SAZARC attends SEAZA meeting

2nd meeting of SAZARC at 10th conference of SEAZA at Perak, Malaysia hosted by Taiping Zoo & Taiping Municiple Council, 7-11 October 2001

Participants from the South Asian Zoo Association for Regional Cooperation (left to right) : Jayanthi Alahakoon (Sri Lanka); Madhav Ghimere (Nepal); R. K. Shreshta (Nepal); Zohare Ali Shariff (Pakistan); M. S. Khan (Bangladesh); M. M. Qazi (Pakistan); G. K. Dubey (India), R. K. Sahu (India); Sally Walker (India); Dammika Malasinghe (Sri Lanka); Lyn de Alwis (Sri Lanka)

Report of the 2nd Meeting of the South Asian Zoo Association for Regional Cooperation SAZARC – held at Perak, Malaysia on the occasion of the 10th SEAZA Conference

South Asia is the area that used to be called the Indian subcontinent. It consists of Bangladesh, Bhutan, India, Maldives, Nepal, Pakistan, Sri Lanka. The region has immense political, social and economic problems which present frequent and serious obstacles to conservation action. South Asia has approximately 300 zoos, 250 of which are in India. About 75 – 100 of these 300 zoos are "standard" zoos with a respectable area, staff, infrastructure, budget and good intentions. The remainder are deer parks, mini-zoos and small breeding centers which nonetheless are governmental institutions. There are very few private zoos in South Asia. Even these 100 South Asian zoos suffer from a multiplicity of problems. In India the Central Zoo Authority and Indian Zoo Directors' Association are making good inroads into the problems and prospects of zoos. The zoos in the other countries – Pakistan, Nepal, Sri Lanka and Bangaldesh do not have any national association and are more or less isolated from one another and from the global zoo community.

Zoo Outreach Organization and the Conservation Breeding Specialist Group, South Asia have been working together to catalyse a Regional Zoo Association for South Asia. The first step was taken in August 2000 in Kathamandu, Nepal when ZOO and CBSG, South Asia organized zoo directors, veterinarians and educators from 15 zoos in 5 countries to gather for a zoo meeting, a CBSG meeting (attended by Dr. U.S. Seal) and a zoo educator training workshop. At the zoo meeting, South Asian Zoo personnel stated their desire for an association in a moving series

of discussions. Many of these zoo persons had not met one another even though they were from the same country. This resulted in the initiation of the "South Asian Zoo Association for Regional Cooperation" SAZARC. The Kathmandu meeting was full of good results – significant changes by all the zoos, some of which are listed below :

Pakistan -- changed their focus to indigenous animals, started maintaining records of animal origin for the first time, initiated habitat development of enclosures according to ecological principles, established contact with Sindh WL department and private zoos for improvement of cooperation for breeding, conducted a visitor survey and focused an education programme around it, got an education budget of 200,000 Pakistan rupees, initiated improvement / development of signage, etc.
Bangladesh — a Government sponsored Redevelopment programme for Dhaka and Rangpur Zoos was initiated and zoo personnel sent for further training by IUCN country office
Sri Lanka — Lyn de Alwis, former Director of Colombo Zoo, became SAZARC advisor
India — increase in educational activities and budget by participating zoos run by steel and municipal authorities
Nepal – the Director of the Kathmandu Zoo won an award

SAZARC Participants along with SEAZA President, Bernard Harrison, in front of the conference banner.

This year a series of workshops (SAZARC, Design Workshop, CBSG, South Asia & Sri Lankan Elephant PHVA) which was to be held in Colombo, Sri Lanka could not take place due to a variety of these reasons. Instead, thanks to the generosity of sponsors from UK, Europe and USA, and the the South East Asian Zoo Association it was possible to take 10 key zoo personnel to the SEAZA meeting in Perak. They then had an opportunity to observe a functioning Asian zoo association and to interact with its members as well as one another. They could attend three days of scientific presentations on the theme of Zoo Animal Welfare and Ethics. They could visit behind the scenes of several zoos (Taiping Zoo, EcoPark Zoo, and Penang Butterfly Park and the Sumatran Rhino Conservation Centre). Some participants were able to visit the Singapore Zoo, Night Safari, Jurong Bird Park, and Underwater World in Singapore and Zoo Negara Malaysia in Kuala Lumpur.

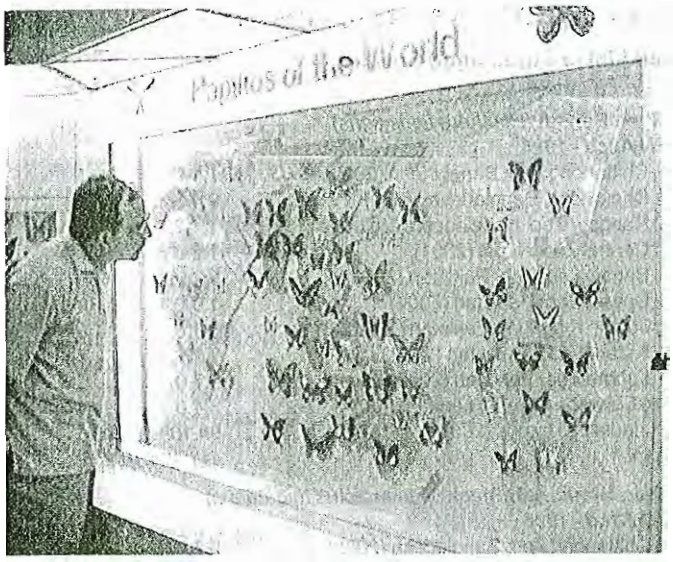
The South Asian Zoo Association met with SEAZA Council for an afternoon session of Questions and Answers which was extremely useful to the new Association. The SEAZA Council and Members went out of their way to make the SAZARC participants feel welcome. Members benefited also from the excellent presentations on zoo ethics and welfare and a variety of scientific topics. SAZARC used the working group time of SEAZA to conduct its own meetings and discuss topics of importance.

Attendees
Dr. M. S. Khan, Curator (Director), Dhaka Zoo, Bangladesh
Dr. G.K. Dubey, Superintendent, Bhilai Steel Plant Zoo, India
Dr. R.K. Sahu, Supt., Kamala Nehru Zoo, Ahmedabad, India
Dr. Madhav Ghimere, Curator, Central Zoo, Nepal
Sri. R. K. Shreshta, Director, Central Zoo, Nepal.
Dr. Zohare Ali Shariff, Director, Jungle Kingdom, Pakistan
Dr. Mansoor Qazi, Director, Karachi Zoo, Pakistan
Sri Lyn de Alwis, Retd. Director, Colombo Zoo, Sri Lanka
Dr. Jayanthi Alahakoon, Vety. Officer, National Zoo, Sri Lanka
Mrs. D. Malsinghe, Asst. Director, National Zoo, Sri Lanka

Some important decisions of SAZARC were
Venue for 2002 agreed – to be discussed with desired hosts before announcing
Venue for 2003 decided – invitation from Sri Lanka
Draft Constitution and By-laws vetted – further discussion

SAZARC participants pose for a photo at the Taiping Zoo. Later at the closing dinner every country participated seperately in a talent show and did the region proud.

Core Committee members replaced after administrative transfers and advisor appointed.
Bangladesh – M. S. Khan (new this year) ;
Pakistan – M.M. Qazi;
Sri Lanka – Jayanthi Alahakoon



Zohare Shariff, Jungle World, Pakistan admires the butterfly display in the Penang Butterfly Park Museum.

