ZSL

LIVING CONSERVATION

Annual Review 2003

ZSL MISSION: TO ACHIEVE AND PROMOTE THE WORLDWIDE CONSERVATION OF ANIMALS AND THEIR HABITATS

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.

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PRESIDENT'S FOREWORD

This is my last Foreword to a ZSL Annual Review, for in June I will be handing over to Sir Patrick Bateson. So it is natural that, following tradition, I use the opportunity to look back over the ten years since I took over from Field Marshal Sir John Chapple.

My predecessor had steered the Society through a difficult period of 'survival'. As the finances were restored and balances moved firmly into the black, we realised his second goal of 'revival'. But have we yet entered his third stage of 'thrival'?

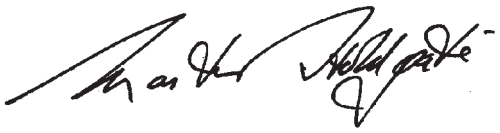
There are encouraging signs. Thanks in part to our successful establishment of the case for VAT exemption our bank balances are healthier than they have been for many years. The leadership of our outstanding outgoing Director General, Dr Michael Dixon, and our first-class team of Directors, has provided the Officers and Council with the sound management that is essential if the Society's policies are to be implemented. We are beginning what is bound to be a long-drawn-out process of rebuilding our two zoos as places where wonderful animals live and breed in spacious and natural-looking settings. Our scientific research and programmes of worldwide conservation are stronger than ever.

But? But we have a long way to go in virtually every department of our work, not least because the need is increasing faster than we and other bodies like us can respond.

I write from the perspective of an ecologist and conservationist and it is therefore with pride that I see ZSL gaining strengths in these areas. I urge the Society, in the years ahead, to be even more forceful in championing the urgent need for animal conservation around the world. It is a tragic fact that there are already more of some sub-species of large predator – like Asian lions, Sumatran and Siberian tigers and Amur leopards – in captivity than in the wild. Several kinds of rhinoceros are in like danger and a massive threat hangs over our nearest relatives, the great apes. It is simply unrealistic to believe that the pressures on their wild habitats will easily be halted or reversed. The world's zoos and National Parks are more and more assuming the role of latter-day Noah's Arks – and this is placing on Societies like ours an immense responsibility not only to keep and breed endangered species but to allow them lives of high quality in settings where their beauty and fascination can be appreciated by all who come to visit them.

If we are to do this, our work in the field and the laboratory must merge seamlessly with the animal collections at Regent's Park and Whipsnade, and we may need to establish more captive breeding facilities close to the wild, as we have done for some years in Saudi Arabia. Our two zoos and the wonderful new aquarium that will, I hope, soon be taking shape at Silvertown Quays, must be developed as genuinely world-class information centres and shop-windows for animal conservation. We are bound to face financial constraints, for it would be easy to spend hundreds of millions in improving our facilities, so the judgement of priority will continue to be an exacting task for our Officers, Council and Directors. One thing we can all be clear on is that we cannot accept second-rate facilities, even if they have historic and architectural merits – if, for example, we are prevented from developing as we should at Regent's Park because of our inheritance of listed buildings, in my view the implication is that our main developments will have to go elsewhere.

The choices will not be easy, but I am confident that exciting and rewarding times lie ahead. I am grateful for the honour the Society has done me by electing me as your President for ten years, and I wish my successor every good fortune.



Sir Martin Holdgate
President

WORLDWIDE NETWORK

ZSL staff worked on a large number of conservation and research projects throughout the world in 2003. Many other collaborations are in development.

Americas

North America
USA

South America
Ecuador p15
Chile p11

Africa

Cameroon p9
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Democratic Republic of Congo p9
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Equatorial Guinea
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Europe

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Asia

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Turkey

Australasia

Australia
French Polynesia p15

THE ZOOLOGICAL SOCIETY OF LONDON

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Her Majesty The Queen

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Malcolm Whitehead BSc*
Harry Wilkinson OBE, MA, FCA
Robert Wingate

† To 17 June 2003
* From 17 June 2003

REVIEW OF THE YEAR

above: New souvenir tickets were introduced for visitors.

