The Zoological Society of London
Registered Charity 208728

Annual Report 1997
Part 2

Contents

The Zoological Society of London

(Registered charity no. 208728)

Patron: Her Majesty The Queen

Principal address: Regent's Park, London NW1 4RY
Also at: Whipsnade Wild Animal Park, Dunstable, Bedfordshire, LU6 2LF

ZSL is established by Royal Charter, and governed by Bye-laws and Regulations. The ruling body is Council. Members of Council, who include the Officers of the Society (the President, the Treasurer and the Secretary), are listed opposite. Council Members (the Trustees) are elected by the membership by postal ballot. Council has the power to co-opt.

Associated Charity:
The Zoological Society of London Development Trust (reg. no. 293255)

Non-trading holding company:
Zoo Operations Ltd (reg. no. 2226414)

Wholly-owned subsidiary trading companies:
Zoo Enterprises Ltd (reg. no. 1178687)
Zoo Restaurants Ltd (reg. no. 570005)
Whipsnade Wild Animal Park Ltd (reg. no. 990860)

Bankers: Royal Bank of Scotland, Drummonds
Auditors: Ernst & Young
Investment Advisers: Henderson Investors

The objects of the Society under the Charter are:
'the advancement of zoology by, amongst other things, the conducting of scientific research, the promoting of conservation of biological diversity and the welfare of animals, the care for and breeding of endangered and other species, the fostering of public interest, the improvement and dissemination of zoological knowledge and participation in conservation worldwide.'

Details of the policies and activities of ZSL in furtherance of these objectives are contained in Part 1 of this Report. There was no change in the objectives or policies during 1997.

The Annual Report was approved by Council on 1 April 1998.

Honorary Fellows

Date of election	
1977	HRH The Prince Philip, Duke of Edinburgh, KG, KT
1991	HM The Emperor Akihito of Japan
1975	Professor Jean Anthony *Museum National d'Histoire Naturelle, 55 rue de Buffon, Paris 53, France*
1975	Professor Jean Dorst *Museum National d'Histoire Naturelle (Mammifères et Oiseaux), 55 rue de Buffon, Paris 53, France*
1984	Professor Ernst Mayr *Museum of Comparative Zoology, Harvard University, Cambridge, Massachusetts 02138-2902, USA*
1988	Professor Dr Milton Thiago de Mello *Instituto de Ciencias Biologicas, Universidad de Brasilia, Brasilia, Brazil DF70 910*
1990	Professor Knut Schmidt-Nielsen *Department of Zoology, Duke University, Durham, North Carolina 27708-0325, USA*
1992	Professor Edward O Wilson *Museum of Comparative Zoology, Harvard University, 26 Oxford Street, Cambridge, Massachusetts 02138-2902, USA.*
1996	Professor John Maynard Smith *School of Biological Sciences, University of Sussex, Falmer, Brighton BN1 9QG.*
1997	The Hon. Miriam Rothschild *Ashton Wold, Peterborough, PE8 5LZ.*

Council

*Attendance at Council**	
5/6	*President:* Sir Martin Holdgate, CB, MA, PhD, CBiol, FIBiol, FRSA, FRGS
5/6	*Treasurer:* Harry Wilkinson, OBE, MA, FCA
6/6	*Secretary:* Professor R McNeill Alexander, PhD, DSc, CBiol, FIBiol, FRS
5/6	Sheila Anderson, BSc
2/2	John Barrington-Johnson ②
2/2	Simon Bearder, PhD ②
2/2	Brian Bertram, MA, PhD, CBiol, FIBiol ②
2/6	Jonathan Boyce, DM, MA, MSc, MRCP, FFPHM
6/6	Michael Brambell, MA, VetMB, PhD, DVSc, MRCVS
2/6	Professor Bryan Clarke, DPhil, FRS ①
6/6	John Edwards, MA, FLS
4/6	Roger Ewbank, OBE, MVSc, MRCVS, CBiol, FIBiol
4/4	Zakaria Erzinclioglu, PhD ①
2/2	Michael Ford, DPhil ②
1/6	Professor Tim Halliday, DPhil
6/6	Councillor Martin Jiggens, FRICS, FSVA, FRSA ①
5/6	Clinton Keeling
4/6	Ken Livingstone MP, *Vice-President*
4/6	Christopher Marler
6/6	Martin Rowson, MA
2/2	Ken Sims ②
4/4	Ted Smith, BSc, CBiol, FIBiol ①
6/6	Tony Stevens, MA, BVSc, MRCVS, DipBact, *Vice-President*
3/6	Professor Ian Swingland, PhD, DSc, CBiol, FIBiol, FRSA, FRGS
3/4	Jane Thornback, MSc ①
4/6	Professor Roger Wheater, OBE, CBiol, FIBiol, FRSGS, FRSA, FRSE

* Actual/Potential

① From 28 May 1997
② To 28 May 1997

Committees & Boards 1997

Committees & Boards of Council

Finance & General Purposes Committee

Terms of Reference: To monitor the financial management of the Society and act as an audit committee; and to preview and prepare papers for Council requiring policy or capital investment decisions.

Sir Martin Holdgate, CB, MA, PhD, CBiol, FIBiol, FRSA, FRGS, *Chairman*
Michael Brambell, MA, VetMB, PhD, DVSc, MRCVS
Jonathan Boyce, DM, MA, MSc, MRCP, FFPHM
Christopher Marler
Professor R McNeill Alexander, PhD, DSc, CBiol, FIBiol, FRS
Harry Wilkinson, OBE, MA, FCA

Conservation & Science Advisory Committee

Terms of Reference: To provide strategic vision, objectives and advice to Council and ZSL staff on conservation and science issues and activities; to monitor all the conservation and science activities of the Society, ensuring that they are implemented to the highest professional standards.

Keith Elringham, PhD, *Chairman*
Lee Durrell, PhD
Bryan Grenfell, PhD
Robin Pellew, PhD
Professor Paul Racey, MA, PhD, DSc, FRSE, CBiol, FIBiol
The Hon. Peregrine Simon, FLS, QC
Professor Ian Swingland, PhD, DSc, CBiol, FIBiol, FRSA, FRGS

Education & Information Advisory Committee

Terms of Reference: To provide strategic vision, objectives and advice to Council and ZSL staff on education issues and projects; to monitor the education and information activities of the Society, ensuirng that they are implemented to the highest professional standards.

Sir Peter Newsam, MA, DipEd, *Chairman*
Sheila Anderson, BSc
Geraldine Baker, BSc
Steve Flowerday, MSc
Kate Harris, BA
Roger James
Sophie McCormick, PhD
Martin Rowson, MA
Alistair Smith, PhD

Animal Welfare Committee

Terms of Reference: To advise Council on matters relating to animal welfare in the Collections, at both London Zoo and Whipsnade Wild Animal Park, at the Institute of Zoology and in the work of Field Conservation & Consultancy.

Professor Patrick Bateson, PhD, ScD, FRS, *Chairman*
Roger Ewbank, OBE, MVSc, MRCVS, CBiol, FIBiol
Andrew Higgins, BVetMed, MSc
Arthur Lindley, MA, DPhil
Professor Andrew Peters, DVetMed, BA, PhD, FRCVS
David Pritchard, BVetMed, BSc, MPH, MRCVS
Christopher Sherwin, BSc, PhD
Miranda Stevenson, MA, PhD

Awards Committee

Terms of Reference: Council presents awards for contributions to zoology: The Prince Philip Prize, Thomas Henry Huxley Award, Stamford Raffles Award, Silver Medal, Scientific Medal, ZSL Frink Medal for British Zoologists, and ZSL Marsh Award for Conservation Biology. The Committee advises Council on all matters relating to these awards.

Professor Mike Hassell, DPhil, DSc, FRS, *Chairman*
Dr B L Bayne, PhD, CBiol, FIBiol
Professor Geoff Boxshall, PhD, FRS
Professor Pat Butler, PhD, CBiol, FIBiol
Professor Sir Brian Follett, PhD, ScD, FRS
Professor Paul Harvey, DPhil, DSc, FRS
Dame Anne McLaren, DPhil, FRS
Professor Ian Newton, DPhil, DSc, FRS, FRSE
Professor Geoff Parker, PhD, FRS

Institute of Zoology Committee

Terms of Reference: To advise the Society and the University of London under the terms of the Agreement between them; to consider and make recommendations on all matters relating to the Institute of Zoology.

Professor Lance Lanyon, BVSc,PhD,DSc,MRCVS, *Chairman*
Professor Bryan Clarke, DPhil, FRS
John Goss-Custard, PhD
Professor Alan Hildrew, PhD
Professor Colin Howard, PhD, DSc, MRCPath, CBiol, FIBiol
Professor Linda Partridge, DPhil, FRSE
Robin Pellew, PhD
Ex officio:
University of London:
Vice Chancellor
Principal
Chairman of Convocation
Zoological Society of London:
President
Secretary
Treasurer
Director of Science: Professor Morris Gosling, PhD, CBiol, FIBiol

London Zoo Board

Terms of Reference: To provide specialist advice on the objectives of London Zoo and on specific aspects of its management; to approve the annual business and financial plan and recommend it to Council; to approve any in-year variances to the plan; to review and approve any capital developments.

Jonathan Boyce, DM, MA, MSc, MRCP, FFPHM, *Chairman*
Christopher Garnett
Steve Harrison
Andrew Jackson
Ken Livingstone, MP
Ken Sims
Jane Thornback, MSc
Director General: Richard Burge, BSc
Director, London Zoo: Jo Gipps, PhD
Director of Personnel: Ian Meyrick, BA, FIPD
Director of Finance: Norman Reed, BSc, FCA

Whipsnade Wild Animal Park Board

Terms of Reference: To provide specialist advice on the objectives of Whipsnade Wild Animal Park and on specific aspects of its management; to approve the annual business and financial plan and recommend it to Council; to approve any proposed in-year variances to the plan; to review and approve any capital developments.

Christopher Marler, *Chairman*
Sir David Madel, MP
Derrick Moore
John Piggott
Roger Smith
Professor Roger Wheater, OBE, CBiol, FIBiol, FRSGS, FRSA, FRSE
Director General: Richard Burge, BSc
Director, Whipsnade Wild Animal Park: Stuart Earley, MInstD, MInstM, FInstSMM
Director of Personnel: Ian Meyrick, BA, FIPD
Director of Finance: Norman Reed, BSc, FCA

Advisory/Editorial Boards for ZSL Publications

Animal Conservation Advisory Board

Professor Jared Diamond, PhD
Professor John Lawton, CBE, PhD, FRS
Professor Stephen Stearns, PhD
Editors: Michael Bruford, PhD
John Gittleman, DPhil
Georgina Mace, DPhil
Robert Wayne, PhD

International Zoo Yearbook Editorial Board

Jeremy Mallinson, OBE, CBiol, FIBiol, FRGS, *Chairman*
Marcia Edwards, PhD, FLS
Nick Jackson
Professor Janet Kear, OBE, PhD
John Knowles, OBE
Georgina Mace, DPhil
Professor Roger Wheater, OBE, CBiol, FIBiol, FRSGS, FRSA, FRSE
Editors: Peter Olney, BSc, DipEd, CBiol, FIBiol, FLS
Fiona Fisken, BSc

Journal of Zoology Editorial Board

Professor Sam Berry, MA, PhD, DSc, FRSE, CBiol, FIBiol, FLS
Clive Catchpole, PhD
Professor Robert Elwood, BSc, PhD
Professor Peter Evans, MA, PhD, DPhil
Tim Flannery, BA, MSc, PhD
Professor Paul Harvey, DPhil, DSc, FRS
Professor Reino Hofmann, TA, Dr med vet, Dr habil
Katharina Mangold, PhD
Professor Brian Morton, PhD
Tim Roper, PhD
Professor John Skinner, MSc, PhD, CBiol, FIBiol, FRS(SA)
Professor Ian Swingland, PhD, DSc, CBiol, FIBiol, FRSA, FRGS
Editor: Juliet Clutton-Brock, PhD, DSc

Staff

As at 31 December 1997

Senior Executives

Director General: Richard Burge, BSc
Director of Science: Professor Morris Gosling, PhD, FIBiol
Director, London Zoo: Jo Gipps, PhD
Director, Whipsnade Wild Animal Park: Stuart Earley, MInstD, MInstM, FInstSMM
Director, Field Conservation and Consultancy: Alexandra Dixon, BA, MSc
Director of Finance: Norman Reed, BSc, FCA
Director of Personnel: Ian Meyrick, BA, FIPD

Central Functions

Director General: Richard Burge, BSc
Secretary/PA to Director General: Karen Harding
Secretary to the Officers: Anne Chapman

Personnel

Director of Personnel: Ian Meyrick, BA, FIPD
Senior Personnel Officer: Paula Harris, MA, GradIPD
Personnel Administrator: Marcia Latty, GradIPD
Pensions Administrator: Peter Carey *(p/t)*

Health and Safety

Security and Safety Manager: Brian Nutkins
Secretary: Brenda Tonks
Consulting Medical Referee: Kenneth Lewis, MA, BM, BCh
First Aid Attendant: Grace Reay
Weekend First Aid Attendant: Ahmed Ibrahim

Switchboard/Reception

Receptionists: David Hitchcock; Sarah O'Neill
Telephonists: Brenda Ambrose; Joanne Kent; Jennifer Molineaux

Finance

Director of Finance: Norman Reed, BSc, FCA
Secretary: Susan Morgan
Financial Accountant: Joan Jupp
Management Accountants: Charles Biggie; Keith Hayward, FCCA
Cash Book Keeper: Heather Penney
Chief Cashier: Dave Lack
Cashiers: Paul Gibbs; Les Oxley; Joe Piggott
Payments Supervisor: Lynette Archer-Morgan
Wages Clerk: Jackie Owen

Fellowship

Fellowship Services Manager: Marion Hoyland

Fundraising

Fundraising Co-ordinator: Claire Knapton
Assistant Fundraiser: Colette Dodge

Information Technology

IT Manager: Ajay Burlingham-Johnson
IT Support Officer: Rob Jinman

Library

Librarian: Ann Sylph, BSc, MSc, MIInfSc
Assistant Librarian: Michael Palmer, BA, MA
Library Assistant: Karen Deakin

Press & PR Office

Senior Public Relations Officer: Kirstie Macfarlane
Assistant Public Relations Officers: Debbie Curtis; Chris Preston

Publications

International Zoo Yearbook

Editors: Peter Olney, BSc, DipEd, CBiol, FIBiol, FLS; Fiona Fisken, BSc
Assistant Editor: Linda DaVolls, BA
Sales Administrator: Mychael Barratt *(p/t)*

Journal of Zoology, Symposia, Nomenclator Zoologicus, Zoological Record

Editor, Journal of Zoology: Juliet Clutton-Brock, PhD, DSc
Honorary Editor, Zoological Record & Nomenclator Zoologicus: Marcia Edwards, PhD, FLS
Assistant Editors: Unity McDonnell, MA; Angela Stroud, BSc
Editorial Assistant: Patricia Manly
Publications Assistant: Shyama Iyer *(p/t)*

Institute of Zoology

Director: Professor Morris Gosling, PhD, FIBiol
Institute Administrator: Christina Herterich, ACIS
Assistant Institute Administrator: Phil Cottingham, BTec(CED), MIScT
PA to Director of Science: Jo Keogh
Secretaries: Maureen Thompson, Catherine Kerr
Development Officer: Peter Cotgreave, DPhil
Director's Research Team: Michelle Andrews, MSc; Craig Roberts, PhD; Elizabeth Thornton, BSc
Postgraduate Research Students: Sam Andanje, MSc; Jakob Bro-Jorgensen, MSc; Stephanie Wehnalt, MSc
Senior Technician (Animals): Andrew Hartley, BAgricSc
Animal Technicians: Mandy Gordon, IIAT; Jake Rozowski
Senior Workshop Technician: Selwyn Mundy
Senior Photographic Technician: Terry Dennett, MInstPI
General Laboratory Assistant: Breda Farrell

Conservation Genetics

Postdoctoral Research Staff: Michael Bruford, PhD *(Head of Group);* Elizabeth Barratt, PhD; Mark Beaumont, PhD; Jan de Ruiter, PhD; Christopher Faulkes, PhD; William Jordan, PhD; Helen Stanley, PhD
Honorary Research Fellows: Heather Hall, PhD; Rob Hammond, PhD; Stephan Funk, PhD; Nick Oguge, PhD; Amanda Vincent, PhD
Senior Technician: Dave Cheesman, BTec, HNC
Technicians: Rob Deaville, BSc; Katherine Foley, BSc; Louise Gosney, BSc; Dada Gottelli, BSc; Miranda Kadwell, BSc
Postgraduate Research Students: Michelle Bayes, BSc; Tamsin Burland, BSc; Steve Casey, BSc; Claudio Ciofi, BSc; Frank Clarke, BSc; Trevor Coote, BSc; Saffron Townsend, BSc

Ecology
Postdoctoral Research Staff: Georgina Mace, DPhil *(Acting Head of Group);* Andrew Bourke, PhD; Peter Cotgreave, DPhil; Tim Coulson, PhD; Sarah Durant, PhD; Karen Laurenson, VetMB, PhD
Honorary Research Fellow: Sarah Cleaveland, VetMB, PhD
Research Assistant: Nick Isaac, BSc
Postgraduate Research Students: Jonathon Baillie, MES; Stephen Brown, BA; Daniella de Luca, BSc; Manuela Fonseca, MSc; Isabelle Porteous, DipVetMed

Veterinary Science
Postdoctoral Research Staff: Peter Bennett, PhD
Honorary Research Fellows: Professor George du Boulay, CBE, MB, BSM, FRCP, DMRD; Peter Kertesz, BDS, LDS; Professor James Kirkwood, BVSc, PhD, MRCVS
Pathologist: Andrew Cunningham, BVMS, MRCVS
Veterinary Officers: Edmund Flach, MA, VetMB, MSc, MRCVS; Tony Sainsbury, BVetMed, CertLAS, MRCVS; Sue Thornton, BSc, BVetMed, MRCVS
Marine Mammals Strandings Co-ordinator: Paul Jepson, BVMS, MRCVS
Senior Veterinary Nurse: Tony Fitzgerald, RANA
Veterinary Nurses: Gillian Ahearne, VN; Christine Dean, VN; Joanne Knibb, VN
Technician: Shaheed Macgregor, HTec, MSc
Postgraduate Research Student: Debra Bourne, BA, VetMB, MRCVS

Reproductive Biology
Postdoctoral Research Staff: William Holt, PhD *(Acting Head of Group);* Alireza Fazeli, PhD; Alison Moore, PhD; Amanda Pickard, PhD
Honorary Research Fellows: Julie Garnier, DVM; Helen Shaw, PhD; Professor Paul Watson, BVetMed, BSc, PhD, DSc, MRCVS
Postgraduate Research Students: Alfredo Medrano, BSc; Clare Stafford, BSc; Lisa Thurston, BSc
Senior Technician: Daphne Green, HNC, AIScT
Technician: Chrysoula Karakosta, MSc

Field Conservation & Consultancy
Director: Alexandra Dixon, BA, MSc
Secretary/PA to the Director: Jane Loveless
Project Manager: Claire Belsham, BSc

Overseas Staff
Adam Britt, PhD; Kevin Dunham, BSc, MPhil; Jacques Flamand, BSc, BA, VetMB, MRCVS; John Grainger, PhD; Rob Hammond, PhD; Richard Kock, BA, VetMB, MRCVS; Kathryn Monk, PhD; Zelealem Ashenafi Tefera, MSc; Tim Wacher, PhD; Stuart Williams, BSc

London Zoo
Director: Jo Gipps, PhD
Secretary/PA to the Director: Fiona Jamieson

Animal Management
Senior Curator: Simon Tonge, BSc
Secretary: Catherine Hallsworth, BA
Conservation Programmes Co-ordinator: Sarah Christie, BSc
Registrar: Elspeth Chaplin
Zoo Manager: Bill James
Curator of Mammals: Doug Richardson
Curator of Invertebrates: Paul Pearce-Kelly
Curator of Lower Vertebrates: Heather Hall, PhD
Head Keepers: Gerald Asher; Mick Carman; Ray Charter; Dave Clarke; Brian Harman; Paul Harrington; Brian Harris; Fred Smith; Linda Walker; Esther Wenman, BA; Frank Wheeler
Senior Keepers: Alan Alder; Mike Clark; Caroline Connor; Matthew Fagg; Amanda Ferguson, BSc; Malcolm Fitzpatrick; Matthew Hennessy; Andy James; Patsy Joseph; Margaret Lamb; Tracey Lee; Keith Lloyd; Simon Mannall; Terry March; Duncan McGinnie; Jeff Nicklin; Jacqueline Ossowski, BSc; John Pullen; Dave Robinson; Jim Robson; Mick Tiley; Paul Whitehorn; Chris Wickenden: Sarah Young; Steve Young
Qualified Keepers: Nichola Burnett; Paul Kybett; Vanessa Long; Andrea McKenna; Karen Nolan, BSc; Una Richardson; Duncan Rowlatt, BSc; Craig Walker; Mary Welsh; Steve Whitelock
Trainee Keepers: Paul Atkin; Margaret Baukham; Tony Cholerton; Rachel Jones, MSc; Teague Stubbington, BSc; Scott Sturgeon; Luciana Wagner; Olivia Walter, BSc

Marketing & Public Relations
Head of Marketing & Public Relations: Sharon Ament, MA, DipCIM
Secretary: Anna Summers, BA
Group & Conference Sales Executive: Terry Lester
Promotions Executive: Jill Ratcliffe, BSc
Lifewatch & Adoptions Manager: Rachel Maybank, BA, MSc
Lifewatch and Adoptions Administrators: Sarah Leggett; Barbie Ordish
Marketing Administrator: Teresa Butler

Visitor Information & Education
Head of Visitor Information & Education: Claire Robinson, BEd
Secretary: Vacant
Education Officers Sandi Bain, BSc; Steven Griffin, BSc
Volunteer Co-ordinator: Natalie Pain, BA
Bookings Co-ordinator: Tasja Gardner, BA
Interpretation Officer: Clare Kelly, BSc
Graphics Co-ordinator/Print & Stationery Buyer: Adrian Taylor

Site & Services
Site & Services Services Manager: Graham Roden
Secretary: Dot Price
Maintenance Supervisor: Colin Rolfe
Contracts Supervisor: Mike Swallow
Craftsmen: Steve Bowsey; Tony Connolly; Martin Foster; John Froud; Bill Manly; Steve Roberts; Terry Sheehan

Semi-skilled Craftsmen: Jim Baker; Dave Field; Gary West
Electrical Foreman: Robin Fitzgerald
Electrician: Peter Smith
Gardens Supervisor: Martin Pett
Gardens Foreman: Matthew Baker
Gardeners: Ian Ament; Dave Burke; Andrew Chys; Noel Heaphy; Rodney Lynch; George Manly; Graham Southard
Supplies Buyer: Chris Major
Purchasing & Transport Chargehand: John Pearce
Drivers/Stores Assistants: Bobby Ashmore; Ron Harrison
Grounds Supervisor: Peter Walker-Croft
Grounds Foreman: Jamie Turner
Groundstaff: Beatrice Ampong; Graham Bukovics; Terry Flannery *(p/t);* Colin George; Gerry Houlder; Colin Jeans; Renuka Lutchman; Geraldine Reidy *(p/t);* Anna Thornburrow; Odit Tiwari; Alison Wilson *(p/t)*
Security Gatekeepers: Paul Brown; George Scofield
Stores Assistant: Alex James

Visitor Services
Head of Visitor Services: Yvonne Ubels
Assistant Retail Manager: Jayne Powell
Office Administrator: Vacant
Supervisors: Gary Constantine; Evon Nicholas
Warehouse Supervisor: Neil Foot
Visitor Services Assistants: Margaret Brown; Alison Coutts; Patricia Delius
Admissions Officer: Bob McLaughlin
Assistant Admissions Officer: Suzanne Cole
Senior Gatekeeper: Sharm Ramdass
Visitor Services Assistants: Golam Chowdhury *(p/t)*; Patience Djima; Tamara Houlder *(p/t);* Bala Patel *(p/t);* Anne Powell; Nick Thomas
Ticket Collector (p/t): Jack Richards

Events
Events Manager: Roger Tomlinson
Senior Presenter: Andy Hallsworth
Presenters: Mandy Currie; Rob Goodchild; Michelle Povada, BSc

Whipsnade Wild Animal Park

Director: Stuart Earley, MInstD, MInstM, FInstSMM
Assistant to Director: Gill Farrell

Finance and Works
Financial Controller: Roman Bodnarec
Senior Accounts Clerk: Carol Davies
Assistant Accounts Clerk: Faye Kirby
Senior Cashier: Joan Lee
Accounts/Cashier's Assistant: Janet Hughes
Membership & Adoptions Executive: Tracey Cross
Works Co-ordinator: Barry Davies
Works Chargehand: Grant Guild
Stores: Tony Latham
Craftsmen: Malcolm Guild; Robert Harris; Jim Harrold; Dave Law; Jim Whinnett

Customer & Park Services
Customer & Park Services Manager: Linda Hughes, GradIPD
Senior Customer Services Assistant: Margaret Hull
Customer Services Assistant: Jo Woodhead
Volunteer Co-ordinator: Graham Lucas
Railway Manager: Ian Gordon
Supervisor, Railway: Tony Button
Park Services Co-ordinator: Mick Shillingford
Supervisors, Park Services: Ted Baisbrown; John Bradley
Groundsman: Ron Beeton
Gardens Chargehand: Rob Scanlan
Gardener: Steve Rutter

Retail and Main Gate
Retail & Gate Manager: Maureen White
Assistant Retail/Gate Supervisors: Yasmin Bates; Tessa Roch

Catering
Catering Manager: John Thornicroft
Assistant Catering Manager: Sue Covington
Trainee Assistant Catering Manager: Zoe Fitzpatrick
Chef/Assistant Manager: Tracey Smith
Sales & Hospitality Executive: Jane Reeve, BSc
General Catering Assistant (p/t): Marjorie Grizzell

Marketing & Development
Marketing & Development Manager: Miranda Kennett-Scott, BA, MSc, Mdip, MCIM
Marketing Administration Assistant: Angela Graham
Graphics Executive: Simon Hodge, BSc

Education
Education Officer: Claire Bidder, BSc

Animal Management
Curator: Nick Lindsay, BSc, CBiol, MIBiol
Assistant to Curator: Dena Richards
Regional Co-ordinators: Vince Curzon; Rob Hutton; Andy White
Animal Activities Co-ordinator: Les Radford
Deputy Co-ordinators: Clive Bates; Cliff Tack
Bird Show Organiser/Demonstrator: Andy Reeve
Senior Keeper in charge of Elephants: Lee Sambrook
Senior Keepers: John Baines; Mark Best; Mark Brett; Roger Catchpole; Carole Day; Joy Lear; Melvin Lear; Alan Morris; Trevor Moxey; Marilyn Spittel; Ken Taylor; Pete Williams
Qualified Keepers: Rebecca Cooper; Phil Curzon; Sarah Gollop; Jim Gregory, BSc; Mark Holden; Luke Warren; Veronica Watkins; Craig White
Trainee Keepers: Sian Goff; Rebecca Raymond; Cheryl Seymour; Sarah Taylor, BSc; Corina Thorne.

Volunteers

As at 31 December 1997

Administration

Jill Beck; Dorothy Gyngell; Maureen Hart.

Animal Management

Leon Ainsworth; Tim Akroyd; Denise Allen; Mark Best; Daniel Bolton; Martin Bott; Friederike Braun; Amanda Brown; Philip Byrne; Jo Castle; Charlotte Coates; Anthony Dowlatshahi; Julian Evans; Gemma Farmer; Ailsa Farquhar; Jenny Fulford; David Gibson

Victoria Hamilton-Barrett; Matthew Hartley; Jane Harvey; Glyn Hennessy; Jayne Herbert; Jane Herne; David Holne; Isobel Hood; Helen-Mary Jones; Janet Knight; Paul Knight; Sara Laub; Mattthew Legge; Oscar Long; Philipe Lopez; Kerry Lyon; Nili Mahoney; Phil Marshall; Gary McGuire; Sophie Miller; Alessandro Mozzorecchia; Vicki Murray

Sarah Norris; Donna Ottaway; Chris Park; Daniel Petterbridge; Natasha Prior; Robert Reed; Katie Rooke; Andrew Sidders; Gabriel Sidoni; Roger Stanley; Nicola Strazzulo; Nick Thomas; Ron Thwaites; Vicki White; Iain Wright.

Education

Raj Amin; Hazel Amor; John Ayrey; J Barrington Johnson; Pam Beanlands; Jill Beck; Dominique Beerli; Denise Blackwell; Sally Brough; Joan Browett; Simon Brown; Elaine Brumstead

Lilah Cameron; Mary Carmichael; Debbie Catt; David Chan; Karen Cilvert; Steph Claxton; John Clifford; Sid Cocks; Andrew Colman; Mary Colwill; Dorothy Copeland; Daphne Cross; Tracey Cullen; Ann Curtis; Geoff Cutting; Gladys Davies; Leonard Davies; Jenny Deco; Mary De Zouche; Felix Fifer

Janet Gates; Celia Gaya; Trish Gibson; Angela Gilham; Gillian Golding; Valery Golding; Nevil Gorthy; Elizabeth Grabow; Daphne Hamilton; Ron Hart; James Holden; John Hopkins; Joyce Hunter Lieberman; Gina James; Jennifer Jennings; Iris Johnson; Edward Jones; Beverly Jordan; Wyn Knowles; Robert Langstone; Sarah Lenton; Belinda Line; Neale Lunn

Rhonda Maclean; David Marlborough; Hilary Marsh; Marina Marshall; Beryl May; Tim May; Gary McGuire; Carole Mintey; H A Moore; Jackie Mutton; Smain Nedjari; Anne O'Brien; George Oswald; Stephen Otter; Praefulla Patel; Jonathan Pollard; Nargiz Price; Vince Price

Jean Reich; Ian Robinson; Jackie Russell; Jo Smith; Maurice Sobell; Ruth Sober; Margaret Stafford; Susan Street; Abigail Tarr; John Thompson; Michael Tigwell; M Tracy; Amelia Walker; Delene Welch; Kristina West; Christina White; Sarah Winfield; Marion Winter; David Wooderson; Jonathan Wright.

Library

Peter Arnold; Ailsa Edwards; Valery Golding; Royce Harris; Peter Hayward; Hilary Marsh; Mike Meakin; Maurice Sobell; Andre Verstraete.

Whipsnade Wild Animal Park

Jean Anderson; Michael Atkins; Heather Bardner; Jill Bilcock; Jill Broad; Allison Brookes; Leile Brown; Carol Butler; Sidney Cocks; Maureen Cook; Catherine Dyer; Kathleen Eames; Kenneth Eames; Arthur Ellis; Pamela Erwood; Elaine Fairey; Nicola Field; Wendy Fitzgerald; Amanda Fraser

Denis Garner; Maggie Garrett; Jean Gercken; Judy Gill; Erica Godman; Evelyn Goodman; Nevil Gorthy; Jim Griffin; Norman Hancock; Maureen Hardy; Pam Harry; Pauline Hodgson; Dorothy Isaacs; Dorothy Lawson; Malcolm Mackenzie; Miriam Martin; Pat McBride; Betty McHugh; Stuart Minall; Patricia Mitchell; Rosemary Myhill

Lyn Paynter; Audrey Perrott; Gilly Pugsley; Ilid Putnam; Jane Rice; Elizabeth Richmond; Rebecca Sandifer; Raye Sawyer; Peter Scrivener; Christine Sharpe; Kenneth Sharpe; Walter Smith; Mary Snoxall; Tony Stevens; Paul Susman; Lorna Taylor; Samantha Taylor; Hans van der Grinten; Arthur Waring; Elizabeth Webb; Naomi White; Patricia Wickens; Jennifer Wynn.

The Society warmly thanks all the volunteers who have done so much to help its work in 1997.

