree in zoology, he has been a keeper at Chiba Zoological Park since 1988. He has an experience not only as zoo keeper but also as animal registrar at Chiba Zoo, while also completing a M.Ed. in zoo environmental education. His major interest lies in the conservation education at the zoo for the public.

Ivan Choo

Junior Avian Management Officer

Jurong Bird Park, Singapore

[*ivan.choo@wrs.com.sg*](mailto:ivan.choo@wrs.com.sg)

Ivan started his career in the Jurong Bird Park as an intern. After earning his Diploma in Biotechnology in Temasek Polytechnic and fulfilling his National Service, he rejoined the park as an Avicultural officer. His outstanding dedication and passion for the birds under his care did not go unnoticed and he was promoted to Junior Animal management Officer in a short span of time.

Now in his 4th year in the Jurong Bird Park, he is involved in the captive management of Lories, crowned pigeons and the Birds of Paradise. In 2009 and 2012, Ivan together with the avian team managed to breed the Twelve-wired Bird of Paradise (*Seleucidis melanoleuca*) and the King Bird of Paradise (*Cicinnurus regius*). The successful breeding of this 2 species made Jurong Bird Park one of the few institutions in the world to have bred these beautiful birds in captivity. Ivan is currently working on the captive management of Andean Cock-of-the-rock (*Rupicola peruvianus*).

Jackson Raj

Head Keeper, Singapore Zoo

[*jackson.raj@wrs.com.sg*](mailto:jackson.raj@wrs.com.sg)

My career in the Singapore Zoo started in 1998 when I first joined as a Show Presenter, in my 20s. As a presenter, I had an opportunity to work closely with animals such as Sealions, Orang Utans and other smaller primates. I particularly liked working with the Orang Utans and seeing my potential, I was given the opportunity to move to the Orang Utan Section.

I now head the Orang Utan Section and together with my team mates, we care for 25 Orangs. All the hard work paid off when I was awarded with the "Best Keeper of the Zoo 2012 Award" by Wildlife Reserves Singapore. Now I am trusted with overseeing new section, the Polar Bears. This is going to be a new challenge for me but with a good team, I am confident that I will be able to do an equally good job as I have done with the Orangs. One needs a good heart to work with animals and I would proudly say that there was never a day I had regretted my decision to take on this job as an Animal Keeper, one that I will cherish for as long as I can.

Jayce Chua Poh Cheng

Aquatic Management Officer, River Safari, Singapore

jayce.chua@wrs.com.sg

'Never stop learning' is a lifetime motto of Jayce Chua. Born in Singapore, Jayce is always pursuing her dreams since young. Having attained her ambition as a woman police officer in 1993 for 2 years; dream job as a Marine Mammal Trainer in 2003 for 6 years; Jayce is currently advancing her career as an Aquatic Management Officer in River Safari. One who always likes challenges has enticed Jayce to join River Safari, a new upcoming river-themed park of Wildlife Reserves Singapore, as the pioneer batch.

Jayce has made significant switches in her academics. From a commerce student in high school, switching to chemical engineering study in polytechnic, then to biology in university, has marked a significant milestone in her career life. Ever since she graduated, she has been working with flora and fauna, where she later found her passion working with aquatic animals. Jayce has not stopped pursuing her dreams and passion. She is active and enjoys running. She takes part in marathons locally and overseas regularly. This helps her to stay fit in her job and most importantly she enjoys what she is doing.

Joe Ong Chew Chuan

Senior Keeper, Night Safari, Singapore

joe.ong@wrs.com.sg

Joe has been with the Night Safari for more than 10 years. Some of the larger cats he has worked with during this time include the Leopards, Clouded Leopards, Golden Cats and Fishing Cats. He and his team have successfully bred the Clouded Leopards for the first time in the history of the Night Safari. Joe is the section head of the Night Safari Section 4 team which is home to almost 30 species of animals that ranges from the small Tarsiers to the largest, the South African Giraffes. He sketches during his free time and is an avid sportsman. He runs marathons, cycles and plays soccer every weekend. And when he is not busy with his outdoor activities, he likes to spend his quiet time reading at home in the company of his lovely wife and his husky.

Karen Simpson

Keeper Exotic Birds and Australian Mammals, Auckland Zoo, New Zealand

karen.simpson@aucklandcouncil.govt.nz

Karen started working at Auckland Zoo in 2005 as a casual keeper and shortly afterwards became a permanent member of staff. Auckland Zoo is separated into seven sections and Karen has now had the opportunity to work on all sections throughout the zoo while undertaking the role of Roving Keeper. This has meant working with animals as small as mice right up to animals as large as rhinoceros and giraffe. She is now working on the exotic birds and Australian mammals section. Karen has also felt privileged to be involved with field work carried out by outside organisations in conjunction with Auckland Zoo, in particular assisting with caring for wildlife following the CV Rena oil spill at the end of 2011.

Kate Barclay BBio. Cons.
Zoos South Australia, Australia

[*kbarclay@zoossa.com.au*](mailto:kbarclay@zoossa.com.au)

Kate Barclay was born and bred in Adelaide, South Australia. However, as a teenager she started competing in the sport of sprint kayaking which took her all over Australia and the world, almost yearly. She represented Australia on many occasions at a junior and senior level at World Cups, World Championships and reaching her pinnacle by being a member of the Australian Olympic Team at the Athens Olympics, where she placed 6th in the K4 500m. Anytime Kate was back in Adelaide she enjoyed spending as much time as possible at her mum's farm, attending to their private bird collection. With this in mind, when she finished high school she decided to study a bachelor of science, majoring in biology, which was offered externally. This allowed her to study no matter where she was in the world. However, as this progressed she realised she enjoyed a more conservation based approach to wildlife and ended up completing a bachelor of biodiversity and conservation. Upon retiring from kayaking in 2007 Kate sought out employment in a relative field and ended up working at the Adelaide Zoo, where she has worked within the bird department for the last four and a half years. Adelaide Zoos unique bird collection has allowed Kate to work with exotics which are rare in Australia, such as the Hyacinth Macaw, and native endangered species breeding programs, such as the Orange Bellied Parrot, Regent Honey-eater and the Malleefowl. This is where Kate was fortunate enough to work directly with one of her favourite species, the Palm Cockatoo.

Kathrin Paulsen

Assistant head keeper, primates, Hanover Zoo, Germany

[*kathrin_paulsen@web.de*](mailto:kathrin_paulsen@web.de)

I've been working in the primate section of Hannover Zoo, Germany for the past 20 years.

In 2007 I was promoted to the position of Vice head keeper, responsible for monkeys and apes.

I have also passed the Zoo-keeper Trainer course, which means that I am qualified to work with trainees during their apprenticeship in the primate section.

I've specialised in non-human primates. In my free time, I work as the chairperson of the german accosiation "save the drill". Our goal is the promotion and preservation of drills in their natural environment in Nigeria and Cameroon.

Kees Rookmaaker,

Chief Editor, Rhino Resource Center, Singapore

[*rhinorrc@gmail.com*](mailto:rhinorrc@gmail.com)

Dr Kees Rookmaaker has a Ph.D. in biology from the University of Utrecht. He has written seven books and some 200 scientific papers on zoological exploration in Africa, the ornithological discoveries of François Levaillant, the historical correspondence of the Museum of Zoology in Camvridge, and on the rhinoceros both in the wild and in zoos. While working as an editor for Darwin Online and Wallace Online, he is also the Chief Editor of the Rhino Resource Center (www.rhinoresourcecenter.com) which makes publications on all species of rhinoceros from all times and from all regions available online.

Ljubov Astahova

St. Petersburg Zoo, Leningrad, USSR

ladoganerpa@mail.ru

Ljubov is a keeper at Saint Petersburg Zoo.

Marissa Parrott

Wildlife Conservation and Science, Zoos Victoria, Australia,

Department of Zoology, University of Melbourne, Australia &

Threatened Species Department, Healesville Sanctuary, Australia

mparrot@zoo.org.au

Reproductive Biologist, Wildlife Conservation and Science, Zoos Victoria Marissa completed her undergraduate studies at the University of Melbourne, Australia, and University of Pretoria, South Africa, before researching mate choice, genetics and breeding success in a carnivorous marsupial, the Agile Antechinus, during her PhD. Following her PhD, Marissa worked with rehabilitation and conservation of Orangutans, Sun Bears and a variety of wildlife in Borneo. Marissa's post-doctoral research examined assisted reproduction and novel techniques to maximise breeding success in captive breeding colonies of marsupials across Australia. She has more than ten years experience in field work, five years in molecular genetics laboratories, and eight years in research and zoo captive breeding programs. Marissa has experience with a variety of wildlife and conservation programs across Australia, Asia, Africa and the Americas.

In 2007, Marissa joined Zoos Victoria to work on the breeding program for the critically endangered Mountain Pygmy Possum, and enjoyed being a keeper for a variety of mammals, reptiles, amphibians, birds and invertebrates at Healesville Sanctuary. She joined Zoos Victoria's department of Wildlife Conservation and Science as their Reproductive Biologist in 2009. Marissa now works across Healesville Sanctuary, Werribee Open Range Zoo and Melbourne Zoo to improve sustainable zoo populations, reproductive research and captive breeding success, particularly in threatened species. Marissa's sits on a number of Threatened Species Recovery Teams and her key projects include the conservation of the Mountain Pygmy Possum, Tasmanian Devil, Eastern Barred Bandicoot and a variety of critically endangered frogs.

Minerva Bongco - Nuqui

Curator, Jurong Bird Park, Singapore

minerva.bongco-nuqui@wrs.com.sg

Dr. Minerva Bongco- Nuqui began her career at the Jurong Bird Park in 1999, as a Veterinarian and is now currently a Curator. Her personal interests include breeding biology, avian behavior, and rehabilitation and release of native bird species. She together with external partners and pioneered the Singapore Hornbill Project which is now on its 7th year. This project was instrumental in increasing the population of Oriental Pied Hornbills in the wild.



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As a Veterinarian, she had pioneered the avian flu vaccination against HPAI in the park. She had also given the opportunity to have quarantined different species of birds from the smallest hummingbird to the largest Ostrich. Aside from her curatorial duties, she also lectures for the Animal Management Course, Wildlife Reserves Singapore is offering together with Ngee Ann Polytechnic.

Nicki Boyd

Behavior Husbandry Manager, Animal Connections, San Diego Zoo, USA

NBoyd@sandiegozoo.org

Nicki Boyd is the Behavior Husbandry Manager at the San Diego Zoo. Her educational background includes graduating from Moorpark College's Exotic Animal Training and Management Program, Mesa College's Animal Health Technician Program, with an Associate in Science Degree, and has a Bachelor's in Business Administration from the University of Phoenix.

She has worked at the San Diego Zoo for 20 years in various departments such as zoo keeper at the Children's Zoo and Veterinary Hospital, animal handler at in the Behavior Department, senior keeper, Team Area Lead, Animal Care Supervisor, Animal Care Manager, Personnel Manager, and now currently as the Behavior Husbandry Manager. She was on the San Diego American Association of Zoo Keepers (AAZK) board of directors for 17 years and has been a member of that organization for 20 years.

She is currently the president of the Red Panda Network which is a non-profit organization dedicated to saving habitat for wild red pandas. She is also on the SSP steering committee for red panda. Nicki is also the Chief Financial Officer for the Animal Behavior Management Alliance (ABMA) and has been on the board of directors for 5 years, and a member for 11 years. She is a founding member of the Association for Professional Wildlife Educators (APWE) and has been member of the American Zoo and Aquarium Association (AZA) for the past 6 years.

Her role as Behavior Husbandry Manager is to set up training programs all over the San Diego Zoo and is the department head for Animal Connections. Animal Connections includes all the show areas, Children's Zoo and any animal encounter the San Diego Zoo offers. She works with various species of bears, large and small cats, hyena, canids and many species of other mammals, birds and reptiles. Training dangerous animals means being in close proximity and that requires focus, appropriate facilities and good safety protocols. The show animals are often involved with various guest interactions this too requires attention to detail and safety protocols. She works very hard to always include best practices when training animals and staff to be safe and successful.

Nicola Field, BSc, MSc

Bear & Vet Team Director, Animals Asia Foundation, China Bear Rescue Centre, Chengdu, China

nfield@animalsasia.org

Nicola Field is the Bear & Vet Team Director at Animals Asia Foundation's Moon Bear Rescue Centre, China, where she has worked for nearly six years. She heads up the vet and bear-keeping staff taking care of the bears, dogs, cats and macaque on site. Her main role is ensuring optimum care of all the animals on site with the support of a fantastic team, as well as promoting the work of the organization and bear care. She has an MSc in Wildlife Biology & Conservation, as well as Animal Management

Presenter Biographies

qualifications. Nicola worked for nearly 10 years as a keeper in the UK, taking care of a variety of species, including North American black bears. She spent two years in education in the UK working as an animal-care assessor. She has also spent time working in Uganda and Vietnam as a researcher on conservation projects and also at the Colobus Trust in Kenya.

For details of projects and publications please e-mail Nicola

Olga Volkova

St. Petersburg Zoo, Leningrad, USSR

ladoganerpa@mail.ru

Olga is a keeper at Saint Petersburg Zoo.

Perumal Manivannan

Deputy Head Keeper, Singapore Zoo, Singapore

mani.perumal@wrs.com.sg

My name is P. Manivannan and I am 47 years old. I started my career at the Singapore Zoo in 1990. In the last 21 years of my career as an animal keeper, I have worked with various primate species and have been a part of the pioneer project of the proboscis monkeys since their arrival to the Singapore Zoo in 1998.

I was also my involved in training the chimpanzees for animal presentations and also had an opportunity working with the rare golden monkeys from China. I am currently a Deputy Head Keeper taking charge of the proboscis monkeys, chimpanzees, mandrills and capuchins.

Rachel Yeo

Junior Animal Management Officer, Singapore Zoo, Singapore

rachel.yeo@wrs.com.sg

My name is Rachel Ann Yeo. I'm Singaporean and have lived abroad for 8 years in Israel and the United States. I graduated with Bachelor of Science in Animal Science from Michigan State University. I've been working at the Singapore Zoo for about a year as a Junior Animal Management Officer. My first assignment was at the Primate Conservation and Breeding Centre, where I worked intimately with proboscis monkeys, langurs, gibbons and other species of primates. Recently, I have just been transferred to Rainforest Kidz World Section. I like to travel and my favourite destination is South Africa; I enjoy observing wildlife during the safari game drives. In my spare time, I volunteer at the Riding for the Disabled Association as an assistant riding instructor. I've been riding horses for about 10 years, and competed at intercollegiate dressage competitions while at Michigan State University.



Presenter Biographies

Raúl Cabrera

Primate Keeper, Barcelona Zoo, Spain

rcabrera07@hotmail.com

Raúl Cabrera is a biologist by Barcelona University and works with primates since 1997.

He has been working in different zoos and primate rehabilitation centres, both in captivity and in the wild.

He worked as Head Keeper in MONA Primate Rescue Centre (Girona, Spain) and as Primate Keeper at Las Águilas Jungle Park (Tenerife, Spain), Madrid Zoo-Aquarium (Madrid, Spain) and currently at Barcelona Zoo (Barcelona, Spain), where he started his professional career.

He has learned in some of the best primate centres in Europe during his stages at Durrell Wildlife Preservation Trust (UK), Monkey World (UK) and Apenheul (NL), and has cooperated with *in situ* conservation centres such as Orang-utan Foundation (Indonesia), Limbe Wildlife Center (Cameroon) and Lwiro Primate Rehabilitation Center (RDCongo).

He has also participated on different primate conservation and educational activities such as workshop courses, conferences, amongst others..., and is constantly implicated on fundraising for different primate conservation projects.