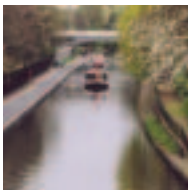
The year began with a great deal of activity on the zoo sites in preparation for the visitor season. Increased commercial success has meant that ZSL can begin to afford to make significant improvements to each zoo site over successive winters and, over time, these changes will dramatically change London Zoo and Whipsnade. During the year at London Zoo there were substantial alterations to Barclay Court and the area around the main lawn, with outmoded lemur and gibbon cages being removed and lawn areas extended along with the provision of a fine new children's playground. In the Middle Garden a new series of exhibits for otters, meerkats and small primates (tamarins and marmosets) was constructed under the theme of *Happy Families.* Together with the Woodland Walk developed last year, the whole area has been vastly improved. The Grade II listed Mappin Café was comprehensively restored with generous financial assistance from The British Land Company plc and English Heritage, to whom we are most grateful. Finally, in December, the Southern Aviary was demolished to make room for a new Komodo dragon exhibit, which will open in 2004.

At Whipsnade there was a great deal of necessary expenditure on basic infrastructure for visitors and a refurbished *Splash Zone* for the sealions. Work began in the autumn on a major improvement to our chimpanzee exhibit for 2004. We also installed electronic point of sale systems (EPOS) on both zoo sites to improve management of our retail business, and new ticketing systems to speed up entry into the zoos. Notwithstanding teething troubles, these systems facilitated further improvement in ZSL's financial performance whilst improving service to our visitors.

Until mid-June, visitor numbers were comfortably ahead of 2002 at both zoos, but through the rest of the summer attendances were disappointing. London Zoo suffered like many attractions in the capital from lower tourist numbers following the war in Iraq and the fear of terrorism and SARS. In addition, the extraordinarily hot weeks in August diminished visitor numbers at both zoos significantly and these lost visits were not made up through the rest of the year. As a result, paid attendances of 815,000 and 445,000 were recorded at London Zoo and Whipsnade respectively.

The zoos' excellent conservation breeding work continued with notable births of Malayan tapir and okapi calves, and Francois' langur and tamandua babies, amongst a great many others. In addition, ZSL spearheaded the European Association of Zoos and Aquariums' Tiger campaign which raised over 285,000 across Europe for field conservation.

The internationally acclaimed scientific work of the Institute of Zoology (IoZ) expanded significantly during the year with many new grants won and large important ones renewed. The UK Marine Mammals Strandings Project funded by the Department of Food, Environment and Rural Affairs (DEFRA) was renewed and this group made the national press with their research finding that naval sonar systems apparently interfere with dolphin and whale behaviour resulting in them suffering mortality from gas bubble disease ('the bends'). At the British Association for the Advancement of Science meeting ZSL scientists and conservation staff also made the headlines with important research in several African countries on the bushmeat trade. At the end of the year the IoZ invited an independent, external review group to undertake a detailed review of our scientific research activities. The group's report made important recommendations which we shall implement in 2004 and beyond.



Our Conservation Programmes advanced significantly during the year with the appointment of managers to further extend our programmes in Bushmeat and Forests, and Marine and Freshwater. In addition, our Jambi tiger project in Sumatra was expanded with further financial assistance from the oil-palm plantation owners. We also continued important work in protected areas managed from the King Khalid Wildlife Research Centre in Saudi Arabia, despite heightened tension in the region. Political issues regrettably did, however, restrict our plans both to extend work on the Babai River and to establish veterinary clinics in the Royal Bardia National Park in Nepal, but we hope to continue with these projects in due course. Our work on native species conservation also increased with a new commitment to use our two zoo sites to promote and interpret such projects. At London Zoo the canal banks have been replanted and are being managed for UK native species conservation with additions such as bat and bird boxes already in widespread use. Work with English Nature and RSPB continued with national press coverage of releases of British field crickets, bred as previously at London Zoo, and of corncrakes, bred at Whipsnade and released at Nene Washes. We made further commitments in the year to continue work in French Polynesia with *Partula* snails.