If you are interested in becoming a volunteer, please ask the Volunteer Co-ordinators at London Zoo or Whipsnade Wild Animal Park for further details.

Obituaries

We record with regret the deaths in 1997 of the following pensioners:
Mr O M Mills; Mr R A Reynolds; Mr S H Southgate; Mr L R F Spanner; Mr A Whitworth

Collaboration with Zoological, Conservation and Research Organizations

Collaborative projects

African Wildlife Foundation: Study of ecology of Ankole Cattle, Lake Mburo National Park, Uganda National Parks.

Animal Diseases Research Association, Edinburgh: Toxoplasmosis of captive wild animals.

BBSRC Institute of Animal Physiology & Genetics Research: Structured demographic analysis of the factors contributing to population change in red deer; Porcine sperm physiology.

Bedfordshire Bat Group: Collaborative work on conservation of local bat species.

Birdlife International: Conservation of endangered invertebrate species from Fregate Island, Seychelles; Assessment of need for veterinary involvement in Seychelles magpie robin conservation programme,.

British Airways Environment: Support for Darwin Initiative project with EWCO in Ethiopia; Collaboration on conservation of great bustard; Collaboration in joint training programme between Whipsnade and Wildlife Department in Ghana.

Brown University, USA: Genetics of wild populations of cotton top tamarin monkeys.

Central Veterinary Laboratory: Transmissible spongiform encephalopathies of captive wild animals.

Centre for Environment, Fisheries & Aquaculture Science: Genetics of Atlantic salmon; Threats to cetaceans from England and Wales.

Centre Internationale des Recherches Medicales de Franceville (CIRMF), Gabon: Genetis of bushbabies.

CSIRO Australian Animal Health Laboratory: Molecular biology of amphibian iridoviruses.

Department of the Environment, Darwin Initiative: Integrating traditional resource management with conservation of biodivrsity and of Ethiopian wolf, Central Highlands, Ethiopia; Survey of the biodiversity in Akagera National Park, Rwanda.

Department for International Development: Secondment of Dr Richard Kock to Kenya Wildlife Service; Chitwan Veterinary Project, Nepal; Cows, Culture and Conservation, Uganda.

Department of National Parks and Wildlife Conservation: Development of Chitwan Veterinary Project.

Department of Wildlife, Ghana: Management of wildlife in Accra and Kumasi Zoos.

Design SA: St Katherine's Protectorate Management Plan, Sinai.

Durrell Institute for Conservation Ecology, University of Kent: Collaborating with ZSL in Ethiopia.

Earthwatch: Conservation biology of the Komodo dragon.

Egyptian Environmental Affairs Agency: Management plan for St Katherine's Protectorate, Sinai; gazelle survey in Western Desert.

English Nature: Genetics of keynote species including red squirrels, wartbiter and field crickets and greater horseshoe bats; Species recovery of above species and mole cricket; Management of SSSI at Whipsnade; Dormouse and smooth snake captive breeding projects; Breeding and reintroduction of Barberry carpet moth.

Environmental Know How Fund: Feasibility study for the reintroduction of European bison into Romania.

Estacion Experimental de Zonas Aridas, Spain: Reproduction in dama gazelle: monitoring oestrous cycles, behaviour and semen preservation.

Ethiopian Wildlife Conservation Organization, and Regional Council of Amhara State: Integrating traditional resource management with the conservation of biodiversity and of the Ethiopian wolf.

Friends of Regent's Park & Primrose Hill: Ecological survey of Regent's Park.

Geomatics International Inc.: Lead consultants on feasibility study for Integrated Protected Areas and Conservation Management incorporating bison reintroduction, Romania.

Glaxo/Wellcome Research & Development: Aspects of spermatogenesis and the use of *in vitro* culture methods.

Government of Indonesia: Leuser Development Programme, Sumatra.

Great Bustard Trust: Collaborative work on management and conservation of great bustards.

Haribon Foundation, Philippines: Field conservation, captive breeding and genetics of seahorses.

Herpetofauna Consultants International: Unusual mortality of the common frog.

HM Customs: Housing and advice on identification of reptiles.

Hobson Tracking Systems Ltd: Aspects of computer-assisted sperm assessment: development of software.

Huszar Brannah: Leuser Development Plan, Sumatra.

Indonesian Sumatran Tiger Project: Tiger survey work.

International Fund for Animal Welfare: Assessment of need for veterinary involvement in Seychelles magpie robin conservation programme.

International Institute of Parasitology: Identification of parasites of zoo animals.

JSR Healthbred Ltd: Supply pig spermatozoa for experimental use.

Kadoorie Charitable Foundations: Support for Chitwan Veterinary Project, Nepal.

Kenyatta University, Kenya: Mole-rat genetics.

Kenya Wildlife Service: Secondment of Dr R Kock as senior veterinarian.

King Khalid Wildlife Research Centre, Saudi Arabia: Gazelle genetics; reintroduction, protected area management.

King Mahendra Trust for Nature Conservation, Nepal: Central Zoo Management Plan and staff training; Chitwan veterinary project.

King Mahendra (UK) Trust: Support for Chitwan veterinary project; secondment of ZSL staff to Central Zoo.

Kingston University, Surrey: Coccidia infestation in squirrels; Protozoal infections of captive and free-living wild animals.

Leicestershire & Rutland Wildlife Trust: Reintroduction of the osprey to Rutland Water.

London School of Hygiene and Tropical Medicine: Avian malaria.

Macauley Land Use Research Institute: Plant-herbivore interactions and the population demography of Soay sheep.

Masterbreeders Ltd: Supply pig spermatozoa for experimental use.
McGill University, Canada: Taxonomy, field conservation and captive breeding of sea horses and sea moths.
Ministry of Agriculture, Livestock, Environment & Rural Development, Rwanda: Survey of the biodiversity in Akagera National Park, Rwanda.
Minnesota Zoo: Rapid evaluation team for Sumatran Tiger Project.
Moredun Research Institute: Epidemiology of parapoxvirus infection in squirrels; Toxoplasmosis research.
National Commission for Wildlife Conservation and Development, Saudi Arabia: Management of King Khalid Wildlife Research Centre.
Natural History Museum: Taxonomy and conservation of Lake Tana barbs; Threats to cetaceans from England and Wales; Specimens for research and display; Parasitic infections of captive and free-living wild animals.
Nature Protection Trust of Seychelles: Conservation of endangered invertebrate species of Fregate Island, Seychelles.
Nature Conservation Bureau: Phylogenetics of bustards.
Oxford Brookes University, Oxford: Bushbaby genetics.
Pan Livestock: Veterinary epidemiology, Botswana.
PIC International Ltd: Cryopreservation of pig semen.
Rare Breeds Survival Trust: Genetics of rare breeds of cattle and sheep.
Roger Williams Park Zoo, Rhode Island, USA: Genetics of wild populations of cotton top tamarin monkeys.
Royal Geographical Society: Ecology of East African hornbill species.
Royal Museum of Scotland: Specimens for research and display.
Royal Society for the Prevention of Cruelty to Animals: Consultant veterinary advice; Housing and advice on identification of reptiles.
Royal Society for the Protection of Birds: Consultant veterinary advice; Assessment of the need for veterinary involvement in the Seychelles magpie robin conservation programme.
Royal Veterinary College: Aspects of semen freezing and sperm microencapsulation; Parasitology research and clinical cases.
Saigon Zoo, Vietnam: Development of a masterplan.
San Francisco State University, USA: Genetics of birds in Cameroon.
Saratov Regional Authority, Russia: Joint programme for conservation of great bustard.
Save the Rhino Trust: Secondment of Dr Rob Brett for rhino population survey, Namibia.
Save Valley Conservancy, Zimbabwe: Reproductive monitoring of black rhinoceros population.
Scottish National Heritage: Phylogenetics of Scottish wildcat.
Scottish Office Agriculture, Environment & Fisheries Department: Genetics of Atlantic salmon.
Serengeti Wildlife Research Institute, Tanzania: Research on Serengeti cheetahs.
Silvi Nova: Leuser Development Plan, Sumatra.
St Mary's Hospital: Retroviral infections of wild animals.
Tanzania National Parks: Research on Serengeti cheetahs.
Tebodin: St Katherine's Protectorate Management Plan, Sinai.
Trinity College, Dublin: Genetics of rare breeds of domestic livestock.
Udayana University, Indonesia: Conservation biology of the Komodo dragon.
Uganda Wildlife Authority: Secondment of Dr Rob Brett for feasibility study of reintroduction of rhinos; Ankole Cow Mburo project.
University of Aberdeen: Phylogenetics of pipistrelle bats.
University of Abertay: Dispersal and group dynamics in red deer.
University of Bristol: Social structure of greater horseshoe bat.
University of California at Davis, USA: Research on Serengeti cheetahs.
University of California at Los Angeles, USA: Genetics research with Dr Robert Wayne.
University of Cambridge: Behavioural study on Patagonian cavy at Whipsnade; Behavioural ecology study of Chinese water deer at Whipsnade; Host-parasite interactions in Soay sheep.
University of Cambridge, Sea Mammal Research Unit: Gene flow in populations of seals.
University of Cape Town, South Africa: Buffalo genetics.
University of Chicago, USA: Baboon genetics.
University of Copenhagen, Denmark: Genetics of birds in Cameroon.
University of East Anglia: Genetics of rare breeds of cattle and sheep.
University of Edinburgh: Genotype by environment interactions in red deer and Soay sheep.
University of Grenoble: Genetics of rare breeds of domestic livestock.
University of Kent: Capture-mark-recapture estimates of the survival of Soay sheep.
University of Leeds: Mechanical properties of wallaby tendons.
University of Lisbon: Conservation genetics and captive breeding of endangered lizard *(Lacerta lepida)* from Berlenga Island, Portugal.
University of Liverpool: The economics of scent-marking.
University of London, Imperial College: Plant-herbivore interactions and population demography of Soay sheep; Transmissible spongiform encephalopathies of captive wild animals.
University of London, King's College: Starfish genetics.
University of London, Queen Mary & Westfield College: Health, welfare and population genetics of red squirrels in the UK reintroduction programme; Epidemiology of parapoxvirus infections in squirrels: Genetics of toads.
University of London, University College: Genetic variation in the horse; Control of gene expression during spermatogenesis; Evolutionary biology of alanine glyoxylate aminotransferase.
University of Madison, USA: Song sparrow genetics.
University of Maryland, USA: Hyaena genetics.
University of Montpellier II: Genetics of rare breeds of domestic livestock.
University of Natal, Brazil: Genetics of wild populations of common marmoset monkeys.
University of Newcastle upon Tyne: Scoping study for monitoring British mammals.

University of Oxford: Mate choice and male reproductive success in wild brown rats; Scoping study for monitoring British mammals; Development of microsatellite library for study of population genetics of range expansion by cynipid gall wasps.

University of Oxford, Wildlife Conservation Research Unit: Collaborative work on conservation of Ethiopian wolf.

University of Pernambuco, Brazil: Genetics of wild populations of common marmoset monkeys.

University of Pretoria, South Africa: Ecology, physiology and genetics of African mole-rats.

University of Queensland, Australia: Life history diversity in birds, evolution and conservation.

University of San Marcos, Peru: Genetic variation in South American camelids.

University of Sheffield: Dynamics of extinction rates in birds and mammals.

University of Stirling: Host-parasite interactions in Soay sheep.

University of Stockholm, Sweden: Genetic and demographic management of endangered fish populations in captivity.

University of Surrey: Fungal infections of amphibians and invertebrates.

University of Sussex: Research on Serengeti cheetahs.

University of Vienna: Genetics of rare breeds of domestic livestock.

University of Washington, Seattle: Research on Serengeti cheetahs.

Wageningen Agricultural University, The Netherlands: Genetics of Atlantic salmon.

Western Plains Zoo, NSW, Australia: Cryopreservation of macropod semen.

WHO Collaborative Centre for the Control of Antivenoms, Liverpool School of Tropical Medicine (The Alistair Reid Snake Venom Research Unit): Advice on housing and management of venomous snakes.

Wildlife Conservation Society, New York: Conservation biology of the Komodo dragon.

Wildlife Research Centre Sudan: Survey of eastern Sudan.

Zoological Society of San Diego: Co-sponsorship of survey of eastern Sudan.

Representation

Animal Health Information Specialists (UK & Iteland): Ann Sylph (Member)

Animal Reproduction Science: Dr William Holt (Member, Editorial Board).

ASLIB Biosciences Group: Ann Sylph (Membership Secretary).

British Andrology Society: Dr William Holt (Committee Member); Dr Alison Moore (Committee Member).

British Veterinary Zoological Society: Andrew Cunningham (Hon. Treasurer); Sue Thornton (Council Member).

British Wildlife Rehabilitation Council: Tony Sainsbury (Member, Steering Committee).

Cambridge College of Agriculture and Horticulture: Whipsnade Industrial Link.

Centre for Ecology & Evolution, University of London: Professor Morris Gosling (Member, Steering Committee).

Coral Cay Conservation: Martin Cooke (Patron).

Department of the Environment: Dr Peter Bennett (Member, Cetaceans Strandings Steering Group).

Durrell Institute of Conservation & Ecology: Dr Michael Bruford (Visiting Lecturer).

European Association of Zoological Parks and Aquaria: London Zoo (Institutional Member); Sarah Christie (Member, EEP Felid TAG); Andrew Cunningham (Veterinary Adviser, EEP Penguin TAG(; Nick Lindsay (Member, EEP Gruiformes, Deer and Rhino TAGs; Member, EEP Przewalski Horse, Scimitar-horned Oryx, Greater One-horned Rhino, White Rhino TAGs; Co-ordinator, EEP Nile Lechwe TAG); Paul Pearce-Kelly (Chairman, EEP Terrestrial Invertebrate TAG); John Pullen (Member, EEP Primate TAG); Doug Richardson (Member, EEP Felid, Antelope, Monotreme and Marsupial TAGs; Chairman, EEP Toucan & Turaco TAG); Simon Tonge (Member, EEP Pigeon, Hornbill, Passerine, and Ciconiiform TAGs; Adviser to EEP Reptile TAG); Frank Wheeler (Corresponding Member, EEP Marsupial TAG).

Fauna and Flora International, Conservation Committee: Paul Pearce-Kelly (Member).

Federation of Zoological Gardens of Great Britain and Ireland: London Zoo (Member); Whipsnade Wild Animal Park (Member).

Council: Stuart Earley (Hon. Treasurer); Dr Jo Gipps (Member).

Joint Management of Species Committee: Sarah Christie (Corresponding Member); Dr Heather Hall (Member); Nick Lindsay (Member); Simon Tonge (Member); Doug Richardson (Member).

Conservation and Animal Management Committee: Alexandra Dixon (Member); Nick Lindsay (Chairman); Simon Tonge (Member).

Membership and Licensing Committeee: Stuart Earley (Member).

Marketing Committee: Stuart Earley (Member)

Taxon Advisory Groups: Dr Elizabeth Barratt (Member, UK Chiropteran and Insectivore TAG); Clive Bates (Member, UK Stork, Ibis & Spoonbill TAG); Dave Clarke (Member, UK Terrestrial Invertebrate TAG; Chairman, Mollusc Subgroup; Member, UK Fish & Aquatic Invertebrate TAG); Alexandra Dixon (Member, UK Rhino TAG); Dr Heather Hall (Chairman, UK Reptile TAG; Chairman, Seahorse Conservation Group; Co-Chairman, UK Fish & Aquatic Invertebrate TAG); Brian Harris (Member, UK Fish & Aquatic Invertebrate TAG); Melvin Lear (Member, UK Reptile TAG); Nick Lindsay (Chairman, UK Rhino TAG; Co-Chairman, UK Crane TAG; Member, UK Bovid and Equid TAGs); Duncan McGinnie (Member, UK Fish & Aquatic Invertebrate TAG); Trevor Moxey (Member, UK Terrestrial Invertebrate TAG); Paul Pearce-Kelly (Member, UK Terrestrial Invertebrate TAG; Chairman, Orthoptera Sub-Group); John Pullen (Member, UK Primate TAG); Les Radford (Member, UK Marine Mammal TAG); Andy Reeve (Member, UK Diurnal Raptor TAG); Doug Richardson (Chairman, UK Bovid TAG; Member, UK Small Carnivore, Rodent &

Lagomorph, and Monotreme & Marsupial TAGs); Simon Tonge (Chairman, UK Hornbill, Toucan & Turaco TAG; Member, UK Ciconiiform, Falconiform, Parrot, Penguin, Passerine, Pigeon and Reptile TAGs); Esther Wenman (Member, UK Reptile TAG); Frank Wheeler (Corresponding Member, UK Small Carnivore TAG); Andy White (Member, UK Penguin TAG).

Exotic Pet Advisory Committee: Dr Heather Hall (Member).

Florida State University: Dr Peter Cotgreave (Guest lecturer & examiner).

Friends of Conservation: Professor Morris Gosling (Member, Scientific Advisory Board).

Ghana Wildlife Department: Nick Lindsay (Adviser to Zoo Committee).

Great Bustard Trust: Clive Bates (Secretary).

Institute of Fisheries Management Committee: Dr Heather Hall (Member).

International Species Inventory System: The Zoological Society of London (Corporate Member).

International Species Recovery Committee for the Golden Lion Tamarin: Dr Jo Gipps (Member).

International Union of Directors of Zoological Gardens: Dr Jo Gipps (Member).

IUCN - World Conservation Union (Species Survival Commission): Dr Elizabeth Barratt (Member, Conservation Breeding Specialist Group); Dr Peter Bennett (Member, Conservation Breeding, and Reintroduction Specialist Groups); Dr Michael Bruford (Member, Conservation Breeding Specialist Group); Sarah Christie (Member, Cat and Conservation Breeding Specialist Groups); Andrew Cunningham (Member, Conservation Breeding Specialist Group); Alexandra Dixon (Member, Conservation Breeding, Antelope, Parrot, and Reintroduction Specialist Groups); Kevin Dunham (Member, Reinroduction Specialist Group); Edmund Flach (Member, Veterinary Specialist Group); Dr Jacques Flamand (Member, Antelope, and Veterinary Specialist Groups); Dr Jo Gipps (Member, Conservation Breeding, Primate, and Reintroduction Specialist Groups); Professor Morris Gosling (Member, Antelope Specialist Group); Nick Lindsay (Member, Reintroduction, and Insectivore Specialist Groups); Dr Georgina Mace (Member, Steering Committee, and Conservation Breeding and Reintroduction Specialist Groups); Peter Olney (International Studbook Co-ordinator, Conservation Breeding Specialist Group; Emeritus Member, Reintroduction Specialist Group); Paul Pearce-Kelly (Member, Mollusc, and Reintroduction Specialist Groups; Member, Invertebrate Conservation Task Force; Chairman, CBSG Invertebrate Working Group); Doug Richardson (Member, Cat, and Conservation Breeding Specialist Groups); Dr Craig Roberts (Member, Antelope Specialist Group); Tony Sainsbury (Member, Veterinary Specialist Group); Simon Tonge (Member, Madagascan Reptile and Amphibian Specialist Group).

IUCN Declining Amphibian Populations Task Force: Andrew Cunningham (Chair).

IUCN Penguin Taxon Advisory Group: Andrew Cunningham (Veterinary Adviser).

Jersey Wildlife Preservation Trust: Dr Georgina Mace (Member, Scientific Advisory Committee).

Journal of Reproduction and Fertility: Dr William Holt (Member, Editorial Board).

Madagascar Fauna Group: The Zoological Society of London (Corporate Member).

MarwellPreservation Trust: Nick Lindsay (Member, Animal Management Committee).

NERC Terrestrial Sciences Peer Review Committee: Dr Georgina Mace (Member).

Pacific Island Land Snail Group: Paul Pearce-Kelly (International Co-ordinator, *Partula* snail programme); Dave Clarke (International Studbook Holder).

Primate Society of Great Britain: Dr Georgina Mace (Council Member); Dr Jan de Ruiter (Council Member).

Royal Veterinary College: Professor Morris Gosling (Council Member).

Society for Conservation Biology: Dr Georgina Mace (Member, Board of Governors).

Thai Society for the Conservation of Wild Animals: Sarah Christie (Adviser).

Tiger Global Conservation Strategy Committee: Sarah Christie (Member).

UK Dependent Territories, Conservation Forum: Alexandra Dixon (Member); Paul Pearce-Kelly (Member, Board).

UK Pig Reproduction Research Liaison Group: Dr William Holt (Member).

UK Reef Working Group: Dr Heather Hall (Member).

Veterinary Invertebrate Society: Andrew Cunningham (Council Member); Martin Cooke (Newsletter Editor).

Wildlife and Countryside Link: Alexandra Dixon (Member, ZSL Representative; Vice-Chairman, Conventions Group).

World Association of Wildlife Veterinarians: Tony Sainsbury (Chairman).

World Pheasant Association: Simon Tonge (Chairman, Conservation Policies and Programmes Committee).

World Society for the Protection of Animals: Tony Sainsbury (Member, Scientific Advisory Panel).

Zoo Outreach Organization, India: The Zoological Society of London (Corporate Member).

Publications by the Society's Staff and Research Workers

Ashworth, C J, Pickard, A,R, Miller, S,J, Flint, A P F & Diehl, J R (1997). Comparative studies of conceptus-endometrial interactions in Large White x Landrace and Meishan gilts. *Reprod. Fert. Dev.* **9**: 217-225.

Balharry, D, Daniels, M & Barratt, E M (1997). Wildcats: can genetics help their conservation? In *The role of genetics in conserving small populations:* 102-111. Tew, T E, Crawford, T J, Spencer, J W, Stevens, D P, Usher, M B & Warren, J (Eds). Peterborough: JNCC.

Balmford, A, Mace, G M & Leader-Williams, N (1997). Priority-setting for ex-situ conservation - reply. *Conserv. Biol.* **11**: 593-594.

Barlow, K E, Jones, G & Barratt, E M (1997). Can skull morphology be used to predict ecological relationships between bat species? A test using two cryptic species of pipistrelle. *Proc. R. Soc. (B)* **264**: 1695-1700.

Barratt, E M, Deaville, R, Burland, T M, Bruford, M W, Jones, G, Racey, P A & Wayne, R K (1997). DNA answers the call of pipistrelle bat species. *Nature, Lond.* **387**: 138-139.

Barratt, E M, Malarky, G, Boddy, S, Gurnell, J & Bruford, M W (1997). Genetic diversity among fragmented populations of red squirrel *Sciurus vulgaris*: a preliminary study. In *The conservation of red squirrels,* Sciurus vulgaris *L.:* 61-66. Gurnell, J & Lurz, P (Eds). London: People's Trust for Endangered Species.

Bennett, P M & Owens, I P F (1997). Variation in extinction risk among birds: chance or evolutionary predisposition? *Proc. R. Soc. (B)* **264**: 401-408.

Borg, K, Colenbrander, B, Fazeli, A, Parlevlier, J & Malmgren, L (1997). Influence of thawing method on motility, plasma membrane integrity and morphology of frozen-thawed stallion spermatozoa. *Theriogenology* **48**: 531-538.

Bourke, A F G (1997). Hymenopteran sex allocation. *Trends Ecol. Evol.* **12**: 488-489.

Bourke, A F G (1997). Sex ratios in bumble bees. *Phil. Trans. R. Soc. (B)* **352**: 1921-1933.

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Bourke, A F G, Green, H A A & Bruford, M W (1997). Parentage, reproductive skew and queen turnover in a multiple-queen ant analysed with microsatellites. *Proc. R. Soc. (B)* **264**: 277-283.

Buhi, W C, Alvarez, I M, Pickard, A R, McIntush, E W, Kouba, A J, Ashworth, C J & Smith, M F (1997). Expression of tissue inhibitor of metalloprotinase-1 protein and messenger ribonucleic acid by the oviduct of cyclic, early pregnant and ovariectomized steroid-treated gilts. *Biol. Reprod.* **57**: 7-15.

Campbell, P (1997). A note on growing season food habits of mountain gazelles and Nubian ibex in Saudi Arabia. *J. Arid Environ.* **36**: 705-709.

Carbone, C, Du Toit, J T & Gordon, I J (1997). Feeding success in African wild dogs: does kleptoparasitism by spotted hyenas influence hunting group size? *J. Afr. Ecol.* **66**: 318-326.

Cheng, F-P, Fazeli, A, Voorhout, W F, Marks, A, Bevers, M M & Colenbrander, B (1997). Use of peanut agglutinin to assess the acrosomal status and the zona pellucida-induced acrosome reaction in stallion spermatozoa. *Biologist* **44**: 253-256.

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Clarke, F M (1997). Dominance and queen succession in captive colonies of the eusocial naked mole-rat, *Heterocephalus glaber*. *Proc. R. Soc. (B)* **264**: 993-1000.

Clarke, L A, Wathes, D C & Jabbour, H N (1997). Expression and localization of prolactin messenger ribonucleic acid in red deer ovary during the oestrous cycle and pregnancy. *Biol. Reprod.* **57**: 865-872.

Cotgreave, P (1997). Human evolution and dispersal. *J. Zool., Lond.* **241**: 823-824.

Cotgreave, P (1997). Sexual selection, genetic variation and speciation. *J. Zool., Lond.* **243**: 435-436.

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Cowlishaw, G (1997). Refuge use and predation risk in a desert baboon population. *Anim. Behav.* **54**: 241-253.

Cowlishaw, G (1997). Alarm calling and implications for risk perception in a desert baboon population. *Ethology* **103**: 384-394.

Cowlishaw, G & Davies, J G (1997). Flora of the Pro-Namib Desert Swakop River catchment, Namibia: community classification and implications for desert vegetation sampling. *J. Arid Envir.* **36**: 271-290.

Cowlishaw, G & Hacker, J E (1997). Distribution, diversity and latitude in African primates. *Am. Nat.* **150**: 505-512.

Cunningham, A A (1997). The role of infectious diseases in amphibian declines. *Herpetology '97: Abstracts of the third world congress of herpetology 2-10 August 1997, Prague, Czech Republic:* 46-47.

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Fazeli, A R, Zhang, B R, Steenweg, W, Larsson, B, Bevers, M M, Van Den Broek, J, Rodriguez-Martinez, H & Colenbrander, B (1997). Relationship between sperm-zona pellucida binding assays and the 56-day nonreturn rate of cattle inseminated with frozen-thawed bull semen. *Theriogenology* **48**: 853-863.

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Jabbour, H N & Bainbridge, D R J (1997). Endangered deer: a suitable case for treatment. *Biologist* **44**: 253-256.

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Leader-Williams, N, Kayera, J A & Overton, G L (Eds) (1997). Mining in protected areas in Tanzania. Proceedings of workshop held in March 1994. *Wildl. Dev. Ser.* No. 9.

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Donations and legacies

We are extremely grateful for the many generous donations received in 1997. Donors included:
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We would also like to commemorate those who kindly remembered us in their Wills:
Frederick Arthur Cooke
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Isabel Gladys (Anne) Mynssen-Pressburg
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If you would like to make a donation to the Society or to remember it in your Will, please ask the Fundraising Co-ordinator (tel. 0171-449-6226) to give you details.

Animal Collection Report

In last year's report, we talked about the investment that the Society had made during the previous year in the conversion of the old white rhino house at Whipsnade to create a new elephant facility. The three female Asian elephants at Whipsnade settled wonderfully well into the new building, and so the next phase of the Society's elephant strategy was implemented in October. A fine young bull elephant, 'Emmet', arrived at Whipsnade from Burnett Park Zoo in Syracuse, New York State. Although he is not yet big enough to mate the females, he is growing fast and has already shown great interest in them. The management of bull elephants in captivity is always difficult because of their unpredictable temperament, and, in due course, a separate bull house will need to be constructed to house Emmet and another bull yet to be identified. Emmet has been trained using a 'protected contact' system so that, unlike the other elephants in the Society's collections, staff do not have to enter the enclosure with him. This system is working superbly well and may have a profound influence on the long-standing 'hands on/hands off' debate about elephant management methods.

Moving the elephants to the new house created an empty enclosure at a focal point near the main entrance to Whipsnade and, during the year, this area was redeveloped to create a naturalistic, landscaped exhibit for a mixed group of ring-tailed and black and white ruffed lemurs. A stream and waterfall running through the area enhances the appearance of the exhibit and has allowed the maintenance of a number of species of waterfowl. The exhibit opened late in the year, by which time the weather had deteriorated, and, despite their spacious new area, the lemurs spent most of their time indoors, gazing at the rain. It is hoped that the spring will be warm and dry and encourage them to use their new paddock.

At Regent's Park, the most significant event of the year was, unquestionably, the re-opening of the Mappin Terraces on 3 May. This area had been derelict for more than 12 years. The new exhibit houses sloth bears, Hanuman langurs, Reeves's muntjac and a variety of bird species. This mixed exhibit has worked better than we had dared hope and, apart from one half-hearted attempt by a bear to catch a peacock (which happened to be filmed by national TV), there has not been a single interspecific interaction that has caused us concern. Five langur babies born during the year testify to their acceptance of the new exhibit, as does the sorry state of some of the trees after repeated visits from these strict folivores.

The only disappointing aspect of the Mappin Terraces was the stereotypical behaviour by the female sloth bear, who, despite the enormous area available to her, and the many forms of behavioural enrichment provided, was unable to break from the abnormal behaviours that she showed during her time at her previous home. However, by the year end, it was strongly

suspected that she was pregnant, and a birth was anticipated early in the new year. It is hoped that the presence of cubs will distract her from the behaviour in future.

Derelict for a much shorter period, but just as high-profile an exhibit, was the old sea-lion pond at Regent's Park which last held pinnipeds in 1994. During the year the pond was combined with one of the paddocks adjacent to the Stork and Ostrich House to form a large pygmy hippo exhibit. Female hippos were received from Edinburgh and Rome Zoos, and they made a fine exhibit during the summer, making excellent use of both the pond and the paddock. Owing to the lack of heating in the pond, it was necessary to bring the hippos into the Elephant House during the winter, where the warm water supply in the old elephant bath was much appreciated.

Entertaining new exhibits do not necessarily have to be as expensive as the Mappin Terraces or the old sea-lion pool, though these exhibits were themselves much cheaper than various earlier suggestions. At Whipsnade, groups of golden-headed lion tamarins and silvery marmosets were given the run of the grounds from a specially designed and constructed area in the centre of the Park. This gave these small primates a superb quality of life, and the visitors a tremendous opportunity to watch them in the trees. Unfortunately, the tamarins became too bold, which led to the deaths of two individuals, killed by other species in the Park.

Probably the biggest event in terms of new arrivals into the collection were the two young female greater one-horned rhinoceroses received from Chitwan National Park as a gift from the Government of Nepal. The carrying capacity of Chitwan for rhinos has been exceeded and young animals are continually dispersing into surrounding farmland. This incurs the anger of local villagers and can make the rhinos vulnerable to poaching. Relocating young rhinos is one of a number of strategies implemented by the Park authorities to address the problem. The two females were quarantined on the Cotton Terraces at Regent's Park, and will transfer to Whipsnade in the spring of 1998 into a new custom-built facility for them and the existing pair already at Whipsnade. By the year end, work was well under way on a new hippo house, also at Whipsnade.

The saddest event of the year was the demise of the young male Malayan tapir, 'Hanno', as the prolapse of the colon described last year got worse and became untreatable. We were extremely fortunate in that we were able to locate quickly another young male, this time from Dortmund Zoo in Germany, who now resides on the Cotton Terraces.

Another male okapi came to Regent's Park, this time from Rotterdam Zoo. We still await the allocation of a female by the international studbook keeper.

Animal moves within the EC are complicated enough, but can usually go from concept to execution within the same calendar year. Transfers with collections outside the EC are usually far more complex. The transfer of two confiscated gibbons from the Royal Forestry Department in Thailand to Regent's Park took approximately three years of intensive paperwork and negotiations. Finally a young female buff-cheeked gibbon and a male white-cheeked arrived in the Sobell Pavilion, where their enthusiastic counter-calling with the Zoo's pair of siki gibbons has been a huge entertainment to visitors and staff alike.