Rengasamy Marimuthu

Senior Education Officer, Zoo Outreach Organization, India

marimuthu@zooreach.org

Rengasamy Marimuthu holds the post of Senior Education Officer at Zoo Outreach Organisation, India. He is a graduate in Education and Master's in Wildlife Biology. After graduation, he worked at Arignar Anna Zoological Park, Chennai for some time as a biologist, educator and liaison staff. During this period he had more acquaintance with zookeepers and other zoo staff learned some basics on zoo management. In the meantime taught the keepers and visitors about the biodiversity conservation in an informal way with proper information. Then he moved to Zoo Outreach Organisation where he could attend many related trainings in Wildlife Institute of India, Jersey Wildlife Preservation Trust and also conferences around the world. He had visited number of zoos especially in South Asia and other countries and learned different aspects on zoo management including the zookeeper's role. He is a member of International Zoo Educators Association IZE, IUCN-CEC & Society for Conservation Biology.

Rodd Stapley

Australian Fauna Precinct Manager, Taronga Conservation Society, Australia

rstapley@zoo.nsw.gov.au

Rodd Stapley is Manager of the Australian Fauna Precinct at Taronga Conservation Society Australia. For over two years at TCSA Rodd has driven positive change in employee culture, processes and animal displays through positive workplace relationships. Rodd's passion for animal conservation began with a personal connection with marine fish, in work Rodd has tried to provide similar connections for the public as a driving force for conservation. Rodd's passion lies in providing naturalistic exhibits that display animals in their natural environment.

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More recently Rodd worked as a “reconciliation champion” on the TCSA Reconciliation Action Plan Committee. The RAP developed formalised TCSA’s commitment to strengthening relationships with Indigenous Australians and providing opportunities for supporting Indigenous working relationships within the Australian Fauna Precinct of TCSA. Previously Rodd gained his experience as a keeper, supervisor and manager of several Zoos and Aquariums of Sydney. A major achievement was his role in the design and construction of Sydney Wildlife World. Rodd’s aim is to provide world class displays which meet conservation outcomes. An ability to think outside the square for exhibit development and display of animals is the key.

Sally Walker

Founder/Director, Zoo Outreach Organization, India

[*sallyrwalker@aol.com*](mailto:sallyrwalker@aol.com)

Sally R. Walker has worked voluntarily for zoos and wildlife in South Asia since 1981. After 7 years of yoga studies in India, a visit to Mysore Zoo became a burning interest. After founding India’s first zoo society, Friends of Mysore Zoo and India’s first NGO zoo publication (GNU’s Letter), Sally was made a member of the National Zoo Advisory Board in New Delhi. She was invited by Dr. T.N. Khoshoo, then Secretary, Department of Environment, to start a national zoo organization funded by the Ministry of Agriculture, Department of Environment. That was Zoo Outreach Organisation. Sally later set up CBSG, India, the first of CBSG’s regional networks. During these years she wrote over 300 newspaper articles about zoos, primarily Indian zoos and their problems. These articles helped catalyze action for zoo legislation in India. At the same time ZOO was founded, Sally started and edited monthly publications among them ZOOS’ PRINT and ZOO ZEN and later several newsletters. A prolific writer she contributed 26 essays to Encyclopedia of Zoos, and 3 chapters to the History of the World’s Zoos.

Sally was appointed a Member of the Central Zoo Authority for 8 years from 1991-1998. She became involved with IZE and helped develop the popular educator summer course at the JWPT Training Centre. She also set up dynamic e-networks for bats, rodents, and primates, all of which became regional networks for IUCN Specialist Groups. Also during this period she and Sanjay Molur introduced CBSG CAMP workshops to India and then South Asia, conducting over 25 CAMPs.

In 1999 Sally enlarged ZOO’s geographic reach to South Asia upgrading CBSG, India to CBSG, South Asia. She also founded the South Asian Zoo Association and became active in the World Association of Zoos and Aquariums (WAZA), securing membership of ZOO and SAZARC in WAZA. From the start Sally was concerned about animal welfare and dysfunctional zoos. In last few years she presented papers in WAZA Conferences about how they reflect badly on good zoos and are leading to extinctions rather than conservation. These led to a WAZA initiative on this topic. Currently Sally chairs the Associations Committee of WAZA.

Awards

2008 Ulie Seal Award for Innovation in Conservation.

2004 Heini Hediger Award for outstanding and dedicated service to Zoos

2001 Hon. Scientific Fellow of the North of England Zoological Society, U.K.

2000 Menon Award for Contribution to Welfare of Capt Wild Animals, India



Presenter Biographies

Sebastian Schorr

Keeper, Zoo Leipzig, Germany

sebastian.schorr@gmx.net

Born: 6th of January 1972

School: finished 1988

Zookeeper training finished: 1990

Zookeeper at Leipzig Zoo since: 1990

Worked with the apes for 15 years.

From 2011 on, working in Gondwanaland (tropical house with different animals)

Sheila Roe

Senior Keeper, Carnivore Department,

Melbourne Zoo, Australia

sroe@zoo.org.au

Sheila started her career at Melbourne Zoo in 1985. Working with a variety of animals in her career from Butterflies to Primates and everything in between she has for the past 14 years worked with Carnivores. She has completed certificates in veterinary nursing, travelled to Africa to work on a variety of conservation projects and completed an internship in America at an Animal Rehabilitation centre which deals with native wildlife. In 2006 Sheila with the assistance of a work colleague organised and hosted the first Regional Environmental Enrichment conference (REEC) in Australia. Career highlights include hosting this conference, breeding Fishing cats, Golden cats and Sumatran Tigers and being asked to participate in a Carnivore symposium in New York. Sheila has a lifelong passion to learn and continues to attend conferences and workshops in this pursuit.

Sophie Dentrinos

Carnivore/Ungulate Keeper, Perth Zoo, Western Australia

sophie.dentrinos@perthzoo.wa.gov.au

Sophie began her zoo keeping career at the National Zoo & Aquarium in Canberra in 2005, before moving to Perth Zoo in 2007. She has worked with a wide variety of birds, reptiles, primates, carnivores and ungulates, and is now the coordinator for the Savannah Round, where she is responsible for the care of Meerkats, Cheetah, Spotted Hyaenas and African Painted Dogs.

Sophie is also the Australasian Species Coordinator for African Painted Dogs, and the Western Australian Branch Manager for the non for profit conservation group, the Asian Rhino Project (ARP). This has given her the opportunity to travel to Indonesia, visiting in-situ rhino programs ARP support.

Sri Pentawati

Surabaya Zoo, Indonesia

kbsurabaya@yahoo.com

Sri Pentawati works as the curator at the Surabaya Zoo in Indonesia.

Associate Professor Dr. Vellayan Subramaniam

**A.M.N., A.M.K., P.J.K., B.V.Sc., M.S., CBiol., MIBiol., FMSA., FSNM.,
FVAM**

vellayan@tm.net.my

Associate Professor Dr. S. Vellayan completed the Bachelor of Veterinary Science (1st Class with Honours with Distinctions) from the Madras Veterinary College, Madras, India. On returning to Malaysia and while working at the Faculty of Veterinary Medicine and Animal Sciences, Universiti Putra Malaysia obtained a Master of Science from UPM under a scholarship from the University of Cambridge. His thesis was on the 'Chemical Composition and Digestibility of Natural and Domestic Foods of the Lar Gibbons (*Hylobates lar*) in Malaysia.

He was the Zoo Veterinarian at Zoo Negara Malaysia (National Zoo) from 1981 till his retirement in June 2008. During his employment at Zoo Negara Malaysia, he also held the positions of Assistant Director and Acting Zoo Director. In 1983 he was awarded as a Chartered Biologist and Member of the Institute of Biology, London, UK. The Malaysia Book of Records has recognised him as the "Longest Servicing Zoo Veterinarian" (27 years 8 months).

Dr.S.Vellayan was instrumental in enclosure designs of exhibits; protocol management of animals; nutrition; teaching and training of staff at Zoo Negara. One of his major contributions to Zoo Negara was in the designing and establishment of a Good Standard Zoo Veterinary Hospital in 1995. He was involved in the initial stage of the ISO 9001 – 2000 for Zoo Negara and training of staff, veterinary and biology students on Industrial Training and interns from the local Universities.

He provides professional advises and consultancy to various other zoos and animal collections in the royal palaces and Malaysian Parliament. He also provides free treatment and advice to the community who keeps wild and exotic animals as pets and to the general public who brings in injured wildlife from the wild since 1982.

On his retirement he was appointed a lecturer and as an Associate Professor at the Faculty of Medicine, Universiti Teknologi MARA. He is also a guest lecturer at UniMAS, Sarawak and Universiti Malaya, Petaling Jaya.

Dr. Vellayan is an active member in 50 professional and scientific bodies both at national and international levels. At the age of 25 he became the member of Malaysian Veterinary Association. He held the positions of Vice President (2001 – 2007) and Acting President (2008 – 2009).

Dr. Vellayan represented the veterinary profession as one of the Board Member in Balai Ikhtisat Malaysia (BIM) since 1982. He became the 9th Chairman of BIM (2002 – 2004). One of his contribution was on 2nd January 1992 when he repaired the BIM Building when it was partial destroyed in a fire. He was one of the active Chairman of the Scholarships and Loans sub-committee for many years. He was a member of the Royal Custom Consultative Council (2004 – 2006) and played an active role to obtain Service Tax Exemption for Practicing Private Veterinarians. Dr. Vellayan has contributed more 30 articles in various BIM Magazines (1984 – 2009).

Dr. Vellayan is an active member in the Malaysian Society of Parasitology and Tropical Medicine, 1982. He held the position of President (1997 – 1998) & (2008 – 2010). He has organized numerous scientific conferences and workshops at various scientific organizations and in UiTM.

Presenter Biographies

As a researcher and scientist, Dr. Vellayan is very active council member Malaysian Scientific Association from 1998. He has vastly contributed in the promotion of understanding science and technology to secondary schools throughout Malaysia.

Dr. Vellayan has published more 60 scientific papers in peer reviewed scientific journals and 50 papers in scientific proceedings. He has presented more than 160 scientific papers at both national and international scientific conferences. He has delivered over 120 invited lectures and talks both at national and international level. Dr. Vellayan has been featured on more than 50 occasions in the local media. He has received numerous awards and honors for his contribution in Zoo Veterinary Medicine in Malaysia.

Dr. Vellayan is a two time recipient of the Malaysian Fulbright Professional Award in 2000 and 2006. He is the Assistant Honorary Secretary of the Fulbright Alumni Association Malaysia since 2005. Dr. Vellayan has given talks over national radio and appeared on national television on the care of pets. He has also been featured on overseas television programmes.

He has been awarded the Fellow of the Veterinary Association Malaysia, Nutrition Society of Malaysia and the Malaysian Scientific Association. Currently he is appointed as an Associate of the Academy of Sciences Malaysia.

He is married to Mrs. Poornam Sagathevan, and has a 23 daughter and a son. His 88 year old mother, Madam Palaniammal who was instrumental in Vellayan's funding and career developing lives with his family just behind Zoo Negara where he can hear the familiar cries of his beloved animals every day.

Taide Pérez Primate Keeper, Barcelona Zoo, Spain

tyfarnes@gmail.com

Taide Pérez is a biologist and primate keeper at the Barcelona zoo.

Tim Husband Curator Life and Science, Bali Safari & Marine Park, Indonesia

curator@balisafarimarinepark.com

With over 35 years experience working in zoos, Tim Husband is a highly experienced 'hands on' Captive Wild Animal Manager, Animal Technician, Zoo Consultant and lecturer. In the Past Tim has been asked to take on the jobs that others can't do because they are too hard or because they need a no nonsense approach to get the job done.

These are jobs like setting up zoo collections, doing independent assessments and recommendations after keeper's deaths, managing zoos that have gone into liquidation, And animal acquisitions. Tim Husband's management skills have been both innovative and definitive of his extensive experience in all areas of zoo management. Tim is well known as a consultant that is not shy when it comes to saying what needs to be said and doesn't believe that giving up is the answer. At one time he was described as "the aggressive curator" because he didn't give up.

Today Tim is the Curator and Manager of Life and Science at the Bali Safari and Marine Park in Indonesia.

Trena Carney BSc

Zoos South Australia, Australia

tcarney@zoossa.com.au

I started my bird obsession in the Bird Department at Taronga Zoo in 1996 where I quickly became interested in artificial incubation and hand raising and specialised in this area. After an amazing experience working in Mauritius with the Mauritian Wildlife Foundation in early 2004, I made the move to Adelaide Zoo. I also worked briefly at David Fleay Wildlife Park and was involved with the Eastern Bristlebird recovery project. I have incubated and hand raised about 45 species of birds ranging from Sacred Kingfishers and Andean Condors to Palm Cockatoos and Frizzled Bantams. I have worked with most animals during my career as a Zookeeper but always return to working with birds as I am passionate about learning more and passing on the skills and techniques that were passed on to me when I first started in this field.

Valerie J. Hare

The Shape of Enrichment, Inc., San Diego, USA

hare@enrichment.org

With Karen Worley, Valerie Hare founded The Shape of Enrichment, Inc. in 1991 and has been a principal ever since. She is currently the Chief Financial Officer and Workshop Coordinator. The two projects that keep her busiest are: Shape's new website (www.enrichment.org) and its enrichment workshops.

The Shape of Enrichment Workshops are designed to assist animal caretakers create successful and efficient enrichment plans for the animals in their care. Since 2000, numerous enrichment workshops ranging from 4 hours to 5 days have been held in Brazil, Chile, South Africa, Uganda, Philippines, Singapore, Indonesia, China, United Kingdom, Ireland, Sweden, Canada, U.S.A., and, later this year, Bulgaria and Georgia in collaboration with EAZA and ICZ.

Valerie has worked as a Research Animal Care Supervisor (Massachusetts General Hospital), Zoo Keeper (San Diego Wild Animal Park), Behavioral Research Technician (San Diego Zoo), and Enrichment Consultant.

Valerie serves on the International Conference on Environmental Enrichment Committee (since 1997) and Bear Care Group Board of Directors (since 2007). She holds membership in American Zoo and Aquaria Association, American Association of Zoo Keepers, Zookeepers Association of the Philippines, and African Zookeepers Association.

Valerie holds a Bachelor of Science Degree in Biology (Zoology emphasis) from San Diego State University and an Associate Degree as a Veterinary Technician from State University of New York—Delhi.



Presenter Biographies

Vicky Melfi

Behavioural Biologist, Research and Conservation, Taronga Conservation Society Australia

vmelfi@zoo.nsw.gov.au

Vicky started working as a zoo keeper in the United Kingdom at the age of sixteen. It was there that her interest in animal behaviour and welfare was sparked. Completing a degree in Animal Science followed by a Masters degree in Applied animal behaviour and welfare, Vicky began a research project in behaviour comparisons between wild and zoo Sulawesi crested black macaque populations which then led her to completing her PhD at Dublin zoo studying the same species.

Before arriving in Australia, Vicky's most recent work was as the Senior Research officer with the Whitley Wildlife Conservation Trust based at Paignton Zoo. It was in this previous role that she founded a conservation program for the critically endangered Sulawesi crested black macaques which aims to conserve the species and their remaining habitat on this Indonesian island.

Vicky says to date her greatest achievement has been to co-write a book about Zoo animals; their behaviour, management and welfare which has been very well received. Her role here at Taronga zoo is to lead the Behavioural Studies unit. This unit is a team of behavioural scientists and volunteers that monitor animal well-being, the use of the exhibit space, wild behaviours and coordinate enrichment programs to maintain optimal animal welfare.

Vijay Madhavan

Head Keeper, River Safari, Singapore

vijay.madhavan@wrs.com.sg

Vijay joined the Singapore Zoo in 1991 as an animal trainer and presenter in the Animal Presentations Department. His duties include working with orang utans, sealions and many more. After that, he joined the Night Safari Zoology Department as an animal keeper and was involved extensively in a project to manage the Malayan Pangolin into captivity. He currently heads one of the sections which consist primarily of primates and birds at upcoming River Safari park. His job includes managing a team of keepers, overseeing the animal collection and assists the Head of Department in the development of WRS' fourth park.

Wendy Husband

Education Manager, Bali Safari & Marine Park, Indonesia

education.manager@balisafarimarinepark.com

Wendy Husband has been around the garden a few times - the zoological garden that is!

For more than 20 years, Wendy has been passionate about wildlife and their habitats..... in-situ or ex-situ.