ZSL's consultancy on and involvement in the aquarium being planned for Silvertown Quays in London Docklands continued. The entire Silvertown Quays development plan was submitted for outline planning consent in December and a detailed application for the aquarium itself is due to be submitted in April 2004. The project is to be pursued by ZSL through a subsidiary charity which will shortly be established. The scale of this project is large and the aquarium will be competitive on the

left: Artist's impression of the proposed new aquarium at Silvertown Quays which will showcase good science and conservation work in marine and freshwater habitats, managed on a sustainable basis.
Terry Farrell and Partners

middle: Dr Michael Dixon, Director General, will leave ZSL in early May to become Director of The Natural History Museum.
Ian Meyrick ZSL

right: Sir Martin Holdgate.
Brian Aldrich

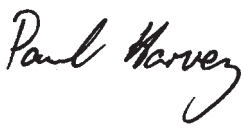
world stage and, as a result, a major new attraction for London. Most important from ZSL's point of view, it will be a showcase for good science and conservation work in marine and fresh-water habitats, and demonstrate that aquariums of this scale can be managed on a sustainable basis. Fish for the exhibits are already being bred and we are propagating coral colonies for installation in the pre-opening phase. A significant fundraising campaign for the aquarium will commence in the spring of 2004.

For many years ZSL has fought a test case, on behalf of and in co-operation with the charitable zoos in the UK, concerning cultural exemption for VAT purposes. In March 2002 the ultimate appeal court – the European Court of Justice in Luxembourg – ruled in favour of ZSL's assertion that the UK Government should correctly interpret European legislation and grant zoos, run as charitable institutions and managed by unpaid trustees, the same status as those in other EC countries. That is, they should qualify for cultural exemption and not be required to charge VAT on admissions to their sites. In March, we ceased paying over the VAT component on admission charges and, at the end of the year, HM Customs & Excise finally agreed the settlement of sums paid over since the correct legislation should have been implemented. As our accounts for 2003 show, these changes have realised retrospectively the larger surpluses that we should have been making since 1990, and allow plans for significant refurbishment and capital investment in new projects.

Lest we be carried away by improved financial performance, we were reminded by the pre-budget announcement at the House of Commons last November of how tenuous some windfalls can be. The Chancellor of the Exchequer announced his intention of withdrawing the current extension of Gift Aid used by charities that treat admission charges to their sites as day membership. In 2003 we realised over £850,000 from this scheme, but the Government seems firm in its intention to remove this benefit, probably from April 2005. We will watch the follow-up to the 2004 Budget with interest and continue to lobby with the many other charitable organisations similarly affected by this impending change.

The year closed with our Director General, Dr Michael Dixon, announcing his intention to resign his post to become Director of the Natural History Museum. Mike will leave us in early May, having been in post for a little over four years. During his time with ZSL, he has conceived and led the implementation of major changes in ZSL. Reorganisation from a divisional to a cross-Society functional organisation has resulted in more coherent policy-making and collaborative working. Our international conservation work and reputation has grown considerably. The financial position is stronger than for many years, and business and strategic plans have been developed that indicate an exciting and secure future for ZSL. Mike leaves a strong management team behind him, and we wish him well in his important new post.

Sir Martin Holdgate will be retiring from the Presidency of the Society this summer. With consummate skill, Martin has steered the Society through a very difficult period. His total commitment to conservation biology, his vision, his political effectiveness and his ability to communicate on their own terms with anybody he meets have all been used to great effect in the service of the Society. Martin has transformed ZSL. He leaves us thriving, and generations of zoologists will be grateful for his achievements on their behalf.



Professor Paul H Harvey FRS
Secretary

AWARDS & HONOURS

ZSL recognises outstanding achievements in the field of zoological research and conservation through its annual presentation of awards and prizes. The awards for contributions to zoology for 2003 are:

THE ZSL FRINK MEDAL FOR BRITISH ZOOLOGISTS

For significant and original contributions by professional zoologists to the development of zoology in its wider implications. Awarded to:
Professor Quentin Bone, for his use of anatomical, ultrastructural, histochemical and experimental techniques to increase our understanding of the functioning of the central nervous system and for his outstanding contribution to zoology.

THE SCIENTIFIC MEDAL

Awarded to zoologists 40 years of age and under, in recognition of scientific merit to:
Professor Mike Bruford, of the University of Cardiff, for his role in developing molecular genetic techniques to reveal the structure of natural populations, and for applying his results to conservation biology; and to:
Dr Edward Charles Holmes, of the University of Oxford, for his analyses of gene sequence data and phylogenetic analysis to reveal the evolution and population dynamic structure of disease-causing viruses.

THE ZSL MARSH AWARD FOR CONSERVATION BIOLOGY

sponsored by the Marsh Christian Trust

For contributions of fundamental science and its application to the conservation of animal species and habitat. Awarded to:
Professor Stuart Pimm, of Duke University, USA, for his contribution to conservation biology.