Another notable primate species that came to Regent's Park during the year was a pair of pottos, loaned by a Fellow. The Moonlight World in the Clore Pavilion has a long and excellent track record with lorisids, and it is some years since pottos were last in the collection. Other notable additions to the collection at Regent's Park included brush-tailed bettong, a variety of waterfowl, rufous-legged owl, rhinoceros hornbill, red-billed chough, blood python, Argentine boa and Madagascan killifish.

Probably the most notable births were the two white rhinos at Whipsnade, born within three months of each other early in the year. Both were reared successfully by their mothers. A red panda was born at Whipsnade but the cub died after weaning from a perforated gut, the cause of which remains unknown. Other notable births and hatching during the year included anoa, Hermann's tortoise, Caribbean flamingo, Aruba Island rattlesnake, fresh water stingray, brush-tailed bettong, pygmy slow loris (all known loris species have now reproduced in the Clore Pavilion), white-faced saki, red-faced black spider monkey, golden lion tamarin, Sulawesi crested macaque, greater Egyptian jerboa, Malagasy giant jumping rat, Oriental small-clawed otter, Asiatic lion, Abdim's stork, roulroul, black-winged lory,Cape parrot, rusty-barred owl, Gouldian finch, Rothschild's mynah, Stanley crane, white-naped crane and rockhopper and king penguins.

Once again, staff expertise was applied overseas. Douglas Richardson continued the work on the management of Kathmandu Zoo. Heather Hall visited the Philippines to carry out fieldwork on behalf of Project Seahorse. Dave Clarke and local biologists and conservationists repaired the snail-proof barrier around the *Partula* reserve on Moorea, and discovered that some of the snails reintroduced in 1996 have survived. Esther Wenman carried out work on Kleinmann's tortoise in Egypt, providing husbandry advice for the authorities holding confiscated animals and surveying the possibilities for a reserve in northern Sinai. Nick Lindsay carried out a reconnaissance of the proposed reintroduction site for European bison in Romania. Sarah Christie was one of the organisers of the highly successful Tigers 2000 symposium held at Regent's Park in February, and later took a small team of veterinarians and dentists to Moscow and Rostov Zoos to assist local staff in the treatment of sick tigers. Mike Clark assisted with the collection of blood samples from mongoose lemurs on Madagascar.

The animal departments also received many visitors from overseas, and provided training and hands-on experience for veterinarians from the Philippines and Syria, and curators and keepers from Nepal, Vietnam, Thailand and Sweden.

Simon Tonge, Senior Curator, London Zoo, and
Nick Lindsay, Curator, Whipsnade Wild Animal Park

ANIMALS IN THE COLLECTIONS

Key to columns for Mammals, Birds, Reptiles, Amphibians and Fishes:

column 1 Number of animals in the Collection at 1st January 1997.

column 2 Number of animals received in 1997 by presentation, exchange, purchase, or transfer between the Society's two Collections. The figures in brackets indicate animals which have been so transferred.

column 3 Number of animals born or hatched during 1997.

column 4 Number of animals which died in 1997 within 30 days of birth or hatching. The figures in brackets indicate animals born or hatched during December 1996 which died during January 1997. Stillbirths are not included.

column 5 Number of animals which died during 1997, apart from those included in column 4.

column 6 Number of animals disposed of in 1997 by presentation, exchange, deposit, sale or transfer between the Society's two Collections. The figures in brackets indicate animals which have been transferred between the two Collections.

column 7 Number of animals in the Collection at 31st December 1997 showing sexes where these are known, e.g. 1/3/1 indicates 1 male, 3 female, 1 sex unknown.

Key

G Genus new to the Collection
S Species new to the Collection
SS Sub-species new to the Collection
RT Regionally threatened (species held in a breeding programme)

*Species subject to the Agreement with the Marwell Preservation Trust on joint ownership and management

**Free-ranging animals at Whipsnade censused once a year

IUCN threatened species categories

1996 IUCN Red List of Threatened Animals. Compiled and edited by Jonathan Baillie and Brian Groombridge. IUCN, Gland, Switzerland

EX Extinct
EW Extinct in the Wild
CR Critically Endangered
EN Endangered
VU Vulnerable

LONDON ZOO

		1	2	3	4	5	6	7
MAMMALS								
Monotremata								
Tachyglossus aculeatus	Australian Echidna	2	-	-	-	-	-	2/0
Dasyuromorphia								
Dasycercus byrnei (VU)	Byrne's Pouched Mouse (Kowari)	7	2	-	-	-	1	4/4
Diprotodontia								
Dactylopsila trivirgata	Striped Possum	5	-		-	-	-	2/3
Gymnobelideus leadbeateri (EN)	Leadbeater's Possum	2	-	-	-	-	-	1/1
Potorous tridactylus	Long-nosed Potoroo	8	-	-	-	2	6	-
Macropus rufogriseus frutica	Red-necked (Bennett's) Wallaby	4	-	1	-	-	2	2/1
Bettongia penicillata	Brush-tailed Bettong	-	6	1	-	1	-	3/3
Insectivora								
Suncus murinus	Grey Musk Shrew	4	-	-	-	2	2	-
Macroscelidea								
Macroscelides proboscideus (VU)	Short-eared Elephant Shrew	3	-	6	4	3	-	0/1/1
Chiroptera								
Pteropus rodricensis (CR)	Rodrigues Fruit Bat	30	-	14	8	-	6	15/13/2
Rousettus aegyptiacus	Egyptian Fruit Bat	4	-	-	-	-	4	-
Carollia perspicillata	Seba's Short-tailed Bat	>350	-	76	10	12	54	>350
Scandentia								
Tupaia minor	Pygmy Tree Shrew	3	-	1	1	-	1	1/1
Tupaia tana	Large Tree Shrew	3	-	1	-	-	-	2/1/1
Primates								
Varecia variegata variegata (EN)	Black-&-white Ruffed Lemur	1	-	-	-	-	-	0/1
Varecia variegata rubra (CR)	Red Ruffed Lemur	2	-	3	3	-	-	1/1
Cheirogaleus medius	Fat-tailed Dwarf Lemur	9	-	-	-	-	2	3/4
Loris tardigradus (VU)	Slender Loris	6	1	-	-	2	-	4/1
Nycticebus coucang	Slow Loris	6	1	-	-	-	2	2/3
Nycticebus pygmaeus (VU)	Pygmy Slow Loris	2	-	2	-	-	-	1/3
Perodicticus potto	Potto	-	2	-	-	-	-	1/1
Galago senegalensis	Senegal Bushbaby	2	1	2	-	-	-	4/1
Aotus trivirgatus	Douroucouli	4	-	-	-	-	-	1/3
Pithecia pithecia	White-faced Saki Monkey	7	-	1	-	2	1(1)	3/2
Ateles paniscus	Red-faced Black Spider Monkey	3	1	1	-	-	1	1/2/1
Callithrix jacchus	Common Marmoset	11	1	2	-	-	2	6/4/2
Callithrix geoffroyi (VU)	Geoffroy's Marmoset	2	1	-	-	-	-	2/1
Callithrix argentata argentata	Silvery Marmoset	7	-	2	-	2	3	2/2
Callithrix pygmaea	Pygmy Marmoset	5	-	1	-	-	2	1/3
Saguinus oedipus (EN)	Cotton-headed Tamarin	4	9	-	-	-	9	3/1
Saguinus imperator subgrisescens	Emperor Tamarin	2	-	5	5	-	-	1/1
Leontopithecus rosalia (CR)	Golden Lion Tamarin	8	-	2	-	-	-	6/4
Leontopithecus chrysomelas (EN)	Golden-headed Lion Tamarin	4	-	-	-	-	-	3/1
Callimico goeldii (VU)	Goeldi's Monkey	6	-	2	2	-	1	2/3
Macaca nigra (EN)	Sulawesi Crested Macaque	6	-	1	-	1	-	2/4
Cercopithecus campbelli	Campbell's Guenon	5	-	-	-	-	-	1/2/2
Cercopithecus diana diana (VU)	Diana Monkey	2	-	-	-	-	-	1/1
Cercopithecus hamlyni	Hamlyn's Owl-faced Monkey	4	-	-	-	-	-	2/2
Semnopithecus entellus thersites	Hanuman Langur	7	-	5	-	-	-	3/6/3
Hylobates gabriellae (EN)	Buff-cheeked Gibbon	-	1	-	-	-	-	0/1
Hylobates leucogenys leucogenys (EN)	White-cheeked Gibbon	-	1	-	-	-	-	1/0
Hylobates leucogenys siki (EN)	White-cheeked (Siki) Gibbon	2	-	-	-	-	-	1/1
Hylobates lar	Lar Gibbon	3	-	-	-	-	-	1/2
Pan troglodytes (EN)	Chimpanzee	12	-	-	-	1	-	1/10
Gorilla gorilla gorilla (EN)	Western Lowland Gorilla	3	-	-	-	-	-	1/2
Xenarthra								
Choloepus didactylus	Two-toed Sloth	2	-	-	-	-	-	1/1
Rodentia								
Sciurus stramineus nebouxii	White-naped Squirrel	-	3	-	-	-	-	1/2
Sciurus vulgaris (RT)	Red Squirrel	2	1	-	-	1	-	1/1
Callosciurus prevostii	Prevost's Squirrel	8	-	-	-	-	6	1/1
Tamias sibiricus	Siberian Chipmunk	1	-	-	-	-	-	0/1
Jaculus orientalis	Greater Egyptian Jerboa	3	-	6	2	-	3	2/2
Phodopus sungorus	Dwarf Hamster	1	-	-	-	1	-	-
Hypogeomys antimena (EN)	Malagasy Giant Jumping Rat	6	-	9	3	1	-	6/4/1

		1	2	3	4	5	6	7
Clethrionomys glareolus caesarius	Jersey Vole	~22	-	38	6	21	13	~20
Alticola semicanus	High Mountain Vole	3	-	4	-	3	-	1/1/2
Gerbillus perpallidus	Pallid Gerbil	3	-	-	-	1	1	1/0
Meriones crassus	Sundevall's Jird	2	-	-	-	-	2	-
Micromys minutus	Harvest Mouse	14	-	24	8	13	10	3/4
Lemniscomys barbarus	Striped Grass Mouse	~21	-	19	6	6	6	~22
Acomys cahirinus	Egyptian Spiny Mouse	~42	-	101	12	92	21	18
Mus minutoides	Pygmy Mouse	-	6	-	-	-	-	5/1
Rattus rattus	Black Rat	30	-	110	-	80	-	~60
Notomys alexis	Spinifex Hopping Mouse	4	-	3	-	1	-	2/2/2
Muscardinus avellanarius (RT)	Common Dormouse	17	-	-	-	5	6	2/4
Coendou prehensilis	Prehensile-tailed Tree Porcupine	2	-	-	-	-	-	1/1
Hystrix africaeaustralis	Cape Crested Porcupine	2	-	2	-	-	-	1/1/2
Atherurus africanus	African Brush-tailed Porcupine	7	-	-	-	-	2	2/3
Dasyprocta punctata	South American Agouti	7	-	5	3	-	2	3/4
Myoprocta acouchy	Green Acouchi	8	-	4	1	1	2	5/3
Chinchilla laniger	Chinchilla	3	-	-	-	-	1	1/1
Carnivora								
Canis lupus	Grey Wolf	2	-	-	-	-	-	1/1
Vulpes zerda	Fennec Fox	1	-	-	-	-	-	0/1
Ictonyx striatus	Zorilla	2	-	-	-	-	-	1/1
Amblonyx cinereus	Oriental Small-clawed Otter	2	1	3	-	1	-	1/1/3
Melursus ursinus inornatus (VU)	Sloth Bear	-	2	-	-	-	-	1/1
Ailurus fulgens fulgens (EN)	Red Panda	2	-	-	-	-	-	1/1
Nasua nasua	Coatimundi	3	-	-	-	-	-	3/0
Potos flavus	Kinkajou	-	1	-	-	-	-	0/1
Suricata suricatta	Meerkat	6	-	14	5	2	1	4/3/5
Genetta tigrina	Blotched Genet	2	-	-	-	1	-	0/1
Arctictis binturong	Binturong	2	-	-	-	-	2	-
Helogale parvula	Dwarf Mongoose	9	-	1	1	-	4	4/1
Mungos mungo	Banded Mongoose	5	-	1	1	-	3	1/1
Caracal caracal	Caracal Lynx	1	-	-	-	-	-	0/1
Felis margarita harrisoni	Sand Cat	4	-	3	-	-	2	4/1
Panthera leo persica (EN)	Asiatic Lion	2	-	4	1	-	-	2/3
Panthera tigris sumatrae (CR)	Sumatran Tiger	3	1	-	-	-	3	0/1
Panthera tigris altaica (CR)	Amur (Siberian) Tiger	2	-	-	-	-	2	-
Panthera pardus saxicolor (EN)	Iranian Leopard	2	-	-	-	-	-	1/1
Neofelis nebulosa nebulosa (VU)	Clouded Leopard	2	-	-	-	-	-	1/1
Proboscidea								
Elephas maximus (EN)	Asian Elephant	3	-	-	-	-	-	0/3
Perissodactyla								
*Equus burchelli chapmanni**	Chapman's Zebra	2	-	-	-	-	2	-
Tapirus indicus (EN)	Malayan Tapir	2	1	-	-	1	-	1/1
Diceros bicornis michaeli (CR)	Black Rhinoceros	2	-	-	-	-	-	1/1
Rhinoceros unicornis (EN)	Greater One-horned Rhinoceros	-	2	-	-	-	-	0/2
Artiodactyla								
Hexaprotodon liberiensis (VU)	Pygmy Hippopotamus	1	2	-	-	-	1	0/2
*Pudu pudu** (VU)	Pudu	3	-	1	-	2	-	0/2
Muntiacus reevesi	Reeves's Muntjac	1	1	-	-	-	-	1/1
Okapia johnstoni	Okapi	1	1	-	-	-	-	2/0
*Giraffa camelopardalis**	Giraffe	3	-	2	-	-	-	3/2
*Tragelaphus strepsiceros**	Greater Kudu	6	-	3	-	-	-	5/4
*Bubalus depressicornis** (EN)	Lowland Anoa	7	-	1	1	2	2(2)	1/2
*Oryx leucoryx** (EN)	Arabian Oryx	9	-	4	-	2	1	4/6
Domestic								
	Rabbit	11	5	-	-	5	4	3/4
	Guinea Pig	10	-	-	-	2	-	2/6
	Golden Hamster	-	1	-	-	-	-	1/0
	House Mouse (domestic)	1	6	20	6	7	4	4/6
	Brown Rat (domestic)	14	4	-	-	7	2	5/4
	Clawed Jird (domestic gerbil)	8	-	-	-	4	1	3/0
	Ferret	6	-	-	-	-	-	6/0
	Pony: Cream	-	2	-	-	-	-	2/0
	Dartmoor	1	-	-	-	-	-	0/1
	Welsh	2	-	-	-	-	2	-
	Shetland	1	-	-	-	-	-	1/0
	Bay	-	2	-	-	-	-	2/0
	Donkey	2	-	-	-	-	-	1/1
	Llama*	2	-	-	-	1	-	1/0
	Bactrian Camel*	3	-	-	-	-	1(1)	0/2
	Reindeer	3	-	-	-	-	1	0/2
	Pig: Berkshire	-	1	14	2	-	13	-
	Large Black	2	1	8	1(1)	-	10	-
	Middle White	-	1	10	-	-	11	-
	Tamworth	-	3	9	2	-	8	0/2
	Cattle: Red Poll	3	-	-	-	-	-	0/3
	Sheep: Leicester Longwool	3	-	-	-	-	2	0/1
	Norfolk Horned	1	2	1	-	-	2	0/2
	Goat: Anglo-Nubian	3	-	-	-	1	2	-
	Pygmy Goat	4	-	-	-	-	-	0/4
	Total: Mammals	**942**	**77**	**553**	**94**	**292**	**260(4)**	**926**
BIRDS								
Casuariiformes								
Dromaius novaehollandiae	Emu	2	-	-	-	1	-	0/1
Sphenisciformes								
Spheniscus demersus	Blackfooted (Jackass) Penguin	41	-	13	3	8	2	9/10/22
Pelecaniformes								
Pelecanus onocrotalus	Eastern White Pelican	8	2	-	-	-	-	3/7
Ciconiiformes								
Nycticorax nycticorax	Night Heron	2	-	-	-	-	-	0/1/1
Bubulcus ibis	Cattle Egret	8	-	2	-	1	-	1/1/7
Egretta garzetta	Little Egret	11	-	-	-	2	-	0/0/9
Ciconia abdimii	Abdim's Stork	10	-	3	-	-	-	3/5/5
Ciconia episcopus episcopus	Asian Woolly-necked Stork	2	-	-	-	-	-	1/1
Threskiornis aethiopicus	Sacred Ibis	36	-	10	1	8	-	0/0/37
Geronticus eremita (CR)	Waldrapp Ibis	10	1	-	-	1	2	2/4/2
Theristicus melanopis	Black-faced Ibis	4	-	-	-	-	-	3/1

		1	2	3	4	5	6	7
Eudocimus ruber	Scarlet Ibis	5	5(3)	-	-	2	-	3/5
Plegadis ridgwayi	Puna Ibis	5	-	-	-	-	-	2/3
Phoenicopterus chilensis	Chilean Flamingo	41	-	-	-	2	-	16/23
Anseriformes								
Anser cygnoides (VU)	Swan Goose	-	2	-	-	1	-	1/0
Anser erythropus (VU)	Lesser White-fronted Goose	-	2	-	-	-	-	1/1
Anser indicus	Bar-headed Goose	-	4(4)	-	-	-	-	3/1
Branta sandvicensis (VU)	Nene (Hawaiian Goose)	2	3	-	-	-	-	0/0/5
Cyanochen cyanopterus	Blue-winged Goose	-	2	-	-	-	-	1/1
Tadorna ferruginea	Ruddy Shelduck	-	7	-	-	-	-	2/2/3
Aix sponsa	Carolina Duck	2	-	-	-	1	1	-
Callonetta leucophrys	Ringed Teal	5	9	-	-	5	-	4/5
Anas sibilatrix	Chiloe Wigeon	3	3	-	-	-	-	1/1/4
Anas laysanensis (VU)	Laysan Teal	4	-	-	-	-	-	2/2
Anas georgica georgica	South Georgia Pintail	4	-	-	-	-	-	4/0
Anas formosa (VU)	Baikal Teal	3	-	-	-	-	-	2/1
Anas versicolor puna	Puna Teal	1	-	-	-	1	-	-
Anas punctata	Hottentot Teal	1	-	-	-	1	-	-
Anas querquedula	Garganey	3	-	1	1	1	-	1/1
Marmaronetta angustirostris (VU)	Marbled Duck	4	-	-	-	1	-	2/1
Aythya nyroca (VU)	Ferruginous (White-eyed) Duck	2	-	-	-	-	-	1/1
Aythya baeri (VU)	Baer's Pochard	-	2	-	-	-	-	1/1
Mergellus albellus	Smew	1	3	-	-	-	-	2/2
Mergus cucullatus	Hooded Merganser	-	4	-	-	-	-	2/2
Oxyura jamaicensis	North American Ruddy Duck	1	-	-	-	-	1	-
Falconiformes								
Cathartes aura	Turkey Vulture	2	4	-	-	-	-	4/2
Vultur gryphus	Andean Condor	-	1	-	-	-	1	-
Milvus migrans	Black Kite	2	-	-	-	-	-	1/1
Milvus migrans migrans	Black Kite	1	-	-	-	-	-	1/0
Torgos tracheliotus	Lappet-faced Vulture	2	-	-	-	-	2	-
Terathopius ecaudatus	Bateleur Eagle	2	-	-	-	-	-	1/1
Polyboroides typus	African Harrier Hawk	3	-	-	-	1	-	1/0/1
Parabuteo unicinctus	Harris's Hawk	2	-	-	-	1	-	1/0
Buteo buteo	Buzzard	1	1	-	-	-	1	1/0
Galliformes								
Crax fasciolata	Bare-faced Curassow	1	-	-	-	-	1	-
Rollulus roulroul	Crested Wood Partridge	7	-	31	15	-	8	7/8
Gallus gallus	Red Junglefowl	5	-	-	-	-	-	5/0
Lophura diardi (VU)	Siamese Crested Fireback	4	-	-	-	-	-	2/2
Lophura edwardsi (CR)	Edward's Pheasant	4	-	1	1	-	-	2/2
Pavo cristatus	Common Peafowl	5	-	10	8	-	-	5/2
Afropavo congensis (VU)	Congo Peafowl	2	-	-	-	1	-	1/0
Polyplectron emphanum (EN)	Palawan Peacock Pheasant	3	1	-	-	-	-	2/2
Acryllium vulturinum	Vulturine Guineafowl	2	-	-	-	-	2	-
Gruiformes								
Grus japonensis (VU)	Red-crowned (Manchurian) Crane	2	-	-	-	-	-	1/1
Grus paradisea (VU)	Stanley Crane	2	-	-	-	-	-	1/1
Limnocorax flavirostra	Black Crake	-	1	-	-	-	-	1/0
Gallinula nesiotis comeri (VU)	Gough Island Moorhen	6	-	10	8	2	2	1/1/2
Cariama cristata	Red-legged Seriema	2	-	-	-	2	-	-
Rallus striatus	Slaty-breasted Rail	-	2	-	-	-	1	1/0
Charadriiformes								
Burhinus oedicnemus	Stone Curlew	5	-	2	-	-	3	1/1/2
Vanellus miles miles	Masked Lapwing	3	1	1	-	-	-	2/2/1
Larus cirrocephalus poiocephalus	Grey-headed Gull	12	-	-	-	2	-	0/0/10
Larosterna inca	Inca Tern	3	-	-	-	1	-	1/1
Columbiformes								
Columba guinea	Speckled Pigeon	8	-	2	-	5	-	0/0/5
Gallicolumba criniger (VU)	Mindanao Bleeding Heart Dove	2	2	-	-	2	-	2/0
Goura cristata (VU)	Blue Crowned Pigeon	1	-	-	-	-	-	1/0
Ducula aenea aenea	Green Imperial Pigeon	5	1	3	-	-	2	1/4/2
Ducula aenea paulina	Chestnut-naped Imperial Pigeon	8	-	5	1(1)	1	4	3/2/2
Ducula rufigaster	Purple-tailed Imperial Pigeon	2	1	-	-	-	-	1/2
Ducula concinna	Blue-tailed Imperial Pigeon	2	-	-	-	-	-	1/1
Ducula perspicillata S	Spectacled Imperial Pigeon	-	1	-	-	-	-	0/0/1
Ducula pinon	Pinon Imperial Pigeon	2	-	-	-	-	-	1/1
Ducula zoeae	Zoe Imperial Pigeon	2	-	-	-	-	-	1/1
Treron vernans	Pink-necked Fruit Pigeon	1	-	-	-	-	1	-
Ptilinopus cinctus albocinctus	Black-backed Fruit Dove	5	-	-	-	1	-	4/0
Ptilinopus magnificus	Magnificent Fruit Dove	2	-	-	-	-	-	2/0
Ptilinopus melanospila	Black-naped Fruit Dove	3	-	-	-	-	-	2/1
Ptilinopus superbus	Superb Fruit Dove	4	-	-	-	1	-	1/2
Zenaida graysoni (EW)	Socorro Dove	2	-	-	-	-	-	1/1
Psittaciformes								
Charmosyna josefinae	Josephine's Lorikeet	1	-	-	-	-	-	1/0
Charmosyna placentis placentis	Red-flanked Lorikeet	2	-	1	-	1	-	1/1
Charmosyna pulchella rothschildi	Fairy Lorikeet	7	2	-	-	4	-	2/0/3
Eos cyanogenia (VU)	Black-winged Lory	2	2	2	-	1	-	2/1/2
Eos reticulata	Blue-streaked Lory	1	-	-	-	-	-	1/0
Calyptorhynchus banksii	Red-tailed Black Cockatoo	7	-	-	-	-	-	4/3
Cacatua alba (VU)	White-crested Cockatoo	2	-	-	-	-	-	1/1
Cacatua goffini	Goffin's Cockatoo	3	-	-	-	-	-	2/1
Cacatua haematuropygia (CR)	Red-vented Cockatoo	2	-	-	-	-	2	-
Cacatua moluccensis (VU)	Salmon-crested Cockatoo	6	-	-	-	-	-	3/3
Nestor notabilis	Kea	1	-	-	-	-	1	-
Poicephalus robustus usambicus	Usambi Cape Parrot	2	-	2	-	1	-	1/1/1
Agapornis nigrigenis (EN)	Black-cheeked Lovebird	10	-	12	-	-	-	1/3/18
Anodorhynchus hyacinthinus (VU)	Hyacinth Macaw	3	1	-	-	-	1	1/2
Ara ararauna	Blue-&-gold Macaw	5	-	-	-	2	1	1/1
Ara chloroptera	Green-winged Macaw	1	-	-	-	-	1	-
Pyrrhura cruentata (VU)	Blue-throated Conure	4	-	1	1	1	-	2/1
Loriculus galgulus	Blue-crowned Hanging Parrot	2	-	-	-	1	1	-
Myiopsitta monachus	Quaker (Monk) Parrakeet	37	-	-	-	6	26	0/0/5
Cuculiformes								
Musophaga violacea	Violet Plantain-eater	3	-	-	-	1	-	1/1
Tauraco persa livingstonii	Livingstone's Turaco	5	-	-	-	-	3	0/2
Tauraco erythrolophus	Red-crested Turaco	2	-	-	-	-	-	1/1
Tauraco leucotis	White-cheeked Turaco	2	-	-	-	-	1	0/0/1
Strigiformes								
Tyto alba	Barn Owl	2	-	-	-	-	-	2/0
Phodilus badius	Bay Owl	1	-	-	-	-	-	0/1
Otus bakkamoena	Collared Scops Owl	3	-	-	-	-	3	-
Otus leucotis	White-faced Scops Owl	13	15(1)	-	-	2	9(1)	5/5/7

		1	2	3	4	5	6	7
Bubo bubo	Eurasian Eagle Owl	1	-	-	-	-	-	1/0
Bubo vosseleri (VU)	Ndak Eagle Owl	1	-	-	-	1	-	-
Pulsatrix perspicillata	Spectacled Owl	5	1	-	-	1	2	2/1
Speotyto cunicularia	Burrowing Owl	4	-	2	1	-	1	2/1/1
Strix hylophila	Rusty-barred Owl	4	-	1	-	-	-	2/2/1
Strix uralensis	Ural Owl	4	-	-	-	1	3(2)	-
Strix nebulosa lapponica	Great Grey Owl	2	-	-	-	-	-	1/1
Strix rufipes S	Rufous-legged Owl	-	2	-	-	-	-	1/1
Caprimulgiformes								
Podargus strigoides	Tawny Frogmouth	2	-	-	-	-	-	2/0
Trogoniformes								
Pharomachrus auriceps	Golden-headed Quetzal	1	-	-	-	1	-	-
Coraciiformes								
Dacelo novaeguineae	Kookaburra	2	1	-	-	-	-	1/1/1
Coracias caudata	Lilac-breasted Roller	5	-	2	-	1	1(1)	2/1/2
Tockus erythrorhynchus	Red-billed Hornbill	1	-	-	-	1	-	-
Anthracoceros albirostris convexus	Southern Pied Hornbill	1	-	-	-	-	-	0/1
Anthracoceros albirostris albirostris	Northern Pied Hornbill	2	-	-	-	-	-	1/1
Bycanistes subcylindricus	Black-&-white Casqued Hornbill	3	-	-	-	-	2	0/1
Buceros bicornis	Great Indian Hornbill	1	2	-	-	-	-	1/2
Buceros rhinoceros	Rhinoceros Hornbill	-	1	-	-	-	-	0/1
Piciformes								
Psilopogon pyrolophus	Fire-tufted Barbet	3	-	-	-	1	-	2/0
Pogoniulus chrysoconus	Yellow-fronted Tinkerbird	2	-	-	-	-	2	-
Lybius dubius	Bearded Barbet	1	-	-	-	-	-	1/0
Pteroglossus aracari	Black-necked Aracari	3	2	-	-	-	-	4/1
Pteroglossus castanotis	Chestnut-eared Aracari	1	-	-	-	1	-	-
Baillonius bailloni	Saffron Toucanet	1	-	-	-	-	1	-
Melanerpes candidus	White Woodpecker	4	-	-	-	1	3	-
Passeriformes								
Pycnonotus jocosus	Red-whiskered Bulbul	4	-	-	-	2	-	0/0/2
Copsychus malabaricus	Common Shama Thrush	2	3	-	-	3	-	1/1
Copsychus saularis	Asian Magpie Robin	2	-	2	1	2	-	1/0
Cossypha albicapilla	White-crowned Robin Chat	2	-	4	3	-	-	1/1/1
Cossypha niveicapilla	Snowy-headed Robin Chat	-	6	-	-	3	-	1/2
Rhyacornis fuliginosus	Plumbeous Redstart	1	-	-	-	-	-	1/0
Garrulax poecilorhynchus S	Rusty Laughing Thrush	-	2	-	-	-	-	1/1
Garrulax chinensis	Black-throated Laughing Thrush	4	-	2	1	-	-	2/1/2
Garrulax sannio	White-browed Laughing Thrush	2	-	-	-	-	2	-
Paroaria coronata	Red-crested Cardinal	6	-	-	-	-	-	2/4
Tangara fastuosa (EN)	Superb (Seven-coloured) Tanager	7	-	-	-	3	-	0/0/4
Tangara sclerocephala	Silver-throated Tanager	5	-	-	-	2	-	2/1
Chlorbia gouldiae (EN)	Gouldian Finch	5	1	14	-	1	6	2/3/8
Estrilda troglodytes	Black-rumped Waxbill	14	-	-	-	-	-	0/0/14
Vidua sp.	Combassou	1	-	-	-	-	-	1/0
Vidua macroura	Pin-tailed Whydah	3	-	-	-	1	-	2/0
Quelea quelea	Red-beaked Weaver (Quelea)	17	-	-	-	1	-	6/7/3
Foudia flavicans (VU)	Rodriguez Fody	1	-	-	-	-	-	0/1
Lamprotornis iris	Emerald Glossy Starling	4	3	-	-	2	-	1/2/2
Sturnus contra	Asian Pied Starling	2	-	-	-	2	-	-
Leucopsar rothschildi (CR)	Rothschild's Mynah	10	-	5	-	1	-	6/3/5
Ampeliceps coronatus	Golden-crested Mynah	1	-	-	-	-	-	1/0
Basilornis celebensis	Sulawesi Mynah	1	-	-	-	-	-	1/0
Pyrrhocorax pyrrhocorax (RT)	Red-billed Chough	-	4	-	-	-	-	2/2
Urocissa erythrorhyncus	Red-billed Blue Magpie	-	1	-	-	-	-	0/0/1
Domestic								
	Duck	2	-	-	-	-	-	0/2
	Chicken	10	-	34	5	2	8	3/6/20
	Budgerigar	7	-	8	2	1	5	3/4
	Total: Birds	**649**	**114(8)**	**186**	**52**	**111**	**119(4)**	**667**