As a zoo professional, Wendy aims for the highest standard wherever she is working and as a zoo consultant, she commits to sharing all she knows about animal welfare and their future survival, and hopes this inspires others lucky enough to be working in this amazing industry, to do the same. Wendy brings her love of travel, wildlife, adventure and change to the ICZ program with the aim to stir your passion..... wildly!

About the educational role of keepers in Fundación Temaikén

Delfino Flood, Guillermo¹, Gillet, Cristian², Gachen, Gustavo³

¹Head Keeper, ²Head of Training, ³General Curator,

Fundacion Temaikén, Buenos Aires, Argentina

Gdelfino@temaikén.org.ar

Temaikén is a foundation that studies, communicates and promotes the protection of Nature. It is based on three mainstays: research, education and conservation. In order to carry out its mission of protecting nature, Temaikén has a Species Reproduction Center (CRET), the Biopark and a Natural Reserve in Misiones.

The Biopark keepers have a fundamental importance in the Biopark structure, due to their role in the care of animals and because of what they communicate and generate in the visitors.

Taking this into account it is very important to develop and foster the attraction and fantasies that this profession generates in the visitors, highlighting animal welfare and conservation education at all times.

At Temaikén Biopark, the keepers provide educational talks to visitors, as an excellent opportunity to reach people and generate a great impact and a transforming experience through the narration of their own experiences. These talks take place together with some activity regarding environmental enrichment, training or offering the possibility to appreciate and have a close encounter with an animal of the park collection. These activities provide an opportunity for the visitors, to talk, learn and receive a message about the fundamental task performed by the Biopark animal keepers and about the importance of preserving each one of the species and its environment.

With this purpose, the keepers carry out different activities:

“Talks on Environmental Enrichment and Conditioning factors” regarding different species such as: South American Tapirs (*Tapirus terrestris*), Tigers (*Panthera tigris*), Guanacos (*Lama guanicoe*), Red-necked Wallabies (*Macropus rufogriseus*), Large flying foxes (*Pteropus vampyrus*), Hippopotamus (*Hippopotamus amphibius*), Meerkats (*Suricata suricatta*) and lemurs (*Lemur catta*).

“Behind the scene” consists of unique moments when the visitors are allowed to observe, know and learn more about the keepers work and the tasks they perform in order to improve the animal welfare, by visiting their working areas.

“Talks on having pets” these are offered at the Veterinary Hospital, and are focused on showing which domestic animals can be kept as pets, and what traumas and problems can affect wild animals that are kept as pets.

“Talks on Birds of Prey” the keepers offer an activity with flying birds, specimens that have arrived to the biopark after suffering different traumas caused mainly by humans, due to which they were unable to be returned to nature. Each one of them was recovered and rehabilitated by veterinary doctors and keepers belonging to Fundación Temaikén. This talk provides, through the close contact with these animals and their life-stories, an excellent opportunity to raise awareness on the importance of nature preservation, communicating this legacy to the new generations.

“The Art of Falconry” is a space where the biopark keepers show the application of this millenary technique with Peregrine Falcons (*Falco peregrinus cassini*) and their present use in airports for biological control.

These meetings are very important as a means to communicate the principles of respect, awareness and protection of nature through education. This is Fundación Temaikén’s mission, and our personal mission due to our privileged position.

American Association of Zoo Keepers (AAZK)

Norah Farnham & Sara Wunder Steward

norah.farnham@aazk.org; sara.steward@aazk.org

The American Association of Zoo Keepers (AAZK) is a U.S. 501c (3) non-profit volunteer association which provides resources to animal care workers for training, professional development, committee chairs, & conservation. It does this through publications, conferences, chapter activities, & online resources. The AAZK membership totals approximately 2800 members in 48 U.S. states, 5 Canadian provinces, & 24 other countries.

Analysis of people's view about zoo keeping in the federal capital territory, Abuja Nigeria

Mr Michael Adedotun Oke

President, Agric-link Multipurpose Cooperative Society Limited, Nigeria

agricproject2009@yahoo.com

Abuja, the acclaimed center of unity was constructed on the shapes of two gigantic rocks structured around it Zuma rock and the Aso rock, a 400 metre monolith by water erosion, Geographical experts say the city is located at the very center of Nigeria. The Aso rock is situated geographically at the Skull of Abuja with a rapidly developing core which expands south side from the rock. Its twin, Zuma Rock, veering off the main road that leads from Abuja to Kaduna, is a tourist delight, while the Aso rock hosts the palatial presidential Villa. Interspersed around the city are ubiquitous smaller rocks which serve as a constant reminder that the regions was once a large expanse of forest and massive boulders

Religious bodies too, especially churches make use of the unusual platforms to publicize their programs to the public. It is interesting a times to see different invitation to programs competing for the space in order to reach out to public.

In the Capital City rocks are gradually turning from being intricate tourist attractions to becoming sources of information about the different good and services available for the public

Therefore the citizen needs to enjoy zoo-keeping, because of the various opportunity that all the citizen will benefit, in terms of employment generation, relaxation, gathering of religious activities, financial income to the Government and discovering of certain Animals that will improve the capacity of people keeping Rabbits.

On the basis three area council of the Federal Capital Territory were randomly selected. And the result obtain suggested that there is need for the establishment of Zoo in the three area council namely, Gwagwalada, Abaji, Kwali .

Key words: Zoo keeping, rock

Captive Breeding and Conservation of Firefly (*Pteroptyx valida*) at the Night Safari

Ernie Fazlihana¹, Razak Alwie²,

¹Keeper, ²Senior Keeper

Night Safari, 80 Mandai Lake Road, Singapore 729826

devillishangelic@gmail.com; razak.alwie@wrs.com.sg

Pteroptyx valida (Family: Lampyridae) is a species of firefly found predominantly in Asia. They play a significant role in the ecological function of tropical forests as important indicators of the ecological health of river systems. The majority of research on the genus involves *in-situ* studies on their behavior and bio-luminescence characteristics. However, very little work has been conducted on the potential for breeding of the species in captivity. The Night Safari has been conducting a structured breeding programme for the species over several years. Founder populations were obtained from the wild and through successful captive breeding, offspring from the founder population are re-introduced back to mangrove forests in Singapore to supplement wild populations. Through our experience breeding fireflies at the Night Safari, we documented several factors that contributed to successful breeding. These include, most importantly, the choice of substrate and appropriate husbandry requirements at various stages of the firefly life cycle. The Night Safari also actively conducts outreach programmes, in conjunction with firefly re-introduction efforts to educate the public on the importance of conserving the species and their habitats.

Conservation can be EASY!

Wendy Husband

Education Manager, Bali Safari & Marine Park, Indonesia

education.manager@balisafarimarinepark.com

Looking at ways to tackle the complexities of Wildlife conservation and a paradigm shift to achieve more successful outcomes in the future! We'll need to do things differently, if we are going to reach the almighty goal set at the 2010 Tiger summit in Russia, "Tiger population doubled by the next 'Year of the Tiger', 2022.

Conservation value of the white tiger

Tim Husband

Curator Life and Science, Bali Safari & Marine Park, Indonesia

curator@balisafarimarinepark.com

Fewer animals have caused as much debate about their conservation value then the White Tiger. In one corner we have the side that feels that they should not be bred and not displayed and on the other side we have those that feel that they are majestic animals that should be protected and displayed.

This paper is not about telling zoos and parks what to do with their white tigers or even telling zoos and parks to go out and find one, but rather it's more about showing a brief history of this animal, showing the pit falls and offering some ideas on what could be done with these tigers, and allowing each zoo to decide for themselves.

Contacts between visitors and animals at "Meet the animals" zone

Astahova L., Volkova O., Matlova M.

Keepers, St. Petersburg Zoo, Russia

ladoganerpa@mail.ru

Visitors, undoubtedly, are the factor of the environmental enrichment for the zoo animals. Obviously, the strongest influence on animals people have in the situations, when there is a possibility for direct contact between a human and an animal, including contacts in "Meet the animals" zones.



Poster Abstracts

The aim of our research paper is to study the structure and the orientation of contacts between visitors and animals of different species which are kept at “Meet the animals” zone.

The observations for the behavior of the animals and their mutual relations with visitors were held between August and November 2011. Using three video cameras we recorded the events taking place in the three appropriate zones, in the fourth zone which was inaccessible for the cameras the visual observation was held. There were three kinds of mammals (goats, a cow and a donkey) and four kinds of birds (hens, geese, ducks, turkey cocks) in the mixed group in the “Meet the animals” zone. The visitors could enter two contact grounds where the goats and all birds could also come. For the cow and the donkey the communication with people was available over the barrier of the main enclosure. During the contact between the animals and visitors the sex and age of people were taken into account. The total duration of observation is 184 hours.

All mammals and birds, which are kept in the mini-zoo, had an opportunity to choose the strategy of communication with visitors and, if they wished to, could avoid direct contacts. According to the degree of interest in communication with people, the animals in mini-zoo can be divided into some groups:

- Avoiding direct contacts (all species of birds)
- Animals which seldom trigger the contact with people but actively take part in it as recipients (the cow and donkey)
- Animals which are very active in triggering the contact with people and often act as recipients (goats)

The goats, which contacts mostly had forms of begging for the fodder, were very accurate in choosing the addressee of the contact. The frequency with which they approached adult women is for certain higher than random.

The goats' reaction on people depended on people's activities. The two ways of behavior as a response on the stroking were found out: neglecting the outside impact (when the animal was walking somewhere or was distracted by something) and responding begging (the animal turned to the person, sniffed the hands, looked at the person or poked its muzzle into person's hands). In response on people's trying to keep or hug and also when the person followed the animal, the goats avoided the contact actively.

The cow spent practically all the time in one and the same place near the barrier, which separated it from the visitors, and contacted only with those people who came to it. At the same time the animal didn't try to move along the barrier and come to the people, who stood aside from it. The behavior of the cow during the contact with people depended on the age and sex of a person. The cow communicated with adults certainly longer than with children ($p < 0,05$). In the cases when the group of children came close to it, the animal refused to communicate and went away from the barrier. At the same time, when the group of adults approached it, the cow showed an active interest, tried to come closer, stretched its neck and lips, begged for the fodder.

While contacting the animals people of different age and sex behave in different ways. During the contacts with goats the girls were more active, triggering for certain more contacts ($p < 0,05$) than the other groups of visitors (boys, adult men and women). Just children (not depending on their sex) showed most various activities towards goats. Adults, as a rule, just stroked the animals.

In the case with the cow we noticed the opposed situation. Adults behaved more active and various than children, while the little visitors just stroked and hugged the animal.

Dactylanthus taylorii - New Zealand's wood rose

Horticulture Team, Auckland Zoo, New Zealand

In 2011, the *Dactylanthus* Recovery Group held its AGM in Auckland. This meant that the Auckland Zoo horticulture team were fortunate enough to be able to attend.

Dactylanthus Taylorii is NewZealands only parasitic flowering plant and occurs only in New Zealand.

It is also called the woodrose, pua o te reinga, meaning “flower of the underworld”. *Dactylanthus* is completely dependant on its host plant for food and water. It is a root parasite growing completely or partially under the ground. Where it attaches to the root a distortion forms which is commonly known as a woodrose. There are approximately thirty species of native trees and shrubs that it can live on.

The short tailed bat (*Mystacina tuberculata*), another endangered New Zealand species, has a close relationship with *Dactylanthus*. They are the only confirmed natural pollinator. The sweet smelling nectar produced by the flowers attracts them.

In the past *Dactylanthus* was found throughout the North Island and northern South Island. It is now found from Northland to Wairarapa, with the largest populations in East Cape and the central plateau. There is also a small population on Little Barrier Island.

Dactylanthus is listed as Critically Threatened – Serious Decline, and ranked as a plant with a high priority for conservation action by the Department of Conservation.

A national recovery plan has been published by the Department of Conservation to co-ordinate conservation effort and ensure the survival of *Dactylanthus*. Plants are caged to prevent browser damage and key pests are controlled at selected sites. New populations have been established through seed sowing. Ongoing research continues to shed light on the ecology of the species.

Auckland Zoo horticulture team has been donated *Dactylanthus* seed, which will be sown at selected sites within the zoo. We plan to establish some plants in moveable containers that will be placed on display within the short-tail bat exhibit in the hope that they will pollinate the flowers. We also intend to sow seed in off display areas where host trees are present. The intention is to establish a permanent population in the Auckland Zoo. Cages will be made to protect the areas where the seed is sown. The germination could take from four to eleven years. Though the zoo has ongoing rodent control the cages will also help identify the sites

Development of social relationships through social play: a comparative study of captive cotton top tamarins and captive wolves

Marina Bertelé, Barbara Fabbri and Caterina Spiezio
Research and Conservation Department of Parco Natura Viva, Italy.
marina.bertele@gmail.com

In the wild, for some species social behavior is key to their survival. Cooperation, courtship and reproduction, feeding and foraging, territorial defense can all be social in nature. Captivity may influence social interactions between individuals of the same group, within both a colony of non-human primates and a pack of carnivores. Cotton top tamarins as well as wolves show very high level of social complexity. Living in an adequate social environment enables juveniles to develop specific skills, particularly through social play. Social bonds between individuals are established early in life and social play seems to be a very important tool in developing and improving social relationships.

This comparative research project aims to evaluate social dynamics within a colony of cotton top tamarins and a pack of wolves focusing on the role of social play influencing the develop of species-specific social behavior and in establishing relationships within subjects.

Two different studies were conducted in order to investigate the social relationship of two captive social groups maintained in Parco Natura Viva, Bussolengo, Italy. One study was carried out with 8 cotton top tamarins, 4 adults and 4 juveniles, and the other study was carried out with 12 wolves, 7 adults/subadults and 5 juveniles. Focal animal continuous sampling was used to collect behavioral data.

Results highlight that the two captive groups showed species-specific behaviors, suggesting that the subjects live in an adequate environment, which can provide welfare and well-being. Moreover, results underline that both the colony of tamarins and the pack of wolves exhibited an adequate social behavior. Furthermore, our data confirm that social play was showed more by juvenile subjects than by adult subjects, according to literature.

This research may assess the importance of social play in developing social behavior. Through social play young wolves become able to develop motor and sensorial functions and they can establish dominance, whereas young tamarins learn to cooperate and care for offspring.

In both species social play seem to be one of the most important tool used by juvenile subjects in order to develop and establish necessary social bonds.

Furthermore, this study underlines the importance of investigating species in order to improve our knowledge of those animals we want to preserve in the wild and the welfare of those we want to manage in captivity.

Eco-exhibit Design on Amphibians and Reptiles

*¹Keeper, Conservation and Research Center, ²Keeper, Animal Department
Taipei Zoo, Taiwan*

dwy81@zoo.gov.tw; crz03@zoo.gov.tw

The opening of Taipei Zoo's amphibian and reptile house is on August 30, 1993. This large hall is an indoor exhibition space that focuses on animal ecology display, species conservation, and interpretive education. The exhibition hall is unlike the traditional animal category display; it focuses on "immersing-in ecological environment", which means animals are satisfied their needs in the captivities that our keepers carefully simulate their natural habitats. In addition, our visitor's trail also coordinates with display fields, so visitors can feel like being in the same environment that animals live. The immersing-in ecological environment can guide visitors to observe amphibians and reptiles in a much closer distance and understand the relationship between animals and wild natural environment.

Many reptiles and amphibians live in tropical forest; their natural habitats include complex, dense forest structures. Species that live in such environments are good at camouflage to avoid and survive predation. Create a natural habitat in a tank may cause difficulties to observe animals, so we will share a few more eco-exhibit tanks. This type of tank not only reveals animals' natural habitats, but also allows people to detect the animals in the environment easily.