Advisor to SAZARC
An Advisor to SAZARC was appointed -- Mr. Lyn de Alwis, former Director of the Colombo Zoo and a doyen of South Asian zoos known all over the world

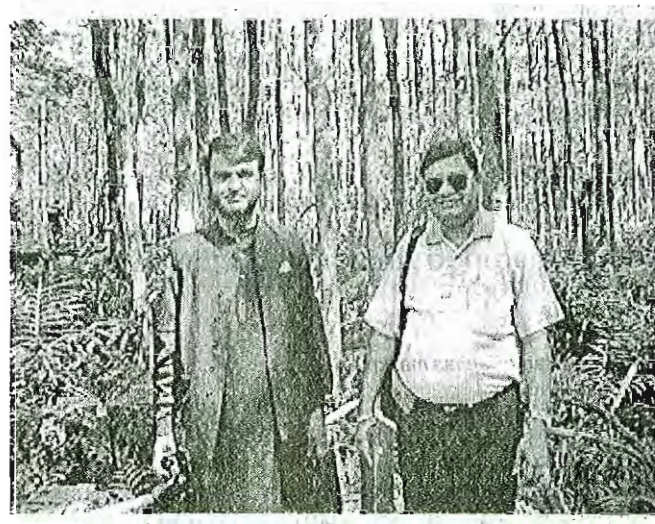
Listing of Training Priorities
Capture, immobilization, tagging / marking of wild animal (Microchips); Zoo Education; Sexing of birds, Zoo / Enclosure Design / Masterplanning; Behavioural & environmental enrichment; Preventative medical care / general zoo medicine; Care of young (parent-reared and handrearing) to prevent neonatal death; Record keeping / Studbook management; MedArks ; Animal nutrition; Transportation / transport cages, etc. ; Planning; Crisis management; Marketing, Publicity, Fundraising; Human Resource Development; Collection Planning and Management

SAZARC participants from Bangladesh, Pakistan and India at the Sumatran Rhinoceros Conservation Centre

Formation of committees to forward projects
Veterinary (for identifying new medicines and means for obtaining them) – Ghimere and Dubey
Nutrition Handbook (with NY Zoological Society) – Jayanthi A.
Data base of species in South Asian zoos – M. M. Qazi

Conference Committee for 2002 – 2003
Sri Lanka and Bangladesh - possible venues
Sally Walker, R.K. Shreshta, M. S. Khan, R. K. Sahu

Publicity and Communication
Logo decided (for time being for use in promotion and fundraising – bear representing all countries)
Brochure approved with changes which will be incorporated
Newsletter items mandatory (Zohare Ali Shariff will handle)



Qazi and Sahu at Mangrove Park

Coordinated breeding programme
List of threatened species presented, errors corrected; Walker approved as Conservation Coordinator for time being.

Sponsors of SAZARC participants to SEAZA
Lord Robin Russell, Woburn Safari, Thrigby Hall Wildlife Garden, Appenheul Primate Centre, Koln Zoo, Germany, Wildlife Information Network, St. Louis Zoo, USA

SAZARC
South Asian Zoo Association for Regional Cooperation

One of the possibilities for the SAZARC logo, represented by a generic Asian bear as some species of bear is found in almost every country.

Threatened Animals in South Asian Zoos

According to 2000 IUCN Red List of Threatened Species

IUCN Red List Category abbreviations used in this document

Critically Endangered (CR)-- facing an extremely high risk of extinction in the wild in the immediate future.

Endangered (EN) -- not Critically Endangered but facing a very high risk of extinction in the wild in the near future.

Vulnerable (VU) -- not Critically Endangered or Endangered but is facing a high risk of extinction in the wild in the medium-term future.

Dates: The date mentioned next to the categories (e.g. Blackbuck - VU A1c - 1996) is the year the species was *last* assessed by IUCN. The species for which the date was not mentioned in the IUCN list is given here as *undated*.

Letters and numbers: The letters following the category (VU A 1cd) refer to the criteria,which are A. Population reduction, B. Extent of occurrence, C. Population estimation, D. Number of mature individuals, E. Probability of extinction. The numbers and lower case letters provide more detail but cannot be explained here for want of space.

Question marks: The question marks given in the list indicates that the information for that zoo is not available currently with us.

Threatened Animals (CR, EN, VU)

Mammals

Elephant, Asian *(Elephas maximus)*
EN A1cd - 1996

1. Dhaka Zoo, Bangladesh (2001)	0.3.0.3
2. Karachi Zoo, Pakistan (2001)	?.?.?.1
3. Lahore Zoo, Pakistan (2000)	0.1.0.1
4. Colombo Zoo, Sri Lanka (2000)	2.6.0.8
5. Pinnewala orphanage, Sri Lanka (2001)	0.0.65.65
6. India in 26 zoos (2000)	28.56.0.84
Total	***30.66.65.162***

Gibbon, Hoolock *(Bunipithecus hoolock)*
EN A1cd - 2000

1. Dhaka Zoo, Bangaldesh (2001)	2.2.0.4
2. India in 6 zoos (2000)	5.5.1.11
Total	***7.7.1.15***

Langur, Capped *(Trachypithecus pileatus)*
EN A1cd, C2a - 2000

1. Chittagong Zoo, Bangladesh (2000)	4.4.0.8
2. Dhaka Zoo, Bangladesh (2000)	3.5.0.8
3. India in 15 zoos (2000)	12.14.0.26
Total	***19.23.0.42***

Leopard *(Panthera pardus kotiya)*
EN C2a - 1996

1. Colombo Zoo, Sri Lanka (2000)	9.5.0.14
Total	***9.5.0.14***

Macaque, Lion-tailed *(Macaca silenus)*
EN B1+2c, C2a - 2000

1. Central Zoo, Nepal (2001)	2.0.0.2
2. India in 22 zoos (2000)	34.34.6.74
Total	***36.34.6.76***

Rhino, Great Indian One-horned *(Rhinoceros unicornis)*
EN B1+2cde - 1996

1. Dhaka Zoo, Bangladesh (2001)	1.1.0.2
2. Central Zoo, Nepal (2001)	1.1.0.2
3. India in 12 zoos (2000)	23.12.0.35
Total	***25.14.0.39***

Tiger, Bengal *(Panthera tigris tigris)*
EN A2cd - 1996

1. Chittagong Zoo, Bangladesh (2000)	1.1.0.2
2. Dhaka Zoo, Bangladesh (2000)	9.4.0.13
3. Rangpur Zoo, Bangladesh (2000)	1.1.?.2
4. Central Zoo, Nepal (2001)	1.2.0.3
5. Bahawalpur Zoo, Pakistan (2000)	?.?.?.?
6. Dewan Zoo, Pakistan (2001)	1.0.0.1
7. Jungle Kingdom, Pakistan (2001)	1.1.0.2
8. Karachi Zoo, Pakistan (2001)	?.?.?.1
9. Lahore Zoo, Pakistan (2000)	6.7.0.15
10. Colombo Zoo, Sri Lanka (2000)	3.4.0.7
11. India in 31 zoos (2000)	94.105.10.209
Total	***117.125.10.255***

Bear, Himalayan Black *(Selenarctus thibetanus)*
VU A1cd - 1996

1. Chittagong Zoo, Bangladesh (2000)	2.3.0.5
2. Dhaka Zoo, Bangladesh (2000)	1.1.0.2
3. Rangpur Zoo, Bangladesh (2000)	1.1.0.2
4. Central Zoo, Nepal (2001)	0.1.0.1
5. Bahawalpur Zoo, Pakistan (2000)	0.0.0.?
6. Dewan Zoo, Pakistan (2001)	1.1.0.2
7. Karachi Zoo, Pakistan (2001)	?.?.?.1
8. Lahore Zoo, Pakistan (2000)	0.4.0.4
9. India in 39 zoos (2000)	73.67.10.150
Total	***78.76.10.164***