REPTILES

		1	2	3	4	5	6	7
Testudines								
Sternotherus odoratus	Stinkpot	8	-	2	-	6	-	0/0/4
Kinosternon subrubrum	Eastern Mud Terrapin	1	-	-	-	1	-	-
Kinosternon scorpioides	Scorpion Mud Terrapin	2	-	-	-	2	-	-
Trachemys scripta elegans	Red-eared Terrapin	6	-	-	-	-	-	0/0/6
Pseudemys floridana	Common Cooter	2	-	-	-	2	-	-
Cuora amboinensis	Malayan Box Turtle	6	-	-	-	1	-	3/0/2
Chinemys reevesii	Reeves's Pond Turtle	1	-	-	-	1	-	-
Heosemys grandis	Giant Asian Pond Turtle	-	2	-	-	-	-	1/1
Terrapene coahuila (EN)	Mexican Box Terrapin	6	-	-	-	-	-	0/0/6
Terrapene carolina	Box Terrapin	1	-	-	-	-	1	-
Terrapene carolina triunguis	Three-toed Box Terrapin	1	-	-	-	-	1	-
Pyxis arachnoides (VU)	Madagascar Spider Tortoise	8	-	-	-	-	-	2/2/4
Homopus areolatus	Parrot-beaked Cape Tortoise	3	-	-	-	-	-	1/2
Testudo graeca (VU)	Spur-thighed Tortoise	34	-	3	-	1	5	0/0/31
Testudo hermanni	Hermann's Tortoise	9	-	-	-	1	2	0/0/6
Testudo horsfieldi (VU)	Horsfield's Tortoise	6	-	-	-	1	-	4/1
Testudo kleinmanni (EN)	Egyptian Tortoise	16	-	-	-	2	-	7/4/3
Testudo marginata	Marginated Tortoise	5	-	-	-	1	-	3/1
Malacochersus tornieri (VU)	Pancake Tortoise	2	-	-	-	-	-	1/1
Geochelone pardalis	Leopard Tortoise	1	-	-	-	-	-	0/0/1
Chelus fimbriatus	Matamata	3	-	-	-	2	-	0/0/1
Chelodina longicollis	Long-necked Terrapin	5	-	-	-	1	-	2/2
Chelodina siebenrocki	Siebenrock's Snake-necked Turtle	2	-	-	-	-	-	0/0/2
Emydura australis albertisi	New Guinea Red-bellied Terrapin	4	-	-	-	1	-	1/1/1
Pelodiscus sinensis	Chinese Soft-shelled Terrapin	1	-	1	-	1	-	0/0/1
Aspideretes hurum	Peacock Soft-shelled Turtle	1	-	-	-	1	-	-
Crocodylia								
Alligator sinensis (CR)	Chinese Alligator	4	-	-	-	-	-	2/2
Sauria								
Nactus serpensinsula serpensinsula (VU)	Serpent Island Gecko	5	-	1	1	3	-	0/0/2
Nactus serpensinsula durrelli (VU)	Round Island Gecko	1	-	-	-	-	-	0/0/1
Stenodactylus sthenodactylus	Elegant Gecko	4	-	-	-	-	-	2/2
Parondura pictus	Malagasy Night Gecko	2	-	-	-	1	-	1/0

		1	2	3	4	5	6	7
Gekko gecko	Tokay Gecko	1	1	-	-	-	-	1/0/1
Homopholis wahlbergi	Wahlberg's Velvet Gecko	1	-	-	-	-	-	1/0
Phelsuma cepediana	Mauritius Day Gecko	3	-	-	-	-	-	0/0/3
Phelsuma ornata ornata	Ornate Day Gecko	4	13	-	-	10	2	0/0/5
Phelsuma guimbeaui rosagularis	Maccabé Day Gecko	2	1	-	-	1	-	2/0
Phelsuma standingi (VU)	Standing's Day Gecko	7	-	-	-	2	-	0/0/5
Eublepharis macularius	Leopard Ground Gecko	4	-	-	-	-	1	1/2
Anolis carolinensis	Green Anole	6	-	-	-	-	-	1/2/3
Basiliscus plumifrons	Plumed Basilisk	5	-	1	1	3	-	1/1
Iguana iguana	Common Iguana	4	1	-	-	1	-	2/1/1
Cyclura cornuta cornuta (VU)	Rhinoceros Iguana	8	-	-	-	-	-	3/1/4
Oplurus cuvieri	Madagascar Spiny Lizard	3	-	-	-	-	-	2/1
Pogona vitticeps	Inland Bearded Dragon	8	2	10	-	9	5	0/0/6
Hydrosaurus pustulatus S	Philippine Sail-finned Water Dragon	-	2	-	-	1	-	1/0
Physignathus cocincinus	Chinese Water Dragon	1	-	-	-	-	1	-
Uromastyx hardwicki	General Hardwicke's Dabb Lizard	2	-	-	-	-	-	1/1
Chamaeleo calyptratus	Veiled Chameleon	5	-	-	-	2	-	1/2
Chamaeleo pardalis	Panther Chameleon	-	2	-	-	1	-	1/0
Chamaelao werneri	Uzungwe Three-horned Chameleon	1	-	-	-	1	-	-
Egernia striolata	Australian Tree Skink	1	-	-	-	1	-	-
Corucia zebrata	Prehensile-tailed Skink	6	3	-	-	3	-	2/2/2
Tiliqua rugosa	Shingleback	8	-	-	-	-	-	3/4/1
Tiliqua scincoides scincoides	Eastern Blue-tongued Skink	3	-	-	-	-	-	1/2
Tiliqua scincoides intermedia	Northern Blue-tongued Skink	2	-	-	-	2	-	-
Mabuya perrotetii	Red-sided Skink	4	-	-	-	3	-	0/0/1
Chalcides ocellatus	Eyed Skink	2	-	-	-	2	-	-
Gongylomorphus bojeri	Bojer's Skink	3	-	-	-	-	-	0/0/3
Gerrhosaurus major	Greater Plated Lizard	4	-	-	-	1	-	2/0/1
Lacerta lepida (RT)	Ocellated Lizard (Berlenga Isl.)	4	2	-	-	1	-	2/3
Lacerta lepida lepida	Jewelled Lizard	1	-	-	-	-	-	0/1
Tregonophis wiegmanni	Wiegmann's Burrowing Lizard	1	-	-	-	1	-	-
Varanus exanthematicus exanthematicus	Bosc's Monitor	7	-	-	-	4	-	0/0/3
Varanus niloticus	Nile Monitor	-	1	-	-	-	-	1/0
Heloderma suspectum suspectum (VU)	Reticulated Gila Monster	4	-	-	-	-	-	2/2
Heloderma horridum exasperatum (VU)	Rio Grijalva Beaded Lizard	1	-	-	-	-	-	1/0
Ophisaurus apodus	Scheltopusik (Glass Lizard)	3	3	-	-	2	-	0/0/4
Cordylus giganteus (VU)	Sungazer	5	2	-	-	-	-	3/4
Cordylus polyzonus	Karoo Girdled Lizard	6	-	-	-	-	-	0/0/6
Serpentes								
Liasis albertisi	D'Albert's Python	1	1	-	-	-	-	2/0
Python amethystinus	Amethyst Python	1	-	-	-	-	-	1/0
Python curtus brongersmai	Blood Python	-	4	-	-	-	-	2/2
Python molurus bivittatus	Burmese Python	5	1	-	-	2	1	1/1/1
Python regius	Royal Python	8	-	2	-	-	-	2/4/4
Epicrates subflavus (VU)	Jamaican Boa	5	-	-	-	1	-	1/0/3
Sanzinia madagascariensis (VU)	Madagascan Tree Boa	5	3	-	-	-	-	3/3/2
Boa constrictor	Boa Constrictor	2	-	-	-	-	-	0/0/2
Boa constrictor occidentalis	Argentine Boa	-	3	-	-	-	-	1/2
Acrantophis dumerili	Dumeril's Boa	-	2	-	-	-	-	1/1
Eryx conicus	Rough-scaled Sand Boa	2	-	-	-	-	-	0/2
Eryx johnii	Smooth Sand Boa	2	-	-	-	-	-	2/0
Natrix natrix	Grass Snake	2	-	-	-	-	-	2/0
Thamnophis sirtalis tetrataenia	San Francisco Gartersnake	1	-	-	-	-	1	-
Elaphe sp.	Ratsnake (albino)	1	-	-	-	-	1	-
Hydrodynastes gigas	Boipevassu Snake	6	2	-	-	1	2	0/0/5
Heterodon nasicus	Western Hog Nose Snake	2	-	-	-	-	-	0/0/2
Coronella austriaca (RT)	Smooth Snake	10	-	-	-	3	-	1/2/4
Lampropeltis getulus floridana	Florida King Snake	1	-	-	-	-	-	0/1
Lampropeltis getulus californiae	Californian King Snake	2	-	-	-	-	1	0/0/1
Lampropeltis getulus splendida	Desert King Snake	1	-	-	-	-	1	-
Lampropeltis triangulum sinaloae	Sinaloan Milk Snake	2	-	-	-	-	-	1/1
Boiga irregularis	Brown Cat Snake	1	-	-	-	-	-	1/0
Duphoidias typus	Boomslang	2	2	-	-	-	-	2/2
Pseudechis colletti	Collett's Snake	2	-	-	-	-	-	0/2
Oxyuranus scutellatus	Taipan	2	-	-	-	-	-	2/0
Notechis scutatus	Tiger Snake	1	-	-	-	1	-	-
Acanthophis antarcticus	Death Adder	4	-	-	-	-	-	0/0/4
Bungarus candidus	Malayan Krait	-	2	-	-	-	-	0/0/2
Naja siamensis	Siamese Cobra	9	-	-	-	-	-	0/0/9
Naja haje	Egyptian Cobra	3	-	-	-	-	1	0/0/2
Naja mossambica	Mozambique Spitting Cobra	2	-	-	-	-	-	0/0/2
Naja pallida	Spitting Cobra	13	-	-	-	2	-	1/1/9
Naja kaouthia	Monocellate Cobra	3	-	-	-	1	-	2/0
Naja oxiana	Central Asian Cobra	2	-	-	-	-	-	2/0
Hemachatus haemachatus	Ringhal's Cobra	1	-	-	-	-	-	1/0
Dendroaspis angusticeps	Common Green Mamba	1	4	-	-	1	-	3/1
Dendroaspis polylepis	Black Mamba	5	-	-	-	-	-	5/0
Vipera lebetina obtusa	Levantine Viper	1	-	-	-	-	-	0/1
Vipera berus	Common Viper	-	6	-	-	5	-	0/1
Vipera palaestinae	Palestine Viper	1	-	-	-	-	-	0/0/1
Vipera ammodytes	Long-nosed Viper	-	10	-	-	10	-	-
Vipera ammodytes ammodytes	Western Long-nosed Viper	-	3	-	-	-	-	0/3
Vipera ammodytes meridionalis	Eastern Long-nosed Viper	6	-	-	-	-	-	6/0
Vipera raddei	Armenian Viper	2	-	-	-	-	-	0/2
Bitis arietans	Puff Adder	45	-	37	-	58	12	7/1/4
Bitis gabonica rhinoceros	Gaboon Viper	6	-	-	-	-	-	5/1
Cerastes vipera	Pygmy Sand Viper	1	-	-	-	-	-	0/0/1
Echis carinatus ssp.	Carpet Viper	4	-	-	-	-	-	0/0/4
Echis carinatus sochureki	Saw-scaled Viper	7	-	-	-	-	-	0/0/7
Echis carinatus leakeyi	East African Saw-scaled Viper	2	-	-	-	1	-	0/1
Echis coloratus	Burton's Carpet Viper	1	-	-	-	-	-	0/0/1
Agkistrodon contortrix contortrix	Southern Copperhead	1	-	-	-	-	-	0/0/1
Gloydius intermedius saxatalis	Rock Mamushi	6	-	-	-	-	-	2/2/2
Gloydius halys caraganus	Karagonda Mamushi	3	-	-	-	-	-	1/2
Calloselasma rhodostoma	Malayan Pit Viper	16	-	7	-	12	-	0/0/11
Trimeresurus purpureomaculatus	Mangrove Pit Viper	1	-	-	-	-	-	1/0
Trimeresurus popeorum	Pope's Pit Viper	1	-	-	-	-	1	-
Trimeresurus albolabris	White-lipped Tree Viper	4	-	-	-	-	-	2/2
Bothrops asper	Terciopelo	1	-	-	-	-	-	0/1
Bothrops atrox	Fer-de-Lance	1	-	-	-	1	-	-
Bothrops moojeni	Moojen's Fer-de-Lance	1	-	-	-	-	-	1/0
Bothrops atrox x *moojeni*	Fer-de-Lance x Moojen's Fer-de-Lance	-	-	19	-	1	2	0/0/16
Bothrops alternatus	Urutu	1	-	-	-	-	-	0/0/1

		1	2	3	4	5	6	7
Crotalus durissus culminatus	North-western Neotropical Rattlesnake	1	-	-	-	-	-	1/0
Crotalus unicolor (CR)	Aruba Island Rattlesnake	8	-	1	1	2	3	2/1
Crotalus vegrandis	Uracoan Rattlesnake	2	-	23	-	3	8	1/1/12
Crotalus atrox	Western Diamondback Rattlesnake	1	-	-	-	-	-	0/0/1
Crotalus scutulatus	Mojave Rattlesnake	3	-	-	-	1	2	-
Crotalus viridis helleri	South Pacific Rattlesnake	1	-	-	-	-	1	-
Crotalus viridis oreganus	Northern Pacific Rattlesnake	8	-	-	-	-	3	0/0/5
Crotalus adamanteus	Eastern Diamondback Rattlesnake	1	1	-	-	-	2	-
Crotalus mitchelli	Speckled Rattlesnake	1	-	-	-	-	-	0/0/1
Crotalus cerastes	Sidewinder	1	-	-	-	-	-	1/0
	Total: Reptiles	**529**	**79**	**107**	**3**	**186**	**60**	**466**

AMPHIBIANS		1	2	3	4	5	6	7
Anura								
Colostethus trinitatus	Stream Frog	65	-	8	-	7	6	~60
Dendrobates auratus	Green-&-black Poison Frog	54	-	-	-	25	15	0/0/14
Dendrobates tinctorius	Blue-&-yellow Poison Frog	5	-	-	-	4	-	0/0/1
Dendrobates pumilio	Strawberry Poison Frog	89	-	-	-	~11	-	~78
Dendrobates azureus	Blue Poison Frog	5	2	-	-	-	-	4/1/2
Phyllobates lugubris	Lovely Poison Frog	1	-	-	-	1	-	-
Phyllobates bicolor	Black-legged Poison Frog	1	-	-	-	1	-	-
Agalychnis callidryas	Red-eyed Tree Frog	-	6	-	-	4	-	0/0/2
Gastrotheca riobambae	Marsupial Frog	2	-	-	-	1	-	0/0/1
Litoria caerulea	White's Tree Frog	1	-	-	-	-	-	0/0/1
Osteopilus septentrionalis	Cuban Tree Frog	1	-	-	-	-	-	0/0/1
Phyllomedusa hypocondrialis	S. American Waxy Tree Frog	-	10	-	-	10	-	-
Ceratophrys sp.	Horned Frog hybrid	2	-	-	-	-	2	-
Dyscophus antongilii (VU)	Northern Tomato Frog	2	-	-	-	1	1	-
Dyscophus guineti	Southern Tomato Frog	2	-	-	-	1	-	0/0/1
Mantella aurantiaca (VU)	Madagascar Golden Frog	3	-	-	-	3	-	-
Rana catesbeiana	American Bullfrog	3	-	-	-	1	-	0/0/2
Bufo regularis	Panther Toad	2	-	-	-	2	-	-
Bufo calamita	Natterjack Toad	-	5	-	-	1	-	0/0/4
	Total: Amphibians	**238**	**23**	**8**	**-**	**73**	**24**	**172**

FISHES

OSTEICHTHYES

		1	2	3	4	5	6	7
Acipenseriformes								
Acipenser ruthenus (VU)	Sterlet	8	-	-	-	-	-	8
Scaphirhynchus platorhynchus (VU)	Shovelnose Sturgeon	2	-	-	-	-	-	2
Polyodon spathula (VU)	Paddlefish	~14	-	-	-	-	-	14
Amiiformes								
Amia calva	Bowfin	4	-	-	-	2	-	2
Gobio gobio	Gudgeon	7	-	-	-	1	-	6
Hypophthalmichthys molitrix	Silver Carp	7	-	-	-	1	-	6
Leuciscus cephalus	Chub	8	-	-	-	-	-	8
Leuciscus idus	Ide or Orfe	~11	10	-	-	5	-	16
Noemacheilus barbatulus	Stone Loach	~17	-	-	-	17	-	-
Osteochilus vittatus	Bony-lipped Barb	1	-	-	-	-	-	1
Phoxinus phoxinus	Minnow	~29	-	-	-	29	-	-
Pseudorasbora parva	Clicking Barb	~10	-	-	-	-	-	10
Puntius bimaculata	Red-stripe Barb	-	10	4	-	-	-	14
Puntius nigrofasciatus	Black Ruby Barb	~2	-	-	-	-	-	2
Puntius sachsi	Golden Barb	1	-	-	-	-	-	1
Rasbora borapetensis	Red-tailed Rasbora	-	10	-	-	-	-	10
Rasbora elegans	Elegant Rasbora	~21	-	-	-	4	-	17
Rasbora trilineata	Scissortail Rasbora	~3	-	-	-	2	-	1
Rutilus rutilus	Roach	9	-	-	-	1	-	8
Sarcocheilichthys sinensis	Amur Sucker	9	-	-	-	-	-	9
Scardinius erythrophthalmus	Rudd	~23	-	-	-	2	-	21
Tinca tinca	Tench	~25	-	-	-	-	-	25
Zacco sp.	Zacco	1	-	-	-	-	-	1
Notropis lutrensis	Red Shiner	-	10	-	-	3	-	7
Cyprinodontiformes								
Aphyosemion gardneri	Clausen's Steel-blue Killie	3	-	-	-	3	-	-
Ameca splendens (EW)	Butterfly Goodeid	~106	-	75	-	11	-	170
Pachypanchax omalonotus	Madagascan Killifish	-	6	5	-	-	-	11
Xenophorus captivus (EN)	Green Goodeid	~113	-	26	-	125	14	-
Xenotoca eiseni	Red-tailed Goodeid	~60	-	-	-	37	-	23
Poecilia nigrofasciata	Black-barred Limia	~185	-	60	-	18	10	217
Poecilia reticulata	Guppy	1 col.	-	-	-	-	-	1 colony
Poecilia reticulata (wild form)	Pitch-lake Guppy	~246	-	436	-	182	-	~500
Gadiformes								
Pollachius pollachius	Pollack	~14	-	-	-	14	-	-
Gasterosteiformes								
Gasterosteus aculeatus	Three-spined Stickleback	~5	40	-	-	21	-	24
Nerophis ophidion	Worm Pipefish	2	10	-	-	-	-	12
Syngnathus acus	Greater Pipefish	-	17	-	-	1	-	16
Hippocampus kuda (VU)	Yellow Seahorse	2	8	-	-	6	-	1/3
Gymnotiformes								
Electrophorus electricus	Electric Eel	1	-	-	-	-	-	1
Lepisosteiformes								
Lepisosteus oculatus	Spotted Gar	2	-	-	-	-	-	2
Lepisosteus platyrhincus	Florida Gar	3	-	-	-	1	-	2
Lepisosteus platostomus	Shortnose Gar	-	1	-	-	-	-	1
Osteoglossiformes								
Gnathonemus ibis	Elephant-nose Fish	1	-	-	-	-	-	1
Marcusenius angolensis	Round-nose Elephant Fish	1	-	-	-	1	-	-
Notopterus chitala	Clown Knife Fish	4	-	-	-	1	-	3
Arapaima gigas	Arapaima	9	-	-	-	8	1	-
Pantodon buchholzi	Butterfly Fish	1	-	-	-	1	-	-

		1	2	3	4	5	6	7
Anguilliformes								
Anguilla anguilla	Common Eel	1	-	-	-	-	-	1
Conger conger	Conger Eel	6	-	-	-	2	-	4
Echidna zebra	Zebra Moray Eel	4	1	-	-	-	-	5
Echidna nebulosa	Snowflake Moray Eel	-	1	-	-	1	-	-
Gymnothorax favagineus	Leopard Moray Eel	2	-	-	-	-	-	2
Atheriniformes								
Bedotia geayi	Madagascan Rainbowfish	1	-	-	-	-	-	1
Glossolepis incisus (VU)	Metallic Rainbowfish	~19	-	-	-	-	-	19
Melanotaenia maccullochi	McCulloch's Rainbowfish	2	-	-	-	1	-	1
Melanotaenia boesemani (EN)	Boeseman's Rainbowfish	5	-	-	-	1	-	4
Melanotaenia splendida	Crimson-spotted Rainbowfish	1	-	-	-	1	-	-
Melanotaenia trifasciata	Rainbowfish	1	-	-	-	-	-	1
Belontiformes								
Dermogenys pusillus	Malayan Halfbeak	4	-	-	-	-	-	4
Nomorhamphus ebrardti	Sulawesi Halfbeak	~29	-	27	-	7	3	46
Beryciformes								
Myripristis jacobus	Blackbar Soldierfish	5	-	-	-	2	-	3
Characiformes								
Leporinus fasciatus	Black-banded Leporinus	1	-	-	-	1	-	-
Acestorhynchus falcatus	Spotted Cachorro	1	-	-	-	-	-	1
Astyanax mexicanus (VU)	Blind Cavefish	~23	-	-	-	1	-	22
Hemigrammus bleheri	Rummy-nose Tetra	~4	-	-	-	-	-	4
Hyphessobrycon herbertaxelrodi	Black Neon Tetra	~20	-	-	-	-	-	20
Hyphessobrycon pulchripinnis	Lemon Tetra	~16	-	2	-	5	-	13
Hyphessobrycon serpae	Serpae Tetra	~8	-	-	-	2	-	6
Metynnis argenteus	Silver Dollar	~3	-	-	-	-	-	3
Serrasalmus nattereri	Red-bellied Piranha	~20	300	-	-	182	-	138
Triportheus angulatus	Narrow Hatchetfish	~6	-	-	-	-	-	6
Hasemania nana	Silver-tipped Tetra	10	-	-	-	-	-	10
Cypriniformes								
Myxocyprinus asiaticus	Chinese Sailfin Sucker	1	-	-	-	-	-	1
Botia hymenophysa	Tiger Botia	2	-	-	-	-	-	2
Botia lohachata	Pakistani Loach	4	-	-	-	-	-	4
Botia macracanthus	Clown Loach	9	-	-	-	4	-	5
Botia modesta	Red-finned Botia	4	-	-	-	1	-	3
Botia sidthimunki (CR)	Chain Loach	~10	-	-	-	-	-	10
Leptobotia mantschurica	Manchurian Loach	2	-	-	-	-	-	2
Acheilognathus micropterus	Asian Bitterling	1	10	-	-	2	-	9
Balantiocheilos melanopterus (EN)	Silver Shark	1	-	-	-	1	-	-
Barbodes schwanenfeldi	Tinsel Barb	3	-	-	-	-	3	-
Barbus barbus	Barbel	4	-	-	-	-	-	4
Capoeta arulius	Arulis Barb	~17	-	-	-	5	-	12
Capoeta oligolepis	Checker Barb	~16	-	-	-	2	-	14
Capoeta semifasciolatus	Chinese Green Barb	6	-	-	-	1	-	5
Capoeta tetrazona	Cherry Barb	~7	-	-	-	1	-	6
Carassius auratus	Goldfish	~16	1	-	-	1	-	16
Ctenopharyngodon idella	Grass Carp	7	-	-	-	-	-	7
Cyprinus carpio	Carp - Koi, mirror, etc.	~49	5	-	-	1	-	53
Epalzeorhynchus siamensis	Flying Fox	6	-	-	-	4	-	2
Garra sp.	Chinese Loach	3	-	-	-	-	-	3
Perciformes								
Naso lituratus	Lipstick Tang	1	-	-	-	-	-	1
Paracanthurus hepatus	Regal Tang	3	-	-	-	-	-	3
Zebrasoma flavescens	Yellow Saillin Tang	5	-	-	-	-	-	5
Ctenopoma kingsleyae	Kingsley's Climbing Perch	3	-	-	-	-	-	3
Apogon nematopterus	Pyjama Cardinal	3	-	-	-	-	-	3
Belontia signata	Combtail	~17	-	-	-	3	-	14
Betta splendens	Siamese Fighting Fish	2	-	-	-	-	-	2
Colisa chuna	Honey Gourami	2	-	-	-	1	-	1
Colisa lalia	Dwarf Gourami	~6	-	-	-	2	-	4
Macropodus opercularis	Paradise Fish	~7	-	-	-	1	-	6
Trichogaster trichogaster	Three-spot Gourami	~8	-	-	-	-	-	8
Blennius gattorugine	Tompot Blenny	6	-	-	-	2	-	4
Lipophrys pholis	Shanny	-	20	-	-	6	-	14
Pterosynchiropus splendidus	Mandarin Fish	1	-	-	-	-	-	1
Lepomis gibbosus	Pumpkinseed	6	-	-	-	-	-	6
Lepomis gulosus	Warmouth Bass	3	-	-	-	-	-	3
Lepomis humilis	Orange Spotted Sunfish	9	-	-	-	7	-	2
Lepomis megalotis	Long-eared Sunfish	8	-	-	-	-	-	8
Siniperca chuatsi	Chinese Perch	3	-	-	-	-	-	3
Chaetodon falcula	Falcula Butterflyfish	1	-	-	-	-	-	1
Chelmon rostratus	Copperband Butterflyfish	1	-	-	-	-	-	1
Heniochus acuminatus	Wimpole or Bannerfish	-	4	-	-	-	-	4
Apistogramma cacatuoides	Cockatoo Dwarf Cichlid	2	-	-	-	1	-	1
Chromidotilapia guentheri	Guenther's Mouthbrooder	~11	-	-	-	-	-	11
Cyphotilapia frontosa	Blue-banded Cichlid	6	-	-	-	-	-	6
Labrochromis ishmaeli (EW)	Victoria Cichlid	~19	-	-	-	11	-	8
Julidochromis regani	Striped Julie	~60	-	11	-	-	40	31
Labeotropheus fuelleborni	Red-top Cichlid	~115	-	-	-	2	-	113
Melanochromis auratus	Golden Cichlid	1	-	-	-	1	-	-
Neolamprologus brichardi	Lyretail Lamprologus	~292	-	-	-	8	-	284
Neolamprologus leleupi	Golden Lamprologus	~14	-	-	-	1	-	13
Pseudocrenilabrus multicolor	Egyptian Mouthbrooder	~7	-	-	-	1	-	6
Pseudotropheus zebra	Zebra Mbuna	~31	-	-	-	3	-	28
Pterophyllum scalare	Angel Fish	~21	-	-	-	4	-	17
Sarotherodon mossambica	Mozambique Mouthbrooder	2	-	-	-	-	-	2
Uaru amphiacanthoides	Uaru	1	-	-	-	1	-	-
Neocirrhitus armatus	Scarlet Hawkfish	1	-	-	-	-	-	1
Gobiodon citrinus	Saffron Goby	-	4	-	-	1	-	3
Pomatoschistus microps	Common Goby	-	20	-	-	5	-	15
Gobius niger	Black Goby	-	20	-	-	4	-	16
Gobius paganellus	Rock Goby	~10	-	-	-	6	-	4
Cheilinus sp.	Fire Tuskfish	-	1	-	-	-	-	1
Periophthalmus sp.	Mudskipper	2	10	-	-	1	-	11
Pterelectris evides	Torpedo Goby	5	-	-	-	1	-	4
Helostoma temmincki	Kissing Gourami	5	-	-	-	4	-	1
Ctenolabrus rupestris	Goldsinny Wrasse	9	10	-	-	1	-	18
Labroides dimidiatus	Cleaner Wrasse	4	-	-	-	2	-	2
Labrus bergylta	Ballan Wrasse	~17	-	-	-	1	-	16
Labrus mixtus	Cuckoo Wrasse	-	5	-	-	-	-	5
Labrus viridis	Green Wrasse	1	-	-	-	-	-	1
Pseudocheilinus hexataenia	Pyjama Wrasse	1	-	-	-	-	-	1
Symphodus melops	Corkwing Wrasse	14	20	-	-	-	-	34
Opistognathus aurifrons	Yellow-headed Jawfish	-	4	-	-	2	-	2
Datnioides quadrifasciatus	Many-barred Tiger Fish	3	-	-	-	-	-	3
Monodactylus argenteus	Silver Fish	5	-	-	-	2	-	3

		1	2	3	4	5	6	7
Dicentrarchus labrax	Sea Bass	~15	1	-	-	1	15	-
Chelon labrosus	Thick-lipped Grey Mullet	~28	-	-	-	1	-	27
Parupeneus barberinoides	Bicolour Goatfish	8	-	-	-	5	-	3
Perca fluviatilis	Perch	~11	-	-	-	1	-	10
Stizostedion lucioperca	Zander or Pikeperch	-	1	-	-	-	-	1
Callopleisops altivelis	Marine Betta	-	1	-	-	-	-	1
Centropyge acanthops	Cherub Angelfish	1	-	-	-	1	-	-
Pomacanthus imperator	Emperor Angelfish	1	-	-	-	-	-	1
Pomacanthus paru	French Angelfish	1	-	-	-	-	-	1
Amphiprion akindynos	Australian Clownfish	2	-	-	-	-	-	2
Amphiprion ocellaris	Clownfish	2	-	-	-	-	-	2
Chromis viridis	Blue-green Chromis	~27	-	-	-	-	-	27
Dascyllus aruanus	White-tailed Humbug	1	-	-	-	-	-	1
Dascyllus marginatus	Marginate Damsel	1	-	-	-	-	-	1
Dascyllus melanurus	Black-tailed Humbug	4	-	-	-	1	-	3
Pomacentrus alleni	Neon Damselfish	-	10	-	-	1	-	9
Premnas biaculeatus	Maroon Clownfish	2	-	-	-	-	-	2
Pseudochromis diadema	Purple Flashback	1	-	-	-	-	-	1
Selenotoca multifasciata	Green Scat	1	-	-	-	1	-	-
Anthias squamipinnis	Lyretail Coralfish	9	-	-	-	2	-	7
Cephalopholis miniatus	Red Grouper	1	-	-	-	-	-	1
Cromileptis altivelis	Polka-dot Grouper	3	-	-	-	-	-	3
Serranus tabacarius	Tobacco Bass	-	2	-	-	1	-	1
Serranus tigrinus	Harlequin Bass	-	2	-	-	1	-	1
Serranus tortugarum	Chalk Bass	-	2	-	-	-	-	2
Sparus auratus	Gilthead Bream	~27	-	-	-	4	23	-
Spondyliosoma cantharus	Black Sea Bream	~10	20	-	-	-	-	30
Toxotes jaculator	Archerfish	4	-	-	-	-	-	4
Echiichthys vipera	Lesser Weever	7	-	-	-	4	-	3
Pleuronectiformes								
Pleuronectes platessa	Plaice	3	-	-	-	2	-	1
Polypteriformes								
Polypterus bichir	Polypterus	2	-	-	-	-	-	2
Polypterus delhezi	Polypterus	1	-	-	-	-	-	1
Polypterus palmas	Polypterus	1	-	-	-	-	-	1
Polypterus retropinnis	Polypterus	2	-	-	-	-	-	2
Polypterus senegalus	Polypterus	1	-	-	-	-	-	1
Polypterus weeksi	Polypterus	1	-	-	-	-	-	1
Salmoniformes								
Esox lucius	Pike	3	-	-	-	2	-	1
Oncorhynchus mykiss	Rainbow Trout	9	-	-	-	-	-	9
Salmo trutta	Brown Trout	5	-	-	-	1	-	4
Scorpaeniformes								
Trigla lucerna	Tub Gurnard	-	10	-	-	1	-	9
Hypodes rubripinnis	Velvetfish	2	4	-	-	2	-	4
Caracanthus madagascariensis	Strawberry Coral Croucher	-	6	-	-	6	-	-
Cottus gobio	Miller's Thumb	5	6	-	-	6	-	5
Taurulus bubalis	Sea Scorpion	9	20	-	-	17	-	12
Pterois volitans	Dragonfish	3	-	-	-	2	-	1
Siluriformes								
Pelteobagrus brashnikowi	Amur Dragon Catfish	~11	-	-	-	-	-	11
Corydoras aeneus	Bronze Catfish	~12	-	-	-	1	-	11
Corydoras elegans	Elegant Corydoras	5	-	-	-	-	-	5
Corydoras haraldschultzi	Corydoras	4	-	-	-	-	-	4
Corydoras melanistius	Black Dorsal Catfish	2	-	-	-	-	-	2
Corydoras nattereri	Blue Catfish	3	-	-	-	-	-	3
Corydoras paleatus	Peppered Catfish	~21	-	-	-	2	-	19
Corydoras panda	Panda Catfish	1	-	-	-	-	-	1
Corydoras trilineatus	Leopard Catfish	1	-	-	-	-	-	1
Corydoras undulatus	Wavy Catfish	~12	-	-	-	2	-	10
Hoplosternum littorale	Hoplosternum Catfish	1	-	-	-	-	-	1
Agamyxis pectinifrons	Spotted Doras Catfish	3	-	-	-	2	-	1
Platydoras costatus	Striped Doras	-	1	-	-	-	-	1
Heteropneustes fossilis	Stinging Catfish	2	-	-	-	-	-	2
Ameiurus melas	Black Bullhead Catfish	1	-	-	-	-	-	1
Ameiurus nebulosus	Brown Bullhead Catfish	1	-	-	-	-	-	1
Ancistrus sp.	Bristle-nosed Catfish	1	-	-	-	-	-	1
Otocinclus affinis	Dwarf Sucker Catfish	8	-	-	-	-	-	8
Pterygophichthys gibbiceps	Sailfin Pleco	7	1	-	-	-	-	8
Synodontis angelicus	African Spotted Catfish	1	-	-	-	-	-	1
Synodontis clarias	Red-tailed Synodontis	1	-	-	-	-	-	1
Synodontis multipunctatus	Cuckoo Catfish	3	-	-	-	-	-	3
Synodontis sp.	Synodontis	4	-	-	-	-	-	4
Tetraodontiformes								
Rhinecanthus assasi	Arabian Picasso Triggerfish	-	1	-	-	-	-	1
Arothron hispidus	Striped-belly Puffer	1	-	-	-	-	-	1
Arothron stellatus	Spotted Puffer	1	-	-	-	-	-	1
Canthigaster valentini	Minstrel Puffer	1	-	-	-	1	-	-
CHONDRICHTHYES								
Carcharhiniformes								
Carcharhinus melanopterus	Black-tipped Reef Shark	3	-	-	-	1	-	0/2
Lamniformes								
Scyliorhinus canicula	Spotted Dogfish	~12	-	2	-	4	3	7
Scyliorhinus stellaris	Bull Huss or Nurse Hound	1	-	-	-	-	-	1
Rajiformes								
Potamotrygon sp.	Freshwater Stingray	3	-	7	-	1	2	7
Raja clavata	Thornback Ray	-	1	-	-	-	-	1
Raja microocellata	Small-eyed Ray	2	-	-	-	2	-	-
Raja undulata	Spotted Ray	-	1	-	-	-	-	1
SARCOPTERYGII								
Lepidosireniformes								
Protopterus aethiopicus	Heckel's African Lungfish	1	-	-	-	-	1	-
Total: Fishes plus 1 colony		**2428**	**648**	**655**	**-**	**890**	**115**	**2726**

Key to columns for Invertebrates:

column 1 Arrivals
column 2 Births/Hatchings
column 3 Deaths
column 4 Departures
column 5 Number at end of year of Young/Eggs (na=not applicable, nr=not recorded)
column 6 Number at end of year of Adult Males/Adult Females/Adults of unknown gender or without gender, or number of colonies
column 7 Count Unit: I=Adult numbers represent exact number of individuals. Young and Eggs may be estimated. A=All numbers are approximate. C=Numbers represent exact number of colonies
column 8 Population Status: M=Maintaining, B=Breeding, D=Declining, N=Newly acquired species, nr=Not recorded, na=Not applicable.