Enrichment Ideas for Hoofed Stock

Ng Ai Lin

Keeper, Night Safari, 80 Mandai Lake Road, Singapore 729826

zaax4eva@hotmail.com

Enrichment is an important aspect of good zoo keeping. Implementing enrichment devices for hoofed stock can be particularly challenging; one of the reasons being that they are usually naturally flighty, and are often wary of any changes in their environment and novel objects. An added challenge is due to their nature of being only food-motivated, and unlike other species like primates, they have no flexible limbs or prehensile tails to manipulate objects. At the Night Safari, a variety of enrichment programmes have been implemented for hoofed stock species including Indian rhino, banteng, water buffalo and several species of deer. From these experiences, we identified important variables which helped overcome the natural wariness of hoofed stock and allowing them to get comfortable with and

eventual success with manipulating new enrichment devices. This involves designing simple, yet workable devices that correspond to the natural foraging behaviour and physical capabilities of hoofed stock. Simple and inexpensive materials can be used to achieve these effects, for example, recycled and natural materials that can be transformed into interesting devices. We also identified certain devices which may be suitable for certain species of hoofed stock but may be unsuitable or even dangerous for other species and discuss the limitations and possible improvements of enrichment designs to ensure appropriate application of enrichment for hoofed stock.

Environmental Conditioning and Enrichment: prevention, resolution and research tools

Delfino Flood, Guillermo¹, Gillet, Cristian², Presa, Florencia³

¹Head Keeper, ²Head of Training, ³Head of Environmental Enrichment

Fundacion Temaikén, Buenos Aires, Argentina

Gdelfino@temaiken.org.ar

Working with animals in captivity includes facing different challenges all the time. There are many reasons why we need to handle the behavior of animals in captivity with extreme care.

That is why we have developed a Training and Environmental Enrichment program, including animal care and problem resolution model.

The following cases refer to situations where this proactive program about handling the behavior became a key factor in the solution of different conflicts or in their prevention.

- **Veterinary Handling:** the keepers detected a protuberance on the neck of one of the cheetahs. The tumor was diagnosed by the veterinarian as a mast cell tumor and was surgically successfully removed. Ten days after, the stitches were removed, and the wound remained completely opened and exposed to infections. Due to the previous handling of this animal, it was decided not to use anesthetics again in order to practice the necessary healings; during the following two months the keepers practiced this procedure, and the result was the definite healing and resolution of the case.
- **Keepers Handling:** There were difficulties to enclose a couple of *Casuarus casuaris*; they only went in some occasions, using diet at closing time. In order to improve their feeding and welfare, the first behavior consisted in reinforcing the entrance and movement inside the enclosures. The feeding system was changed to manual feeding at indoor as well as outdoor feeding stations. They were desensitized to the opening and shutting of doors. Thanks to these procedures, it was possible to improve the daily handling, and animals were able to enter even 9 times a day, improving feeding and consumption.
- **Emergencies:** Quick enclosing: Big felines are trained to go into their night houses by means of 2 different orders, the number of times that are deemed necessary during the day according to the reason. We need to do this, in order either to place their enrichments in their exhibits or to train them according to the emergency protocol, where it is established that such species must enter immediately into their night houses whenever people fall in the environment or in case other animals escape.
- **Research:** (*Tapirus terrestris*). The specimens of the collection have been trained for their veterinary handling; these include weighing, morphometric measurements, blood extraction, injections and ecographies, among others. Contributing to the research program on the species, it was possible to study the milk composition, hormonal studies, biochemical values and follow-up of the fetus during pregnancy by means of ecographies.
- **Behaviors/ environmental enrichment:** There was a case of an ocelot (*Leopardo pardalis*) losing its tail hair. After analyzing this problem and once clinical affections had been ruled out, an ethological

study was started to determine the causes. It was decided to redefine the enrichment program objective applied at that moment and make a new design of the environment, with the purpose of stimulating the search for food and the implementation of live prey. By adding live fishes, the ocelot developed a great number of typical behaviors and the use of different materials increased the exploratory behavior, increasing the animal welfare and achieving a total hair regrowth in the tail.

Animal welfare is the ethical and moral responsibility we must assume when keeping animals in captivity. For this reason, it is our objective to foster the development of natural behaviors through environmental enrichment and by implementing a training plan.

Ethno Veterinary treatment and management of foot injury in a captive Asian Elephant (*Elephas maximus*)

Powar, K.V¹, Tripathi S.A.², Karavale M.S.³, Bangar N.S.⁴

Veermata Jijabai Bhosale Udyan Zoo, Mumbai, India

¹Veterinary Officer, VJB Udyan Zoo, Byculla, ²Dy. Supdt Vet (I/C), VJB Udyan Zoo, Byculla, ³Ex- Dy. Supdt Vet (I/C), Byculla, ⁴Undergraduate Veterinary Student, Bombay Veterinary College, India

vjbudyanzoo@yahoo.co.in

Veermata Jijabai Bhosale Udyan Zoo, Byculla in Mumbai is 150 yrs old Zoo with total area of 53 acres. This zoo has two female Asiatic elephants namely "Laxmi" and "Anarkali" for public display in a moated enclosure of 4339.80 sq mts. area.

In the month of July 2011, 'Anarkali', a 46 years old, female, Asiatic Elephant exhibited signs of limping when left for rounds in the open enclosure. Closer examination revealed punched ulcerated lesions on left foot, redness and pain on palpitation. Topical dressing with Betadin and antibiotic cream was done. However, two days later the right leg developed similar lesions along with increase in size of the lesions on the left foot sole. A swab from both the feet lesions was sent for microbial examination. Aerobic and anaerobic bacterial culture and antibiotic sensitivity test was conducted.

Intramuscular injection of antibiotic Enrofloxacin and Phenyl butazon @ 2 mg/kg bdwt was administered for 3 days and then shifted to oral dosing of Enrofloxacin @ 2.5 mg/kg PO sid Phenyl Butazon @ 4.4 mg/kg PO sid for 7 days. Oral vitamin supplementation was done through concentrate food ration daily. The elephant rounds in the open enclosure were restricted.

The feet were washed thoroughly with Potassium permanganate solution and smeared with betadin solution. Calendula ointment was applied for faster healing. Dressing powder made of Turmeric powder, Boric acid powder, Zinc sulphate powder, Sulphur powder and Metronidazole powder was applied after cleaning the foot daily.

Aerobic Antibiotic sensitivity test done revealed Sensitivity (S) to Amikacin, Chloramphenicol and Intermediate Sensitivity (I) to Enrofloxacin, Cefotaxim, Tetracyclin, Amoxicilin and Resistance (R) was shown towards Ciprofloxacin. Anaerobic Antibiotic Sensitivity test revealed Sensitivity (S) to Erthromycin, Ciprofloxacin, Intermediate sensitivity (I) to Tetracyclin, Amoxicilin and Resistance (R) towards Penicillin, Ampicillin.

Ethno veterinary treatment was tried for the first time which consisted the use of Decameli oil prepared from plant resin dicameli, garlic, camphor and neem oil. (Ref :- Dr.S.Gopalan, Z P Jr; Vol-11(4); 17). Ingredients used were: Neem oil-680 ml, Garlic- 28 gms., Camphour- 28 gms. and Dicameli-28 gms.

Procedure: Crush all solid items. Boil in neem oil (Except camphour) till dissolved. Add powdered camphour over the mixture and mix it well in luke warm state, cool it and use. This was then applied over the foot and in between nails to prevent foot ailments henceforth.

Hay and rice straw was spread on the floor to absorb moisture as well as to provide soft bedding which was changed on daily basis. The Elephant was not allowed for walks till the signs of pain were alleviated. Within a week weight bearing was observed and short walks were allowed only in the dry area.

Foot problems are commonly encountered in captive elephants and they need meticulous treatment and care. The predisposing factor for occurrence of injury on both the feet was attributed to excessive wetness in the open enclosure due to the monsoon season. The open space for walks is made up of mud which became excessively wet due to heavy rainfall leading to foot condition called as cracked foot.

Managerial precautions like restricting walks only in the dry area, keeping the feeding enclosure dry, provision of dry hay and rice straw under the feet along with daily dressing helped in faster recovery.

Free Ranging Primates in Singapore Zoo

Rajan Thanapal

Senior Keeper

Singapore Zoo, 80 Mandai Lake Road, Singapore 729826

iamkrazie@hotmail.com

The concept of free-ranging animals at the Singapore Zoo was first implemented in 1985 to provide for more naturalistic displays of captive primates. Free-ranging of primates involves the release of animals from the confines of their exhibits or holding areas to range freely near their original holding areas or in other areas within the compounds of the Singapore Zoo, with options for the animals to return to their exhibits or holding areas, and feeding provided at fixed locations at pre-determined times. A similar form of free-ranging display involves the deliberate modification of existing natural forested areas or creation of naturalistic areas as exhibits which restricts primate movement within the designated areas. Primate species that are currently free-ranged around the park include cotton top tamarin (*Saguinus oedipus*), white-faced saki (*Pithecia pithecia*), brown lemur (*Eulemur fulvus*), golden-handed tamarin (*Saguinus midas*), common marmoset (*Callitrix jacchus*), silver-leaf monkey (*Trachypithecus cristatus*) and orangutan (*Pongo spp.*). Free ranging of primates provides benefits to both animals and visitors. For animals, it provides opportunities to explore a larger usable area in a more complex environment and for natural foraging opportunities which helps enrich their lives in captivity. For visitors, they are able to observe animals in a more naturalistic setting in closer proximity and this provides for more realistic wildlife entertaining experiences. However, there are also disadvantages to free-ranging, for example, higher risk of exposure to direct trauma and injuries due to irresponsible visitor behavior or wild animal predators, as well as potential competition from other wild or free-ranging animals for resources and pathogen exchange through zoonotic and anthrozoönotic transmissions. Design and implementation of free-ranging displays should achieve a balance to maximize display value while ensuring the safety of smaller-sized, more delicate primate species from aggression/predation and in the case of larger-sized primates, to ensure the safety of visitors.

Handrearing and Socialisation of a White-handed Gibbon (*Hylobates lar*) at Zoo Landau, Germany

Kai Hartenstein^{1*}, Christina Schubert², Jens-Ove Heckel³

¹work colleague, ²zoo administrator, ³zoo director

Zoo Landau in der Pfalz, Germany

zoo@landau.de

Zoo Landau is keeping a pair of white-handed gibbons (*Hylobates lar*) of unknown origin (approx. born 1978) which was confiscated from a private holder. The female ever since showed signs of abnormal behaviour with regards to disproportionately high licking and scratching of little wounds and spots. After some normal births and raisings she showed this exaggerated fostering behaviour also towards her babies, licked and bit especially their noses, so that she was hormonal averted by an implant for many years. This abnormal behaviour is also known from gibbon mothers in a rescue station in Vietnam (pers. comm.). A male baby, born 22nd July 2010, was carried, fed and fostered normally until day 10 after birth. For unknown reasons the female started licking a little wound at the baby's nose at that time. They were kept under strict surveillance, the female was treated with long acting neuroleptica (LNA) to calm her down, but at day 16 two third of the baby's alar wings of the nose were gone and left a bloody wound. For the welfare of the baby it was decided to take it off and start hand rearing. The baby accepted the bottle right from the beginning and except from some days of diarrhoea in week three and four of hand rearing, never had any digestive problems and never vomited at all. Conversion to solid food went smoothly and was accomplished by feeding of baby mash, fruit pulp and cooked vegetables. The baby was shown to his parents and older sister (born 1997) frequently at the enclosure fence, but the family showed very little interest in the infant. When it crawled or made a noise the adults were attentive but otherwise showed no signs of recognition, interest or aggression. Cases are known that hand reared gibbons could not be reintroduced to the family group due to aggression of the father. Since the mother did not show any interest and the enclosure situation did not allow to separate her from the group to try to introduce the little to her alone, it was decided to look for another opportunity to let the baby grow up with gibbons and to be socialised.

At Zoo Schwerin (Germany) two female pileated gibbons (*Hylobates pileatus*; sisters, born 2009) were hand reared and housed together. Zoo Schwerin agreed to take over the little male from Landau at an age of nine months. Their experience with the second born baby showed that the infant should be mentally and physiologically ready to be separated from his human parents by this time. During a 16 days period he was introduced to his new keepers, who would take over bottle feeding for a few more months, the new enclosure and the gibbons step by step. The two little females were very interested and never showed anything but friendly and protective behaviour towards the new mate from the beginning. The male showed interested, friendly and self-confident behaviour towards the females as long as he was separated through mesh, but panicked when he got in body contact with them the first time. After this throwback, he started acting more and more unfearful after 10 days of the introduction process. The separation from his human parents and accommodation to the new situation went smoothly after that, without any signs of negative impacts like stereotypes, hair plucking or self-injury. He was affectionate to the keepers at the beginning and started crying when they arrived, left or passed by but this behaviour declined over a few months and he is now fully integrated into the group and independent.

Human Well-Being

Bambang Triana

Zoo Vet, Ragunan Zoological Parks, Indonesia

murdimantriono1@gmail.com

To protect the safety of the “wild animal” foster, he must treat the animal with utmost caution while working with wild animals in the Zoo. A small mistake could endanger the foster’s well-being, even if it would only be a bite by a small Cobra snake. Prevention is in this case better than reaction. Zoo foster education through Human well-being seminar and training would help a lot in this respect. Handling method are useful in how to capture a wild animal safely without being scratched, bitten or kicked by an animals. Method of carrying poisonous snakes are of much use as well. Vaccination for diseases like hepatitis for primate fosters are important in the endemic area of those diseases. Special equipment and clothes, such as special boot, shoes, leather cloves, helmet, glasses etc. are an important part of safety measures while working with wild animals. Warning signs must be placed clearly on a big and clear sign plate.

Animal foster Insurance is very important for Keeper to protect the health and well-being of the fosters themselves. Visitor Insurance is important as well to anticipate on any visitor accident while visiting our Zoos. In some countries animal insurances are available.

Education and training on how to anticipate and act upon a human accident, foster and visitors alike, are extremely important in the first aid upon the occurrence of accident conditions.



Husbandry and Breeding of Hog Badgers (*Arctonyx collaris*)

Rahmat Hidayat¹, Joe Ong²

¹Keeper, ²Senior Keeper

Night Safari, 80 Mandai Lake Road, Singapore 729826

joe.ong@wrs.com.sg

The hog badger (*Arctonyx collaris*) is classified as ‘Near Threatened’ by the IUCN Red List of Threatened Species, with populations in the wild showing a decreasing trend. The Night Safari has been maintaining a collection of hog badgers since 2001, with successful breeding, the most recent in March 2012. There is very little available information on hog badger husbandry in captivity, making it a considerable

challenge to care for and breed the species when they were initially acquired for the collection. Our success in maintaining and breeding the species is the result of constant refining of husbandry protocols over the past ten years. From these efforts, we derived tried and tested dietary, breeding and other captive management guidelines for the species to serve as a reference for current and future caretakers of this magnificent species.

In-situ and *Ex-situ* Breeding and Conservation Efforts for the Oriental Pied Hornbill (*Anthracoceros albirostris convexus*) in Singapore

Minerva Bongco-Nuqui

Curator

Jurong Bird Park, 2 Jurong Hill Singapore 628925

[*minerva.bongco-nugui@wrs.com.sg*](mailto:minerva.bongco-nugui@wrs.com.sg)

The Jurong Bird Park houses 14 Asian hornbill species, one of which is the oriental pied hornbill (*Anthracoceros albirostris convexus*). Hornbills have very unique breeding characteristics which involve the sealing of the female in a tree cavity used as a nest, leaving only a small opening for the male to provide food for the female and the chicks until they are weaned. As part of the breeding efforts for this species in captivity and a concurrent effort to increase the dwindling wild population in Singapore, breeding and nesting behaviours have been monitored closely since 2005. Artificial nest boxes that resemble natural tree cavities were provided for both captive and wild hornbills. All nest boxes were fitted with closed-circuit televisions to improve monitoring efficiency. Significant breeding and nesting behaviours were recorded and this included observations of infanticide and cannibalism. This project has achieved much success for *in-situ* and *ex-situ* breeding and conservation of oriental pied hornbills. In 1994, the oriental pied hornbill population in the wild was estimated at 20 individuals but the estimated numbers of these birds now stands at 100 individuals. This project also saw the successfully re-introduction of a pair of captive bred hornbills to the wild in 2008.