THE ZSL SILVER MEDAL

Category 1
Awarded to a member of staff of the rank of Curator (or the equivalent in non-menagerie departments) or above, or an Honorary Consultant, for long and distinguished service to the Society or for outstanding achievement, to:
Peter Olney, for his work to promote good practice and responsible management of wildlife in captivity, and his broader work for the zoo community.

Category 2
Awarded to a Fellow of the Society or any other person for contribution to the understanding and appreciation of zoology, including such activities as public education in natural history and wildlife conservation:
Professor Aubrey Manning, for his original and outstandingly informative television series that has helped a wider general public to appreciate the origins and functions of the British landscape.

THE BIOSIS AWARD FOR COMMUNICATING ZOOLOGY

Awarded to an individual for a communication of a zoological nature that has an outstanding impact on a general audience:
Dr Olivia Judson, of Imperial College, London, for her book *Dr Tatiana's Sex Advice to All Creation.*

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. Awarded to:
Chris du Feu, for his contributions to ornithology.

THE THOMAS HENRY HUXLEY AWARD

sponsored by the Marsh Christian Trust

For original work submitted as a doctoral thesis. Awarded to:
Dr Graham Taylor, of the University of Oxford, for his thesis *Animal flight dynamics: mechanics of stability and control.*
Letter of commendation goes to runner-up **Dr James Poulet**, of the University of Cambridge, for his thesis *Sound processing in the singing cricket.*

THE PRINCE PHILIP PRIZE

sponsored by the Marsh Christian Trust

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 aspects of animal biology. Awarded to:
Stuart Goodfellow, of St Paul's Catholic College, Sunbury-on-Thames, for his essay *The effect of habitat fragmentation on the invertebrate population on golf course heathland.*

HONORARY FELLOWSHIP

Awarded to:
Professor Sir Brian Follett, of the University of Oxford, in recognition of his research on circadian rhythms, his outstanding contributions to promoting zoology at every academic and political level possible in the UK, his work for the Zoological Society of London as a member of the Awards Committee, and as a contributor towards promoting and refereeing candidates for the Scientific Medal since he retired from the Committee.

this page: ZSL continues to focus on eco-tourism at the Mikongo Conservation Centre, situated in Lopé National Park in Gabon.
Troy Inman

opposite page top: Aerial surveys of savannah in Virunga National Park revealed alarming declines in wildlife populations, notably elephants and hippopotami.
Jakob Bro-Jorgensen ZSL

opposite page bottom: Snapshots of species taken by hunters, such as this mandrill, form part of the research on bushmeat hunting.
Noëlle Kümpel ZSL

CONSERVATION & SCIENCE

ZSL's conservation and science is co-ordinated across the Society under six key programmes: Bushmeat and Forests, Deserts and Rangelands, Carnivores and People, Marine and Freshwater, UK Native Species, and Island Ecosystems. The work on these programmes may take place in the zoos, in the Institute of Zoology, or by Conservation Programmes staff in the UK or in the field. Here we report on our work during the year in each of the programmes.

BUSHMEAT & FORESTS

In the Democratic Republic of Congo (DRC), we continue our support to the wildlife authorities in order to strengthen the management of protected areas through a Darwin Initiative project. Staff from the Virunga National Park went for a six-week ranger training course in South Africa and the participants now train their colleagues back in DRC. The urgency of upgrading Park operations was highlighted by aerial surveys in the savannah sections of the Virunga Park, which revealed alarming declines in wildlife populations, notably elephants and hippopotami. To understand the causes of wild animal declines in the area, ZSL has launched a research programme on bushmeat hunting in and around the Park.

Also in DRC, as we hold a breeding population of the threatened species okapi at London Zoo, we have made a number of contributions to support the Okapi Reserve.

At the Mikongo Conservation Centre, situated in Lopé National Park in Gabon, we continue to focus on ecotourism. Our Conservation Volunteers search for and follow selected gorilla groups, to get them used to the presence of tourists. As gorilla viewing becomes easier and attracts more tourists, long-term management of the Park will need to focus on generating funds to support conservation management and bring benefits to Gabonese society. As tourism develops, we continuously monitor the health status of the gorillas, which are susceptible to human diseases.

Through our investment in the UK Bushmeat Campaign, we continue to inform UK and EC government policy. We hosted a Campaign conference in December, which brought together ministers and representatives from Ghana, Cameroon and the UK, the European Parliament, the timber industry and various NGOs. The conference built on the recent African Forest Law Enforcement and Governance (AFLEG) Ministerial Declaration, and encouraged discussions about optimal solutions for sustainability of bushmeat hunting in African forests.