INVERTEBRATES (Invertebrates in the aquarium are not listed)		1	2	3	4	5	6	7/8
CNIDARA								
Scyphozoa								
Cassiopeia sp.	Upside-down Jellyfish	25	-	46	-	0/nr	0.0/1	I/D
ANNELIDA								
Hirudinea								
Hirudo medicinalis (RT)	Medicinal Leech	-	6	33	-	6/nr	0.0/0	I/D
MOLLUSCA								
Gastropoda								
(figures reported for *Partula* and *Samoana* spp. are for the end of the year only)								
Partula affinis (CR)	Polynesian Tree Snail	-	-	-	-	5/na	0.0/5	I/D
Partula clara (CR)	Polynesian Tree Snail	-	-	-	-	286/na	0.0/90	I/B
Partula dentifera (EW)	Polynesian Tree Snail	-	-	-	-	208/na	0.0/110	I/B
Partula faba (EW)	Polynesian Tree Snail	-	-	-	-	102/na	0.0/52	I/B
Partula gibba (CR)	Polynesian Tree Snail	-	-	-	-	0/na	0.0/1	I/D
Partula hebe bella (EW)	Polynesian Tree Snail	-	-	-	-	7/na	0.0/11	I/D
Partula hyalina (CR)	Polynesian Tree Snail	-	-	-	-	2/na	0.0/5	I/D
Partula labrusca (EW)	Polynesian Tree Snail	-	-	-	-	29/na	0.0/6	I/B
Partula mirabilis (EW)	Polynesian Tree Snail	-	-	-	-	0/na	0.0/0	I/na
Partula mirabilis x *taeniata*	Polynesian Tree Snail	-	-	-	-	5/na	0.0/6	I/N
Partula mooreana (EW)	Polynesian Tree Snail	-	-	-	-	30/na	0.0/33	I/B
Partula nodosa (EW)	Polynesian Tree Snail	-	-	-	-	2/na	0.0/6	I/D
Partula otaheitana (CR)	Polynesian Tree Snail	-	-	-	-	22/na	0.0/26	I/D
Partula radiolata (CR)	Polynesian Tree Snail	-	-	-	-	4/na	0.0/3	I/N
Partula rosea (CR)	Polynesian Tree Snail	-	-	-	-	0/na	0.0/1	I/D
Partula suturalis strigosa (EW)	Polynesian Tree Snail	-	-	-	-	118/na	0.0/117	I/M
Partula suturalis vexillum (EW)	Polynesian Tree Snail	-	-	-	-	185/na	0.0/146	I/B
Partula suturalis mixed ssp.	Polynesian Tree Snail	-	-	-	-	8/na	0.0/12	I/N
Partula taeniata	Polynesian Tree Snail	-	-	-	-	0/na	0.0/0	I/na
Partula tohiveana (EW)	Polynesian Tree Snail	-	-	-	-	325/na	0.0/98	I/B
Partula tristis (EW)	Polynesian Tree Snail	-	-	-	-	6/na	0.0/8	I/B
Partula turneri	Polynesian Tree Snail	-	-	-	-	20/na	0.0/5	I/B
Partula varia (CR)	Polynesian Tree Snail	-	-	-	-	119/na	0.0/51	I/B
Samoana attenuata (EN)	Polynesian Tree Snail	-	-	-	-	5/na	0.0/2	I/M
Samoana bellula	Marquesan Tree Snail	-	-	-	-	1/na	0.0/1	I/D
Samoana striata	Marquesan Tree Snail	-	-	-	-	0/na	0.0/0	I/na
Samoana sp. (Hiva Oa 1)	Marquesan Tree Snail	-	-	-	-	10/na	0.0/3	I/M
Trochomorpha sp.	Tahitian Trochomorph Snail	-	6	7	-	2/na	0.0/0	A/D
Achatina achatina	Giant Land Snail	-	nr	nr	-	0/nr	0.0/0	A/na
Achatina fulica	Giant Land Snail	2	nr	nr	12	0/nr	0.0/14	A/M
Archachatina marginata	West African Giant Land Snail	-	nr	nr	2	14/nr	0.0/0	A/M
Asperitas sp.	Land Snail	40	nr	nr	-	0/nr	0.0/1	A/D
Euglandina rosea	Predatory Snail	2	-	6	-	0/nr	0.0/1	I/M
Strophocheilus oblongus	Mega Snail	-	-	-	2	2/nr	0.0/1	I/D
Diplomorpha delatouri	Vanuatu Tree Snail	5	nr	nr	-	0/nr	0.0/6	I/D
Pachnodus fregatensis	Fregate Island Enid Snail	-	nr	nr	31	0/nr	0.0/1	I/D
Pomacea palludosa	Apple Snail	-	nr	nr	-	400/nr	0.0/30	A/B
CRUSTACEA								
Malacostraca								
Birgus latro	Robber Crab	-	-	1	-	0/nr	0.0/0	I/na
Coenobita clypeatus	Land Hermit Crab	-	-	-	-	0/nr	0.0/1	I/M
Cardisoma sp.	African Blue River Crab	5	-	-	-	0/nr	0.0/5	I/M
Procambarus sp.	Australian Crayfish	6	-	6	-	0.0	0.0/0	I/na
ARACHNIDA								
Araneae								
Nephila madagascariensis	Golden Orb Weaver	20	-	-	-	5/nr	0.2/0	I/N
Phoneutria sp.	Wandering Spider	-	-	1	-	0/nr	0.0/0	I/na
Brachypelma auratum	Flame-knee Spider Bird-eating Spider	-	-	-	-	0.0	0.1/0	I/M
Brachypelma pallidum	Mexican Rose Bird-eating Spider	-	-	-	-	3.0	0.0/0	I/M
Brachypelma smithi	Red-kneed Bird-eating Spider	25	-	9	28	73.0	2/12.0	I/M
Brachypelma emilia	Red-legged Bird-eating Spider	-	-	-	-	1.0	0.0/0	I/M
Brachypelma vagans	Red-rumped Bird-eating Spider	-	-	1	-	1.0	0/1.0	I/M
Grammostola spatulata	Chile Rose Spider	1	-	-	-	0.0	0.2/0	I/M
Hysterocrates gigas	Cameroon Rusty-red Baboon Spider	-	-	2	-	0.0	0.0/0	I/na
Lasiodora parahybana	Brazilian Bird-eating Spider	-	-	-	-	0.0	0.2/0	I/M
Avicularia avicularia	Pink-toed Bird-eating Spider	-	-	1	-	3.0	0/1.0	I/M
Avicularia hirsuta	Pink-toed Bird-eating Spider	-	-	1	-	0.0	0.0/0	I/na
Avicularia versicolor	Surinam Bird-eating Spider	-	-	1	-	0.0	0.0/0	I/na
Metriopelma sp.	Bird-eating Spider	1	-	-	-	0.0	0/1.0	I/N
Poecilotheria regalis	Indian Ornamental Spider	-	-	-	-	0.0	0/1.0	I/M
Poecilotheria subfusca	Sri Lankan Ornamental Spider	-	-	6	-	0.0	0/1.0	I/M
Latrodectus hasselti	Red-back Black Widow Spider	-	-	1	-	0.0	0.0/0	I/na
Latrodectus mactans	North American Black Widow Spider	1	nr	nr	2	0.0	0.2/0	I/M
Scorpiones								
Androctonus australis	Tunisian Fat-tailed Scorpion	-	-	-	-	0/na	2.2/0	I/M
Androctonus crassicauda	Fat-tailed Scorpion	6	-	-	2	0/na	0.0/4	I/N
Buthus occitanus	Yellow Scorpion	1	-	-	-	0/na	0.0/1	I/N
Pandinus imperator	Imperial Scorpion	59	130	48	24	88/na	11.26/0	I/M
Pandinus sp.	Malagasy Jungle Scorpion	-	-	-	-	0/na	0.0/1	I/M
Solifugae								
Galeodes sp.	Egyptian Solifuge	2	-	1	-	0/nr	0.0/1	I/N
MYRIAPODA								
Chilopoda								
Scolopendra abnormis (VU)	Serpent Island Centipede	-	-	2	-	0.0	0.0/0	I/na
Scolopendra gigantea	Giant Centipede	-	-	1	-	0.0	0.0/0	I/na
Scolopendra sp.	Egyptian Giant Centipede	6	-	5	-	1.0	0.0/0	I/N
Diplopoda								
Graphidostreptus sp.	Giant Millipede	4	nr	1	-	0/nr	0.0/3	I/M
Sechelleptus seychellarum	Seychelles Giant Millipede	22	nr	nr	-	20/nr	0.0/16	I/B
Epibolus pulchripes	Mombassan Train Millipede	-	nr	nr	-	60/nr	2.2/0	A/B

		1	2	3	4	5	6	7/8
INSECTA								
Orthoptera								
Schistocerca gregaria	Desert Locust	-	nr	nr	-	100/nr	0.0/30	A/M
Gryllus bimaculatus	African Field Cricket	600	nr	nr	-	400/nr	50/50.0	A/M
Gryllus campestris (RT)	British Field Cricket	7	1830	992	-	838/nr	0.0.0	A/B
Pholeogryllus geertsi	Cave Cricket	-	nr	nr	-	100/nr	0.0/20	A/B
Hemideina crassidens	Wellington Tree Weta	-	60	48	-	0/nr	10/8.0	I/B
Decticus verrucivorus (RT)	British Wart-biter Cricket	-	212	184	28	0/6628	0.0.0	I/B
Gryllotalpa gryllotalpa (RT)	Mole Cricket	-	-	6	-	1.0	5/7.0	I/M
Blattodea								
Gromphadorhina portentosa	Malagasy Hissing Cockroach	5	nr	nr	10	60/na	10/20/50	A/M
Periplaneta americana	American Cockroach	-	nr	nr	-	500/nr	250/250	A/M
Periplaneta australasiae	Australian Cockroach	-	nr	nr	-	50/nr	25/25.0	A/M
Mantodea								
Sphodromantis sp.	African Praying Mantis	20	nr	nr	2	0/nr	0/1.0	I/M
Phasmatodea								
Acrophylla wuelfingi	Queensland Titan Stick Insect	-	nr	nr	52	140/200	4/8.0	A/B
Eurycantha calcarata	Indonesian Spiny Stick Insect	-	nr	nr	20	15/300	2/1.0	A/B
Extatosoma tiaratum	Macleay's Spectre Stick Insect	-	nr	nr	6	150/400	10/25.0	A/B
Heteropteryx dilatata	Malaysian Jungle Nymph	-	nr	nr	14	10/200	12/8.0	A/B
Coleoptera								
Dytiscus sp.	Egyptian Great Diving Beetle	6	nr	nr	-	0.0	0.0.0	I/na
Unidentified sp.	Egyptian Diving Beetle	4	nr	nr	-	0.0	0.0.0	I/na
Anthia sp.	Domino Beetle	1	-	1	-	0.0	0.0.0	I/na
Scarabaeus semipunctatus	African Dung Beetle	43	nr	nr	-	nr/nr	0.0/20	A/M
Blaps mucronata	Churchyard Beetle	-	nr	nr	-	nr/nr	0.0/8	A/M
Blaps sp.	Desert Beetle	15	nr	nr	-	nr/nr	0.0/1	A/D
Polposipus herculeanus (CR)	Giant Fregate Beetle	21	nr	nr	-	100/nr	0.0/34	I/B
Diptera								
Drosophila melanogaster	Fruit Fly	-	-	-	-	0.0	0.0/1	C/M
Lepidoptera								
Bombyx mori	Silkworm	-	nr	nr	-	0/300	0.0.0	A/M
Heliconius charitonius	Zebra Butterfly	-	-	2	-	0.0	0.0.0	I/na
Heliconius melpomene	Postman Butterfly	10	nr	nr	89	nr/nr	0.0/20	A/B
Actias luna	American Moon Moth	-	nr	nr	-	0.0	0.0.0	A/na
Hymenoptera								
Ampulex compressa	Jewel Wasp	-	nr	nr	12	nr/nr	18/9.0	A/B
Apis mellifera	Honeybee	2	-	4	-	0.0	0.0/2	C/M
Atta cephalotes	Leaf-cutting Ant	3	-	1	2	0.0	0.0/2	C/M
Formica rufa	Red Wood Ant	-	-	-	-	0.0	0.0/1	C/M
Hemiptera								
Platymerus biguttata	Assassin Bug	-	nr	nr	-	40/nr	0.0.0	A/D
Total: Invertebrates: approx. 84 species; approx. 6631 specimens; 6 colonies								

WHIPSNADE WILD ANIMAL PARK		1	2	3	4	5	6	7
MAMMALS								
Diprotodontia								
Macropus rufogriseus frutica	Red-necked (Bennett's) Wallaby**	823	-	-	-	-	-	550
Macropus rufogriseus	White Wallaby	14	-	4	-	2	-	5/7/4
Macropus parma	White-fronted Wallaby	-	2	-	-	-	-	1/1
Primates								
Lemur catta	Ring-tailed Lemur (VU)	-	6	-	-	-	-	6/0
Varecia variegata variegata (EN)	Black-&-white Ruffed Lemur	-	2	-	-	-	-	1/1
Varecia variegata rubra (CR)	Red Ruffed Lemur	-	2	-	-	-	-	1/1
Pithecia pithecia	White-faced Saki Monkey	2	2(1)	-	-	-	2	1/1
Saimiri boliviensis	Black-capped Squirrel Monkey	16	2	1	-	2	4	2/11
Callithrix argentata argentata	Silvery Marmoset	-	2	-	-	-	-	1/1
Leontopithecus chrysomelas (EN)	Golden-headed Lion Tamarin	-	6	-	-	2	-	3/1
Pan troglodytes (EN)	Chimpanzee	11	-	1	1	-	2	6/3
Rodentia								
Cynomys ludovicianus	Prairie Marmot**	250	-	-	-	-	-	100
Dolichotis patagonum	Mara**	210	-	-	-	-	-	188
Carnivora								
Canis lupus	Grey Wolf	16	-	6	1	1	-	8/11/1
Ursus arctos	Brown Bear	5	-	-	-	-	-	1/4
Ailurus fulgens fulgens (EN)	Red Panda	2	-	1	-	1	-	1/1
Helogale parvula	Dwarf Mongoose	8	-	6	6	1	-	3/4
Panthera leo	Lion	1	-	-	-	-	-	0/1
Panthera tigris altaica (CR)	Amur (Siberian) Tiger	2	2	-	-	-	2	1/1
Acinonyx jubatus (VU)	Cheetah	7	1	-	-	2	1	3/2
Pinnipedia								
Zalophus californianus	Californian Sealion	3	-	1	1	-	-	1/2
Phoca vitulina	Common Seal	1	-	-	-	-	-	1/0
Halichoerus grypus	Grey Seal	1	-	-	-	-	-	0/1
Proboscidea								
Elephas maximus (EN)	Asian Elephant	3	1	-	-	-	-	1/3
Perissodactyla								
*Equus burchelli chapmani**	Chapman's Zebra	1	-	-	-	-	-	1/0
*Equus grevyi** (EN)	Grevy's Zebra	8	-	1	-	-	-	2/7
*Equus hemionus onager** (EN)	Asiatic Wild Ass	8	-	1	1	-	-	1/7
*Equus przewalskii** (EW)	Przewalski's Horse	11	-	-	-	-	-	3/8
Rhinoceros unicornis (EN)	Greater One-horned Rhinoceros	2	-	-	-	-	-	1/1
Ceratotherium simum simum	Southern White Rhinoceros	7	-	2	-	-	-	2/7
Diceros bicornis michaeli (CR)	Black Rhinoceros	2	-	-	-	-	-	1/1
Artiodactyla								
Hippopotamus amphibius	Hippopotamus	3	-	-	-	-	-	2/1
Hexaprotodon liberiensis (VU)	Pygmy Hippopotamus	3	-	1	1	-	-	1/2
*Lama glama**	Llama (domestic)	2	-	-	-	-	-	2/0
Camelus bactrianus	Bactrian Camel (domestic)	12	1(1)	2	-	-	1	4/10
Muntiacus reevesi	Reeves's Muntjac**	25	-	-	-	-	-	18
Dama dama	Fallow Deer	27	-	13	5	10	-	9/15/1
*Axis axis**	Axis Deer	51	-	20	10	12	4	14/22/9
*Axis porcinus**	Hog Deer	37	-	14	5	3	2	15/19/7

		1	2	3	4	5	6	7
*Cervus duvaucelii** (VU)	Barasingha	32	-	12	7	6	-	10/20/1
*Cervus nippon taiouanus**	Taiwan Sika Deer	25	-	10	3	10	-	6/15/1
Cervus elaphus	Red Deer	70	-	-	-	9	61	-
*Elaphurus davidianus** (CR)	Père David's Deer	56	-	17	3	32	9	9/12/8
Rangifer tarandus	Reindeer (domestic)	3	-	-	-	-	-	0/3
Hydropotes inermis	Chinese Water Deer**	500	-	-	-	-	-	400
*Giraffa camelopardalis reticulata**	Reticulated Giraffe	5	-	1	-	-	-	3/3
*Tragelaphus angasi**	Nyala	11	-	6	-	6	-	3/8
*Tragelaphus spekei**	Sitatunga	16	-	6	-	-	4	7/11
*Boselaphus tragocamelus**	Nilgai	16	-	-	-	1	-	1/14
*Bubalus depressicornis** (EN)	Lowland Anoa	-	2(2)	1	-	-	-	2/1
*Bos gaurus** (VU)	Gaur	2	-	-	-	-	-	1/1
Bos grunniens	Yak (domestic)	20	-	11	-	1	6	3/21
*Syncerus caffer nanus**	African Buffalo	6	-	1	1	-	-	3/3
Bison bison	American Bison	2	-	1	-	-	-	2/1
Bison bonasus (EN)	European Bison	9	-	-	-	-	-	1/8
*Hippotragus equinus**	Roan Antelope	8	-	2	1	1	-	4/4
*Kobus ellipsiprymnus**	Common Waterbuck	7	-	3	-	2	1	1/6
Kobus megaceros	Nile Lechwe	8	-	2	-	-	-	6/4
*Oryx gazella gazella**	Gemsbok	9	-	4	1	1	-	2/9
*Oryx dammah** (CR)	Scimitar-horned Oryx	15	-	1	-	-	-	1/15
*Antilope cervicapra** (VU)	Blackbuck	21	-	8	7	3	-	6/12/1
Ovibos moschatus	Musk Ox	1	-	-	-	-	-	0/1
Ovis orientalis musimon (VU)	Mouflon	1	-	-	-	-	-	0/1
Domestic								
	Horse: Shire	1	-	-	-	-	-	1.0
	Cream Pony	2	-	-	-	-	-	1/1
	Welsh Pony (Cream form)	1	-	-	-	-	-	1.0
	Pig: Oxford Sandy x Black Pig	1	-	-	-	-	-	0/1
	Pot-bellied Pig	-	2	6	-	4	2	0/2
	Cattle: Belted Galloway	1	-	-	-	-	-	0/1
	Red Poll	3	-	-	-	2	-	0/1
	Jersey	1	-	-	-	1	-	-
	Sheep: Lincoln Longwool	4	-	-	-	2	-	0/2
	Hampshire	16	-	-	-	6	-	0/10
	Black-faced	-	1	-	-	-	-	1.0
	Goat: Windsor White	15	1	4	1	5	-	5/9
	Pygmy	3	-	-	-	-	-	0/3
Total: Mammals		**2465**	**35(4)**	**170**	**55**	**128**	**101**	**1834**
BIRDS								
Casuariiformes								
Dromaius novaehollandiae	Emu	9	-	6	1	-	3	3/2.6
Sphenisciformes								
Aptenodytes patagonica	King Penguin	12	-	1	-	3	-	4/1/5
Eudyptes crestatus	Rockhopper Penguin	17	-	1	-	1	2	5/3/7
Spheniscus humboldti	Humboldt's Penguin	46	7	15	1	6	11	16/19/15
Ciconiiformes								
Ciconia ciconia	White Stork	14	-	-	-	-	-	2/3/9
Eudocimus ruber	Scarlet Ibis	20	-	5	-	2	5(3)	6/7/5
Phoenicopterus ruber ruber	Rosy Flamingo	44	-	3	-	5	-	0.0/42

		1	2	3	4	5	6	7
Anseriformes								
Cygnus atratus	Black Swan	2	1	-	-	1	-	1.0/1
Cygnus cygnus	Whooper Swan	2	-	-	-	-	-	1/1
Coscoroba coscoroba	Coscoroba Swan	2	-	-	-	-	-	1/1
Anser indicus	Bar-headed Goose	39	-	-	-	-	5(4)	4/7/23
Anser canagicus	Emperor Goose	3	-	-	-	-	-	2/1
Branta leucopsis	Barnacle Goose	4	-	1	1	2	-	0.0/2
Branta ruficollis (VU)	Red-breasted Goose	4	-	-	-	-	-	2/2
Branta sandvicensis (VU)	Nene (Hawaiian Goose)	2	-	-	-	-	-	1/1
Alopochen aegyptiacus	Egyptian Goose	8	-	-	-	7	-	0.0/1
Tadorna tadorna	Shelduck	7	3	-	-	2	-	4/4
Aix galericulata	Mandarin Duck	8	4	9	-	-	-	7/5/9
Aix sponsa	Carolina Duck	10	4	-	-	-	-	7/7
Chenonetta jubata	Australian Wood Duck	3	1	-	-	-	-	2/2
Callonetta leucophrys	Ringed Teal	3	6	14	1	1	6	5/8/2
Anas americana	American Wigeon	4	1	-	-	1	-	2/2
Anas bahamensis	Bahama Pintail	6	-	-	-	-	1	3/2
Netta peposaca	Rosybill	4	-	-	-	-	-	2/2
Netta rufina	Red-crested Pochard	4	4	-	-	-	-	4/4
Aythya ferina	European Pochard	3	-	1	-	-	-	1/3
Somateria mollissima mollissima	Northern Eider	11	-	6	5	3	-	3/5/1
Bucephala islandica	Barrow's Goldeneye	2	-	-	-	-	-	1/1
Mergus albellus	Smew	-	3	-	-	-	-	1/2
Mergus cucullatus	Hooded Merganser	4	-	-	-	-	-	2/2
Falconiformes								
Haliastur indus	Brahminy Kite	1	-	-	-	-	-	0.0/1
Haliaeetus leucocephalus	Bald Eagle	1	-	-	-	-	-	0/1
Gyps africanus	African White-backed Vulture	1	-	-	-	-	-	0.0/1
Gyps rueppelli	Ruppell's Griffon Vulture	6	-	-	-	1	-	2/3
Accipiter nisus	Eurasian Sparrowhawk	1	-	-	-	-	-	0/1
Parabuteo unicinctus	Harris's Hawk	2	-	-	-	-	-	1/1
Falco biarmicus	Lanner Falcon	3	-	-	-	-	-	3.0
Falco cherrug	Saker Falcon	1	-	-	-	-	-	0/1
Falco columbarius	Merlin	-	1	-	-	-	-	0/1
Galliformes								
Excalfactoria chinensis	Painted Quail	1	-	-	-	1	-	-
Tragopan temminckii	Temminck's Tragopan	2	-	6	-	3	2	1/1/1
Gallus gallus	Red Jungle Fowl**	70	-	-	-	-	-	65
Pavo cristatus	Common Peafowl**	200	-	-	-	-	-	210
Lophura edwardsi	Edward's Pheasant	2	-	-	-	1	-	1.0
Crossoptilon mantchuricum	Brown Eared Pheasant	2	-	-	-	-	-	1/1
Gruiformes								
Grus japonensis (VU)	Red-crowned Crane	5	-	-	-	1	-	1/3
Grus vipio (VU)	White-naped Crane	8	-	3	1	-	3	4/3
Grus rubicunda	Brolga	3	-	-	-	-	-	2/1
Grus paradisea (VU)	Stanley Crane	2	-	2	1	-	-	1/2
Grus carunculatus (VU)	Wattled Crane	4	-	-	-	-	-	2/2
Balearica regulorum	South African Crowned Crane	1	-	-	-	-	1	-
Cariama cristata	Red-legged Seriema	1	-	-	-	-	-	1.0
Otis tarda tarda (VU)	Great Bustard	1	-	-	-	-	-	1.0

		1	2	3	4	5	6	7
Charadriiformes								
Haematopus ostralegus	Oystercatcher	5	-	-	-	1	-	0/0/4
Burhinus bistriatus	Double-striped Thick-knee	2	-	-	-	-	-	1/1
Burhinus oedicnemus oedicnemus	Stone Curlew	2	-	-	-	-	2	-
Himantopus himantopus	Black-winged Stilt	2	-	-	-	-	-	1/0/1
Psittaciformes								
Psittacus erithacus	Grey Parrot	-	1	-	-	-	-	1/0
Agapornis personata	Masked Lovebird	5	-	-	-	1	-	0/0/4
Psittacula eupatria	Alexandrine Parrakeet	2	-	-	-	-	-	2/0
Ara ararauna	Blue-&-gold Macaw	2	-	-	-	-	-	2/0
Ara macao	Scarlet Macaw	2	-	-	-	-	-	2/0
Myiopsitta monachus	Quaker (Monk) Parrakeet	2	-	-	-	-	-	1/1
Strigiformes								
Tyto alba	Barn Owl	1	-	-	-	-	-	0/1
Otus leucotis	White-faced Scops Owl	5	1(1)	-	-	1	3(1)	1/1
Bubo bubo bengalensis	Bengal Eagle Owl	1	-	-	-	-	-	0/1
Nyctea scandiaca	Snowy Owl	3	-	-	-	-	1	1/1
Strix aluco sylvatica	Tawny Owl	2	-	1	1	-	-	1/1
Strix uralensis	Ural Owl	-	2(2)	-	-	-	-	1/1
Speotyto cunicularia	Burrowing Owl	1	-	-	-	-	-	0/0/1
Coraciiformes								
Dacelo novaeguineae	Kookaburra	1	-	-	-	-	-	0/0/1
Coracias caudata	Lilac-breasted Roller	-	1(1)	-	-	-	-	1/0
Tockus erythrorhynchus	Red-billed Hornbill	2	-	-	-	-	-	1/1
Piciformes								
Ramphastos vitellinus citreolaemus	Citron-throated Toucan	1	-	-	-	-	-	0/1
	Total: Birds	**656**	**40(4)**	**74**	**12**	**44**	**45(8)**	**674**

REPTILES

Testudines								
Terrapene carolina	Three-toed Box Tortoise	3	-	-	-	1	-	1/1
Testudo hermanni	Hermann's Tortoise	8	7	5	1	-	1	4/10/4
Testudo kleinmanni (EN)	Egyptian Tortoise	9	-	-	-	2	-	5/2
Testudo horsfieldi (VU)	Horsfield's Tortoise	8	-	-	-	-	-	4/3/1
Chelus fimbriatus	Matamata	2	-	-	-	-	-	0/0/2
Crocodylia								
Osteolaemus tetraspis (VU)	West African Dwarf Crocodile	2	-	-	-	-	-	1/1
Sauria								
Phelsuma standingi (VU)	Standing's Day Gecko	2	-	-	-	-	-	1/1
Eublepharis macularius	Leopard Ground Gecko	35	-	-	-	-	25	2/7/1
Basiliscus plumifrons	Plumed Basilisk	2	-	5	1	-	-	1/1/4
Iguana iguana	Common Iguana	2	-	-	-	-	-	0/2
Mabuya perroteti	Red-sided Skink	10	-	-	-	5	-	2/0/3
Uromastyx hardwicki	General Hardwicke's Dabb Lizard	4	-	-	-	-	-	0/0/4
Chamaeleo owenii	Owen's Chameleon	1	-	-	-	1	-	-
Chamaeleo lateralis	Jewel Chameleon	1	-	-	-	1	-	-
Chamaeleo pardalis	Panther Chameleon	-	2	-	-	-	2	-
Chamaeleo calyptratus	Veiled Chameleon	-	7	-	-	1	-	1/5
Ameiva sp.	Ameiva	1	-	-	-	1	-	-
Varanus exanthematicus	Bosc's Monitor	3	-	-	-	1	-	1/0/1
Serpentes								
Python molurus bivittatus	Burmese Python	1	-	-	-	-	-	0/1
Corallus enydris cooki	Cook's Tree Boa	3	-	-	-	-	-	1/2
Eryx johnii	Smooth Sand Boa	2	-	-	-	-	-	2/0
Echis carinatus sochureki	Saw-scaled Viper	3	-	-	-	-	-	0/0/3
	Total: Reptiles	**102**	**16**	**10**	**2**	**13**	**28**	**85**