Bear, Sloth *(Melursus ursinus)*
VU A2cd, C1+2a - (undated)

1. Chittagong Zoo, Bangladesh (2000)	1.1.0.2
2. Dhaka Zoo, Bangladesh (2000)	1.1.0.2
3. Central Zoo, Nepal (2001)	1.1.0.2
4. Colombo Zoo, Sri Lanka (2000)	6.10.0.16
5. India in 48 zoos (2000)	68.55.16.139
Total	***77.68.16.161***

Blackbuck *(Antilope cervicapra)*
VU A1c - 1996

1. Central Zoo, Nepal (2001)	33.38.14.85
2. Bahawalpur Zoo, Pakistan (2000)	?.?.?.?
3. Dewan Zoo, Pakistan (2001)	4.4.0.8
4. Jungle Kingdom, Pakistan (2001)	1.2.0.3
5. Karachi Zoo, Pakistan (2000)	0.0.0.9
6. Karachi Safari Park, Pakistan (2001)	?.?.?.40
7. Marghzar Zoo, Pakistan (2000)	21.14.1.36
8. Colombo Zoo, Sri Lanka (2000)	0.1.0.1
9. India in 44 zoos	275.323.118.716
Total	***334.382.133.898***

Deer, Swamp *(Cervus duvauceli)*
VU c1 - 1996

1. Central Zoo, Nepal (2001)	2.0.0.2
2. India in 8 zoos (2000)	33.45.2.80
Total	***35.45.2.82***

Leopard, Clouded *(Neofelis nebulosa)*
VU A1cd - 1996

1. Chittagong Zoo, Bangladesh (2000)	1.0.0.1
2. Central Zoo, Nepal (2001)	1.2.0.3
3. India in 7 zoos (2000)	9.4.0.13
Total	***11.6.0.17***

Loris, Slender *(Loris tardigradus)*
VU A1cd - 2000

1. Colombo Zoo, Sri Lanka (2000)	0.1.0.1
2. India in 3 zoos (2000)	1.5.3.9
Total	***1.6.3.10***

Macaque, Assamese *(Macaca assamensis)*
VU A1cd - 2000

1. Dhaka Zoo, Bangladesh (2001)	1.0.0.1
2. Central Zoo, Nepal (2001)	1.1.0.2
3. India in 17 zoos (2000)	44.24.6.74
Total	***46.25.6.77***

Macaque, Pig-tailed *(Macaca nemestrina)*
VU A1cd - 2000

1. Dhaka Zoo, Bangladesh (2000)	2.4.0.6
2. Colombo Zoo, Sri Lanka (2000)	0.1.0.1
3. India in 9 zoos (2000)	9.9.0.18
Total	***11.14.0.25***

Mouflon Antelope *(Ovis musimon)*
VU A2cde - 1996

1. Bahawalpur Zoo, Pakistan (2000)	?.?.?.?
2. Karachi Zoo, Pakistan (2000)	1.0.0.1
3. Karachi Safari Park, Pakistan (2001)	?.?.?.25
4. Lahore Zoo, Pakistan (2000)	10.16.3.19
Total	***11.16.3.45***

Otter, Common *(Lutra lutra)*
VU A2cde - 1999

1. Dhaka Zoo, Bangladesh (2000)	2.0.0.2
2. India in 13 zoos (2000)	17.10.4.31
Total	***19.10.4.33***

Otter, Smooth Indian *(Lutra perspicillata)*
VU A1acd - 1999

1. Chittagong Zoo, Bangladesh (2000)	0.0.2.2
2. Lahore Zoo, Pakistan (2000)	0.1.0.1
3. India in 3 zoos (2000)	4.2.0.6
Total	***4.3.2.9***

Squirrel, Indian Giant *(Ratufa indica)*
VU B1+2c - 1996

1. Central Zoo, Nepal (2001)	1.1.0.2
2. India in 7 zoos (2000)	8.4.1.13
Total	***9.5.1.15***

Squirrel, Grizzled Giant *(Ratufa macroura)*
VU A1c - 1996

1. Colombo Zoo, Sri Lanka (2000)	4.6.0.10
2. India in 6 zoos (2000)	3.5.2.10
Total	***7.11.2.26***

Reptiles

Crocodile, Gharial *(Gavialis gangeticus)*
EN C2a - 1996

1. Dhaka Zoo, Bangladesh (2000)	2.3.0.5
2. Rangpur Zoo, Bangladesh (2000)	1.0.0.1
3. Central Zoo, Nepal (2001)	1.1.2.4
4. Karachi Zoo, Pakistan (2001)	?.?.?.1
5. Lahore Zoo, Pakistan (2000)	2.1.0.3
6. Colombo Zoo, Sri Lanka (2001)	1.0.0.1
7. India in 31 zoos (2000)	29.57.149.235
Total	***35.62.151.250***

Tortoise, Elongated *(Indotestudo elongata)*
EN A1cd+2cd - 2000

1. Chittagong Zoo, Bangladesh (2000)	0.0.6.6
2. Central Zoo, Nepal (2001)	1.2.0.3
3. Colombo Zoo, Sri Lanka (2000)	3.0.0.3
4. India in 33 zoos (2000)	27.29.267.323
Total	***31.31.273.335***

Crocodile, Mugger *(Crocodylus palustris)*
VU A1a, C2a - 1996

1. Dhaka Zoo, Bangladesh (2000)	1.1.0.2
2. Chittagong Zoo, Bangladesh (2000)	1.2.4.7
3. Central Zoo, Nepal (2001)	0.0.1.1
4. Karachi Zoo, Pakistan (2001)	?.?.?.6
5. Lahore Zoo, Pakistan (2000)	1.1.0.2
6. India in 42 zoos	78.74.3080.3282
Total	***81.78.3085.3299***

Birds

Vulture, Bengal *(Gyps bengalensis)*
CR A1ce + 2ce - 2000

1. Dhaka Zoo, Bangladesh (2000)	3.1.0.4
2. Central Zoo, Nepal (2001)	0.0.0.1
3. India in 7 zoos (2000)	7.4.17.28
Total	***10.5.17.33***

Heron, White *(Ardea insignis)*
EN A2c, C1 - 2000

1. Rangpur Zoo, Bangladesh (2000)	1.0.0.1
Total	***1.0.0.1***

Crane, Black-necked *(Grus nigricollis)*
VU C1 - 2000

1. Dhaka Zoo, Bangladesh (2000)	0.0.1.1
Total	***0.0.1.1***

Crane, Sarus *(Grus antigone)*
VU A1cde + cde - 2000

1. Dhaka Zoo, Bangladesh (2001)	1.1.1.3
2. Central Zoo, Nepal (2001)	1.1.0.2
3. Colombo Zoo, Sri Lanka (2000)	1.1.0.2
4. India in 13 zoos (2000)	13.9.14.36
Total	***16.12.15.43***

Pelican, Spot-billed *(Pelecanus philippensis)*
VU A1cde, C1 - 2000

1. Colombo Zoo, Sri Lanka (2000)	50.60.0.110?
2. India in 16 zoos (2000)	19.23.32.74
Total	***69.83.32.184***

Pheasant, Cheer *(Catreus wallichi)*
VU, C1 + 2a - 2000

1. Lahore Zoo, Pakistan (2000)	1.0.0.1
2. Marghzar Zoo, Pakistan (2000)	8.9.13.30
3. India in 1 zoo (2000)	1.1.0.2
Total	***10.10.13.33***