Introducing SHAPE-Southeast Asia

Bianca Espinos¹, Debbie Ng², Diana Marlina Bte Mohd Idris³

¹*Zoological Operations, Ocean Adventure, Philippines*

²*Fauna Department, Kadoorie Farm and Botanic Gardens, Hong Kong*

³*Zoology Department, Singapore Zoo, Wildlife Reserves Singapore, Singapore*

[*bgespinosa@gmail.com*](mailto:bgespinosa@gmail.com)

The idea of SHAPE-Southeast Asia was born at the joint ICZ and AAZK conference in Seattle in 2009. As with other SHAPE regional groups, the objectives are to promote environmental enrichment among zookeepers and zoo professionals in the region and to provide them an opportunity to receive training and exchange ideas on a more local scale. So far, the committee's main achievement has been the development of the Animal Enrichment and Training Workshop (AETW). The 1st AETW in 2010 was hosted by Wildlife Reserves Singapore and held at its three parks; the Jurong Bird Park, Night Safari and Singapore Zoo. The 2nd AETW in 2011 and 3rd AETW in 2012 were jointly hosted by Ocean Adventure and Wildlife In Need Foundation and held at their facilities in Subic Bay, Philippines. The workshop is focused on the concept of behavioral management, which consists of environmental

enrichment, positive reinforcement training and problem solving. A big plus is the real hands-on training and instruction with a variety of animal species and settings. Attendance from a broad range of institutions and various levels of the organizations, from India all the way to China, are very encouraging. This shows that more and more people are getting involved in enrichment activities at their facilities and that there is an increasing request for more training and collaboration in the region. Thus the committee members are looking forward to receive training as instructors for these workshops in the future. SHAPE-SEA also hopes to hold its own regional conference one day, to continue to promote and spread the good news about environmental enrichment.

Keepers Training Program at Fundación Temaikén

Aguirre, Cecilia¹, Delfino Flood, Guillermo², Gachen, Gustavo³

¹Human Resources, ²Head Keeper, ³General Curator,

Fundacion Temaikén, Buenos Aires, Argentina

Gdelfino@temaikén.org.ar

With the purpose of developing a professional team of wild animal keepers, Fundación Temaikén carries out a continuous educational program consisting of two aspects: the internal training in charge of professionals belonging to the institution and the participation in courses organized inside or outside Temaikén, led by professionals from other zoos. Considering that in Argentina and in South America the academic or professional career of wild animal keeper does not exist, as it does in some countries in Europe and in North America, and considering the absence of keepers associations to facilitate the existence of training courses involving the different zoos in Argentina, it was decided to design a formal educational program for keepers who work at Temaikén. This training has the goal of providing the theoretical, practical and methodological tools for the complete development of a wildlife keeper.

Temaikén biopark's keepers training program is focused in the needs of the different existent categories at Temaikén: Keeper, Trained Keeper and Expert Keeper. The program is developed, taught and evaluated by the same professionals who perform different tasks and professions at Temaikén, and considers the knowledge, experience and development that every keeper shows at work, prioritizing animal welfare. Each discipline has personnel belonging to different areas, with a large variety of professionals such as veterinarians, laboratorists, biologists, aquarists, preservationists, educators, Human Resources experts and people in charge of keepers. All these people work together every day and actively cooperate in training the keepers' team.

The first modules are meant for junior keepers and the subjects include basic and essential items such as: History and Evolution of Zoos, CRET (Temaikén Species Reproduction Center), Keeper's role, Animal Kingdom, Preventive Medicine, Evolution and Behavior, Animal Nutrition, Communication and team work.

Continuing with trainings, the following module is implemented, aimed at those keepers who already have a greater theoretical basis, experience and responsibilities.

During the whole year different activities take place, as programmed or unexpected animal captures, which are also considered as training situations. Each participant has a previously defined role and is evaluated at the end. This activity can be carried out by someone in charge or by the role model keeper of that section.

Keepers also participate in the trainings and courses given at Temaikén about Environmental Interpretation, Corporal Expression, Environmental Conditioning and Enrichment. The Expert category in addition, receives Leadership training to be able to perform as role model in their section.

Together with the mentioned trainings, there are quarterly evaluations and feedback, focused on acknowledging, discussing and correcting the performance of each keeper.



Complementing the applied methodology, there is an annual evaluation, in which personal goals are assessed, these are established at the beginning of the year and contribute to the fulfilment of Fundación Teraikén's mission, protecting nature, which is a permanent incentive for development, growth and professionalization.

Kids in Conservation

Wendy Husband

Education Manager, Bali Safari & Marine Park, Indonesia

education.manager@balisafarimarinepark.com

It's 'Year of the Dragon, 2012' so let's take a group of school kids to visit Komodo Island National Park, Indonesia to see Komodo Dragons in the WILD!

Management and Welfare of Captive Radiated Tortoises (*Astrochelys radiata*)

Raffaele Grisa, Marina Bertelé & Caterina Spiezio

Research and Conservation Department, Parco Natura Viva, Italy

rafgrisa@yahoo.it

The modern zoos play an important role in conservation. Besides research is an important tool for modern zoos in order to provide a valuable insight into animal behaviour and welfare, which can lead to improvements in how to care for captive animals as well as having an impact on conservation. In particular, researches carried out with captive reptiles highlight that these animals maintained in an inadequate environment (temperature, light, food providing etc.) might show abnormal behaviours such as apathy or hyperactivity.

This study aims to evaluate the behaviours of a group of 7 radiated tortoises (*Astrochelys radiata*) hosted by Parco Natura Viva (Italy) in the reptile house. In particular this research focuses on management and welfare of these reptiles by observing the use of enclosure space and the food preference. Furthermore the present study aims to investigate the behavioural effects of two different food provision strategies.

The tortoises were housed in a new enclosure designed, built and equipped for this species of South Madagascar. The enclosure was ideally divided into 6 distinct areas (3 shelter areas, the coldest area, the hottest with UVB light area and the food area) in order to collect data about the use of space. The tortoises were provided with two different kinds of food in different days in order to meet tortoises' natural requirements: feeding fresh hay or mixed vegetables alternating every other day. Two different kinds of dish were used for vegetables: firstly a circular dish was used and later a rectangular one was introduced.

Results highlight that the tortoises showed specific behaviours and they did not exhibit any abnormal behaviours. Besides the tortoises seemed to have a preference in the use of enclosure areas, suggesting that the exhibit provides them with different opportunities. Thus our findings seem to describe a good welfare of these tortoises. Moreover, a food preference was found, as vegetables were more eaten than hay. Furthermore, results underline that the tortoises showed less agonistic behaviour when the rectangular dish was used suggesting that this kind of dish was more adequate to feed them than the circular one.

In conclusion, it is important to underline that similar studies are necessary to improve management and welfare of reptiles, tortoises in particular, in captivity.

Observations of a Juvenile Red and White Giant Flying Squirrel (*Petaulista alborufus*)

Eli Ong¹, Osman Ramli²

¹Keeper, ²Junior Keeper

Night Safari, 80 Mandai Lake Road, Singapore 729826

eli.ong19@gmail.com; osmanramli@hotmail.com

Red and white giant flying squirrels (*Petaulista alborufus*) are nocturnal and arboreal and this nature posed considerable challenges for field researchers to study and document important information like their growth and development in the wild. They are also one of the rarer species to be found in zoos all over the world today although these squirrels have been known to thrive in captivity, achieving a maximum recorded lifespan of 21.4 years. Red and white giant flying squirrels were first displayed at the Night Safari in 2004 and have successfully bred since. We documented the growth and development of 'Junior', a one-year-old red and white giant flying squirrel since the first day of his birth in October 2010. We observed the significant physical and behavioural changes in his first year of development and compared these between the growth and development of other red and white giant flying squirrels. This effort is part of a long-term study to document the growth and developmental patterns of red and white giant flying squirrels, so as to contribute to the knowledge base for this species.

Operant Conditioning of a Juvenile South African Giraffe (*Giraffa camelopardalis giraffe*)

Kughan Krishnan¹ and Cecilia Tang²

¹Senior Keeper, ²Junior Animal Management Officer

Night Safari, 80 Mandai Lake Road, Singapore 729826

khugan_ns@hotmail.com; cecilia.tang@wrs.com.sg

The Night Safari is currently home to four South African giraffes (*Giraffa camelopardalis giraffe*), with the newest addition to the family being born in December 2011. An adult giraffe can grow up to 5.5m in height, with an average expected lifespan of 25 years. Kayin, a 3.8m tall three-year-old South African giraffe was subjected to operant conditioning procedures with the objective of accustoming her to the squeeze cage raceway, so as to minimise the risks of injury during medical examinations and veterinarian procedures such as sedation and blood draw. Blood draw from the jugular vein of the giraffes is preferred over anesthesia darting as it lowers the stress level experienced by the animal. The timeline and progress of this operant conditioning project, as well as the responses of this juvenile South African giraffe to the crush cage training are documented; the challenges faced and lessons learnt from this conditioning procedure are discussed.

Positive Reinforcement Training of the Pygmy Marmoset (*Callithrix pygmaea*) to Facilitate Husbandry Procedures

Sabrina Binte Abdul Jabbar

Keeper, Singapore Zoo, 80 Mandai Lake Road, Singapore 729826

fragileforest.zoo@wrs.com.sg

Positive Reinforcement Training was introduced for a family group of Pygmy Marmosets (3.1.2) at the Singapore Zoo to facilitate routine husbandry procedures conducted by their caretakers. This was also aimed at preparing the group for an impending transfer from the zoo to their new home at the upcoming River Safari park. Due to their pocket-sized physique and very shy nature, the training and maintenance of training for these procedures is very crucial. Training first commenced with 1.1 adult pygmy marmosets in which desensitization as well as target trainings were introduced. These procedures were subsequently intensified and extended to allow the younger pygmy marmosets to observe and learn from the adults. The training process took into account the diurnal activity levels of the marmosets to serve as guidelines for the caretakers to plan and prepare training sessions. Trainings were divided into several sessions per day to increase the rate of response and progress. Several training procedures were accomplished over a period of one year - target training, scale training, syringe-feed training and crate training. The most significant results were: 1) close contact with the dominant female pygmy marmoset to conduct daily checks during pre and post parturition and to conduct weekly weightings to monitor changes in weight; 2) crating of young marmosets for routine health checks, without any form of aggression and hostility from their mother; and 3) syringe-feed training enabled issue of medications to specific individuals or to the entire marmoset group with accuracy and consistency. Some key observations were also made on the pattern and process of learning and training. The process of allowing younger marmosets to observe the training of adults helped build confidence level and responsiveness of younger individuals to trainings. There was no specific hierarchy system in the marmoset's response to training as the youngest member in the group was, at times, observed to be the first to respond to training followed by its older sibling or even its dam or sire, without any aggression from the older members of the group.

Prevalence of Gastrointestinal Parasites in Goats Fed to Animals in the University of Ibadan Zoological Garden, southwestern Nigeria

*Oladele A. Oluwayiose, Olusola Jeje and Olajumoke A. Morenikeji**

Department of Zoology, University of Ibadan, Nigeria

jumokemorenikeji@yahoo.co.uk

Studies were carried out to determine the prevalence of gastrointestinal parasites in goats fed to animals in the University of Ibadan Zoological Garden between May and September, 2011. McMaster Egg Counting Technique for parasite egg counts and Petri Dish-Filter Paper Slant (Modified Harada-Mori Technique) for larvae recovery were used. One hundred and seventy-five (175) faecal samples from goats were examined. Parasites recovered included *Haemonchus contortus*, *Paramphistomum* spp, *Nematodirus* spp, *Trichostrongylus colubriformis*, *Trichuris caprice*, *Toxocara vitulorum* and *Strongyloides papillosus*. The result of McMaster Technique revealed that *Trichostrongylus colubriformis* had the highest prevalence [12 (10.8%)], followed by *Haemonchus contortus* [11 (9.91%)]. The least prevalence was observed in *Strongyloides papillosus* [2 (1.80%)]. The differences observed in parasite prevalence were statistically significant ($F=34.45$, $df=5$, $p<0.05$).

Two sets of larvae recovery were done and in both the prevalence of *Haemonchus contortus* was significantly higher [(64.86% and 39.64%) ($\chi^2=109.97$, $df=5$, $p<0.05$ and $\chi^2=35.56$, $df=5$, $p<0.05$ respectively)] than all other gastrointestinal helminths. In the overall larvae recovery, *Haemonchus contortus* had the highest percentage recovery (66.29%), which was also statistically significant ($\chi^2=161.74$; $df=3$; $p<0.05$). This study also showed that *Haemonchus contortus* had the highest mean egg intensity (2358.29), which was followed by *Trichostrongylus colubriformis* (816.42). This study highlights that *Haemonchus contortus* is the most prevalent gastrointestinal parasite in goats fed to animals in the University of Ibadan Zoological Garden and the Petri Dish- Filter Paper Slant Technique is more sensitive in diagnosing gastrointestinal infection when egg shedding is low (i.e. <50). A case was made for the deworming of goats before using them as feed.

Key words: Gastrointestinal parasites, Goats, Zoological Garden, McMaster Technique, Petri Dish-Filter Paper Slant (Modified Harada-Mori Technique).

Professionalizing Zookeeping in the Philippines

Leo Jonathan A. Suarez

The Zookeepers Association of the Philippines (ZAP)

leo_sj@yahoo.com

The Zookeepers Association of the Philippines (ZAP) is a non-profit organization that aims to promote the conservation of Philippine biodiversity through the development of the profession of zookeeping in the Philippines. ZAP was formed in 2003 during the first national zookeeping workshop. Because zookeeping is not considered as a formal profession in the Philippines, the participants saw the need to create a venue and network among the zookeepers in the country to increase their knowledge and develop their skills. With perseverance and hard work, ZAP was officially registered the following year as a legitimate organization in the Philippines. Since then, ZAP has conducted five national and several more regional workshops around the country. The workshops focused on the basics of zookeeping such as animal welfare, enclosure design, record keeping, restraint, and enrichment. It has become instrumental in promoting zookeeping as a profession in the country, improving the welfare of captive animals, and contributed in the conservation of some species in the Philippines. Although it is still far from its goal, ZAP will continue its efforts to create positive changes in the zoo community in the Philippines.

Structured Enrichment and Operant Conditioning Programme for Sloth Bears (*Melursus ursinus*)

Anand Kumar, Senior Keeper

Night Safari, 80 Mandai Lake Road, Singapore 729826

anandk_80@hotmail.com

The Night Safari has maintained a collection of sloth bears (*Melursus ursinus*) since the park first opened in 1994. They are the only representative of the eight extant species of bear in the park. Carnivores like bears have been shown to be prone to stereotypic behaviour, reduced activity in captivity. Enrichment and operant conditioning can improve an animal's mental and physical wellbeing, as well as their display value. We conducted structured enrichment and operant conditioning programmes for two sloth bears "Nici" and "Helga", aged 11 and 9 years old respectively. There were two main objectives for this programme: first, to increase the activity of the bears during night display, and second, to utilise operant conditioning to assist husbandry procedures for the bears. Various enrichment

devices were provided, which were mostly food-based to encourage natural foraging behaviour. The enrichment devices showed varying effectiveness and some underlying factors for these results were identified, with possible solutions offered.

Tea for One

Management of Auckland Zoo's ageing tea party chimpanzee

Primate Team, Auckland Zoo



In 1956 Auckland City Council decided that Auckland Zoo needed “first-class money-spinners to bolster income.” Four chimpanzees (*Pan troglodytes*) were shipped to Auckland Zoo from London Zoo to perfect the art of tea parties. This exploitative entertainment continued for eight years.

*It is of psychological interest that almost any young chimpanzee learns table manners in a few days, partly by imitation of his or her fellows and partly by seeming to try to understand what the keeper wishes done. There are individual differences in quickness, as Darwin pointed out in the ‘Descent of Man’...
—The Times, 5 December, 1931*

Janie was one of the first tea party chimpanzees to arrive in New Zealand after witnessing her mother and probably other family members being killed in Sierra Leone. On the way to Auckland Zoo the chimps stopped at the town hall to have tea with the mayor.