AMPHIBIANS

Anura								
Dendrobates auratus	Green-&-black Poison Frog	9	-	39	-	1	23	0/0/24
Dendrobates pumilio	Strawberry Poison Frog	-	21	-	-	13	-	0/0/8
Dendrobates azureus	Blue Poison Frog	5	-	-	-	-	-	2/3
Dendrobates leucomelas	Yellow-banded Poison Frog	3	-	-	-	-	-	0/0/3
Dendrobates truncatus	Yellow-&-black Poison Frog	12	3	4	-	1	2	2/2/12
Ceratophrys cranwelli	Wide-mouthed Frog	1	-	-	-	-	-	1/0
Ceratophrys ornata	Ornate Horned Frog	1	-	-	-	-	-	0/1
	Total: Amphibians	**31**	**24**	**43**	**-**	**15**	**25**	**58**

The numbers given for fishes and invertebrates at Whipsnade represent the numbers held at the end of 1997

FISHES

Characiformes		
Serrasalmus nattereri	Red-bellied Piranha	16
Hemmigrammus erythrozonus	Glowlight Tetra	4
Cypriniformes		
Rasbora heteromorpha	Harlequin Fish	6
Capoeta tetrazona	Cherry Barb	4
Tanichthys albonubes	White Cloud Mountain Minnow	6
Cyprinodontiformes		
Poecilia reticulata	Guppy	30
Poecilia hybrid	Molly	70
Xiphophorus variatus variatus	Platy	30
Gasterosteiformes		
Hippocampus whitei	Seahorse	13
Gymnotiformes		
Electrophorus electricus	Electric Eel	1
Perciformes		
Zebrasoma flavescens	Yellow Sailfin Tang	1
Acanthurus dussumieri	Hawaiian Surgeon Fish	1
Monodactylus argenteus	Silver Fish	30
Chrysiptera parasema	Yellow-tailed Damsel	6
Pterosynchiropus splendidus	Mandarin Fish	2
Amphiprion percular	Percular Clownfish	5
Amphiprion clarkii	Clark's Clownfish	3
Amphiprion melanopus	Pacific Fire Clownfish	2
Chromis viridis	Blue-green Chromis	4
Valenciennea puellaris	Orange-spot Goby	1
Ptereleotris zebra	Shotsilk Goby	4
Pteroleotris evides	Torpedo Goby	2
Nemateleotris decora	Purple Firefish	1
Meiacanthus oualanensis	Canary Blenny	2
Anthias squamipinnis	Lyretail Coralfish	1
Symphorichthys spilurus	Majestic Snapper	1
Tilapia sp.	Tilapia	30
Siluriformes		
Otocinclus vittatus	Dwarf Sucker Catfish	2
Plecostomus sp.	Plecostomus Catfish	1
Lophiiformes		
Antennarius sp.	Angler Fish	1
	Total Fishes: approx. 29 species; approx. 280 specimens	

INVERTEBRATES

ARACHNIDA		
Arneae		
Brachypelma smithi	Red-kneed Bird-eating Spider	0/1/4
Grammostola cala	Chile Rose Bird-eating Spider	1/0/1
Poecilotheria regalis	Indian Ornamental Spider	1/0/1
Steatoda albomaculata	Gambian False Widow Spider	colony
Latiodora parahybana	Brazilian Bird-eating Spider	0/0/1
Phoneutria sp.	Wandering Spider	0/1
Scorpiones		
Pandinus imperator	Imperial Scorpion	0/0/8
Pandinus sp.	Scorpion	0/0/2
Hadrurus arizonensis	Arizona Desert Scorpion	0/0/1
MYRIAPODA		
Chilopoda		
Scolopendra sp.	Giant Centipede	0/0/2
Diplopoda		
Epibolus pulchripes	Mombassan Train Millipede	0/0/1
Unidentified millipede	Nigerian Chocolate Millipede	0/0/4
INSECTA		
Orthoptera		
Schistocerca gregaria	Desert Locust	Colony
Gryllus bimaculatus	African Field Cricket	Colony
Pholeogryllus geertsi	Cave Cricket	Colony
Blattodea		
Gromphadorhina portentosa	Malagasy Hissing Cockroach	Colony
Coleoptera		
Oryctes nasicornis	European Rhino Beetle (larvae)	0/0/7
Scarabaeides sp.	Desert Beetle	0/0/1
Gevtrupes vernalis	Egyptian Dung Beetle	0/0/3
Eudicella gralli bhyni	Fruit Chafer Beetle	Colony
Eudicella woermanni	Fruit Chafer Beetle	Colony
Pachnoda naciguli	African Sun Beetle	Colony
Lepidoptera		
Heliconius melpomena	Postman Butterfly	Colony
Parnalype berberaha	Barberry Carpet Moth	Colony
Hymenoptera		
Acromyrmex octospinosus	Leaf-cutter Ants	Colony
Atta cephalotes	Leaf-cutter Ants	Colony
MARINE INVERTEBRATES		
Stichodactyla sp.	Carpet Anemone	1
Ophiocomina sp.	Brittle Starfish	2
Ophiolepis sp.	Red Serpent Starfish	1
Clibinarius vittatus	Hermit Crab	4
	Total Invertebrates: approx. 30 species; approx. 48 specimens; 12 colonies	

SUMMARY

	1	2	3	4	5	6	7	Number of species (excluding domestic)
London Zoo								
Mammals	942	77	553	94	292	260 (4)	926	94
Birds	649	114 (8)	186	52	111	119 (4)	667	128
Reptiles	529	79	107	3	186	60	466	112
Amphibians	238	23	8	-	73	24	172	12
Fishes	2428	648	655	-	890	115	2726	202
Total	**4786**	**941 (8)**	**1509**	**149**	**1552**	**578 (8)**	**4957**	**548**

In addition: one colony of fishes (individuals not counted)
Estimated number of invertebrates in the Collection at 31 December 1997:
Invertebrates Approx. 6631 specimens (+ 6 colonies) · Approx. 84 species

Whipsnade Wild Animal Park								
Mammals	2465	35 (4)	170	55	128	101	1834	60
Birds	656	40 (4)	74	12	44	45 (8)	674	69
Reptiles	102	16	10	2	13	28	85	18
Amphibians	31	24	43	-	15	25	58	7
Total	**3254**	**115 (8)**	**297**	**69**	**200**	**199 (8)**	**2651**	**150**

Note: Births, deaths, arrivals and departures of free-ranging animals at Whipsnade are not recorded.

Estimated number of fishes and invertebrates in the Collection at 31 December 1997:

Fishes	Approx. 280 specimens	29 species
Invertebrates	Approx. 48 specimens (+ 12 colonies)	30 species

Grand Total Zoological Society of London	**8040**	**1056**	**1806**	**218**	**1752**	**777**	**7608**	**646*** excl. fishes at Whipsnade

Grand Total of fishes: approx. 3006 specimens of 221 species*
Grand Total of invertebrates: approx. 6679 specimens (+ 18 colonies) of 100 species*

* The species common to London Zoo and Whipsnade Wild Animal Park are counted as one

ZSL98

The Zoological Society of London Annual Report

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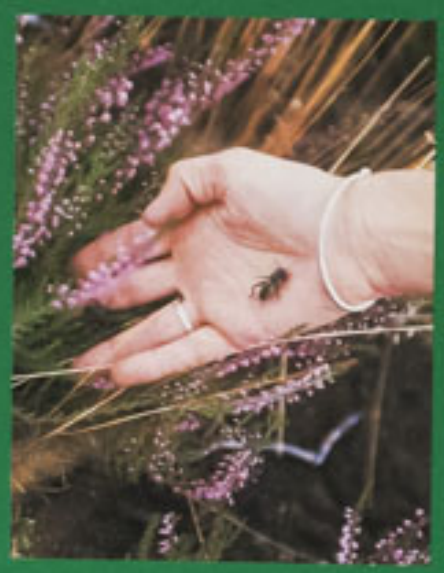


Cover pictures: Conservation in action: ZSL's work with English Nature's Species Recovery Programme for the British field cricket has resulted in 7000 zoo-bred animals being released into their natural habitat. The pictures show a release into a site in West Sussex.
Photos: Brian Aldrich, Dave Clarke and Paul Pearce-Kelly

ZSL MISSION

To promote the worldwide conservation of animals and their habitats by presenting outstanding living collections, breeding threatened species, increasing public awareness through information and education, conducting relevant research and undertaking action in the field.

The ZSL pursues this mission by:

1 keeping and presenting animals at London Zoo and Whipsnade Wild Animal Park in accordance with best practice;

2 giving priority to species that are threatened in the wild;

3 increasing public understanding of animals and their welfare and of the issues involved in their conservation;

4 maintaining an outstanding education and information programme, particularly for schoolchildren and families;

5 undertaking field conservation programmes, both in Britain and abroad;

6 developing its role as a leading centre for research and conservation biology and animal welfare;

7 fulfilling its role as a learned society and force for zoology and animal conservation through publications, scientific meetings, lectures, the award of prizes for outstanding achievement and the promotion of conservation policy.

PRESIDENT'S INTRODUCTION

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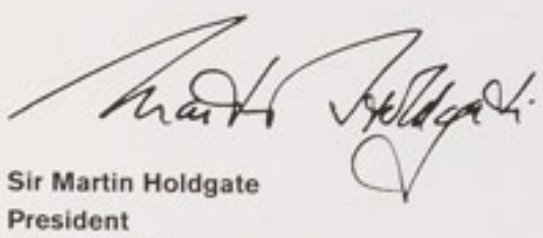
It seems scarcely credible but I write this Introduction only a few weeks before my first 5-year term of office as President of the ZSL comes to an end. Such an occasion invites retrospect as well as prospect.

In June 1994 I found myself presiding over a Society that was still deeply traumatised. Thanks to the distinguished leadership of my predecessor, Field Marshal Sir John Chapple, and the Secretary, Professor R McNeill Alexander, ZSL's survival was no longer in doubt – but we were still in the early stages of revival and far short of the 'thrival' that Sir John had set as the goal. Since then the hard and capable work of Officers, Council, Committees, staff at all levels, volunteers, Fellows and supporters – for all are indispensable components of the team – has brought that thrival into bud. It has some way to go to burst into full bloom.

For the past five years, the Society has been in the financial black. For the past three there has been a significant surplus to plough back into facilities that bore many marks of past neglect. At Regent's Park, the Mappin Terraces are once more occupied by animals. The Ambika Paul Children's Zoo is bursting with activity. The new *Web of Life* exhibit promises to be one of the most exciting displays of animal biodiversity in the world. At Whipsnade, elephants, hippos, rhinos and lemurs all have spacious and stimulating new habitats. And the side of our work that the public does not see is also flourishing. The Institute of Zoology's research has been commended by the Higher Education Funding Council for England. The scientific meetings and scientific journals have maintained a very high standard. The Library remains a unique and well-tended facility. ZSL staff are making an expert contribution to animal conservation in many regions of the world.

But ... the more we do, the more we recognise the need to do more. The world's fauna is in crisis, with many of our most spectacular species facing severe threats. While there is no substitute for conservation in natural habitats, zoos can and do play a major part in helping species through 'bottlenecks' of danger, breeding them for restoration to the wild. We in ZSL are fully committed to that work, and to the education programmes, research and publications that will enhance animal conservation worldwide. Our two living collections also help by allowing people who love animals to see them and admire them. Everyone who supports the Zoological Society of London, and who adds their voice to the call for conservation, is an ally in that cause.



Sir Martin Holdgate
President
13 April 1999

THE ZOOLOGICAL SOCIETY OF LONDON

Patron: Her Majesty The Queen

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Clinton Keeling (resigned 8 March 1998)
Nancy Lane, OBE, DPhil, ScD, CBiol, FIBiol *
Ken Livingstone MP †
Christopher Marler
Sophie McCormick, PhD *
Derrick Moore, FCA (co-opted 3 June 1998)
Martin Rowson, MA
Ken Sims *
Ted Smith, BSc, CBiol, FIBiol
Tony Stevens, MA, BVSc, MRCVS, DipBact †
Professor Ian Swingland, PhD, DSc, CBiol, FIBiol †
Jane Thornback, BSc, MSc
Professor Roger Wheater, OBE, CBiol, FIBiol, FRSE, *Vice-President*
Robert Wingate *

* From 3 June 1998
† To 3 June 1998

REVIEW OF THE YEAR

One of the two pygmy hippo calves born at Whipsnade.
Photo: Simon Hodge

1998 was a year during which we made steady progress with our conservation and education programmes, vigorously pursuing our mission. This report illustrates some of the work carried out by ZSL staff throughout the world as we build on our strengths.

The cover pictures show the results of our collaboration with English Nature on the conservation of the British field cricket – one of the UK's rarest invertebrate species. By the early 1990s it had been reduced to a single colony in West Sussex which numbered fewer than 100 individuals. Since 1992, over 7,000 ZSL-bred crickets have been released into a total of six sites and English Nature have been able to announce that the programme has successfully prevented the otherwise inevitable extinction of the species in this country.

This success story, which received a good deal of press interest, is a valuable reminder that the conservation of our own native species is as much a part of our mission as our projects overseas, which also continue to thrive. Our work in Nepal, still in its early stages last year, has developed well with the establishment of domestic livestock clinics and clinical wildlife treatment. The released gazelle and oryx in the Empty Quarter of Saudi Arabia prosper, and other countries in which ZSL staff are working include Sumatra, Madagascar, Rwanda, the Philippines as a partner in *Project Seahorse* and Kenya as part of the African Wildlife Veterinary Project.

Dr Durrell meets Whipsnade's lemurs

RAY, Gizmo, Fingers, Big Ears and the gang... Sounds like a gathering of henchmen for Al Capone.

But in fact it's just some of the names of Whipsnade Wild Animal Park's group of eight ring-tailed and ruffed lemurs.

Dr Lee Durrell, wife of the late Gerald Durrell, was at the park on Tuesday to officially open the new lemur enclosure.

There are ropes, hills and a waterfall to make the new residents feel at home, but you will most likely find them relaxing on special sun-bathing rocks within the enclosure – lemurs are real sun-worshippers.

The motley gang is sure to be a firm favourite with visitors, but in the wild there are fears for the lemurs who are disappearing fast. Lemur expert Dr Adam Britt of the Zoological Society of London, came to the park on Tuesday from Madagascar to report on their plight and on a scheme to introduce captive bred lemurs into the wild.

These activities also serve as a demonstration of one of ZSL's greatest strengths – the integrated nature of our activities. We are able to undertake conservation activities in the wild and in our two animal collections with the vital support of the highest quality strategic research and veterinary work.

Although our work is, of course, far wider than the two animal collections, London Zoo and Whipsnade Wild Animal Park remain our main shop windows in the UK. Despite a year in which the peak visitor seasons were dogged by poor weather, around 1.4 million people saw some of our work at first hand, giving us an enormous audience to engage with the conservation message. Many of these visitors go on to join our membership schemes, and work is in progress to bring all these supporters together in an integrated Society-wide scheme.

Above, left: Dr Lee Durrell opens the Whipsnade Lemur Island, dedicated to the memory of her husband, the naturalist Gerald Durrell.
Courtesy of Dunstable Gazette

Above, right: Vet on the move: ZSL Senior Veterinary Officer Tony Sainsbury with the vehicle loaned by Volvo for veterinary and animal management use.
Photo: Brian Aldrich

Left: London Zoo's Poet in Residence, Tobias Hill.
Photo: Nichola Kurz

We improved facilities at both zoos during the year. At Whipsnade, Lemur Island (dedicated to the memory of Gerald Durrell, once a student keeper at the Park) was officially opened by his widow, Dr Lee Durrell, who herself plays an active part in ZSL's work as a member of our Conservation & Science Advisory Committee. The new hippopotamus complex, with greatly improved indoor and outdoor facilities for common and pygmy hippos, was also opened during the year. We were delighted that two pygmy hippo calves were born there at the end of the year. The two Asian greater one-horned rhinos moved from London Zoo to their new accommodation at Whipsnade, a visible demonstration of our conservation links with Nepal.

At London, a great deal of work has been carried out to continue the ongoing programme of upgrading the zoo's general appearance and facilities. The major project, however, has been the planning and building of the ZSL Millennium Conservation Centre, which will house the biodiversity exhibition, *Web of Life*. Although this does not open its doors until 1999, it deserves special mention in this review of the year 1998, as the completion of a £4.4 million development is the culmination of several years of hard work involving staff from all parts of ZSL. We look forward with excitement to the opening of this world-class exhibit, which will further enhance the role of the zoos as an educational resource.

The availability of new technology enables us to produce an ever higher standard of interpretation, signage and publications for visitors, all of which are used to underline the issues of conservation. Our range of meetings, symposia and publications are also an important part of our educational and scientific activities; particular mention should be made of the success of the new journal, *Animal Conservation*, which has completed its first year of publication, and has been enthusiastically received.

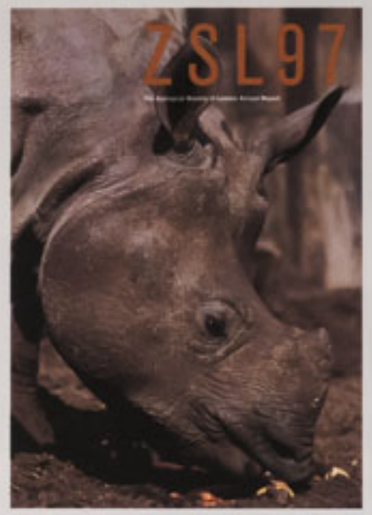
Above left: Labour MPs on a visit to London Zoo.

Good publicity is vital to any charity. This year has seen a flow of stories, and it is encouraging that, as well as the traditional (and important) zoo items, increasing space is being given to our scientific and conservation successes. We are also finding a growth in the number of 'household names' wanting to be associated with our work by making financial donations or gifts-in-kind. Details of some of these appear in this report, and we are most grateful for such recognition and support.

None of the work outlined in this report would be achieved without the co-operation and dedication of our staff, some of whom have to work in difficult conditions in order to further our mission. I would like to thank them as well as the many volunteers, Council and committee members who give up so much of their time because they passionately believe in what ZSL is doing. A marked feature of our mission is that there is never a shortage of projects and opportunities to consider; our problem is how to prioritise in order not to stretch our resources beyond their limits.

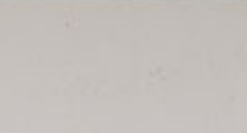
Richard Burge, the Director General for the past three years, decided to leave us at the end of the year in order to pursue his career elsewhere. His period with us saw a continuation of the improvement in our stability, a much higher profile in the media and the conservation world, and the development of a number of important projects. We thank him for the contribution he made to ZSL during his time with us.

Above: Visitors to ZSL included Lady Thatcher and the Emperor of Japan.
Photos: Ian Meyrick and Brian Aldrich



ZSL97, last year's award-winning Annual Report, featured our links with Nepal.
Cover photo: Terry Dennett

The ZSL Annual Report aims to be much more than a bare description of what has happened in any particular year. As well as its important function of reporting to the Fellowship, it is also an important publicity and information publication for use with potential individual and corporate donors, public bodies and others who may influence or wish to support our work. We were, therefore, delighted when last year's Annual Report won the award for Corporate Literature in the annual *DBA Marketing Week Design Effectiveness Awards*. This is given jointly to the designer and organisation for demonstrating commercial success and helping to achieve the required business objectives. I very much hope that this year's Report will be similarly successful in bringing our vital work to the attention of an even wider audience.



Professor R. McNeill Alexander
Secretary

ZSL recognises outstanding achievements in the field of zoological research and conservation through its annual presentation of awards and prizes. Council has announced the following awards for contributions to zoology for 1998:

Honorary Fellowship
to Sir David Attenborough, Britain's leading natural history film maker. He was knighted in 1985 and has received many prestigious awards including Fellowship of the Royal Society.

The ZSL Frink Medal for British Zoologists
(for significant and original contributions by professional zoologists to the development of zoology in its wider implications) to Professor John Lawton, FRS, of Imperial College, Ascot in recognition of his contributions to ecological science and to science in public life.

The Scientific Medal
(awarded to zoologists 40 years of age and under, in recognition of scientific merit) to Dr Nicholas Dale of St Andrews University, for his research in electro-physiology; to Dr L.W. Simmons of the University of Western Australia, for his research in insect behavioural ecology; and to Dr Chris Thomas of Leeds University, for his research in population ecology.

The ZSL Marsh Award for Conservation Biology
(for contributions of fundamental science and its application to the conservation of animal species and habitat) to Professor Peter Maitland, of the Fish Conservation Centre in Haddington, for his outstanding contribution to aquatic conservation.

The Stamford Raffles Award
(for distinguished contribution to Zoology, open to amateur zoologists or to a professional zoologist in recognition of contributions which are outside the scope of his or her professional activities and principal specialisation) to Dr Clive Carefoot, of Preston, for his contributions to research on plumage genetics.

The Thomas Henry Huxley Award
(for original work submitted as a doctoral thesis) to Dr Georgy Köntges, of Harvard University, for his thesis *The Role of the Rhomencephalic Neural Crest in Craniofacial Pattern Formation.*

The Prince Philip Prize
(open for competition to pupils under 19 years of age, of schools or other places of education in the United Kingdom, the Channel Islands or the Isle of Man, on the basis of an account of practical work involving some aspect of animal biology) to Fiona Graham of Garnock Academy, for her essay *A Study of the Social Behaviour of Chimpanzees.*

The ZSL Marsh Award for Conservation Biology, The Thomas Henry Huxley Award and The Prince Philip Prize are sponsored by The Marsh Christian Trust.

The Awards for 1997:

Honorary Fellowship
The Hon Miriam Rothschild

The Frink Medal
Professor Tim Clutton-Brock

The Scientific Medal
Dr Ian Boyd, Dr Innes Cuthill

The Marsh Award
Dr Rhys Green

The Silver Medal
Dr George B. Rabb

The Bronze Medal
Terence Kickenside, Dr James Kirkwood

The Thomas Henry Huxley Award
Dr Catherine Williams

The Prince Philip Prize
Carolyn Knight

Above from top: 1997 ZSL Awards winners.

The Prince Philip Prize medal.
Photos: Michael Lyster

CONSERVATION & SCIENCE

Project Seahorse: corral for pregnant male seahorses at Jagoliao in the Philippines.
Photo: Doug Warmolts

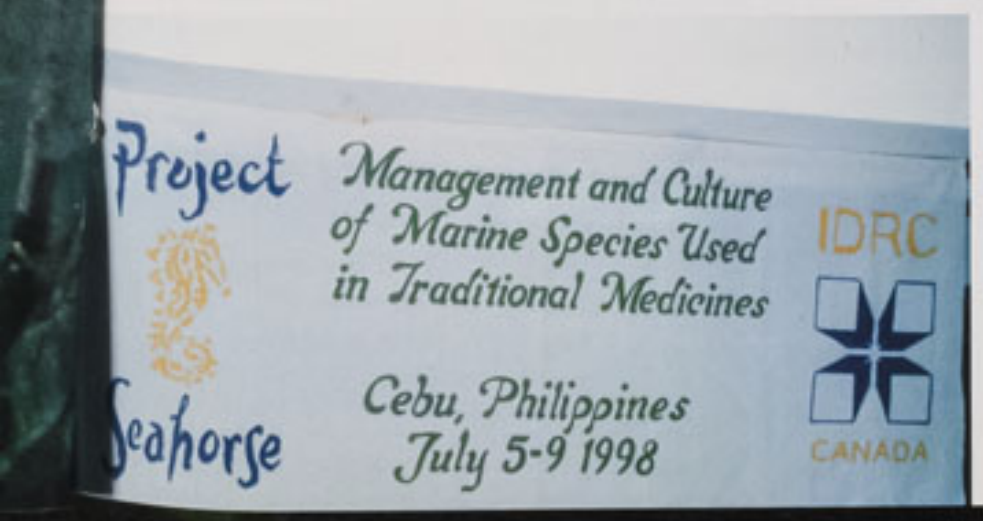
ZSL's unique strength is that work on animal conservation is underpinned by an active programme of strategic research. Practical conservation work at our two zoos and in the wild is supported by a world-leading institute of conservation biology. We aim not only to be effective conservationists but also to achieve the level of understanding that is essential if the daunting problems of animal conservation are to be addressed. We can only cover here a selection of the wide range of projects in which ZSL staff have been involved during the year.

We are working with English Nature on conservation programmes for several native species. At Whipsnade, captive-breeding skills are being used in a new conservation programme for the dormouse. A wild population of dormice was living on the boundary of Whipsnade and staff placed nest boxes in the area; a litter of young was found in one of these. We hope that further enhancement of this habitat will secure the species in this area and that captive-bred dormice will be used for reintroduction elsewhere in England. Whipsnade also collaborates with English Nature on a project for the Barbary carpet moth, a species which is difficult to breed in captivity. Poor weather during the summer resulted in a low hatching rate, but hopefully enough pupae will survive the winter to provide a nucleus for breeding in 1999.

Staff from Whipsnade travelled to Russia to discuss the potential for establishing a joint programme between ZSL and the Regional Authorities for conservation of the great bustard. The steppe grasslands around Saratov are home to the largest population of great bustards in the world and, although the number of birds is increasing, little is known of the species' use of the habitat. Some nest sites are vulnerable to agriculture and predators, and loss of birds in these areas could have a significant impact on the total population. There is considerable interest in extending the Memorandum of Agreement to include other species, and progress in this area will be made in 1999.

Christiane Silveira, a PhD student working in conservation genetics and Curator of Hoofstock at Lisbon Zoo, is carrying out a study on captive populations of sable, roan, impala and Nile lechwe in order to identify the wild origins of these species. Using blood and tissue samples from animals at Whipsnade and other collections, management strategies for the European populations of these species can be developed, taking account of their subspecific taxonomy and maintaining genetic diversity.

As part of our project to develop the methodology necessary to analyse Sumatran tiger population data, ZSL provided short-term technical assistance on tiger monitoring techniques in the Leuser Development Programme. We are also working with the Sumatran Tiger Project in Way Kambas National Park and with Fauna and Flora International in Kerinci Seblatt to develop reliable techniques to assess the numbers and status of tigers and other reclusive forest species.



Above from top:
The dormouse is the subject of a conservation programme at Whipsnade.
Photo: E.A. Janes

ZSL and Russian Regional Authorities are jointly working for conservation of the great bustard.

In Madagascar, we continue to monitor the captive-bred black and white lemurs reintroduced into the Betampona reserve to reinforce the existing wild population. Selected from various collections in the USA, the lemurs were transferred to the Duke University Primate Centre where they were familiarised with conditions in the wild prior to reintroduction. As part of a wider consortium including the Jersey Wildlife Preservation Trust, Dr Adam Britt observes and records the behaviour of these animals so that if problems arise, we may know why.

Working under difficult conditions in Rwanda, Dr Stuart Williams completed his survey of Akagera National Park, funded by the Darwin Initiative and the German Aid Agency GTZ. The Park, which has international importance for the conservation of antelopes, is scheduled to be substantially reduced in size under a government plan to provide land for returning refugees. However, there are still healthy, albeit reduced numbers, of roan, eland and sitatunga as well as elephant in the Park. The conclusion is that, with protection, these populations would continue, providing a major tourist attraction for this country which is in desperate need of foreign investment.

Dr Heather Hall presented a paper at a conference in Mexico on conservation breeding programmes for endangered live-bearing fishes. With Dr Gordon Reid (Director of the North of England Zoological Society, Chester Zoo), her co-chair of the UK Fish and Aquatic Invertebrate Taxon Advisory Group, she also conducted field visits with two other FAITAG members. During the course of these, a fish species, *Ameca splendens*, previously thought to be extinct in the wild, was rediscovered. We are now working with Mexican scientists on the conservation of these fishes in the wild and in aquaria.

Above left: Soay sheep on St Kilda are an excellent species in which to study natural selection.
Photo: Glyn Satterley

She also spent two weeks in the Philippines working on Project Seahorse. Some time was spent in the village where the field project is run, and the remainder in Cebu, where she co-organised an international workshop (40 people from 17 countries and territories) on the *Management and Culture of Marine Species used in Traditional Medicines*. In December, she also organised a *Seahorse Conservation Husbandry and Management Workshop* for the international aquarium community.

ZSL hosted an international *Population Group Management Workshop* to address the practical and scientific issues involved in the management of captive populations in which individuals cannot be easily identified. A research and action plan was developed as a result of the workshop.

Significant advances were made in our field project for the conservation of the Egyptian tortoise. Holding pens were constructed for animals seized from Cairo market last year. Ten tortoises that had been held in quarantine for several months received full veterinary screening before being radio-tagged and released to a former habitat within the Zaranik protected area. They were closely observed for three weeks and are now being monitored by the Egyptian team on a regular basis.

Studies of population dynamics and life-history evolution often ignore age structure. In collaboration with others, ZSL has analysed age-specific survival rates in a population of Soay sheep which has been the focus of a long-term study on Hirta, an island in the St Kilda archipelago in Scotland. Our results indicate that the dynamics of a population may be strongly influenced by its age structure. This has important implications for our understanding of how different life-history strategies evolved, and highlights the need to incorporate age-specific differences in population models.

Age-structured modelling approaches have also been used in our examination of goose populations which overwinter in the UK but breed in the arctic and high-arctic. Much of this work has been conducted under contract to Scottish Natural Heritage and in collaboration with The Wildfowl & Wetlands Trust. These analyses will be used by government agencies when they formulate population-specific action plans as stipulated under the African-Eurasian Migratory Waterfowl Agreement.

Above left: Radio-tagged Egyptian tortoise in the Zaranik protected area.
Photo: Wenman/D'Alterio

Above right: There are Asian elephants at both zoos, and we recently added a young male (seen in the foreground) to the herd at Whipsnade.
Photo: Simon Hodge

Above from top:
ZSL scientists have been exploring the reproductive biology of the Mohor gazelle *(Gazella dama mhorr).*
Photo: Mar Cano

Colonies of a multiple-queen ant are the subject of an Institute of Zoology study on social evolution.

Population Viability Analysis (PVA) was used to examine extinction risk in the Asian elephant. We found that a time-frame much longer than the traditional 100-year assessment of population persistence is needed to assess extinction risk accurately. These results have important implications for how investigators conduct PVAs, and for the listing of endangered species by IUCN, the World Conservation Union.

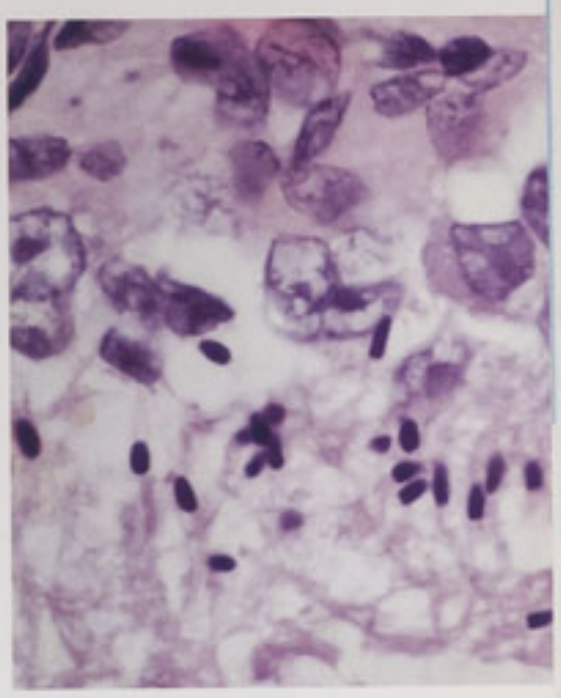
PVA models have also been used to make predictions about the likely size that populations will reach over time. However, such predictions assume that populations will not show any change in behaviour resulting from varying ecological conditions or human impact on the habitat. By incorporating the behaviour of individuals into the modelling process, we may increase the reliability of predictions from these models. In collaboration with the Institute of Terrestrial Ecology, The Wildfowl & Wetlands Trust, and others, we have adopted an individuals-based behavioural approach to modelling goose populations. This work is of relevance to managers of reserves and to conservation bodies.