Pheasant, Hume Bar-tailed *(Syrmaticus humiae)*
VU C1 + 2a - 2000

1. Lahore Zoo, Pakistan (2000)	0.1.0.1
Total	***0.1.0.1***

Stork, Black-necked *(Ephippiorhynchus asiaticus)*
LRnt - 2000

1. India in 12 zoos (2000)	12.7.12.31
Total	***12.7.12.31***

Stork, Greater Adjutant *(Leptoptilos dubius)*
EN A2cde, C1 - 2000

1. Dhaka Zoo, Bangladesh (2000)	1.0.0.1
2. India in 16 zoos (2000)	10.10.13.33
Total	***11.10.13.34***

Stork, Lesser Adjutant *(Leptoptilos javanicus)*
VU C1 - 2000

1. Chittagong Zoo, Bangladesh (2000)	0.0.1.1
2. India in 2 zoos (2000)	1.0.2.3
Total	***1.0.3.4***

Near-Threatened LR-nt

Lower Risk (LR) -- does not satisfy the criteria of any of the threatened categories but is close to qualifying for Vulnerable. Therefore, we have included these species also.

Mammals

Cat, Fishing *(Prionailurus vivverinus)*
LR/nt - 1996

1. Chittagong Zoo, Bangladesh (2000)	3.0.0.3
2. Dhaka Zoo, Bangladesh (2000)	3.1.0.4
3. Dewan Zoo, Pakistan (2001)	1.1.0.2
4. Colombo Zoo, Sri Lanka (2001)	5.3.0.8
5. India in 5 zoos (2000)	6.5.0.11

Total	***18.10.0.28***

Hyaena, Striped *(Hyaena hyaena hyaena)*
LRnt - 1999

1. Dhaka Zoo, Bangladesh (2000)	3.3.0.6
2. Lahore Zoo, Pakistan (2000)	1.0.0.1
3. Bahawalpur Zoo, Pakistan (2000)	?.?.?.?
4. Colombo Zoo, Sri Lanka (2000)	3.2.0.5
5. India in 45 zoos (2000)	61.59.21.141
Total	***68.64.21.153***

Langur, Common *(Presbytis entellus)*
LR/nt - 2000

1. Central Zoo, Nepal (2001)	5.2.2.1
2. Dhaka Zoo, Bangladesh (2000)	1.1.0.2
3. Lahore Zoo, Pakistan (2000)	3.2.0.5
4. India in 36 zoos (2000)	78.56.19.153
Total	***87.61.21.161***

Macaque, Rhesus *(Macaca mulatta)*
LR/nt - (Undated)

1. Chittagong Zoo, Bangladesh (2000)	18.13.0.30
2. Dhaka Zoo, Bangladesh (2000)	32.42.0.74
3. Rangpur Zoo, Bangladesh (2000)	5.4.0.9
4. Dewan Zoo, Pakistan (2001)	1.1.0.2
5. Jungle Kingdom, Pakistan (2001)	0.1.2.3
6. Karachi Zoo, Pakistan (2001)	?.?.?.17
7. Lahore Zoo, Pakistan (2000)	7.4.0.11
8. Marghzar Zoo, Pakistan (2000)	4.5.2.11
9. Colombo Zoo, Sri Lanka (2000)	0.2.0.2
10. India in 76 zoos (2000)	204.176.83.463
Total	***271.248.87.522***

Reptiles

Python, Asiatic Rock *(Python molurus)*
LR/nt - 1996

1. Chittagong Zoo, Bangladesh (2000)	0.0.11.11
2. Dhaka Zoo, Dangladesh (2001)	10.7.18.35
3. Rangpur Zoo, Bangladesh (2000)	1.1.0.2
4. Central Zoo, Nepal (2001)	1.0.1.2
5. Lahore Zoo, Pakistan (2000)	1.0.0.1
6. Colombo Zoo, Sri Lanka (2001)	7.7.1.18
7. India in 60 zoos (2000)	65.60.122.247
Total	***85.75.153.270***

Birds

Bustard, Houbara *(Chlamydotis undulata)*
LR/nt - 2000

1. Lahore Zoo, Pakistan (2000)	2.0.0.2
Total	***2.0.0.2***

Hornbill, Great Indian *(Buceros bicornis)*
LR/nt - 2000

1. Dhaka Zoo, Bangladesh (2000)	0.1.0.1
2. Chittagong Zoo, Bangladesh (2000)	1.0.0.1
3. India in 11 zoos (2000)	9.9.2.20
Total	***10.10.2.22***

Ibis, White *(Threskiornis melanocephalus)*
LR/nt - 2000

1. Colombo Zoo, Sri Lanka (2000)	15.20.0.35
2. Central Zoo, Nepal (2001)	0.0.3.3
3. India in 23 zoos (2000)	43.43.159.245
Total	***58.63.162.283***

Stork, Painted *(Mycteria leucocephala)*
LR/nt - 2000

1. Dhaka Zoo, Bangladesh (2000)	2.2.0.4
2. India in 24 zoos (2000)	48.39.218.305
Total	***50.41.218.309***

Data Deficient - DD

Data Deficient (DD) -- insufficent information to derive a category. This is often the most dangerous status. If we don't know the status of the species, we don't know what measures are required to strengthen it should it be threatened. A seriously threatened species could become extinct before we even know it is threatened. Therefore we have included these species also.

Mammals

Bear, Malayan Sun *(Helarctus malayanus)*
DD - 1996

1. Chittagong Zoo, Bangladesh (2000)	1.1.0.2
2. Dhaka Zoo, Bangladesh (2001)	3.3.0.6
3. India in 3 zoos (2000)	0.2.3.5
Total	***4.6.3.13***

Loris, Slow *(Nycticebus bengalensis)*
DD - 2000

1. Chittagong Zoo, Bangladesh (2000)	1.1.0.2
2. Dhaka Zoo, Bangladesh (2000)	2.1.0.3
3. India in 11 zoos (2000)	16.13.3.32
Total	***19.15.3.37***

Reptiles

Cobra, Central Asian *(Naja naja oxiana)*
DD - 1996

1. Central Zoo, Nepal (2001)	0.0.2.2
2. Karachi Zoo, Pakistan (2001)	?.?.?.11
3. Lahore Zoo, Pakistan (2000)	7.6.0.13
4. Colombo Zoo, Sri Lanka (2000)	6.6.8.20
5. India in 1 zoo (2000)	*0.0.1.1*
Total	***15.12.11.47***

Species-wise tabulation

Threatened, Near Threatened and Data Deficient Mammals, Reptiles and Birds found in South Asian Zoos (2000/2001).

The important question here is how many species are under managed conservation programmes ? None for any but India and only two in India. There are 32 species of threatened animals -- 2 out of 32 is not so good for the region. Time to wake up and get organised !