Their wild antics during tea parties were encouraged by keepers to ensure audiences returned (up to 5,000 people). When Janie's group began to mature and became too big and aggressive to be used for entertainment they were replaced with a second shipment of animals, but by 1962 attitudes began to change and the chimpanzees were abruptly placed into concrete and steel cages with no further human contact, very little attention and certainly no enrichment. The chimpanzees' resulting behaviour was expressed through aggression and they were unable to be integrated into a non-human reared chimpanzee troupe. They displayed abnormal, anti-social behaviour for the duration of their lives. Janie, being the biggest in her group of three, became the leader as the male could not or did not fulfil the role that is natural to males. Janie's last companion died in 2004 and keepers were worried she would quickly deteriorate without her cage mate but in fact she thrived and a comprehensive management programme was put in place with Janie's welfare as top priority.

This involves extensive one to one keeper time throughout the day, which includes activities such as painting, reading to her, showing her pictures and photos, watching animal documentaries, sitting with her and grooming her. A large repertoire of behavioural and environmental enrichment activities are given throughout the day to ensure her physiological and psychological needs are met. Janie has formed attachments to specific toys and she is not often seen without a toy cell phone wedged in her thigh. She has diabetes that is carefully managed through diet and asthma that is controlled with medication and inhaler training. Her keepers routinely meet with vets and curators to discuss quality of life and ensuring a plan is in place for her eventual decline. Over time good zoos have changed their mission and focus due to a growing realisation and documentation of the decline in wildlife, driven mostly by loss of habitat as well as a shift to making animal welfare the top priority. Janie's shocking start to life has become more meaningful as she has become an ambassador for how zoos have evolved. When Janie goes it will be the passing of an era. She is the history of this zoo.

The Americas in Emmen Zoo

A mixed exhibition, where visitors and animals come together

Renee Higler, Zookeeper, Emmen Zoo, The Netherlands

r.higler@zoo-emmen.nl

The Americas is a beautiful large greenhouse where the public can walk through it and where a piece of tropical rainforest is simulated. Containing the animals, plants and climate as seen in South America.

Several species live here together; fish, amphibians, reptiles, birds and small mammals. All this is a relationship between animals, plants and visitors with should be in a balance. Important is the animal welfare, education and experience for the public.

The Changing Role of Keepers in Creating the Future

Michelle Whybrow and Karen Simpson, Auckland Zoo, New Zealand

karen.simpson@aucklandcouncil.govt.nz

Zoos, and their roles, have changed dramatically over the years as we have moved from an entertainment focus to one of conservation.

It is no longer enough to parade a menagerie of animals in concrete boxes and to provide animal rides and shows. Instead, we show case wildlife in their natural habitats, offer connections that inspire our visitors and encourage them to take action for conservation.

As Auckland Zoo has changed, so too have the keepers that work here. Once considered to be menial, unskilled labourers focussed on 'shit shovelling', keepers now have to become a core part of how we deliver our messages. In addition to the traditional keeping role, which has expanded in itself, they must also have a sound knowledge of the ecology of the species they work with, their conservation status, be familiar with current conservation efforts in the wild, as well as educate and enthuse visitors.

This progression from 'unskilled labourers' to highly skilled specialists, means that keepers are now expected to have a huge range of skills. This poster looks at what is expected of a keeper at Auckland Zoo in the 21st century, and what might be expected of them in the future.

The development of the wild seas precinct at Melbourne Zoo

Marcia Salverson, wild seas precinct supervisor, Melbourne Zoo, Australia

MSalverson@zoo.org.au

In December 2009, Melbourne Zoo opened its most expensive precinct to date, a \$20 million dollar marine exhibit featuring Australian Fur seals, Australian Little Penguins and various local Australian fish and aquatic species. The development of the precinct took place over 18 months and each stage involved numerous challenges. This poster presents photos of the development stages and the completed exhibit and will explore the advantages and disadvantages to the exhibit design. This would be beneficial to other organizations considering the development of a marine area in their own parks

**The Ecological Effects of a Man-Made Disaster:
Rena Oil Spill, New Zealand 2011**

Karen Simpson

Keeper, Auckland Zoo, New Zealand

karen.simpson@aucklandcouncil.govt.nz

When the Rena struck the Astrolabe Reef near Tauranga, New Zealand at 2.20am on Wednesday 5 October 2011, New Zealand went on high alert. Damage at several points in the vessel's hull, allowed hydraulic oil to leak from the engine, resulting in a oil slick up to 2000m in length within hours. Suddenly our country was faced with a huge threat to its clean, green image, and an even bigger threat to its aquatic and land living flora and fauna. Although New Zealand had never been confronted with such a manmade aquatic disaster in its history, a coordinated emergency response was launched immediately. The National Oiled Wildlife Response Team moved quickly to set up facilities to receive affected wildlife with assistance from New Zealand's Department of Conservation and other specialist agencies. Keepers from Auckland Zoo were requested to assist with cleaning and caring for the wildlife. This presentation will background events leading up to and shortly after the grounding, the action required to deal with it, and human involvement as wildlife carers, right through to the end objective of the operation – seeing our charges being released back into the wild.



The International Rhino Keeper Association

Sara Wunder Steward

IRKA Scholarship Chair, USA

sarauek@aol.com

The International Rhino Keeper Association (IRKA) was started in 1999 and is supported by the International Rhino Foundation (IRF). The IRKA's mission statement is, "The IRKA promotes professional collaboration, development and practices to advance rhinoceros conservation worldwide." The IRKA is dedicated in the sharing of knowledge in relation to the five species of rhinos. Information experienced through captive management and field study are both valued as critical knowledge to use in the fight for the rhino's survival.

The IRKA conducts the Rhino Keeper Workshop every two years to learn and discuss the most up-to-date information in the fields of rhino biology, management, nutrition, and training. This is a membership based organization that both serve its members to become the best zoo keepers and managers of the rhinos in their care, as well as depend on them to participate in the association's interests and growth. The IRKA has coordinated seven workshops since its founding 13 years ago. The organization does offer professional development funding, as well as valuable tools on their website, such as; current rhino facts, management practices, and news.

In 2011, the IRKA had their first endeavor as an organization to actively participate in an in-situ rhino conservation project through the IRF. The IRKA produced and internationally sold the 2012 Rhino Conservation Calendar, where funds raised from the sales will assist in the purchasing of supplies to help increase effective protection of the rhino populations and the successful prosecutions of wildlife crimes, specifically in selected areas in Zimbabwe and the Republic of South Africa.

The Journal of Zoo and Aquarium Research (JZAR)

Geoff Hosey

Honorary Professor, University of Bolton, UK

gh2@bolton.ac.uk

Will provide a forum for rapid publication of novel, peer-reviewed research papers, reviews, technical reports and evidence-based case studies. Through their living collections, zoos and aquariums are uniquely placed to contribute to conservation-related research. Research categories covered by JZAR will include studies in basic and applied biological sciences, *in situ* conservation research and research aimed at developing other roles of zoos and aquariums, including animal welfare, visitor studies and conservation education. For more information about the journal visit www.jzar.org

JZAR is an initiative of EAZA, the European Association of Zoos and Aquaria. EAZA represents and links 345 institutions and organisations in 41 countries. Formed in 1992, EAZA's mission is to facilitate cooperation within the European zoo and aquarium community towards the goals of education, research and conservation. www.eaza.net

The Possible Causes of the Sudden Death of Wild Animals in Captivity. Case Study - Mvog-Betsi Zoo, Yaounde, Cameroon

Jean-Jacques

Mvog-Betsi Zoo, Cameroon

jeanjacquesnt@yahoo.fr

1: HABITAT (ENCLOSURES)

- Enclosure size for given animals species
- Norms to be respected when conceiving or constructing an enclosure to intergrate certain animals species.

2: NUTRITION

- Food quality
- Origin of food (where is the food coming from)
- Conservation methods of the food once in the zoo
- Food variation

3: ANIMAL KEEPERS RESPONSIBILITIES

- Keepers personal health
- Duties and responsibilities of keepers vis-a-vis animals and their enclosures.

4: VETERINARY SERVICE

- Approach adopted for the follow up of animals in the zoo and veterinarians know how.

5: SOLUTIONS

- Those already conceived and implemented to remedy problem.
- Propose solutions from conference attendees (group work and discussion).



The role and contribution of keepers in wildlife conservation

Delfino Flood, Guillermo¹, Lic Gonzalez Ciccía, Paula²

¹Head Keeper, ²Preservation and Research Department

Fundacion Temaikén, Buenos Aires, Argentina

[*Gdelfino@temaiken.org.ar*](mailto:Gdelfino@temaiken.org.ar)

Fundación Temaikén carries out programs regarding Endangered Species Protection, Marine and Coastal Biodiversity and Protected Areas, and these programs include within them, the preservation projects developed in situ and ex situ by Fundación. These projects are focused on the fulfilment of Temaikén's mission: to protect nature. In this context, the keepers are one of the mainstays for the achievement of that mission and for which, since many years ago, they actively participate in the actions of the conservation programs. Their aim is to perform the projects strategies requiring their technical skills and, at the same time, these activities contribute to develop their professional capacity, while they continue performing their fundamental task as animal caretakers. In every project there is a wide-ranging participation and collaboration of the biopark keepers regarding the activities development; they work in an interdisciplinary way together with the biologists team belonging to the Conservation and Research Department and the Veterinarians involved. Among the tasks they carry out we may mention the ethograms of the endangered species which are part of the plans of protection for species such as the tapirs (*Tapirus terrestris*) and the vinaceous parrots (*Amazona vinacea*). These records are essential tools to optimize the handling of animals in captivity and to be able to apply the results to nature. Another important task is the work carried out in the distribution area of the maned wolf (*Chrysosyon brachyurus*), which include area surveys, interviews with local inhabitants, tracing animal tracks, faeces, finding dead specimens, etc. The gathering of this information aims to estimate the abundance of the species in the region. One of the most important works performed by Temaikén keepers is their participation, together with UNPA (University of Southern Patagonia) and WCS (Wildlife Conservation Society), in the study project of the Magellanic penguin (*Spheniscus magellanicus*) parental investment: nesting reduction hypothesis and sex ratio in nesting. To accomplish this Project, the keepers travel to the zone where the animals nest and they become the role models in the handling of penguins, capturing them for morphometric measurements, marking the specimens and collecting samples for sanitary studies.

Regarding the Endangered Species Protection Project, Fundación Temaikén works as a rescue center for some species which are in danger of extinction in Argentina. When these specimens arrive, they are studied according to each case, receive veterinary treatments and are rehabilitated in a specialized center where the keepers are in charge of their welfare. Here, the keepers are a fundamental source of information to determine if the animals are ready to be released and if they are, the keepers shall accompany them during all the process of reinsertion in the environment.

Due to these contributions it is essential to highlight the importance of the keepers' knowledge, not only in reference to the handling of animals in controlled situations, but also in the significant differences according to each animal's origin and life story, for the differential treatment applied in each case can condition the animal's future and its contribution to the preservation of the species. On the other hand, the fact of participating in the different stages and processes of the protection projects generate in the keepers a positive feature derived from their experiences that deepen their knowledge on the species and its environment and improve their human and professional skills.

The target training of the *Tomistoma schlegelii* at the Taipei Zoo

Yi-Ting Chen¹, Eric Hsieh-Shao Tsao²

¹Keeper, Animal Department, ²Associate Research fellow, Conservation and Research Center, Taipei Zoo, Taiwan

dwy83@zoo.gov.tw; dwx07@zoo.gov.tw

The activities of Tomistoma (*Tomistoma schlegelii*) are highly affected by environmental temperature. Since the Tomistoma exhibition at the Taipei Zoo is an outdoor enclosure and Taiwan is located in the subtropical area, changes in temperature is expected to alter Tomistoma's daily activities and feeding behaviors. The training goals of this study is first to better understand Tomistoma's optimal feeding period at the Taipei Zoo. The second is to improve animal welfare through proper husbandry and health care procedures, such as allocating the animals between different enclosures for cleaning work, crate training for future transportation, or burying medicine in food to ensure Tomistoma's uptaking of the medicine.

From October 2007 to April 2012, we have studied a female Tomistoma named Kuba. According to the records, Kuba usually starts eating in May but its stable feeding period is from June to October. In November, Kuba gradually slows down feeding and it completely fasts from December to April. It seems reasonable to believe that the changes of environmental temperature are the main factor to affect Kuba's appetite.

After the training program, Kuba can be successfully lead to different enclosures so the zookeepers can do the cleaning work in a safe condition, but this operation only works from June to October while the environmental temperature is still relatively warm. In addition, the similar training program has been applied to the new arrival pair of Tomistoma (named Kulon and Kuchi) since Nov. 2010. However, we have also trained Kulon and Kuchi to get themselves close to different targets respectively. This training method not only ensures both of them can eat enough food, but also avoids fighting injuries during feeding process.

Training in lowland tapirs (*Tapirus terrestris*) as an educative tool for the Program "Feeling Nature" aimed at people with visual disability

*Gillet, Cristian¹, Delfino Flood, Guillermo², Godoy H³, Barreiro B⁴, Sambón E⁵,
Gonzalez Ciccía, Paula⁶*

*¹Head of Training, ²Head Keeper, ⁶Preservation and Research Department
Fundacion TEMAikén, Buenos Aires, Argentina*

cgillet@temaiken.org.ar

Fulfilling its mission of spreading knowledge in all areas and levels of education, TEMAikén Foundation has developed several proposals to offer people with disabilities an approach to living things and their environment.

Special Education Programs are born with the aim of providing people with disabilities the tools and appropriate resources to participate in educational activities, being active participants in the Biopark activities, fostering attitudes of respect and care for the environment.



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During the Program “Feeling Nature” visually impaired visitors receive a tour behind the scenes, giving them the opportunity to make contact with some animals, sharing experiences with their keepers. Thanks to this specific contact, persons with visual disabilities are able to know the general characteristics of these animals.

The tour agenda, the selection of the animals and the activities during the visit are specifically chosen depending on the characteristics of each visitor group to encourage their participation.

In this context we decided to include the tapir (*Tapirus terrestris*) in this Program by being a native species, which is in serious danger of extinction in Argentina and is known for its ecological and cultural importance.

The tapir is a species that can be easily managed through positive reinforcement training in order to achieve the proper care in captivity. This feature helps people with visual disabilities to interact with individuals, allowing them to reach a comprehensive understanding of the species (size, weight, shape, texture, body, sounds, food, habitat and conservation status).

The animals selected for the Program are chosen based on their temper and are conditioned to accept the presence of the public in various situations unforeseen. The training of the animals is only under protected contact and as in all faunal collection is used operant conditioning with positive reinforcement to train animals.

Throughout the activity, participants are accompanied by trained guides in charge of the group and keepers trained to handle animals. The contact is always protected by a containment bar according to the species and visitors can only touch body areas that do not involve risk, excluding the head and legs.

The activity with the tapir takes 15 minutes (duration of the training session) and are mainly used secondary reinforcers (petting and brushing) and primary reinforcers (food) is only given to the animals at the end of the session to minimize their anxiety in order to improve security for the activity. All the time, two keepers are present and working with the animal, noting that the work is done with wild animals trained but not domesticated animals.

Through this activity persons with visual disabilities are able, through contact with the tapir, to build attitudes of respect for life, care and preservation of the environment, and particularly of the flagship species that needs to be known.