ZSL scientists have been researching how social evolution is shaped by within-group conflict in colonies of the multiple-queen ant *Leptothorax acervorum*. Theoretical models predict that queens and workers are in evolutionary disagreement over how the colony should allocate resources between new females and males (sex-ratio conflict) and between new workers and new reproductives (life-history conflict). Demographic data from field colonies confirmed important elements of both sets of predictions. Investigating ants can, therefore, help us to understand fundamental evolutionary processes occurring in all types of animal society.

A project to investigate the taxonomic relationships of the Saudi gazelle has made some important findings. An analysis of DNA sequences from museum skins collected prior to their extinction in the wild has shown that the Saudi gazelle is closely related to the African dorcas gazelle, and not to the Indian gazelle. Similar analyses of the only two remaining captive populations of Saudi gazelle indicate that these animals are not actually Saudi gazelle and are therefore unsuitable for reintroduction. These results highlight the importance of genetic analysis in conservation.

In collaboration with the Estación Experimental de Zonas Aridas in Almería, Spain, we have continued to explore the reproductive biology of the Mohor gazelle *(Gazella dama mhorr)*. Faecal hormone assays have been developed for use in monitoring oestrous cycles and pregnancy. A bank of frozen spermatozoa from a genetically viable population has now been established and will be used to support the management of reintroduced populations.

Histological analysis of tissue samples from harbour porpoises which have been stranded or incidentally caught by fishing boats has enabled us to determine patterns of testis and ovarian development. Significant asymmetry of ovarian development was detected in neonates, with the left ovary containing a higher density of primordial oocytes than the right. Testicular development followed a normal mammalian pattern, but our studies revealed that sexual development may be occurring at an earlier age than was observed in similar studies carried out 10-20 years ago.



Above: **Tissue sample from harbour porpoise used in studies of sexual development.**

A small group of red pandas, provided by the Red Panda European Endangered Species Programme (EEP), has been set up at Whipsnade in order to investigate basic reproductive mechanisms. Questions about the control of seasonal breeding, implantation and pregnancy are currently under investigation. This work is important for the management of captive-breeding programmes and also provides background information for a planned reintroduction programme.

Amphibians have recently been undergoing documented unexplained population declines in Europe, Australia, Central America and North America. Work carried out at ZSL has been essential to the discovery of a disease which causes mortality in epidemic proportions in amphibians in the rain forests of Australia and Central America. This disease is caused by a previously unknown genus of chytrid fungus, a primitive member of the fungal kingdom. In addition to being a major development in the investigation of global amphibian declines, this is the first report of vertebrates being parasitised by a chytrid fungus.

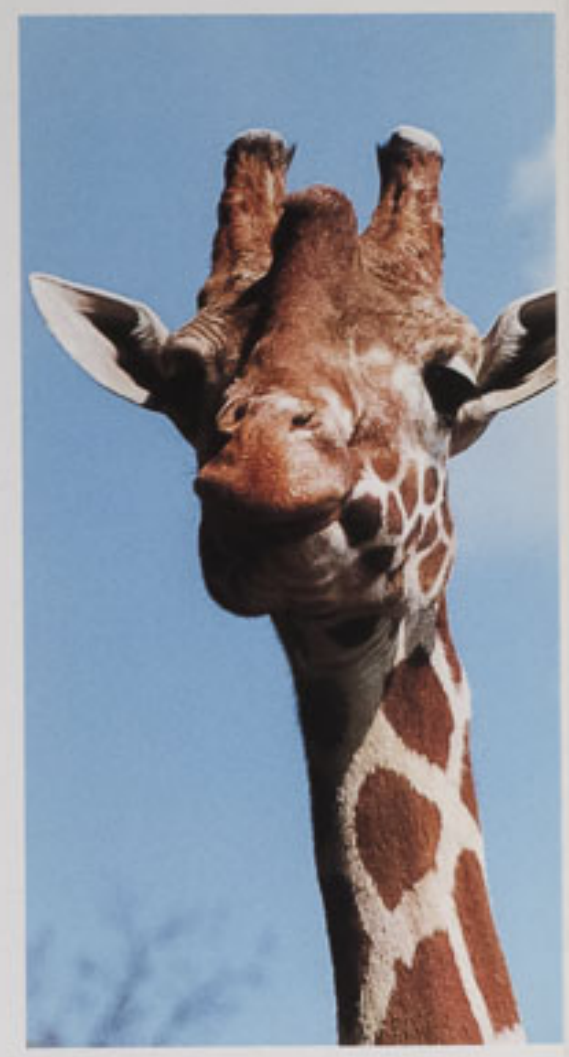
Many species of *Partula* snail are endangered and 12 species occur only in captivity. Captive populations, however, are subject to periodic crashes which have led to one species, *Partula turgida*, becoming extinct. The cause of death of each individual examined was extensive destruction of the digestive gland by a protozoan parasite of the microsporidian genus *Steinhausia*. Our recording of this extinction is believed to be the first definitive account of an infectious agent causing the extinction of a species. It has been suggested that infectious diseases may have caused previous extinctions, for example, of Hawaiian birds, but these hypotheses have remained unsubstantiated.

Left: A small group of red pandas has been established at Whipsnade in order to investigate reproductive mechanisms in the species.

Giraffes are difficult to sedate and anaesthetise because they tend to suffer injuries when unco-ordinated and have a long way to fall when becoming recumbent. During 1998, there were four sedations of giraffe at Whipsnade using a recently developed anaesthetic regime. Many parameters of physiological function have been assessed and there are signs that cardiac output of giraffe may be compromised during anaesthesia.

The remarkable homing ability of Atlantic salmon has long intrigued biologists. We are involved in a number of projects investigating the genetic basis of this behaviour. Olfaction is known to be crucial for accurate homing, and young salmonids are thought to imprint on odours in their home stream before they migrate to sea. These are used to guide them to the home river system during the spawning migration. We are studying how this olfactory memory is established by examining variation in the DNA sequence of genes involved in odour production and perception, combined with research into odour preferences in individual fish. An understanding of homing behaviour is essential to discovering how population structure is maintained in this commercially important species.

A study is being carried out on the genetic structure of wild populations of the Komodo dragon, a threatened species from south-east Indonesia. Information on the degree of genetic diversity among island populations is being used to identify populations for conservation. The results of this research will also enable us to make recommendations for reintroduction or augmentation in areas where the species is extinct or depleted. By identifying conservation priorities, the project intends to protect the extant populations of Komodo dragons, use the species as a 'flagship' for the protection of the natural habitat, and involve local people in a programme focused on the sustainable use of land.



Above: This photograph of a giraffe at Whipsnade, taken by Peter Davies, was a winner in the *Lifewatch* photographic competition.

What is a Hippo

- An Enormous Mouth

Hippos have enormous mouths which can be opened unbelievably wide, revealing the strong lower teeth.

- A hippo's jaw is capable of opening up to 150°, compared to a human jaw which can open about 50°.

...ow wide you can open your ...th and then look at the Hippos!

- Adult hippos have razor-sharp tusks in the lower jaw.
- In common hippos these tusks can grow as ...long as 50cm and can weigh over 1kg (2.2 lbs).
- ... tusks are used for display between rival ...es and can inflict severe wounds. Fights ...y last for up to 1½ hours and can be lethal.
- ...ult common hippos can be very aggressive ...en disturbed and are considered to be one ... the world's most dangerous animals.

Man

By Rebecca W

Education is an important feature of ZSL's mission and covers every area of our activity. It ranges from serious scientific papers to adult education courses, from observation trails for visiting schoolchildren to giving a blind child an opportunity to touch and understand 'penguin'.

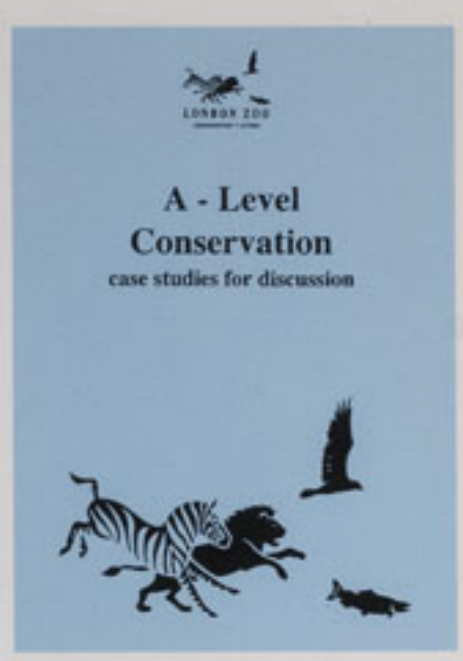
One of our most important educational activities this year was the design and preparation of our Millennium project, *Web of Life*. London Zoo's education staff have been heavily involved in developing interpretation for the exhibition, which will increase visitors' understanding of biodiversity and its conservation. Research for the interpretation panels involved contacting sources as far afield as Papua New Guinea, USA and Australia, liaising with numerous conservation organisations and trawling the internet. Hundreds of photos were selected and design briefs were prepared for interactive displays, videos and computer games.

Towards the end of the year, graphic designers were beginning to turn our work into an exhibition. Invertebrate House staff managed the selection of appropriate animals to illustrate the exhibition and planned 'behind the scenes' facilities including on-show breeding rooms. *Web of Life*, which opens in April 1999, promises to be ZSL's most innovative educational development.

New interpretation graphics at Whipsnade have included further use of the animal-shaped boards which have proved to be an attractive means of presenting information. Life-size cut-out hippos help visitors appreciate not only the size of a fully grown animal (not always easy to judge as they spend so much time in the water), but also the difference in size between common and pygmy hippos. A 3D model shows the full extent of a common hippo's open mouth and visitors can now be seen with their mouths wide open trying to compare themselves to the hippo's head.

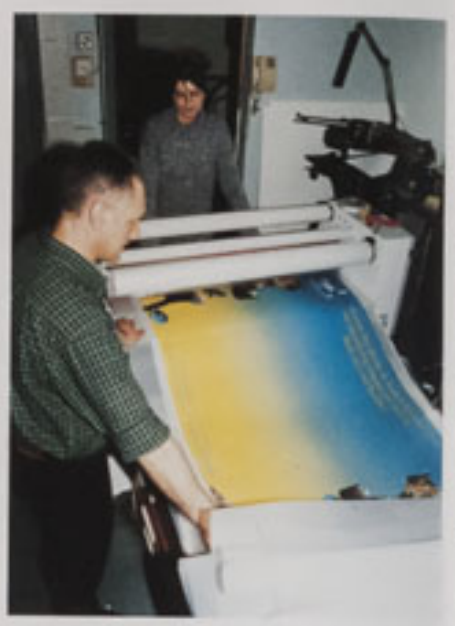
We received a generous donation of computers, scanner, colour printer, vinyl cutter and a laminator to help with the production of interpretation and signage at both zoos. These were used to develop a colourful new design for the Animal Adopters' 'thank you' boards at London, enabling us to remove some of the clutter of information on the enclosures.

Information to help visitors find their way around the zoos was considerably improved this year. Road signs around Whipsnade were updated and now use conventional traffic signs rather than words. Speed restriction and vehicle access signs have been increased and appear to be paying dividends in safer visitor behaviour. Striking animal enclosure signs, using the yellow and



Left and opposite page: **Colourful murals, a 'try your mouth against a hippo' challenge and life-size hippo-shaped information boards are part of the eyecatching interpretation at Whipsnade.**
Photos (opposite page): Ian Meyrick

Above: **Teachers' resource materials and information sheets on threatened species are produced by the education departments.**



green of the Whipsnade logo, have been erected on new developments and are being introduced across the Park.

At London, large bright green signs have been used to identify each animal house. These are combined with a green footprint trail along the recommended route, enabling visitors to see everything without getting lost. New maps reinforce the trail and now provide a grid for the easier location of animals. Large information panels, sited at the entrance, provide visitors with up-to-date information on the latest 'zoo babies', new exhibits, daily events and catering.

A set of information sheets on threatened species was produced at London Zoo for the general public and to answer the never-ending stream of enquiries by letter. They are also sent out to Animal Adopters where appropriate.

The development of resource materials for teachers is an on-going process. In addition to the standard curriculum-based packs, Whipsnade has developed a comprehensive guide showing how the Park can be used, not only for science, but also for cross-curricular activities in topics such as music, design and technology, English and maths. School visits at London increased by 11.8% over last year, with a new total of 50,800 children attending, and an exchange of Education Officers with Taronga Zoo, Australia, brought an antipodean flavour to teaching during the first two terms. School visits at Whipsnade were up by 5%, the third year of increase.

Both the *Careers with Animals* day and the A-level conservation symposium were over-subscribed and our GNVQ Leisure Tourism talks attracted many repeat visits. Whipsnade linked up with Queensbury School in Dunstable for their *Environment Week*, an initiative designed for students to work within their local community on environmental projects. For five days, up to 60 students undertook various tasks in the Park including clearing the Discovery Centre pond, removing flintstones from the hippo paddocks and a census count of the free-roaming animals.

Above: The generous donation of equipment by Hunt Graphics, Hewlett Packard and Spandex enables us to produce a wide range of interpretation panels.
Photos: Ian Meyrick

Work experience placements are offered by both zoos for GCSE up to university level students. The *Gifted Students* placement scheme at Whipsnade, developed with the Bedfordshire Education Business Partnership, was presented with a Meritorious Award for Education Initiatives by the Federation of Zoological Gardens. At London, students in Years 10 and 11 were taken for placements on animal sections, and in the education and retail departments.

A grant from the Arts Council to the Poetry Society enabled London Zoo to benefit from a Poet in Residence for six months. Tobias Hill joined us in July and together we developed a series of activities. A trail of well-known animal poems around the Zoo was devised for children and a poetry workshop was held for adults. An evening of poetry in the aquarium, *Poetry among the Piranhas*, was a huge success, combining the words of Tobias and fellow poet Carol-Ann Duffy, with music played by harpist Julia Thornton.

Two keepers from London and one from Whipsnade achieved the City and Guilds Animal Management qualification. The course takes two years and involves assignments, a project, practical assessments and a written exam.

ZSL continues to be represented on the Zoo Federation Education Committee, which influences such issues as setting education standards in zoos in Great Britain and Ireland.

The Friends of Whipsnade evening talks have continued to grow in popularity with 80 or more in regular attendance. Talks include topics such as Antarctica, an update on FCC's work, and the cheetah project. London Zoo provided a range of enjoyable activities for Young Lifewatch members during the school holidays. Other children experienced the work of a zookeeper, assisting with on-going development work in the Snowdon Aviary, while younger children explored animal camouflage, using different media and looking at live animals. All visitors were welcome to the special activities

The Institute of Zoology continues to attract students from the UK for postgraduate training. This year, eight PhD students joined the Institute to work on areas as diverse as the population genetics of green turtles, the regulation of olfactory receptors in the homing behaviour of migratory Atlantic salmon and the impact of low level taxonomy on conservation projects. Six students were awarded their doctorates during the year for projects which included the social organisation of the brown long-eared bat, the importance of individual variation in boar semen cryopreservation, and the conservation biology and management of the Komodo dragon. The students now have a formalised registration process which monitors their progress during the PhD programme and they regularly present their work both within and outside the Institute.

Fourteen veterinarians qualified from the 1997/1998 Master of Science Course in Wild Animal Health which is run jointly by the Institute of Zoology and the Royal Veterinary College; most returned to their countries of origin, including Colombia, Mexico, India, Japan and Zambia, to continue their careers in wildlife medicine. Of the 29 veterinarians from 18 countries in six continents who have graduated from the course since it started in 1994, 18 have already found posts working with free-living or captive wildlife.

Above from top: Meeting reptiles face to face on a touch table.
Photo: Michael Lyster

Following the green footprint trail around London Zoo ensures that visitors do not miss anything.

An essential part of ZSL's work is bridging the communication gap between professional zoologists and the general public as well as facilitating the communication of data and ideas between zoologists and researchers. There are four series of meetings, which are open to the public as well as to members and staff. They are planned to appeal to people at different levels of interest and expertise and offer a varied range of subjects.

Tuesday Talks are aimed at a general audience. The ten well-illustrated talks held during the year covered subjects as diverse as *The dynamics of dinosaurs, Conservation on Potaro Plateau, Guyana*, and *Why do wild birds sing?* Speakers included our own research and field staff.

Subjects of the seven Scientific Meetings ranged from *Impacts of invasions by alien species* to *Ideal homes: animals as architects*. At each meeting three speakers presented important current research on different aspects of the subject. *Monogamy – does it exist?; Bending gender: reptiles and birds* and *Early natural history in South-East Asia* were particularly well attended.

Afternoon Research Seminars, held by the Institute of Zoology, are open to visitors. Talks by invited speakers on subjects relevant to our research included *The Komodo Dragon Project: interaction of research and management; From golden moles to elephants: endemic African mammals shake the phylogenetic tree* and *Social organisation and genetic structure of a brown long-eared bat population.*

A two-day international symposium, *Carnivore Conservation*, attracted a capacity audience of 250. Speakers presented an overview of the problems facing wild carnivores, and discussed priorities for research and strategies for carnivore conservation. Themes covered included demography, prey availability, diseases and environmental toxins, hybridisation and conservation genetics.

The 1998 Sir Stamford Raffles Lecture, *The diversity of life on earth: past, present and likely future*, was given by Professor Sir Robert May, FRS, a Royal Society Research Fellow at University of Oxford and Imperial College, London, and Government Chief Scientific Adviser. The event was sponsored by the Singapore Tourist Promotion Board and Singapore Airlines.

Since January the *Journal of Zoology* and the new quarterly journal *Animal Conservation* have been published by Cambridge University Press for ZSL.

The *Journal of Zoology*, a pre-eminent journal dedicated to academic zoology, continues to attract contributions from top researchers worldwide. During the year, 159 original, refereed articles were published in the 12 monthly parts of Volumes 244–246. A Short Communications section has been introduced, and Short Reports on ZSL's Scientific Meetings are also published.

Animal Conservation specialises in the rapid publication of scientific studies of past, present and future factors influencing the conservation of animal species and their habitats. It focuses on rigorous empirical or theoretical studies relating to species and population biology – particularly on important new ideas from evolutionary biology and ecology that contribute towards the scientific basis of conservation biology. There has been a very good response to the first volume, which was published during 1998.

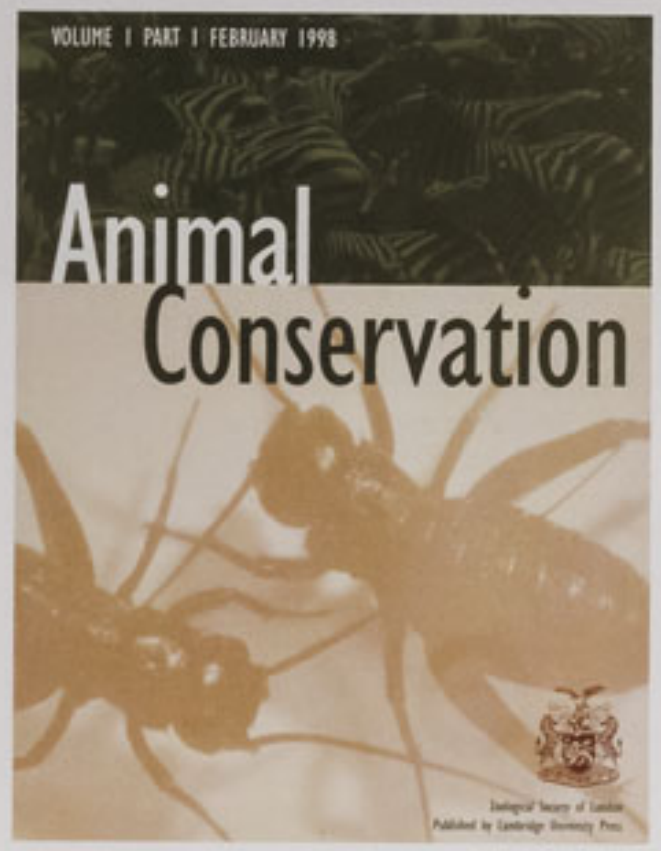
Above top: Delegates at the international Carnivore Conservation Symposium held at ZSL.
Photo: Terry Dennett

Left and above: Twenty-nine veterinarians have graduated from the MSc course in Wild Animal Health since it started in 1994.

Behaviour and Ecology of Riparian Mammals, edited by Nigel Dunstone and Martyn Gorman, was published in the series *Symposia of the Zoological Society of London*. Books in preparation for the new *Conservation and Biology* series, published by Cambridge University Press for ZSL, include *Conservation in a Changing World*, edited by Georgina Mace, Andrew Balmford and Josh Ginsberg, and *Behaviour and Conservation*, edited by Morris Gosling and William Sutherland. *Riding the Tiger*, edited by John Seidensticker, Sarah Christie and Peter Jackson, brings together the work of key players from around the world in the only comprehensive and up-to-date account of the problems and solutions of tiger conservation.

Volume 36 of the *International Zoo Yearbook* focuses on the husbandry, management, behaviour and status of Old World Primates. The special section comprises 17 articles ranging from the husbandry and breeding of gentle lemurs to the status and conservation of the gelada baboon, moloch gibbon and orang-utans. A practical model of the possible form and content of a husbandry manual, using slender loris as an example, is also provided.

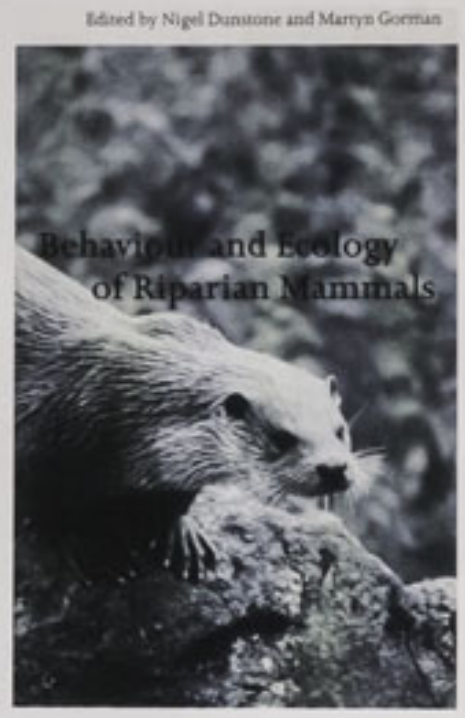
Section 2 contains 12 articles ranging from a report on the rearing project for ladybird spiders to a study on sex ratios in captive-born ruminants. The development of key performance indicators as bench-marks for progress in order to improve overall organisational management in zoos is also described. The Guest Essay, by Lee Durrell and Jeremy Mallinson of the Jersey Wildlife Preservation Trust, discusses how an in-depth institutional review strengthened the organisation's participation in field conservation and the impact of these changes on the role of the institution.



The Volume also contains a list of zoos and aquariums of the world, the list of vertebrate species bred in captivity during 1995 and 1996, a census of rare animals in captivity for 1996 and 1997 and the list of authorised international studbooks and registers.

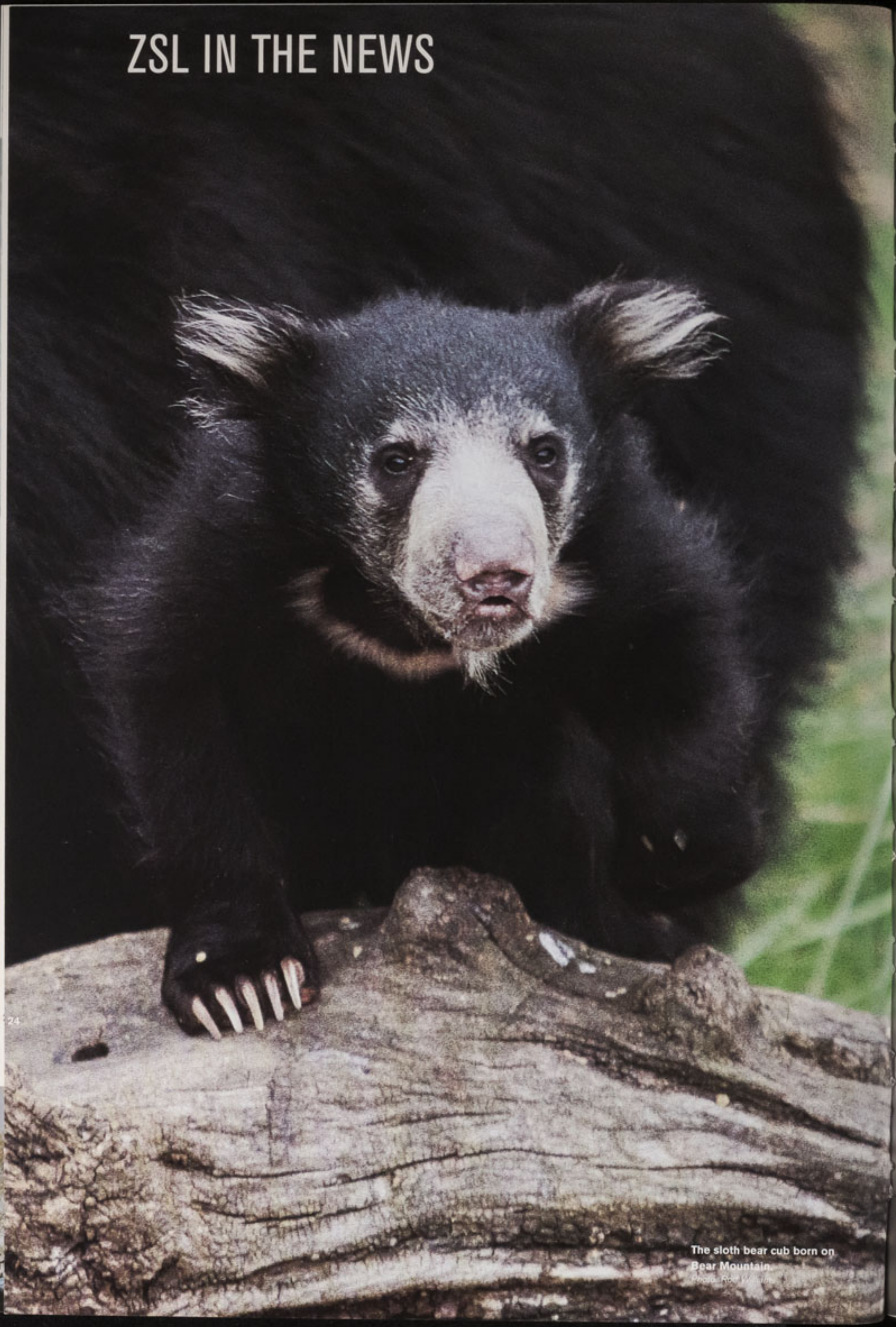
Volume 134 of *Zoological Record*, published jointly with BIOSIS and containing 72,000 items, was indexed and distributed in print, online and CD ROM formats. The continued generous support of various institutions, principally the Document Supply Centre at Boston Spa and the Natural History Museum, London, in providing access to material for indexing is gratefully acknowledged.

Sales of Volume 9 of *Nomenclator Zoologicus*, the essential reference work for zoological taxonomists, which gives the name of every genus and subgenus in zoology since 1758, continued throughout the year.



Above from left: ZSL's growing list of publications includes the new journal, *Animal Conservation*, the Symposia series and the *International Zoo Yearbook*.

ZSL IN THE NEWS



The sloth bear cub born on Bear Mountain.
Photo: Rex Features

ZSL's profile in the public eye continues to develop, and 1998 saw work beginning on two major TV series for broadcasting in 1999, as well as a great deal of positive press coverage of a host of stories.


Gazelles are back in the lost desert

This was achieved by maintaining our presence in the media throughout the year, as well as building up valuable contacts for future collaborations. As a result, after long discussions with the BBC, ZSL has embarked on an extensive series, due to be shown from June 1999 on BBC 1 at the prime time of 7 pm. Anglia Television filmed a 13 episode series at Whipsnade during the spring and summer. Focusing on the behind-the-scenes work of the Park, the programmes will be shown in 1999.

The first story of 1998 was the annual New Year's Day London Zoo stocktake. The Duty Manager for the day was seen counting all the animals, receiving wide coverage in national and regional newspapers, as well as on regional TV and radio.

Also at the beginning of the year, we said farewell to the group of children who comprised the Children's Committee, and embarked on the process of recruiting their successors. BBC *Newsround*, the *Times Educational Supplement*, the *Sunday Times* and various regionals showed their support and the response was, yet again, overwhelming. A new committee was recruited at the beginning of March and some have appeared on national and regional media.

The revamp of the Keepers' Lodge sitting room at Regent's Park was the focus of a BBC *Real Rooms* programme with *Animal Magic* presenter Johnny Morris. Keepers and producers were delighted with the programme and happily the new-look keepers' sitting room has survived the test of time! Two editions of BBC Radio 4's '*Gardeners Question Time*' were also recorded at ZSL.

A fundraising evening for 21st Century Tiger at Regent's Park was attended by HRH Princess Michael of Kent. A photocall of arrivals was organised with face painted volunteers being introduced to the Princess. This was covered by *OK!* and *Hello!* magazines with a full write up both of the event and the 21st Century Tiger initiative.

At Whipsnade, Emmett, the new bull elephant, was introduced to the three females and pictures appeared in local press, TV and radio. Lemur Island was opened in the summer by Dr Lee Durrell. A photocall was organised and attention focused on Dr Adam Britt and the black and white ruffed lemur reintroduction programme in Madagascar. Coverage appeared in key regional newspapers.


Counting the animals two by two

Above left: Sand gazelles back in the Empty Quarter of Saudi Arabia.
Courtesy of Express Newspapers Ltd

Above from top: The 21st Century Tiger Dinner and London Zoo new year stock-take.
Courtesy of Alpha and Hello! and East Anglian Daily Times /PA.

The announcement of the birth of London Zoo's bear cub in April was a challenge – we could not guarantee that the cub would be on show all the time and so a structured press preview day was not possible. We therefore spent some time, with the help of TVE, getting footage of mother and cub investigating their enclosure. This was then put together as a video news release and sent to key contacts in television. A patient photographer provided some good stills which were distributed to the press. We were delighted with the results, with pictures appearing in some of the national newspapers and on regional television.

In August the biggest ever release of a captive bred animal into the wild – nearly 4,000 British Field crickets – was a major conservation success for ZSL and English Nature. The event was covered by ITN news, Channel Four news, many radio stations and *The Times*.

Dr Mike Bruford's article in *LifeWatch* magazine, *DNA Deepfreeze*, was picked up by the *Express* and BBC *Newsround*, and July saw an extensive article by Dr Tim Wacher in *BBC Wildlife* about the gazelle reintroduction in the Empty Quarter of Saudi Arabia.

Crickets' 2nd innings

BY JIMONY: Zoo keeper Rachel Jones and a colleague release the crickets, which don't look quite so funny as the Walt Disney character

3,000 released as ZOO gives rare species a new lease of life

AN almost forgotten noise returned to parts of the British countryside yesterday as more than 3,000 crickets were released into the wild.

The merrily chirping field crickets were bred in captivity from three pairs caught by London Zoo in order to boost the natural population.

The sound the males make by rubbing their wings together was once common in grassland across southern England. But by the 1980s there were only 100 crickets left in a single colony in Sussex.

In 1991 English Nature launched a species recovery programme. Yesterday's release was at three secret sites.

Paul Pearce-Kelly, the zoo's curator of invertebrates, said: "It's a fan-

BY TRACY McVEIGH

tastic achievement to be releasing so many.

"It proves that the establishment of an endangered species can occur with a combination of excellent animal management skills backed by good science, site management and the support of the land-owners."

Field crickets are about an inch long with black bodies and brown and yellow wings.

They like short grass and bare ground usually grazed by sheep or rabbits. But changes in farming have resulted in fewer sheep being grazed and the grass becoming too long for them.

David Sheppard of English Nature said: "We have now established two new colonies. This is a real conservation success story."