IUCN Category	No. of animals		
Critically Endangered - CR	0.0.1		
Endangered - EN	7.2.2		
Vulnerable - VU	13.1.6	Total Thr.	20.3.9
Lower-Risk Nr. Thr'd - LR/nt	4.1.4	Total	4.1.4
Data Deficient - DD	2.1.0	Total	2.1.0
Total			***26.5.13***

List of Zoos included:
Bangladesh: Dhaka Zoo (2001), Chittagong Zoo (2000), Rangpur Zoo (2000)
Nepal: Central Zoo, Kathmandu (2001)
Pakistan: Bahawalpur Zoo (2000), Dewan Zoo (2001), Jungle Kingdom (2001), Karachi Zoo (2001), Karachi Safari Park (2001), Lahore Zoo (2000), Marghzar Zoo (2000)
Sri Lanka: National Zoo, Colombo (2001)
India: 56 zoos which include Large, Small and Mini zoos according to Central Zoo Authority

Sources:
Taylor, C.G. (2000). 2000 IUCN Red List of Threatened Species, IUCN Species Survival Commission Publication, Gland, Pp.
Anon (2000). Inventory of animals in Indian Zoos 1999 -2000, Central Zoo Authority, New Delhi, Pp.
Walker, S. and Priya, K.P. (unpub.) List of Threatened, LR-nt and DD Species in South Asian Zoos prepared for In Situ Priorities Meeting in Chaing Mai, Thailand, September 2000.

ZOOS' PRINT normally covers the South East Asian Zoo Association conference because there is so much overlap between the South East Asian zoos and zoos of this region. They face some of the similar problems and have the same enormous potential to provide some security to many of the world's endemic species.

This year, due to problems in the South Asian region in establishing a Venue, the South Asian Zoo Association for Regional Cooperation took representatives to the SEAZA meeting, where we got a very cordial welcome.

Despite a very busy schedule, the SEAZA Council made time to meet with SAZARC participants and answer questions on how they formed and maintained their association for ten years.

The theme of the conference this year was Welfare and Ethics, a timely subject considering the criticism meted out by animal rights organisations toward even the best of zoos. SEAZA meetings consist of hard work in the morning, a zoo or wildlife related field trip in the afternoons and complete relaxation at night. This year was no exception. Listed below are highlights of field trips and on the following pages are Abstracts of papers.

The conference was attended by 97 delegates representing the following 19 countries and territories: Australia, Bangladesh, Botswana, Cambodia, Hong Kong, India, Indonesia, Japan, Malaysia, Nepal, Pakistan, Philippines, Singapore, South Africa, Sri Lanka, Taiwan, Thailand, United States of America and Vietnam.

During the scientific sessions, 31 papers were presented covering the broad topics of animal welfare and ethics, enrichment, conservation, education, veterinary medicine, captive breeding and husbandry. Three workshops on conservation, ethics & welfare and zoo exhibit planning and design were held.

Workshops: There were three participatory workshops, which ran simultaneously. The Conservation Workshop was chaired by B. P. Jansen Manansang with Mr. Tan Kit Sun; the Welfare & Ethics Workshop by Dr. G. Agoramoorthy; and the Zoo & Enclosure Design Workshop by Mr. Bernard Harrison with Mr. Pisit na Patalung.

Field trips were to Bukit Merah Ecopark, Visit to Bukit Merah Orang Utan Island, Penang Butterfly Park, Matang Mangrove Swamp, Charcoal Factory, Natural History Museum and Taiping Zoo. After the conference there was a tour of the Sam Poh Tong (cave temple) in Ipoh and the Sungai Dusun Sumatran Rhino Conservation Center. Each of these sites provided fodder for idea and information-hungry zoo directors and deserves an article of its own which is not possible in this issue.

The venue for the 11th SEAZA Annual Conference will be Singapore and this meeting will be held jointly with the 11th ARAZPA Annual Conference, scheduled for 23-27 June 2002. The theme for the joint Conference is "Partners in Conservation". The venue for the 2003 conference is tentatively scheduled to be hosted by Kunming Zoo, China.

The opening statements of the Minister of Science and Technology and of the President of SEAZA are so apt and appropriate for this region and its zoos as well as South East Asia, that they have been presented in full as follows.

Bukit Mehra Orangutan Island was a popular field trip with many lessons for zoo persons.

Message from the Minister of Science, Technology and the Environment, YB Dato' Law Hieng Deng

"The roles of zoological parks have changed over the years, from animal collections for public exhibition to more significant roles in wildlife conservation and educating the public on conservation issues. The evolution in zoological concept has seen changes in zoo design, from basic cages to

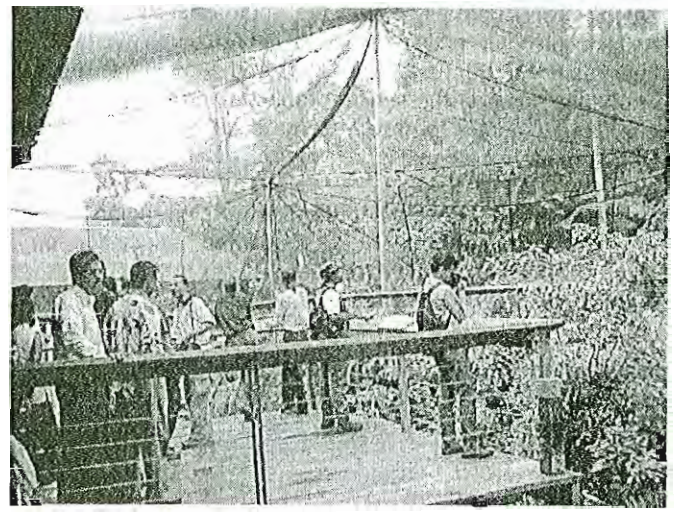
the open zoo, which incorporates the landscape immersion concept. Exhibits are not only limited to animals but also include aspects of the ecosystem, habitat, culture and to some extent, history. The role of zoological parks in the conservation of endangered species is further enhanced with the application of the latest techniques of assisted reproduction and molecular genetics.

Conference participants enjoy see the rhinos close up at the Sungai Dusun Sumatran Rhino Conservation Center

The Government of Malaysia acknowledges the roles of zoological parks in conservation and this is evidenced through the continuous disbursement of development grants to zoological parks in the country. The Government is finalizing the guidelines for zoological parks to ensure that animal welfare and ethics are given priority in the management of zoological parks. The guidelines will incorporate the standard practices of zoo management in use in the region if not the world. It is hoped that these guidelines will enable zoological parks in the country to achieve the status of a modern zoo in all aspects of zoo management. The South East Asia Zoo Association (SEAZA) over the years has embarked on various projects to enhance cooperation and professionalism among zoological parks in the region. I would like to urge SEAZA to continue the initiatives taken to further enhance the standard of zoological parks in the region. This annual conference is one of the forums where participants can update their knowledge on zoological park management.

Malaysia is in the process of building a new zoological park, which will embrace the latest concepts in zoo design and management. The new zoological park is expected to play a more significant role in the conservation of endangered wildlife species in the country and region apart from providing recreational and educational experiences to visitors.

The publics' expectations of a zoological parks have changed tremendously over the years. They are more critical on the welfare of the animals exhibited in the enclosure and the environment where the animals are displayed. As a result, zoological parks will need to upgrade their facilities and expertise to meet these expectations. This annual conference should be able to assist zoological parks in the region in meeting the public expectations as it fosters closer cooperation in various fields of zoological park management and animal husbandry which can lead to better management of zoological parks in the region. "



Participants enjoy the free flight aviary at the Bukit Mehra Eco Park, where every attempt is made to manage along good environmental principles.

Message From President of South East Asian Zoos Association (SEAZA), Bernard Harrison

"With extensive global movements for animal welfare and ethics permeating public awareness, expectations have also increased proportionately. As a result, zoos around the world have set ever-higher accreditation standards for themselves. Zoological institutions within our region, in particular, have to be more outward looking, in order not to be left behind in a rapidly-changing arena.

We have therefore set this year's theme as "Animal Welfare and Ethics: South East Asian Zoos in the 21st Century". Only by acquiring a more intimate knowledge of our animals' needs and the necessary skills to meet them, may we elevate our current husbandry standards and we can only achieve this with greater regional co-operation, as well as having more intensive training and skills upgrade.