Training Project Report on Captive Reptile Management

Prerna S., Lal S B., Somesh.S

Sam Higginbottom Institute of Agriculture, Technology & Sciences

Wildlife SOS, India

prernawildlife@gmail.com

The Project training was carried out in Dr. K. Shivaram Karanth Pilikula Biological Park which is inspired by the concept of protecting the flora and fauna in consideration with one of the richest biodiversity of eighteen hotspots of the world “Western Ghats”. The complete exciting training project expanded my horizons and my way of thinking towards the management of centers. The training was mainly to gain the practical knowledge of managing rescue centre specially concentrating on reptiles. The idea was to implement the theoretical knowledge at its best with practical hands on work with reptiles. One of the main objectives was to understand the importance of captive breeding of reptiles, their handling, rescue and release and the overall management of the reptile centre. The captive breeding of endangered species are very essential for the conservation of the species and many captive bred animals are translocated to various state forest departments and neighbouring countries

for head starting and restocking programs. The Dr. K. Shivaram Karanth Pilikula Biological Park is home for more than 25 species of reptiles including snakes, crocodiles, monitor lizards, turtles and tortoises. The main project of the park is *Ophiophagus Hannah* breeding program. The breeding program with all natural care was 100% success and the recently bred young ones were released into their natural habitat in Western Ghats. The other reptiles include 19 species of snakes with all 4 major venomous, 2 Pit Vipers species, 2 mildly venomous and other non venomous. The crocodylians included the Mugger and the Gharial. *Varanus bengalensis* is the species of monitor lizard and the turtles include 3 indigenous species and an exotic species. Tortoise 1 species. As the park is mostly concentrated in the indigenous species of Western Ghats it also acts as a Rescue Centre for all the rescued snakes and other reptiles. All the rescued reptiles are released into their natural habitat. It was a complete experience of involvement in rescue, handling and the management of the captive reptiles.

Key words. Student (MBA Forestry & Environment Management), Pro VC, Dean School of Forestry and Environment , Assistant Professor Wildlife Science, Management, Rescue, Release

Variety is the Spice of Life: Enrichment for Avian Species

Exotic Birds and Australian Mammals, Auckland Zoo, New Zealand

Providing enrichment is an essential part of any keeper's daily routine but it can at times seem complicated when it comes to avian and chiropteran species.

As with any species, the provision of enrichment requires the consideration of many facets such as (but not limited to): individual behavioural needs, dietary requirements, multispecies enclosures, public perception, and animal safety.

For a large keeping section a scheduled programme can be a major asset in ensuring that preparation and implementation of enrichment remains consistent and dynamic.

This poster will display a variety of enrichment items used with exotic bird and flying fox (*Pteropodidae*) species at Auckland Zoo and the sections programme schedule. Details for further information and ideas are also included.

Various Enrichments for Rescued Orangutans

Hsiao-Wei Kuo¹, Hsin-I Hsieh²

¹Keeper, ²Curator, Conservation and Research Center, Taipei Zoo, Taiwan

crz01@zoo.gov.tw; dwx03@zoo.gov.tw

Conservation and Research Center at Taipei Zoo has rescued many wild animals from smuggling and abandonment, including primates, carnivores and reptiles. The center is not open to the public, but to the biological research related groups only. The space for the animals is not as large as the display area. Therefore, we need to do more efforts on the enrichment lest abnormal behaviors should be resulted. This study was conducted on 8 orangutans, and the exercise yard in question is about 98 m², and 11 m in height. The two exercise yards imitate tropical rainforest, inside we arrange vines, fire hose, and hammock platform for animals to rest, climb, and swing, and different types of feeding facilities to supply them with all kinds of seasonal food and fruit ice.

On top of which, we install behavior enrichment facilities to stimulate animal's auditory, visual and interaction. In auditory, we placed whole grains in bamboo tube, this type of feeding enrichment facilities is not only easy to carry and have difficulties to feed, but also have a significant increase in the dynamic



behavior (37.7%!59.2%, $p<0.05$). We also set up a voice infrared sensor device, when an orangutan pass by, this device will emit sound like cricket or frog, which induce the orangutan to search concealed creatures. In sense of sight, we put many feeding tanks around mesh and hang feeding buckets that contain fruit and honey on fire hoses. The decentralized feeding enrichment method promotes animals to fully explore the space to find food, and can improve dynamic behavior (37.7%!49.1%) and reduce static behavior (40%!36.2%).

To improve interaction and reduce the aggressive behavior of two male individuals, we connected two floating balls that contain food with fire hoses. So on the two adjacent exercise yards, animals can have a tug of war competition for food and such method succeeded in reducing strong individual's hostile interactive behavior (26.6%!10.1%, $p<0.05$). We also placed mild animals as rabbit, tortoise, and guinea pig on the middle aisle between two adjacent exercise yards, to imitate the chance that an orangutan encounters other animals in wild. In conclusion, we believe sensory stimulation and increase positive interaction chances are wholesome to orangutans.

Welfare Status of elephant handlers in India; An experience of an assessment of professional experience and socio-econ status of handlers in India

Surendra Varma

*Research officer, Asian Elephant Research and Conservation Foundation (AERCC),
India*

varma@ces.iisc.ernet.in

Experience in handling elephants and an understanding of the needs of elephants are keys to maintaining positive welfare of both elephant and handler. Ferrier (1947) writes about the importance of knowing the signs of a healthy elephant and maintaining a routine of check-list to prevent injuries to the animal while being worked. Ilangakoon (1993) observed the existence of a close relationship between mahouts and their elephants among those who had been employed in this profession from an early age. This study carried out to assess the welfare status of mahout across 12 states and 5 to 6 management regimes in India. Information regarding elephant's handlers was collected by direct observation and through interview of relevant personnel.

The rating scale from unsuitable welfare conditions to suitable welfare conditions was used to assess the welfare status of handlers. The experts, based on their concept of importance of a particular welfare parameter to a handler, developed a rating for each parameter, which is termed Experts' Rating (E-R). Mean Rating (M-R) representing the actual situation existing for the handler/s was obtained through the ground survey. The difference between E-R and M-R (expressed as percentage) indicates deviations from the prescribed norm.

The results of professional experiences indicate that mean number of years of experience for mahouts in Andaman and in Assam was 18 years, 15 for Bihar 12 for Gujarat 15 for Kerala 14 for Karnataka 17 for Maharashtra 16 for Rajasthan 15 for Tamil Nadu 12 for west Bengal. Mean number of years in experience with given elephant in Andaman was 9 yrs in Andhra Pradesh 14 yrs Assam 9 yrs Bihar 25yrs 8 yrs in Karnataka 5 years in Kerala 11 years in Maharashtra 3 years in Rajasthan 12 years in Tamil Nadu 9 years in west Bengal.

Mean professional experience was in mahouts from circus 18.7 years, 15 years in forest camp, and 15.9 years in private, 15.2 years in temple, 6.5 to 20 years in travelling and begging elephants and 15.2 years for mahouts from zoo. Mean experience with given elephant was 5.7 years in circus 8.3 years in forest camp, 4.1 years in private, 11.4 years in temple 6 to 20 years in travelling and begging and

Poster Abstracts

7.4 years in zoo. Mean annual income of mahout from circus was Rs.39818/- for forest camp Rs.58,856/-, for private Rs.23,304/-, for temple Rs.30,055/-, for travel and begging Rs.29,455/- and for zoo Rs.64,397/-. With reference to alcohol consumption, 38% of circus, 63% of forest camp, 54% of private, 57% of temple 97% of travel and begging and 50% of Mahouts from zoo reported to consume alcohol.

Mean Rating (MR) for professional experience ranged from 2.7 (Punjab) to 6.9 (Tamil Nadu) as against ER of 9.0. Comparing rating across regimes, minimum was observed for TrvBeg (3.7) and maximum for Temple (5.7). MR for socio-economic status of handlers ranged from 1.5 (Rajasthan) to 4.9 (Karnataka) as against ER which ranged from 7.0 to 8.0. In terms of regimes, MR ranged from 1.5 (TrvBeg) to 4.8 (Temple) as opposed to ER ranging from 7.0 to 8.0. In most of the states and different management regimes in India, absence of basic infrastructure, poor remuneration, practice of alcohol consumption, illiteracy may characterize the lives of handlers. Unsatisfactory working conditions may lead to poor quality of managing elephants and likely occurrence of accidents involving handler/elephant.



Organising Committee In April 2011

Guiding Principles and Practical Considerations in Animal Exhibit Design

Cham Tud Yinn

Wildlife Reserves Singapore

A good animal exhibit balances the needs of animals, environment and people. A holistic approach is recommended for animal exhibits creation, where processes and decisions are guided by modern zoo concepts, established animal welfare and enclosure standards, environmentally sustainable design, customer needs and expectations.

Problem Solving

Valerie J. Hare and Bianca Espinos

The Shape of Enrichment, Inc., San Diego, CA, USA; shape@enrichment.org

During the Problem-Solving Workshop on Tuesday afternoon, we will collectively attempt to solve an animal behavior problem one of the participants is currently facing. Some frequently encountered examples might be aggression, refusal to shift, stereotypy, etc. If one of your animals is currently presenting you with a behavior challenge that you would like us to consider, please submit the issue on the available forms.

Animal Welfare

Graeme Phipps, Richmond Institute of TAFE and Liz Romer, ASZK

This session will look at how keepers can make a difference to animal welfare including scenarios such as making decisions on when parks are no longer viable or when care is generally compromised. The topic of euthanasia, and when it is appropriate, including the use of euthanasia as a management tool will be discussed.

Captive Management and Restraint of Amphibian & Reptile

Dr. Luis & Dr. Abraham

Wildlife Reserves Singapore

This workshop covers classroom & practical aspects of reptile & amphibian husbandry, nutrition and physical restraint. The trainers will cover the principles of nutrition and principles of suitable housing conditions for reptiles & amphibians; explain and demonstrate the different physical restraint techniques used for different species of reptiles and amphibians.

Work Safety

Leo Khong Gain

Wildlife Reserves Singapore

This session introduces participants to the workplace safety policies implemented in all parks of WRS. The trainer will cover the Environment Safety & Health Policy, ISO 14001 and OHSAS 18001 Certification, common safety issues, safety improvement programmes and risk management.

The Satisfaction of Rising to the Challenge: exploring the concept of 'flow'

Vicky Melfi, Margaret Hawkins and Amanda Pemberton

Taronga Conservation Society of Australia and Charles Sturt University

Increasingly we are looking for positive measures of wellbeing in zoo animals, to be used in conjunction with 'indicators' associated with negative welfare to give a more comprehensive assessment of individual welfare. The concept of 'flow' originated in the field of human psychology and is being applied in animal welfare studies. Flow encompasses the very positive feeling of satisfaction and achievement that results when the challenge faced closely matches the skills of the individual. Applying these methods to animals requires that we consider an animal's skill set, so that we can provide appropriate challenges for them; so they might attain flow.

This workshop will further explore these concepts. In small groups, you will be asked to consider the skill set of different zoo animals or groups and devise a series of challenges to achieve the positive state of flow. You will also consider how you would recognise an animal in flow (a positive welfare state) and how you could measure it.

Primates - Captive Husbandry of Colobine Monkeys

Mani and Rachel Yeo

Wildlife Reserves Singapore

Colobine or leaf-eating monkeys have been historically difficult to maintain in captivity. For example, at least nine zoos throughout Europe and America had proboscis monkeys in their collection in the last four decades but none remain today. The key challenges with successful maintenance and breeding of colobine monkeys include providing diets suited to their specialized digestive adaptations and husbandry techniques that takes into consideration, their unique natural histories, for example, preferred habitats and social systems in the wild. There has however been increasing success with the maintenance of colobine monkeys in recent years with improved knowledge gleaned from studies both in captivity and in the wild and augmented by lessons learnt from past failures. This workshop will provide an overview of colobine monkey husbandry in captivity, touching on topics including diet, social group management, exhibit design and veterinary care.

Topics to be covered:

- 1) Diet – nutrition, food presentation and sustainable use of foliage plants;
- 2) Social management – establishing and maintaining mixed groups, bachelor groups and breeding pairs;
- 3) Exhibit design – design of exhibits that provides for sufficient space, complexity, physical and visual barriers, and mimicking wild habitats; themed mixed species exhibits;
- 4) Veterinary care – veterinary care, restraint, common ailments and treatments.

Captive Management and Operant Conditioning of Malayan Tapirs in Night Safari

S R Nandakumaren

Night Safari, Wildlife Reserves Singapore

The classroom session will briefly introduce the collection of Malayan tapirs in Singapore Zoo and Night Safari, touching on the history, breeding success, housing management for courtship & breeding, and close-contact/hands-on management of the animals. It will be followed by a behind-the-scenes tour to Night Safari's Tapir facilities and demonstration on target training, conditioning of animals for medical management and practical hands-on.

Hornbill Breeding and Husbandry

Dr. Minerva Bongco- Nuqui

Jurong Bird Park, Wildlife Reserves Singapore

The Jurong Bird Park is fortunate to have one of the finest collections of hornbills in the world. It houses 16 species of hornbill, 11 of which is ASEAN and the rest Africans. Out of the 16 species we have successfully bred 10 species. The year 2010 was a bountiful year for our hornbill collection, 5 species of hornbill bred yielding 10 progenies including the first time breeding of Plain-pouched hornbill (*Rhyticeros subruficollis*) listed vulnerable in the IUCN list.

The first successful breeding of hornbills in the park started with the hatching of Great pied hornbill (*Buceros bicornis*) in 1978, since then, coupled with the major renovation of the exhibit in 1990, breeding of hornbills has been in the forefront of the conservation projects in the park. In 2005, together with external partners, we studied the breeding and nesting behavior of Oriental pied hornbill (*Anthracoceros albirostris convexusus*) in situ and ex situ. This collaboration helped to increase the wild population of OPH in the wild.

In this workshop comprising a brief talk and guided tour to the hornbill breeding facility, we will share the successes and failures of breeding this magnificent breed, from the moment the courtship begins till the time the young ones fledge from the nest.

An Introduction to Animal Training & Conditioning Concepts

Elly Neuman

Taronga Conservation Society

This workshop covers the basic and introductory processes of training and conditioning animals and is designed to give individuals a unique way of understanding and gaining the training skills used in Animal Training. Through theory and interactive activities, participants will gain insight into understanding the use of reinforcement, establishing conditioned reinforcers, use of approximations in training and behavioral problem solving techniques. Participants will also partake in a discussion about how to address curatorial and management considerations for supporting training programs.



Developing Interpretive Skills of the Zookeepers from Developing Countries

Dr. S. Paulraj, Ph. D.

No. 164, 6th Street, Kamar Nagar, Chennai – 600082, India

Gone are the days when the people visiting the zoos were merely interested in just seeing the zoo animals and go. Now a days, most of the visitors like to know something new and interesting about the animals ecology, behavior etc. Accordingly, the objectives of the zoos have also been changed to a greater extent all over the world so as to meet the visitors' interest by including zoo education and interpretation as one of their main objectives.

The role of zoo keepers in the field of zoo education and interpretation is very vital as, they are the persons having firsthand knowledge about their animal and direct contact with the visitors. Although some of the modern zoos are having a separate officer for zoo education, they cannot cover the needs of thousands of visitors unless the zoo keepers possess basic skills of zoo education. If every zoo / animal keeper has developed some expertise in their respective animal, then it would create greater impact on disseminating knowledge about most of the zoo animals. For this purpose, a zoo keeper need not be an interpretation expert but, he may develop some basic skill on zoo education and interpretation.

Unfortunately, many of the zoos especially, zoos from the developing countries, do not have zoo keepers with some basic skills of interpretation nor they consider their zoo keeper as a basic source of disseminators of knowledge of zoo animals. Unless every zoo keeper possesses or develops some basic skills on zoo interpretation, the very purpose of objective of zoo education seldom is achieved to an expected extent.

It is not a very difficult job to train the zoo keepers to acquire some basic interpretive skill if some systematic training are designed and imparted. Keeping this important fact in to consideration, a workshop type training programme is designed and proposed based on the study done by the author at Arignar Anna Zoological Park at Chennai, India.

This workshop will cover the following aspects:

- a. Arousing interest
- b. Interpretation methods for neglected exhibits.
- c. Interpretive walk
- d. Enrichment devises and interpretation of animal behavior
- d. Biodiversity Conservation

This proposed workshop will be of great use for all zoo / animal keepers especially for keepers from the developing / under developed countries.



Amanda Pemberton

Taronga Conservation Society of Australia and Charles Sturt University, Australia

amandajunepemberton@gmail.com

Amanda Pemberton obtained her bachelor of Animal Science from the school of Animal and Veterinary Science at Charles Sturt University in 2011. She is currently a PhD student under the supervision of Rafael Freire, Vicky Melfi and Margaret Hawkins. Her Research is centred on animal welfare with particular interest in positive emotional states in animals.