The theme of The British Association's Festival of Science in September was aliens and their impact on native species. Topics ranging from mink, hedgehogs, and ruddy ducks to *Partula* snails were covered by the media.

Work on *Web of Life* continued throughout the year but there had been little opportunity for the media to find out more about it since the Millennium Commission grant was awarded back in 1995. We announced the name of the exhibition and held a press conference to outline more of what the building was to house. National and regional media covered the launch with Ken Livingstone MP and a host of animals providing the picture.

The cheetah's habitat is further eroded each year. There are now fewer than 10,000 left

Fight to save the cheetah

By Daniel McGrory

LOOKS can deceive in nature's pitiless pecking order. Crouched on its muscular haunches, ready to run down its prey with lightning speed, the cheetah appears to be a match for anything.

Yet the beautiful animals are seen in ever-decreasing numbers. The cheetah is in danger of disappearing from the wild. Once huge numbers roamed across much of Africa and Asia but now there are fewer than 10,000 left, confined to a corner of southeast Africa.

On the plains of the Serengeti in Tanzania, Dr Sarah Durant is working on the only long-term study of cheetahs in the wild, trying to find ways to reverse their decline. Cheetahs, it seems, are too soft to survive on they own. Often one will make a kill only to have a lion or hyena chase it away and help itself to the food. Only one of every 20 cheetah cubs lives to independence at 18 months. The rest are eaten by other carnivores.

There are other enemies, of course, principally and inevitably mankind. Although the days of big-game hunting are over, man still threatens the cheetah. Its habitat is further whittled away each year, squeezing the cheetah into open savannah where it cannot be compete with its fiercer neighbours.

Hungry cheetahs sometimes kill goats and are then shot or poisoned by the tribesmen who own them. The Serengeti is one of the largest parks in Africa but it holds no more than 400 cheetahs. For the past 15 years this project has monitored all the Serengeti cheetahs, fixing some with tracking devices and recognising the rest by their spot patterns, which are unique to each creature.

Since 1991 Dr Durant, who was educated at Cambridge, has lived in the Serengeti with the cheetahs. She now wants to extend her study to the woodlands, where she hopes the cheetahs may find respite from other carnivores.

This is a way you can ensure this beautiful but vulnerable animal will survive into the millennium and beyond.

To end the year with *The Times* adopting one of our projects as their Christmas Appeal was indeed a testament to the increasing perception of ZSL as a major conservation charity.

Above from top: Two ZSL conservation stories – a cricket release and *The Times* Christmas Appeal.
Courtesy of Express Newspapers Ltd and The Times.

FUNDRAISING

Our work is increasingly catching the imagination of both corporate and private donors. Many financial donations and gifts-in-kind were received, in a year which saw the development of our *Animal Partners* scheme, and the launch of the Web of Life appeal.

The new corporate adoption scheme, *Animal Partners*, has generated sponsorship in excess of £105,000, predominantly cash, but also including some substantial gifts-in-kind. The scheme covers the animal collections at both London Zoo and Whipsnade Wild Animal Park. Sponsors are able to choose from the benefits available, to suit their own objectives, dependent upon their sponsorship value.

Gifts-in-kind sponsorship has provided a wide variety of equipment and produce. Volvo have loaned a top quality vehicle for veterinary use. Hewlett Packard, Hunt Graphics and Spandex have provided a colour printer, laminator and vinyl cutter respectively, all capable of large format for the production of graphics for the zoos. Twinings donated a year's supply of herbal infusions for the gorillas and British Salt donated salt for the sealion pool at Whipsnade. Cash sponsors during the year included London Electricity, Robert Horne, American Express, Microsoft, Yellow Pages, Tellabs Inc., Parker Pens and Cathay Pacific.

The *Web of Life* appeal was launched to assist in matching the Millennium Commission's £2.2m grant for the building of the Millennium Project at Regent's Park. A generous response to a mailing of ZSL's Fellows and Members raised £133,000 and contributions from the corporate sector raised £140,000 in cash and gifts-in-kind. Sponsors included Mitsubishi, Thames Water, Nestlé, Esso, Merlin Interiors, Spur Shelving and Dow Construction.

British Airways continued to support our work by offering free flights to staff working on projects, ranging from the reintroduction of the Egyptian tortoise, and conservation work in Ethiopia, to attendance at an international conference about seahorses in Hong Kong.

The Times chose the ZSL Cheetah Project as one of its charities for its Christmas appeal. It described the plight of the cheetah in the wild, and the work of ZSL to combat its continued decline, raising over £25,000.

ZSL's application to the National Lottery Charities Board resulted in a grant award of £560,000 for Project Seahorse. This was the second biggest award by the NLCB for 1998.


Wheely Good Fun

Microsoft are celebrating the launch of their fantastic new Wheel Mouse by sponsoring the Harvest Mice at London Zoo, and you and your family can win a trip to visit them.

The Wheel Mouse has a wheel between the two familiar mouse buttons to make it easier to scroll and zoom. It's also easy for left- and right-handers to use. It comes complete with Intellipoint software, allowing customisation for easier use, and costs only £19.99. Microsoft are supporting the Harvest mice because their natural habitat is being threatened by modern farming techniques. It is Britain's smallest rodent and measures only 5-6cm long and weighs just 10g.

To win a family ticket (2 adults and 2 children) to visit this tiny creature at London Zoo, as well as a Wheel Mouse for your computer, just tell us:

How much does a harvest mouse weigh?

Send your answer on a postcard to Wheel Mice, PO Box 28, Altrincham, Cheshire WA14 2FG by June 15.

BRITISH AIRWAYS
Assisting Conservation

LONDON ELECTRICITY

AMERICAN EXPRESS
Insurance Services

Microsoft

Robert Horne

TWININGS

YELLOW PAGES

PARKER BUSINESS TO BUSINESS

SEAL

CATHAY PACIFIC

Mitsubishi Corporation

BRITISH SALT

tellabs

Above: Some of the many household names that supported the work of ZSL during the year.

Left: Microsoft adopted a harvest mouse.
Courtesy of Myatt McFarlane

LZ

LONDON ZOO

Giant anteaters return to London Zoo after an absence of 10 years.

Following 1997 when, for the first time in six years, visitor numbers went over a million, 1998 can best be described as a year of consolidation. In 1997 we had the new Bear Mountain which attracted visitors in large numbers, and this year we advertised the presence of the new bear cub heavily; although the weather was not on our side, we ended the year with just under one million visitors.

Much of the year was spent working on the planning and construction of ZSL's Millennium Conservation Centre, which will house *Web of Life*. As well as providing a new home for our invertebrate collection, many new animals have been arriving, including one of the pair of giant anteaters, four rheas, and new invertebrates including giant weta crickets, freshwater mussels and giant clams.

This year has seen two major art initiatives in the Zoo. *Zoosculpt '98* was an exhibition of nearly forty pieces of animal-related sculpture, and Tobias Hill was our Poet-in-Residence for six months, funded through the Poetry Society by the Arts Council.

The Christmas promotion, sponsored by Nestlé, generated a record 10,600 visitors. During the year, animals have been adopted by many well-known names, including Jennifer Aniston (a bush baby), Sir Anthony Hopkins (an anoa), Zoë Ball (a kinkajou), and Dame Judi Dench (a fennec fox). We now have more than 25,000 London Zoo *Lifewatch* members.

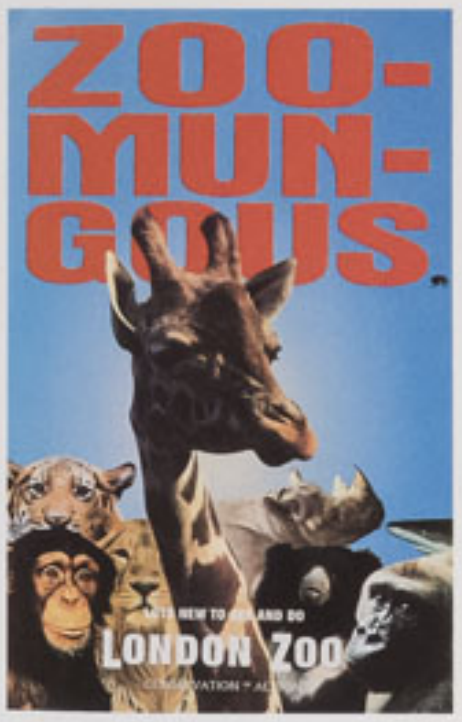
Esso continued to sponsor the co-ordination of the EEP for Amur and Sumatran tigers, and 21st Century Tiger (the wild tiger conservation partnership between Global Tiger Patrol and London Zoo) raised substantial sums of money for tiger conservation work in India, Sumatra, and the Russian Far East. Esso also sponsored the 21st Century Tiger Dinner, which raised £24,000.

Improvements have included new indoor facilities for the langurs on Bear Mountain and a new red-ruffed lemur facility in the refurbished aviary next to the amphitheatre. Other work included a complete refurbishment of the Raffles Restaurant and Bar, air conditioning in the Zoo Shop, and the third phase of upgrading the water mains throughout the site – unglamorous, but vital.

The Flight Simulator, *Adventure Reef*, was installed during the year, and has proved very popular with our visitors, as well as a commercial success for ourselves and the operators. Another concession, Aka Rampage, has provided children's activities to visitors and school parties, as well as excellent children's birthday parties. The refurbishment of the Discovery Shop, next to the Penguin Pool, led to a marked increase in turnover.

Market research over the last two years has given us insights into the sort of zoo that our visitors most appreciate, and these are being incorporated in our plans; in particular, we hope to increase the number of opportunities for visitors to meet keepers, volunteers, and – especially – animals. Our Events Programme and all visitor-related activities are under review. We have also started the process of reviewing the historic and cultural significance of the Regent's Park site, both buildings and landscape. This will influence future developments, particularly with respect to new animal houses, and the ways in which we modify existing buildings for our visitors' benefit.


Kodak news
'A stellar performance' says upbeat Fisher
FUTURE IS ROSY FOR ENDANGERED LEMUR DAME



Above from top: Staff from Kodak adopted a black-and-white ruffed lemur.
Courtesy of Kodak

Posters promise a 'zoomungous' time at London Zoo.

WWAP

WHIPSNADE WILD ANIMAL PARK

The new facility for common and pygmy hippos opened during the year.
Photo: Ian Meyrick

1998 was a difficult year for Whipsnade, with one of the wettest summers on record. Water proved to be our bane in more ways than one, as our ancient water pipes and pumps began to fail, requiring a major investment which will continue into 1999. Despite the dual water problems, however, we generated a financial surplus for the sixth successive year.

This performance would not have been achievable without non day-visitor income such as The Cloisters functions business, which hosted major conferences and events by organisations such as Ernst & Young, Whitbread, and the Bedfordshire Chamber of Commerce. Further links have been developed across the Business Community and following on from Stuart Earley being awarded Bedfordshire Business Personality of the Year in 1997, Linda Hughes received the award for Bedfordshire Business Woman of the Year for 1998.

Great effort has been put into the presentation of the Park to maintain and improve the high standard already in place. The new hippo complex, which now houses both common and pygmy hippos under one roof, was completed during the year. The extended paddocks and large outside pools not only benefit the hippos but also provide excellent public viewing areas. New accommodation was created for the Asian greater one-horned rhinos and a new penguin exhibit on the site of the original enclosure was also developed. A major road renovation project for the Park is also underway.

The importance placed on good customer care has been highlighted by seminars which have been attended by every employee, and seasonal employees have also attended sessions focusing on real case histories.

Following the successful experiment of closing Whipsnade to the public for the winter quarter, we developed this by introducing a new 'winter membership', valid until the end of February. This provides excellent value for money and we hope to convert a good percentage of these winter members to full members.

Staff had the opportunity to demonstrate their work to a wider audience thanks to the presence of an Anglia TV crew who worked alongside them for six months. The series, broadcast from January to April 1999, introduces the public to aspects of Whipsnade which cannot always be seen on a visit. It was presented by Pam St Clement of Eastenders, who plays an active role in conservation organisations.

Animal management recorded a large number of births, including scimitar-horned oryx, pygmy hippo, red panda, giraffe, and West African dwarf crocodiles. A Brolga crane chick was also hatched following the use of artificial insemination, a technique which may prove invaluable to the future conservation of crane species. Important animal moves included the arrival of Behan and Beluki, the two young Asian greater one-horned rhinos from Nepal, following their period at London Zoo.

The popular dwarf crocodile exhibit swarmed with butterflies, making it a truly wonderful experience for the visitor. The new Conservation Room in the Discovery Centre has proved to be very successful, providing us with the facilities to participate in conservation programmes for *Partula* snails, seahorses and Lake Victoria cichlids, and allows visitors to see this aspect of our conservation work for the first time.

Above from top: Filming a 13 part series at Whipsnade for broadcast in 1999.
Photo: Imago Productions Ltd

Russell Craddock, Sales and Marketing Director for British Salt, which donated salt for the Whipsnade sealion pool, meets one of the residents.
Photo: Simon Hodge

The scimitar-horned oryx bred particularly well during the year.

FCC

FIELD CONSERVATION & CONSULTANCY

Dr Jacques Flamand has established domestic livestock clinics in the buffer zones of the Royal Chitwan National Park.
Photo: Alexandra Doron

Although FCC continues to run several relatively small-scale projects, especially in East Africa, we are gradually moving into bigger initiatives as a result of our growing expertise and the reputation of ZSL staff. This is economically more beneficial, as the reporting requirements of donors are frequently the same in terms of time and staff input regardless of the amount of money involved in the actual project.

Through Dr John Grainger, our work in the St Katherine's Protectorate in Sinai continues to go well albeit with the occasional bureaucratic problem. Staff from other projects, most notably Dr Richard Kock from Kenya and Dr Tim Wacher from Saudi Arabia, provided short-term technical assistance on veterinary training and gazelle conservation respectively. As well as generating income, this approach demonstrates the dovetailing skills of our activities. Similar short-term expertise was provided to the Leuser Development Programme in Sumatra where Dr Kathryn Monk carries on with her monitoring programmes despite serious local unrest and uncertainty.

In Nepal, Dr Jacques Flamand has established two out of the four intended domestic livestock clinics in the buffer zones of the Royal Chitwan National Park, and appointed junior technical assistants. User Group Committees, comprising local representatives, manage these clinics, ensuring that they are responsive to the needs of the people. On the wildlife front, he has assisted with the translocation of rhinos and nilgai, amongst others, and set up the protocols for disease investigation. Samples are taken on an opportunistic basis so progress is necessarily slow but it is hoped that by the end of 1999 we will be building up reasonable profiles of the prevalence of disease in the wildlife as well as the domestic stock. Dr Kamal Gairhe has been assigned as the Veterinary counterpart by the Department of National Parks and Wildlife Conservation and we also have Ekraj Sigdel from the King Mahendra Trust for Wildlife Conservation on the team as Project Impact Evaluator.

In Saudi Arabia, Dr Iyad Nader took over as Project Director of the King Khalid Wildlife Research Centre (KKWRC). The released gazelle and oryx continue to do extremely well in the Rub al Khali, although in view of developments elsewhere we are conscious of a need for increased vigilance against poaching.

In the genetics laboratory, Dr Rob Hammond completed his project on the genetic analysis of Arabian gazelle taxonomy. This revealed that the southern sub-species of sand gazelle is actually more closely related to a North African species – the slender-horned gazelle – than it is to its northern con-subspecific and indeed it may well be considered a separate species altogether. In addition, the elusive Afri or Saudi gazelle was found to be no longer extant in captivity as those animals previously regarded as such turned out to be hybrids. None are known to exist in the wild although a major priority for KKWRC in the next year must be to verify the extinction of the Afri in the Kingdom.

The African Wildlife Veterinary Project finally got underway in November under the leadership of Richard Kock and in collaboration with CIRAD in Montpelier. This project, worth 800,000 ECUs in Phase I, will focus on the investigation of rinderpest in wildlife populations.

All of these projects will continue through 1999. For future developments, we are actively seeking funding for our bison reintroduction project in Romania and for a project to monitor the effects and social behaviour of translocated matriarchal groups of elephants in Zimbabwe.

Above: Released Arabian oryx in Saudi Arabia.
Photo: Tim Wacher

IOZ

INSTITUTE OF ZOOLOGY

Barnacle goose.
Photo: Joe Blossom/The Wildfowl & Wetlands Trust

The Institute of Zoology has continued to pursue financial policies that have produced a small surplus (for future investment) and allowed the Scientific Fund to continue to increase in value. These policies and continued support from the Higher Education Funding Council for England (HEFCE) have provided a platform for an improved level of external fund-raising. The Institute's work programme is described more fully in *Science for Conservation 1998*.

During the year we reorganised our work into four programmes, reflecting our research strengths and strategic direction:

- Evolutionary ecology
- Population ecology
- Conservation biology and management
- Origins and maintenance of biodiversity

We also established a series of informal discussion groups to promote new ideas in each of these areas. These have been particularly successful in stimulating new inter-disciplinary projects, such as the use of techniques in reproductive technology for understanding variation in mammalian reproductive strategies.

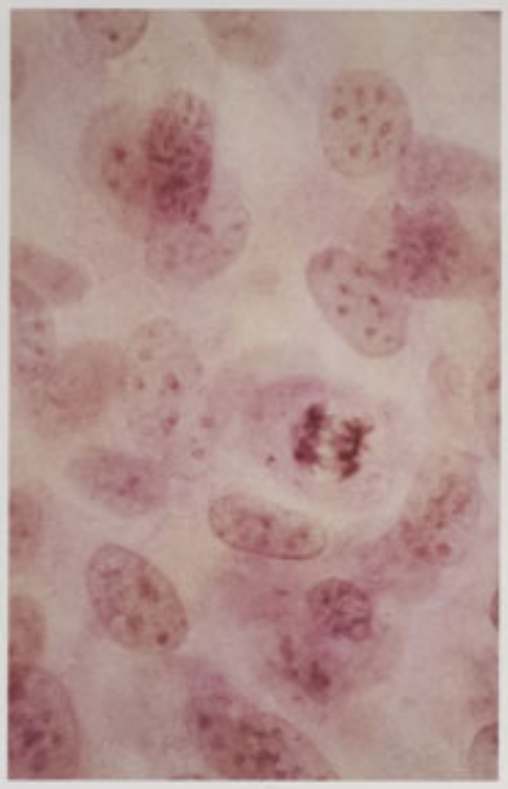
Our annual core grant of £1.6 million from HEFCE continued to provide a stable base for our research activities. ZSL also made a significant contribution to the costs of the clinical veterinary work based in the Institute and, through the Scientific Fund, supported two Zuckerman Research Fellowships. These post-doctoral positions are named after the late Lord Zuckerman who established this important endowment to support scientific research in the Society.

Core funding from HEFCE provides an opportunity for further external fund-raising. During 1998, significant new grants included a three year grant of £168,100 from the Natural Environment Research Council (NERC) for research on the evolution of sociality in multiple-queen ant societies and £205,000 from Glaxo Wellcome for an initial two-year project on interactions between Sertoli cells and spermatids in mouse testes. A two year grant of £63,000 from the Ministry of Agriculture, Fisheries and Food for work on genetic diversity of domesticated sheep and goats, complements existing funding from the European Union on genetic diversity among sheep breeds of Europe.

A NERC Thematic Programme grant enabled us to model the behaviour of the Svalbard barnacle goose population using an individual-based behavioural approach and further research on geese was funded through a NERC Industrial Case Studentship (with The Wildfowl & Wetlands Trust) and contract funding through Scottish Natural Heritage.

Grants for the Serengeti Cheetah Project included support from the Wildlife Conservation Society. English Nature, the Royal Society for the Preservation of Birds and the Universities Federation of Animal Welfare have together provided £106,000 over three years to investigate patterns of disease and mortality in wild animals.

HEFCE carried out a routine audit of the Institute in November 1998. The process proved to be both thorough and constructive and a number of procedural suggestions have already been implemented. A formal report will be issued early in 1999.



Above: Sertoli cells in tissue culture, part of our work sponsored by Glaxo Wellcome. The project contributes towards the development of immuno-contraceptive methods of managing animal populations.
Photo: Alison Moore

Boleophthalmus roseatus

Gobius cyanomos

A selection of the images from the library shown to the Emperor of Japan during his visit.

Our Library continues to maintain its pre-eminence as the largest collection of books and periodicals on the subjects of zoology and animal conservation in private ownership in the world, but despite its private nature it is one of the most readily accessible. Much of the material is available for Fellows of ZSL to borrow. We received 5,200 user visits and 2,500 enquiries from the general public. We added 660 new books, many of which were donated, to the collection.

The publication of a limited edition book *The Ape in Myth and Art*, by Lord Zuckerman, was launched by HRH Prince Philip in London Zoo Aquarium at a reception attended by Founder Subscribers to the book. A display of rare illustrated books, paintings and manuscripts generated a considerable amount of interest at the book launch. The book is available from the Fundraising Office, London Zoo Shop and the Library.

We held two of our popular evening 'themed' Library tours during the year – *Native Species* and *Images of Invertebrates*. These are social occasions for Fellows and provide an opportunity to see how the depictions of animals have changed from the sixteenth century to the present, using items from our archives, rare and illustrated books, historical photographs and paintings. A wider public saw items from the Library in the weekend *Times* illustrating how our knowledge of animals has changed over the past 500 years.

Our computer software and hardware were up-graded during the year, improving the facilities for Library users. The book catalogue and the serial holdings are accessible from each of the PCs in the Reading Room and the new software offers enhanced search facilities for our catalogues. Through the *Animal Partners* scheme, Hewlett Packard donated a CD-ROM tower.

The *Sponsor a Book* scheme resulted in many of the listed books being donated to the Library and a postal book auction in the spring raised funds.

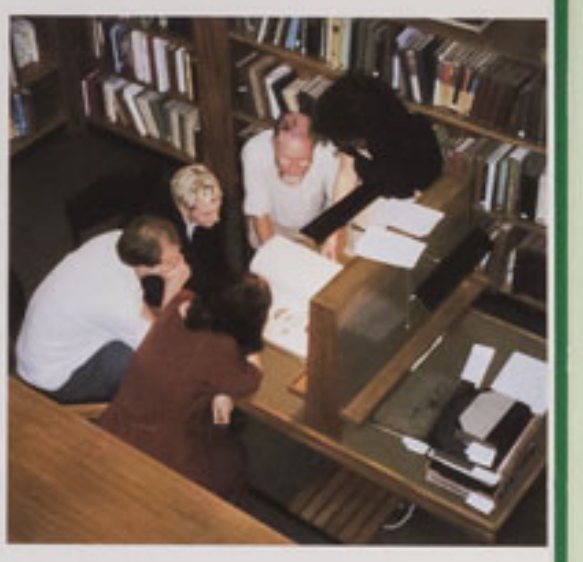
We are extremely grateful for the continuing invaluable assistance of the team of volunteers who have been cleaning and repairing books and periodicals. Two conservators from Allyson McDermott Associates provided a training day for our volunteers, giving them an opportunity to refresh and enhance their skills so that their important role in helping the Library can be expanded.

The bust and portrait of Sir Stamford Raffles, one of ZSL's founders, and the first volume of the Minutes of Council were displayed at the British Museum's exhibition *The Golden Sword: Stamford Raffles and the East.*

Two trips to Whipsnade and the recreation of the Fellows' Restaurant (if only for an afternoon) were amongst the highlights of this years Fellows' events. Although Fellows can attend all the *Lifewatch* activities, it was especially good to see such support for their special events.

The Whipsnade visits provided an excellent opportunity of seeing the Park, and gave a valuable insight into the behind-the-scenes work. Before Christmas, Fellows had the chance of inviting family and friends to attend a Fellows' Sunday lunch, held in the Prince Albert Suite overlooking Barclay Court. The event proved popular and recreated the venue for those who have happy memories of the original Fellows' restaurant.

This year has seen a steady stream of newly elected Fellows and Scientific Fellows, many of whom have taken out the additional *Lifewatch* or *Friends of Whipsnade* options. It is also encouraging to see so many Fellows subscribing to the new *Animal Conservation* journal.



Above from top: Two themed library tours were organised during the year.
Photo: Ailsa Edwards

Library volunteers learn about book conservation.
Photo: Ann Sylph

TREASURER'S STATEMENT

1. The attached summarised accounts show the overall results of ZSL for the year to December 31, 1998. The Society achieved a surplus of £666,000 for the year (1997 – surplus of £1,089,000) and increased its total funds to £17.2 million, an acceptable performance given the poor weather conditions for much of the summer.

2. The summarised accounts generally follow the format adopted for the previous year, and the main statement, the consolidated statement of financial activities, is taken from the statutory accounts which must follow the requirements of charity financial reporting. Additional information is given on the operating divisions based on internal management accounts which do not follow the exact format of the statutory accounts.

3. ZSL remains dependent on the two zoos for the success of its operating results. Both London Zoo and Whipsnade recorded a decline in visitor numbers, London by 4% to 994,513, Whipsnade by 6% to 403,188. The decline was attributable largely to the poor weather in 1998, especially at Easter and during the months of June and July. Both the Institute of Zoology and Field Conservation and Consultancy (FCC) increased their activities but their funds are effectively ring-fenced and can not generate surpluses for the Society. The negative result of FCC is due primarily to a provision for losses on a contract in Sub-Saharan Africa where recent political events have rendered the performance of the operations exceptionally difficult. Gains on investments of £263,000 contributed significantly to the overall surplus.

4. The financial situation of ZSL has been significantly affected by the building of the Millennium Conservation Centre – *Web of Life*, in 1998. During the year the Society

- incurred capital expenditure of £2.8 million
- billed the Millennium Commission for its matching share of grant to date of £1.4 million
- received other external contributions of £160,000 relating to the building, which have been treated as deferred income
- drew down a loan of £682,000 from the contractor, Kajima, which is interest free.

In the absence of a signed lease for the Regent's Park site the Millennium Commission has delayed payment of the grant to ZSL which accounts for the high level of debtors and the lower level of cash.

Other capital expenditure for the year was approximately £1 million, the main items being

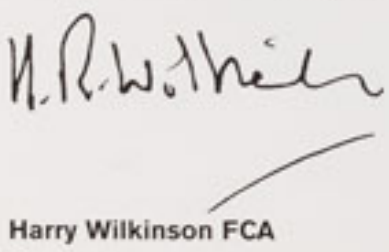
- completion of the hippopotamus and rhinoceros houses at Whipsnade
- refurbishment of Raffles Suite and meeting rooms at Regent's Park
- work on the roads and water mains at Whipsnade.

Much of the capital spend in 1998 and that budgeted for 1999 relates to essential refurbishment, including the library roof at Regent's Park.

5. During the year we have reviewed our operational systems to assess the risks to our activities arising from the 'Year 2000' problem. We have undertaken and continue to undertake remedial action in respect of identified problems, and we believe that we will achieve an acceptable state of readiness and have provided resources to deal with significant subsequent failures or issues that might arise.

6. ZSL has again shown a positive result in 1998 in spite of the poor weather. We have recently completed the most significant and exciting new building for years as well as making satisfactory progress on our overall refurbishment programme. We are still looking for a positive outcome on our case to reduce our VAT payments, and are awaiting the results of an appeal against a judgement in our favour.

We remain as always grateful to members and donors for their continuing support.



Harry Wilkinson FCA
Treasurer

SUMMARISED ACCOUNTS FOR 1998

Consolidated Statement of Financial Activities for the year ended 31 December 1998

	Year to 31.12.98 £000		Year to 31.12.97 £000	
Incoming Resources				
Zoo Operating Income:				
Visitor Admissions	7,665		7,675	
Catering and Shops (Net)	2,464		2,352	
Other Zoo Income	894		976	
		11,023		11,003
Government and other Grants		2,321		2,288
Sales and Fees		961		823
Subscriptions		159		168
Donations and other Income		881		743
Interest and Investment Income		522		616
Total Incoming Resources		**15,867**		**15,641**
Resources Expended				
Direct Charitable Expenditure:				
Zoo Operating Costs	10,883		10,388	
Science and Research	3,017		3,008	
Conservation and Consultancy	801		640	
		14,701		14,036
Fundraising and Publicity		253		213
Management and Administration		510		499
Total Resources Expended		**15,464**		**14,748**
Operating Surplus for the year		**403**		**893**
Gains on Investments		263		196
Surplus for the year		**666**		**1,089**
Total funds balance brought forward, as previously reported		16,817		15,728
Prior year adjustment		(244)		(244)
Total Funds balance brought forward, as restated		**16,573**		**15,484**
Total Funds balance carried forward		**17,239**		**16,573**

Cash Flow Statement for the year ended 31 December 1998

	Year to 31.12.98 £000	Year to 31.12.97 £000
Surplus for the year	**666**	**1,089**
Add Depreciation	1,105	1,006
	1,771	**2,095**
Less Purchase of Fixed Assets (Net)	(3,236)	(1,567)
	(1,465)	**528**
Changes in other Assets and Liabilities	301	(147)
Net Cash (Outflow)/Inflow	**(1,164)**	**381**

Analysis of Surplus by Division for the year ended 31 December 1998

	Year to 31.12.98 £000	Year to 31.12.97 £000
Divisions:		
Zoological Gardens:		
London Zoo	618	701
Whipsnade Park	285	509
	903	**1,210**
Scientific:		
Institute of Zoology	3	45
Field Conservation and Consultancy	(135)	(26)
Learned Society	137	(69)
	5	**(50)**
Surplus on Funds not included above	**521**	**641**
Less: Fundraising and Publicity	(253)	(213)
Management and Administration	(510)	(499)
	(763)	**(712)**
Surplus for the year	**666**	**1,089**

Consolidated Balance Sheet at 31 December 1998

	31.12.98 £000	Restated 31.12.97 £000
Fixed Assets		
Tangible Assets	11,934	9,288
Investments	2,556	2,326
	14,490	**11,614**
Current Assets		
Stock	423	410
Debtors	2,608	1,239
Cash at Bank and in Hand	5,519	6,683
	8,550	**8,332**
Creditors: Amounts falling due within one year	(3,075)	(2,728)
Net Current Assets	**5,475**	**5,604**
Deferred Liabilities:		
Amounts falling due after more than one year	(2,726)	(645)
	2,749	**4,959**
Net Assets	**17,239**	**16,573**
Funds		
Unrestricted – General	12,213	11,768
– Designated	4,055	3,881
Restricted – Endowments	704	656
– Other	267	268
Total Funds	**17,239**	**16,573**

During the year it has been determined that the income from the animal adoption and zoo membership schemes should be more appropriately treated as annualised subscriptions. Accordingly, the opening balance of the general fund on 1 January 1997 has been reduced by £244,000 reflecting this change in accounting policy.

The summarised accounts are based on the Society's full annual accounts. These summarised accounts may not contain sufficient information to allow for a full understanding of the financial affairs of the Society. For further information, the full Society's accounts, and Ernst & Young's audit report on them which is unqualified, should be consulted. A full set of the Society's accounts is obtainable on request from the Director of Finance.

(registered charity no. 208728)
Regent's Park, London, NW1 4RY
Whipsnade Wild Animal Park, Dunstable, Bedfordshire, LU6 2LF

Directors

Director General **Richard Burge** (until 31 December 1998)
Director, Field Conservation & Consultancy **Alexandra Dixon**
Director of Finance **Norman Reed**
Director of Science, Institute of Zoology **Professor Morris Gosling**
Director, London Zoo **Dr Jo Gipps**
Director of Personnel **Ian Meyrick**
Director, Whipsnade Wild Animal Park **Stuart Earley**

For further information

Director General's Office **0171 449 6207**
Fellowship Services **0171 449 6261**
Field Conservation & Consultancy **0171 449 6204**
Fundraising Office **0171 449 6264**
Institute of Zoology **0171 449 6601**
Library **0171 449 6293**
London Zoo **0171 449 6501**
Whipsnade Wild Animal Park **01582 872171**

Full information on organisation, committee membership, staffing, and animals in the collection is contained in Part 2 of this report.

Report edited by Ian Meyrick and Linda DaVolls.

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