It is my hope that zoos take on responsibility as champions of conservation. We may do so at various fronts, for example, in public education, marketing, fundraising, and maintaining global networks. But fundamental to all these action, is a basic respect of the animal and plant life that we work for. Without this, we cannot be in a position to lead by example.

Let us bear this in mind as we proceed with the conference, and work together at this common cause."

SELECTED ABSTRACTS

10th Annual Conference of the South East Asian Zoo Association, Taiping Zoo/Taiping Municiple Council, 7-11 October 2001

Think Globally –> Assess Regionally –> Act Locally : Regional Red List Assessments using the CAMP Process and CBSG Networks -- Sally Walker, *Zoo Outreach Organization / CBSG, SA.*
We are all part of a global network which depends in many ways on the World Conservation Union (IUCN). IUCN is unquestionably the premier conservation organization in the world with dozens and hundreds of participating governmental, NGOs and individuals. However, IUCN is "real" primarily to those few individuals who attend their meetings or work in close collaboration with their many commissions. To most people IUCN seems so distant as to be almost unrelated to day-to-day actions even though we are in, and for many of us obsessed with the field of nature conservation.

The Convention on Biodiversity, tells us to Think Globally and Act Locally. This catchphrase sounds good but is it possible ? How can local actions really impact global trends ?

This paper suggests that individuals and institutions at the grassroots level can narrow the gap between themselves and IUCN so that they feel a part of this powerful conservation community and gives a methodology for doing so. The methodology is a combination of regional conservation networks and regional species red list assessment exercises. Red listing species had been done for several decades by a few individuals in the academias of temperate countries writing letters to even fewer individuals across the globe asking vague questions about the conservation status of species. Only relatively recently did this activity come out of Gland and Cambridge and into the mega-diversity countries which hold most of the earth's species. Today, field biologists from India, Indonesia, Malaysia, Myanmar and other high biodiversity countries and continents participate in the Conservation Breeding Specialist Group's Conservation Assessment and Management Plan (CAMP) workshops contributing current field data which is used to categorise species according to the Red List criteria. This is a sea change and highly welcome.

Conducting conservation assessments at the regional level has many advantages over traditional approaches:
- Regions are often more representative than countries of the biogeographical range of species
- Pooling the knowledge of field biologists from adjacent countries generates more current accurate information on species and can resolve border questions of distribution, taxonomy, and migration.
- The number of endemic species which can be assessed in most cases will be significantly greater at the regional level than at the national level. Thus more species can be submitted straightaway to the IUCN Red List Officer for inclusion in the IUCN Red List.
- More field biologists from the range countries themselves can be involved for greater information sharing and enhanced cooperation. CBSG's CAMP process also enhances the amount of information that can be collected.
- Zoos from range countries can use these threatened species lists with greater confidence, knowing their own people have participated.
- Zoos can become involved in the workshop process and even organize such workshops in their own region and country.

In this way, everyone is a winner. Grass roots field biologists win by being able to use their data to make the assessment; IUCN SSC wins by having much of their work done for them by the most knowledgeable people, and threatened species win ... we hope ... by attracting conservation funds to carry out vital conservation strategies which will insure their survival.

Ethical Issues Facing Zoos in South East Asia -- S. Vellayan, *Head Veterinary Services Department, Zoo Negara Malaysia*
Throughout human history, animals have been viewed primarily in utilitarian terms and the history of zoos is no exception. More recently, however, zoos have evolved to breeding of endangered species, conservation education and science. With this changing mission has come a closer examination of the ethical basis for keeping wild animals in captivity.

The purpose of this paper is to summarize the major ethical concerns facing modern zoos. My intention is not to provide solutions, but rather, to identify, categorize and briefly describe the issues so that the process of problem solving can begin. I am also aware of the fact that solutions may require input from many sectors of society and that some individuals or organizations may never be satisfied with the outcome. I do, however, feel that these questions must be resolved if zoological institutions are to fulfil their potential in the areas of conservation, education and science.

Animal Welfare and Wildlife in Zoos : A Perspective of Veterinarians Ethics and Responsibilities -- S. Vellayan
Housing wildlife and zoo animals in zoos and in captivity poses many challenges. Among which are ethical questions concerning animal welfare. Although some individuals in South East Asia oppose keeping wildlife in captivity, including in zoos and aquaria, most agree that the practice will continue. We, veterinarians, therefore, do our best to ensure that captive wild animals are maintained in a professional, humane, and healthy manner. We should be more pro-active and should participate in forums that promote a better understanding of the relationship between an animal's psychological needs and its physical health. It is important to remember that we are responsible for providing a comprehensive health program for our patients, which includes addressing their behavioural needs.

Garlands as a behavioural and nutritional enrichment tool in lesser Primates and Apes -- S.Vellayan
Garlands are wreath of flowers, leaves, buds strung on banana stem fiber or at times, strings. The author collects the various types of garlands from the Sri Maha Kaliamman Temple, Hospital Kuala Lumpur, on a regular basis and brings them to Zoo Negara. They are provided to the monkeys and the apes on an empty stomach. The lesser apes and monkeys take the garlands to a secure place, pluck the flower petals and consume it readily. The lesser apes and monkeys show more interest compared to the chimpanzee and orang utan. For the chimpanzees, the garlands are placed into a cardboard box and placed in the exhibit. Initially they are suspicious and knock the box. Then they open the box and run with the garlands. The chimpanzees throw and hit the garlands on the ground prior to consumption. In the case of orangutan they use slow movements in their consumption of the petals from the garlands. No nutritive analysis of the flowers was done. This has been carried out for the past three years in the zoo.

Behavioural Differences of Sumatran Rhinoceros (*Dicerorhinus sumatrensis*) in Natural and Unnatural Enclosures at Sumatran Rhinoceros Concervation Centre -- Sungai Dusun, Selangor, Malaysia, Zakaria. M, [1]Yee, C.M. and [2]Zahari, Z. Z. *Faculty of Forest, University Putra Malaysia and Department of Wildlife and National Parks, Peninsular Malaysia*
A study was conducted on ethological differences shown in natural and unnatural enclosures by Sumatran Rhinoceros (*Dicerorhinus sumatrensis)* at the Sumatran Rhinoceros Conservation Centre, Sungai Dusun, Selangor. The natural enclosure was a ten acres' fenced up forest while the unnatural enclosure had a paddock and night stall. The first 2 weeks were observed for habituation and ethogram development. The remaining 16 weeks were allocated equally between the two enclosures for diurnal behaviour observations (7 am - 7 pm daily). Correlation results had shown the significant difference in the activity time budget, indicating certain missing niches in the unnatural enclosure. Thus, such differences were useful information to better understand the behaviours of the Sumatran Rhinoceros and the influence of captive environment on the species breeding success.

Behaviour patterns of Javanese Deer (*Cervus timorensis russa* Mul. & Schl.) in the breeding compounds of Perum Perhutani, Hari Palguna, *Zoological and Botanical Gardens*
Javanese deer *(Cervus timorensis russa)* is one of the fauna protected by law in Indonesia. However, not many results of researches and (*ex*

situ) breeding activities had yet been obtained on their breeding. This research was to find out the conditions of the *ex situ*: 1 Behaviour patterns, 2. Productivity, 3. Availability of food. The research was conducted in three locations of Wana Wisata Waluya Karangkates Malang, Wana Wisata Monumen Suryo Ngawi and Wana Wisata Ranca Upas Bandung. The following parameters were included; 1 . Measuring and recording the size the area of breeding compound, the shelters and vegetation analysis 2. Food analysis including the availability, the palatability and nutrition value 3. Recording the individual number and population structure 4. Behaviour patterns using "Focal Animal Sampling Method" applied to 5 samples in each location including the frequency of ingestion, movement, rest and eliminative with time interval between 05:30 – 17:30. The data obtained was analyzed descriptively with graphics and statistics. The statistical method used was multivariate and multiple regressions analysis.