Cham Tud Yinn

Director (Animal Exhibits), Wildlife Reserves Singapore, Singapore

tudyinn.cham@wrs.com.sg

Cham Tud Yinn has been with the Singapore Zoo since 1994 and has been designing animal exhibits for the last 16 years. Cham is now the Director in charge of all animal exhibit developments for the Singapore Zoo, Night Safari and Jurong Bird Park. Cham conceptualized the River Safari and is involved in every aspect of this \$160m development, from design to construction. Cham has a degree in Mechanical Engineering and diploma in Environment Management.

Dr. S. Paulraj, MSc, PhD

Consultant (Forestry & Environment), India

paulrajifs@gmail.com

Dr. Paulraj is a retired Indian Forest Service officer and has developed his expertise on wildlife and modern zoo management as evidenced from his numerous research publications, books and dissertations. He is also experienced in zoos and protected areas management. He has worked in a modern zoo in India over a period of five years and in wildlife areas over a period of ten years.

Elly Neumann

Senior Keeper and Trainer, Taronga Zoo

dguth@bigpond.net.au

After completing a Bachelor of Science degree (Zoology) and a Diploma of Education (Science) Elly started working at Taronga Zoo in Sydney Australia in 2000. She has now been at the zoo for 12 years and is currently a Senior Keeper and Trainer in the Marine Mammal Department, working with the zoo's fur seals, sea lions and Leopard seal as well as penguins and pelicans. She has experience in training animals for shows, educational talks, interactive programs and research.

Elly is also a certified Trainer and Assessor for the Taronga Training Institute (TTI) where she teaches Certificate II and Certificate III in animal studies and captive animal management. She has developed and runs Animal Training and Conditioning courses for TTI student, zoo staff as well as special courses for general interest.

Graeme Phipps

Teacher and Animal Care Co-ordinator of Captive Animals, Richmond College, Australia

Graeme.phipps@gmail.com and Graeme.Phipps@tafensw.edu.au

Graeme Phipps has an extensive avicultural, bird keeping, teaching and general zoo background.

Graeme studied zoology at The University of Sydney, and became a research assistant in ornithology at the university's Macleay Museum of Natural History.

He went to Taronga Zoo firstly as Curator of Birds, then Curator of Birds and Gardens (creating Life Sciences at the zoo by including plants in the equation); then General Curator before rising to Principal Curator. Ever supportive of zoo keeping and the ASZK, in 2011 Graeme was elected a Life Member of the Australasian Society of Zoo Keeping.

He currently teaches nationally accredited Certificates 3 and 4 in Captive Animal (Management), offering face-to-face, blended and online modes at Richmond College of Technical And Further Education in Sydney. The On-The-Job Distance online mode offers online support including weekly online Chat tutorials, has been very successful and demonstrates that it is completely feasible to CONNECT KEEPERS WORLDWIDE.

Graeme thinks that trained professional zookeepers are extremely important to the welfare of wild animals – firstly, because there is possibly nothing as dangerous out there as well-meaning but clueless people working with wild animals; and secondly, because trained zookeepers are particularly important when they apply their intensive wildlife management skills to the fragments that the 'wild' in the world is becoming. Zookeepers can help wildlife survive in these fragments.

Liz Romer

Executive Officer Australian Society of Zoo Keepers (ASZK), Australia

slromer@bigpond.com

Liz started working in Zoos in 1982 after completing a science degree. She worked at a number of wildlife facilities in Australia including Currumbin Wildlife Sanctuary, Taronga Zoo, Australian Reptile Park and Wildlife Sydney. She is currently editor of the ASZK journal "Thylacinus", and treasurer of the ICZ and works for her local Council full time on Companion Animals. She has a strong interest in animal welfare.

Margaret Hawkins

Taronga Conservation Society of Australia (TCSA), Australia

margaret.hawkins41@gmail.com

Margaret Hawkins has been involved in the work of Taronga Conservation Society of Australia at Sydney's Taronga Zoo for more than thirty five years, initially as a volunteer. Observation requests from staff lead her to create the Taronga Animal Watch program. This program expanded to play an important operational and research role and became the Behavioural Studies Unit. Margaret was a member of zoo staff for 22 years and, now retired, continues an association with TCSA in an emeritus position. Highlights of her zoo career have been her involvement with JGI chimpanzee sanctuaries in Uganda and Congo and the monitoring of the first successful breeding of platypus at Taronga.

In the mid-nineties Margaret became involved in environmental enrichment in the zoo and this quickly became one of her passions. Taronga was host to the 5th International Conference on Environmental Enrichment in 2001 and Margaret has since remained secretary of the ICEE committee. She has promoted enrichment in the region by regularly running enrichment workshops at the ASZK annual conferences and compiling and co-editing the Environmental Enrichment Handbook for Australian Animals, currently being revised.

Workshop Presenter Biographies

Minerva Bongco - Nuqui

Curator, Jurong Bird Park, Singapore

minerva.bongco-nuqui@wrs.com.sg

Dr. Minerva Bongco-Nuqui began her career at the Jurong Bird Park in 1999, as a Veterinarian and is now currently a Curator. Her personal interests include breeding biology, avian behaviour, and rehabilitation and release of native bird species. She together with external partners and pioneered the Singapore Hornbill Project which is now on its 7th year. This project was instrumental in increasing the population of Oriental Pied Hornbills in the wild.

As a Veterinarian, she had pioneered the avian flu vaccination against HPAI in the park. She had also given the opportunity to have quarantined different species of birds from the smallest hummingbird to the largest Ostrich. Aside from her curatorial duties, she also lectures for the Animal Management Course, Wildlife Reserves Singapore is offering together with Ngee Ann Polytechnic.

S R Nandakumaren

Assistant Curator (Field Operations), Night Safari, Singapore.

nanda.rajalu@wrs.com.sg

Nanda is the Assistant Curator of Night Safari Zoology Department and also a member of the Tapir Specialist Group. He was also responsible for the captive breeding of giant anteaters in 2005 - a first for Night Safari. Besides the giant anteaters, his other great passion is with the Malayan tapirs. He has worked with the Malayan tapirs since 1993 and has successfully bred more than 25 tapir calves ever since. He has imparted his knowledge and trained many keepers to work with these animals safely. Working together with Gail Laile using operant conditioning methods, he is able to engage and condition the tapirs positively to receive medical treatment without the need to anesthetize the animals.

Rachel Yeo

Junior Animal Management Officer, Singapore Zoo, Singapore

rachel.yeo@wrs.com.sg

Rachel Ann Yeo is a Singaporean but lived abroad for 8 years in Israel and the United States. She graduated with Bachelor of Science in Animal Science from Michigan State University. She has worked at the Singapore Zoo for about a year as a Junior Animal Management Officer. Her first assignment was at the Primate Conservation and Breeding Centre, where she worked intimately with proboscis monkeys, langurs, gibbons and other species of primates. Recently, she was transferred to Rainforest Kidzworld at the Singapore Zoo. She likes to travel and her favourite destination is South Africa; she enjoys observing wildlife during the safari game drives. In her spare time, she volunteers at the Riding for the Disabled Association as an assistant riding instructor. She has been riding horses for about 10 years, and competed at intercollegiate dressage competitions while at Michigan State University.

Valerie J. Hare

The Shape of Enrichment, Inc.

hare@enrichment.org

With Karen Worley, Valerie Hare founded The Shape of Enrichment, Inc. in 1991 and has been a principal ever since. She is currently the Chief Financial Officer and Workshop Coordinator. The two projects that keep her busiest are: Shape's new website (www.enrichment.org) and its enrichment workshops.

The Shape of Enrichment Workshops are designed to assist animal caretakers create successful and efficient enrichment plans for the animals in their care. Since 2000, numerous enrichment workshops ranging from 4 hours to 5 days have been held in Brazil, Chile, South Africa, Uganda, Philippines, Singapore, Indonesia, China, United Kingdom, Ireland, Sweden, Canada, U.S.A., and, later this year, Bulgaria and Georgia in collaboration with EAZA and ICZ.

Valerie has worked as a Research Animal Care Supervisor (Massachusetts General Hospital), Zoo Keeper (San Diego Wild Animal Park), Behavioural Research Technician (San Diego Zoo), and Enrichment Consultant.

Valerie serves on the International Conference on Environmental Enrichment Committee (since 1997) and Bear Care Group Board of Directors (since 2007). She holds membership in American Zoo and Aquaria Association, American Association of Zoo Keepers, Zookeepers Association of the Philippines, and African Zookeepers Association.

Valerie holds a Bachelor of Science Degree in Biology (Zoology emphasis) from San Diego State University and an Associate Degree as a Veterinary Technician from State University of New York—Delhi.

Vicky Melfi

*Behavioural Biologist, Research and Conservation, Taronga Conservation Society
Australia*

vmelfi@zoo.nsw.gov.au

Vicky started working as a zoo keeper in the United Kingdom at the age of sixteen. It was there that her interest in animal behaviour and welfare was sparked. Completing a degree in Animal Science followed by a Masters degree in Applied animal behaviour and welfare, Vicky began a research project in behaviour comparisons between wild and zoo Sulawesi crested black macaque populations which then led her to completing her PhD at Dublin zoo studying the same species.

Before arriving in Australia, Vicky's most recent work was as the Senior Research officer with the Whitley Wildlife Conservation Trust based at Paighton Zoo. It was in this previous role that she founded a conservation program for the critically endangered Sulawesi crested black macaques which aims to conserve the species and their remaining habitat on this Indonesian island.

Vicky says to date her greatest achievement has been to co-write a book about Zoo animals; their behaviour, management and welfare which has been very well received. Her role here at Taronga zoo is to lead the Behavioural Studies unit. This unit is a team of behavioural scientists and volunteers that monitor animal well-being, the use of the exhibit space, wild behaviours and coordinate enrichment programs to maintain optimal animal welfare.

Workshop Presenter Biographies

Leo Khong Gain

Environmental, Health and Safety Manager, Wildlife Reserves Singapore, Singapore

khonggain.leo@wrs.com.sg

Leo has been with Wildlife Reserves Singapore since 2010. He started his career as a Police officer with the Singapore Police Force. He graduated with a Bachelor's Degree in Environment, Occupational Health and Safety from University of Newcastle, Australia. He is also a Registered Workplace Safety & Health Officer with Ministry of Manpower and has been in EHS field for the past 12 years.

Dr. Abraham Mathew

Senior Veterinarian, Wildlife Reserves Singapore, Singapore

abraham.mathew@wrs.com.sg

Dr. Abraham graduated with a veterinary degree from University Putra Malaysia. After which he worked for one year as a research assistant with the University of Florida for the Malaysia Tiger Project working on tiger population density by photo-trapping. He then worked for 4 years in Zoo Negara as the Veterinarian and Assistant Curator of Reptiles and following that, another 4 years in the Department of Wildlife & National Parks Peninsula Malaysia as a field veterinarian. He has had the experience of working both with wildlife in captivity and the wild. He also has special interest in reptiles, particularly crocodiles.

Dr. Luis Carlos

Assistant Director (Avian), Jurong Bird Park, Singapore

luis.carlos@wrs.com.sg

Dr Luis graduated from Lisbon's Faculty of Veterinary Medicine in 2002 and did his Thesis on Hematology on Exotic Birds. He was previously the Senior Vet for Clinical Pathology Marine Mammal Medicine, and also the Reptile Curator in Loro Parque, a zoo in Tenerife (Canary Islands). 4 years ago, he accepted an offer as Assistant Professor of Clinical Pathology, Bacteriology and Immunology in Lisbon University, Faculty of Veterinary Medicine and was also the Head of Exotic Animal Department. Dr Luis is currently working on his Masters Degree on Emerging Infectious Diseases, through Lisbon's Medical Faculty, and his thesis is on reptile bacteriology.



NOTES



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**International
Congress
on
Zookeeping
2012**

Singapore

Many Voices, One Calling

9th – 13th September 2012

Program and Abstract Booklet

Wildlife Reserves Singapore Group



Welcome to the 4th International Congress on Zookeeping

Welcome to the 4th ICZ conference kindly hosted by the Wildlife Reserves Singapore Group. It has taken four years to organise this wonderful conference and there have been many people assisting in making this happen. I would like to thank Liz Romer, the ICZ Congress Chair for the inception and organisation, the ICZ Steering Committee, in particular Paul Howse our wonderful Program Chair, who has done an amazing job with compiling the program for the papers and posters. The Singaporean team for all their organisation assistance at the Singapore end, in particular, Francis Lim who commenced these negotiations and who was followed by Saravanan Elangkovan as chair of the Wildlife Reserves Singapore Organising Committee and Daisy Ling who has provided us with great organisational help and understanding, just to mention a few. A very big thanks needs to go to the management of Wildlife Reserves Singapore who have supported us in the provision of a huge amount of resources and provided a fantastic facility for us to use.

It takes a lot of time and organisation to produce an international conference of this calibre and I hope you will find these paper, poster and workshop presentations informative and thought provoking to enable you to pursue your chosen profession with the most up-to-date information offered on an international scale. The networking of like-minded zoo professionals can only be an asset to your on-going development in this field.

I hope you enjoy all the conference has to offer in the formal and informal sessions and the wonderful zoological parks that make up the Wildlife Reserves Singapore Group as part of the ICZ mission in connecting keepers world-wide.

Pep Xarles, ICZ President

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About the International Congress of Zookeepers

Vision of the ICZ

“A global network of zookeepers with the highest standards of professional animal care contributing to a diverse and sustainable natural world where neither wild animals nor their habitats are in danger.”

The International Congress of Zookeepers (ICZ) was founded at the AAZK national conference in Columbus, Ohio, USA in 2000 by seven existing zookeeping associations: American Association of Zoo Keepers (AAZK), Australasian Society of Zoo Keeping (ASZK), Association of British and Irish Wild Animal Keepers (ABWAK), Association Iberica de Cuidadores de Animales Salvajes (AICAS), Association Francophone des Soigneurs (AFSA), Berufsverband der Zootierpfleger (BdZ) and the Dutch zookeepers' association known as de Harpij. The ICZ became incorporated in the state of Ohio, USA, in 2008. A Constitution and By-Laws are maintained by the Steering Committee and Executive Officers including a President, Vice President, Treasurer and Secretary. Currently, the ICZ is operated completely by volunteer committee members and has no paid staff.

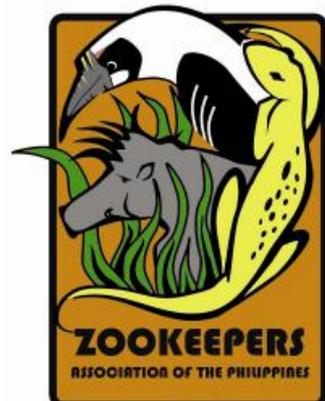
From its inception, the ICZ has had one goal – to improve the professionalism of zookeepers worldwide, which in turn would improve animal welfare in zoos throughout the world. One of the ICZ's main objectives was the establishment of new professional zookeeper associations. Since its founding, two new zookeeper associations have been created with assistance from the ICZ. They are the Animal Keepers' Association of Africa (AKAA) and the Zookeepers' Association of the Philippines (ZAP), both of which are now represented on the ICZ Steering Committee. Collectively, the membership of the ICZ and its nine member associations totals over 6000 professional zookeepers worldwide.

Another key objective was to hold a conference every three years in varying locations to allow zookeepers from around the world to share their experiences, learn from each other and develop a professional network. The first ICZ conference was held in the Netherlands in 2003, followed by Australia in 2006 and the USA in 2009. Now the 2012 International Congress on Zookeeping is being held Singapore.

The ICZ's significant achievements - a global network for the world's zookeepers, increased professional development opportunities for animal care professionals, the development of new and emerging zookeeper associations, improved animal welfare and conservation - point to a promising future.

We hope that through continuing to grow our congresses and further our networks all keepers worldwide will be connected and experience the value of the knowledge and experience that can be shared.

We look forward to many of you joining us for the 2015 congress in Leipzig Germany. Please continue to visit our website www.iczoo.org for upcoming events and information updates.



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