The size of the areas of breeding compounds, shelters, results of the vegetation analysis, the availability of food and its variety and nutrition value in the three locations were different. The individual number and the population structure of Javanese deer in the three locations were different: Wana Wisata Ranca Upas Bandung 40 heads,Wana Wisata Waluya Karangkates Malang 33 heads, and in Wana Wisata Monumen Suryo Ngawi 13 heads. The availability of food, productivity, behaviour patterns related to the size of the breeding compounds especially on the food availability and individual numbers of population, carrying capavity of vegetation of Javanese deer were calculated. The productivity of Javanese deer within the three breeding compounds was not affected positively by its population structure, and had a determinant coefficient of 97.97 %.

Diet Studies at the Taipei Zoo's Bird Park -- Ci Wen Yang
Taipei Zoo, 30, Sec. 2, Hsin Kuang Road, Taipei, Taiwan, R.O.C.
There are 702 individuals of 87 avian species living at the Taipei Zoo's Bird Park. This year, we examined all the diets of these birds in 9 areas including: Bird flying area, waterfowl pond, reproduction area, cockatoo display house, peacock big cages, temporary cockatoo cages, releasing area, cane display area, small and game bird area. We analyzed and amended the diets of birds living in the crane display area, the temporary cockateo cages, and the pheasant reproduction area. This information is taken from ongoing research at the Taipei Zoo examining the nutrition of various bird species in comparison to their feral counterparts. We will continue the diet studies for two more years.

Education Masterplan for Taiping Zoo -- Musnarizal Abdul, *Manap Education Officer, Taiping Zoo, Taiping Municipal Council*
A zoo plays an important role in conservation by breeding wild animals especially the endangered species and as a resource center for learning wildlife conservation and functions as a living classroom. This paper describes the design and implementation of conservation education programmes that will effectively bring improved environmental management in Taiping Zoo. Through education, a zoo creates a learning ground for the visitors especially the younger generation to increase their understanding and appreciation of wildlife conservation.

Rearing Orphan Elephants at Phnom Tamao Zoological Garden and Wildlife Rescue Center -- Nhek Ratanapich
Wildlife Protection Office, Dept. of Forestry and Wildlife, Cambodia
Phnom Tamao Zoological Garden and Wildlife Rescue was established in 1995 with an area of 80ha. We have conserved 86 species in 1200ha. Most of the animals were confiscated from illegal trade and the rest, surplus animals. The Rescue Center was created with the following objectives: conservation, breeding, scientific research, education and recreation. This paper highlights the keeper's care, medical treatment, nutrition, training and some enrichment.

Husbandry and Management Practices of Captive Malaysian Elephants in Major Zoos in Malaysia and Singapore -- Abraham Mathew, *Assistant Curator, Zoo Negara Malaysia*
A comparative study of the husbandry and management practices of Malaysian elephants in zoos in Malaysia and Singapore was undertaken. This study includes the time of release, feed quantity, variety and the time of feeding, elephant shows, rides and working with the elephants in all these zoos. Varied management practices as a form of enrichment is discussed.

Environmental Enrichment of Parrots in naturalistic settings -- Ng San San, *Avicultural Officer, Jurong BirdPark, Singapore*
Parrots are active, inquisitive, communicative, intelligent and highly social animals. When bored, they carry out on their surroundings, including their aviary-mates, and themselves. Environmental enrichment is an indispensable aspect of keeping parrots in captivity. Commercial or improvised "toys", such as swings, provide parrots with amusement, thereby distracting them from destructive activities, such as feather-plucking or plant-chewing. However, these "toys" would look out of place in the naturalistic setting of a display aviary, perhaps even defeating the aim of exhibiting animals in the context of their natural habitat. This paper discusses several enrichment methods used at Parrot Paradise, Jurong BirdPark.

The Genetic Research of Apes at the Taipei Zoo - A Future Research Plan in Our SEAZA Region -- Ci Wen Yang[1], Po-Chung Chang[1], Kuang-Yu Hu[2] and En-Min You[2] *[1]Taipei Zoo, [2]National Defense Medical College.*
The chimpanzee has been proclaimed an endangered species by CoA (Council of Agriculture) in the Executive Yuan of the R.O.C. and CITES. To prevent the 26 chimpanzees at Taipei Zoo from inbreeding, which could produce genetic disorders, we chose the microsatellite loci DNA as the target gene for PCR to develop a fast method of chimpanzee paternity determination. The results suggest that we can successfully determine the relationship between the chimpanzees at Taipei Zoo by analyzing 10 primers with the CEQ2000 XL machine. Subsequently, we can then benefit from these results and then use the multiplex-PCR for further research in this project. We believe that we should be able to set up a fast genotyping assay and fulfill the breeding and nurturing requirements of chimpanzees at the Taipei Zoo.

Husbandry and Management of Milky Storks at Zoo Negara -- Doreen Khoo Say Kin, *Zoo Negara Malaysia*
The Milky stork (*Mycteria cinerea*) is a large bird that can be found only in certain parts of SE Asia (Kuala Gula, Perak, Sumatera and Java). The Milky stork population in Malaysia has declined to about 100 individuals as observed in 1984-1985 and are on the verge of extinction in Peninsular Malaysia. At Zoo Negara, we have been breeding these birds since 1989 and have an on-going breeding programme with the Malaysian Nature Society to start another *in situ* breeding site in Kuala Selangor Nature Park and Taiping Zoo. The breeding behaviour, hand rearing technique and problems encountered in these birds are discussed in this paper.

Masterplanning Zoo Education in South East Asia: Training and Utilisation -- Sally Walker, *Zoo Outreach Organization / CBSG, SA.*
Conservation education is one of the most important objectives of zoos. Conservation education in zoos has been neglected for years and only in the last two decades has really come into its own around the world. In Asian countries, many zoos still do not have education officers or an education budget or any place to send staff for training. Frequently training in zoo education in foreign countries or by western educators is not appropriate for Asian cultural conditions.

It was with an eye to providing a beginning for Asian zoos with interest in initiating or improving their education programme that the Asian Regional Network of International Zoo Educators (ARNIZE) approached officials of SEAZA, President, Bernard Harrison and Training Chair, Tan Kit Sun with a novel approach to organizing a zoo educator training course. The training would be done in Singapore at the famous Singapore Zoo and related facilities as well as other appropriate leisure facilities in Singapore, e.g., Jurong Bird Park, Underwater World, Science Centre, Singapore Botanical Garden. A 10- day zoo educator course was conducted in Singapore last March 2001. The course was attended by 22 participants of South East Asia, e.g. Philippines, Vietnam, Cambodia, Malaysia, Laos, Thailand, and Indonesia. A great part of the course was devoted to participants presentations, interactive exercises in working groups and a Master-plan for Zoo Education. The proof of the pudding was demonstrated three months later when the Indonesian Zoological Parks Association, assisted by several zoos which sent representatives to the course, conducted their own zoo educator training course for the zoos of Indonesia. This presentation will be a photographic review of some highlights of the course.

A new drug delivery formulation of GnRH analogue deslorelin forcontraception in canines: a significant step forward in animal welfare -- Arif Junaidi, *Universitas Gadjah Mada,Indonesia* **T.E .Trigg,** *Peptech Animal Health, Australia*
The effect of chronic treatment with a slow release implant containing GnRH agonist deslorelin on pituitary and testicular function was studied in Indonesian mature male dogs. Eight were implanted with a 10 mg deslorelin implant placebo implant (group1). Group 2 (control dogs) were given a placebo implant. Plasma testosterone concentrations were undetectable on Day 30 after implantation in treated dogs. Testes volume dropped to 35% after 13 weeks and ejaculate could not be obtained 4 weeks after implantation. Histological assessment of the testes and prostate gland 3 and 8 months after implantation showed atrophy of the seminiferous tubules. Spermatogenesis was absent and the glandular epithelium of formulation containing deslorelin was effective in long term suppresslon of reproductive function in male dogs. There were no adverse side effects seen in any of the dogs treated.

Handralsing rescued Leopard Cat kittens with Goat's milk -- Jawahir, J. and Mohd Najib, O. *Malacca Zoo and Dept. of Wildlife and National Parks, Peninsular Malaysia*
Hand-raising of leopard cat (*Felis bengalensis tingia*) kittens with commercial infant formula have resulted in diarrhoea and a very high mortality in kittens. The palatability of the commercial diet is also a factor in the intake of the kittens thus affecting the growth rate and making them prone to infections. Three two-week old kittens were rescued from a construction site, located in Serkam, Malacca. The kittens were fed with commercial frozen goat's milk every three hours day and night. The kittens were fed with ½ oz of milk every feeding by a 50 mililiters bottle. The health and performance of the kittens were better compared to those feed with infant formulas.

Puberty and Pairing Behaviour in captive-born and wild-born Eastern Sarus Crane (*Grus antigone sharpii*) -- Wichit Kongkham, *Zoo veterinarian, Nakornratchasima zoo*
This paper reports the captive breeding behavior of Eastern Sarus Cranes (*Grus antigone sharpii*). A zoo-born, captive crane started to pair and lay eggs at the age of 4 years. Natural-born, captive cranes often start around the age of 7-11 years. Another observation was that hand-reared and parent reared cranes have different pairing ages and behavior. A parent-reared hen could reach breeding age and produce chicks at the age of 4 years old, while hand-reared hen had problems pairing with a cock.

A preliminary study in Cytochrome-b gene of mitochondrial DNA from white blood cell in Asian Elephants -- Manoch Yindee and Nikorn Thongtip, *Kasertsart University, Thailand*
Although the Asian Elephant has been listed as Appendix I CITES since 1975, its population throughout Asia continues to decline due to habitat loss and hunting. Habitat loss and civilization causes fragmentation of habitat and increased chances of inbeeding. The genetic diversity of Thai Asian elephant is still unknown. In this study, the cytochrome-b gene of mitochondria DNA from white blood cell was used to separate the group of elephants by Halotype which will facilitate the breeding programme management in Asian elephant in the future by avoiding the same group mating that will decrease genetic diversity. The sample size is too small so the study needs to be continued.

Snake – slithering through past into future: The Introduction of "2001 Snake Year" Exhibition -- Ming Hsung Chang, *Taipei Zoo*
The year 2001, is the 'Year of the Snake' on the Chinese Zodiac. An exhibition 'Snake - slithering through past into future' was held in Taipei Zoo to mark the coming 'Year of the Snake' in the new century. The main purposes of the exhibition are aimed at acquainting visitors with the true face and importance of the snakes and at overcoming prejudices (e.g. hate, fear) and wrong assumptions (such as "dangerous" or "they are pests") against them. The exhibition is composed of three parts: 'Snake legends', 'Snakebite' and 'Snake S.O.S', which encompassed the cultural myths around the world, arts of Indigenous tribes of Taiwan, avoiding snakebite and treatments, poisonous snakes of Taiwan, life and medical application of snakes, food chain relationship and conservation of snakes.

Comparative Study of Captive Breeding in Some Water Fowl Birds at Khao Kheow Open Zoo -- Sumate Kamolnorranath, Urarikha Kongprom, Sompong Srima, *Chiang Mai Zoo, Khao Kheow Open Zoo*
Some parameters in breeding of waterfowl species in two families; Ciconidae and Gruidae are described. The five species that were observed: Black-necked Stork (*Ephippiorhynchus asiaticus*), Woolly necked Stork (*Ciconia episcopus*), Lesser Adjutant Stork (*Leptoptilos javanicus*), Eastern Sarus Crane (*Grus antigone shapii*) and West African Crowned Crane (*Balearica pavonina pavonina*). All five species were cooperative nest builders and cooperative incubators. Clutch size were; 3, 5, 3, 2 and 3 resp. Incubation periods were; 37, 28-30, (not successful), 36 and 29 respectively. The chick hatched was; 2, 5,0, 2 and 3 respectively.

Wild Animal Welfare and Ethics in Zoo Education -- Sally Walker, *Zoo Outreach Organisation*
Zoological gardens and parks often come under attack by animal welfare and animal rights organizations. Over the long history of zoos in the world, there has been good reason for such criticism but in the last two decades there has been a growing awareness of the need for reform in zoos by zoos themselves. Zoos all over the world have begun focusing more on the better care of the animals' emotional well-being. This concern with animal welfare should carry over into zoo education. Zoos should use their unique situation of holding living animals which charm and amaze millions of visitors to create empathy as well as interest in wildlife. Zoos should do this by setting a good example for treatment of animals in their institution and for abiding by both the letter and spirit of wildlife legislation. This includes making sure that visitors themselves do not mistreat animals, particularly when they come to the zoo. Wildlife welfare education in zoos also includes teaching visitors to change their behaviour towards wild (and even other) animals in their community to avoid indulging in purchase of animals or their products, to avoid patronizing institutions and projects which survive by a wrongful use of wild animals and to treat all animals kindly. Educational materials specifically targeting visitor behaviour and animal welfare have been developed by Z. O. O. on the basis of the conclusions of such research.

In-house reference values for captive wildcat hematology parameters in the Zoological Parks Organization of Thailand, Pisit na Pattalung et al, *Zoological Park Organization of Thailand*
This paper reports the hematological parameters of eight species of wildcats kept by the Zoological Park Organization of Thailand. During 1993-2001, over 150 blood samples were collected and analyzed. Most of the samples were collected from healthy cats during annual physical examinations, semen collections and skin biopsies. The hematological parameters can be used as in-house reference values for routine work for veterinarians in the zoo.

Zoos and Aquaria as a "Walking Library" -- S. Vellayan and Claire Beastall, *Zoo Negara Malaysia.*
Education within Zoos and Aquaria is often considered at a very formal level. By approaching zoo education as an immersion experience, we can consider the zoo to be a "walking library" with information available to the visitor at every turn. The educational requirements of our visitors vary enormously. It is our responsibility to ensure that we offer an educational experience for all visitors. A greater understanding of the natural world and our place within it can promote more favorable attitudes towards wildlife and the environment. This paper will consider the scope of zoo education and the ways in which information can be made available to all of our visitors.

Rescue of Malayan Tapirs in Peninsular Malaysia -- Razeem Mazlan A. and Mohd Ermy M. A., *Zoo Melaka and Department Wildlife and National Parks, Malaysia*
The Malayan Tapir (*Tapirus indicus*) is listed as an endangered species in Malaysia. The clearing of forest to agriculture and sustained development has lead to fragmentation of the forest and isolation of these animals in the wild. This paper reports the various methods used in the rescue of these isolated wild tapirs.