In terms of inter-zoo links, we continued our support of the West African Primate Conservation Action, through a consortium of European zoos that fund primate conservation work in Ghana in partnership with their Wildlife Department.

Research on bushmeat hunting has led to the development of new analyses and an approach to assess the impacts on multi-species prey communities. Model predictions can also be used to aid the interpretation of incomplete field reports, such as snapshots of the species taken by hunters. This will improve our ability to assess the sustainability of multi-species hunting systems using the limited information typically available.

DESERTS & RANGELANDS

This year saw the end of the St Katherine's Protectorate Project, after seven years. John Grainger has moved on to new conservation work after his considerable achievements in Sinai, where he brought together human culture and biodiversity as inter-linked features for tourism development. The St Katherine's Visitor Centre was opened this year, leaving a lasting legacy in terms of infrastructure, to complement the local management capacity that had been built.

In Saudi Arabia, work at the King Khalid Wildlife Research Centre continues, with new equipment in the Genetics Laboratory, which now analyses samples from all

top: Monitoring animals after release is needed to ensure viable populations are maintained in the wild.
Tim Wacher ZSL

bottom: A laboratory technologist loads DNA samples into an automated analysis machine at the KKWRC Conservation Genetics Laboratory.
KKWRC ZSL

over the region. In the Ibex Reserve, rangers continue to monitor the mountain gazelle and ibex populations, focusing management to address the increasing threats from hunting, livestock and wood-cutting.

As part of a long-term study of reproductive characteristics in the Mhorr gazelle we have investigated the hypothesis that male gazelles can not only recognise the current reproductive status of females but, using behavioural and olfactory cues, can also obtain information about the likely quality of ovulation and probability of conception. Analysis of faecal oestrogen/progesterone ratios during a series of reproductive cycles in relation to the behaviour of a vasectomised male lent support to this hypothesis and also demonstrated that the male could anticipate the onset of oestrus approximately three days in advance.

Our other long-standing rangelands project, the Pan-African project for the Control of Epizootics (PACE) based in Nairobi, has continued with investigations of rinderpest reports in cattle of northern Kenya and warthogs of Mauritania, as well as numerous training workshops. Monitoring and preventative work have, however, been interrupted by delays in agreeing an extension to the PACE programme.

Two important Darwin Initiative projects were awarded to ZSL this year. One continues our long-standing work with black rhinos in Kenya, in collaboration with Kenya Wildlife Service and IUCN, by training wildlife rangers in rhino monitoring and patrol techniques. The second project extends our area of rangeland conservation action to Mongolia, where field courses and complementary support activities are being used to build up a new cadre of ecologists through the University of Mongolia.

Our project on chacma baboons in Namibia has led to the development of a new model to explain how animals co-ordinate their activities to make sure that all individuals derive benefits from foraging in a group. Mathematical models developed with our University of Cambridge collaborators (recently published in the journal *Nature*) show that in pairs of animals, one animal should make all the decisions, but this 'leader' doesn't need any special properties (such as being dominant or larger). In fact, the leader is quite often simply the hungrier member of the pair. Furthermore, the best behaviour for an animal can be summarised as a rule-of-thumb: 'if I am hungry, I should forage; if I'm not, then I should copy my colleague.'

In addition to these large projects, we have conducted rapid surveys in the Sahel, working with a consortium of interested parties to look for addax, scimitar-horned oryx and gazelles in key areas of Chad and Niger. Populations of these striking animals have suffered severely from the impacts of war, and are vulnerable to hunting by heavily armed 'sportsmen'; very few were found. More encouraging have been the positive reports of scimitar-horned oryx reintroductions in Tunisia, where ZSL worked with Marwell Zoo and others to monitor the reintroduced population. The abundance of large mammals in the Cabo Delgado project area in northern Mozambique was also good news.

top: Telemetry fixes from the tiger Slamet's *radio-collar so far indicate a minimum home range size of 50 km², though more time is needed to establish the full extent of his movements.*
Dawn Scott

middle: Webpage from www.habari.co.tz/carnivores

bottom: Most of the remaining cheetahs live outside protected areas.
Sarah Durant ZSL, Tanzania Carnivore Program

CARNIVORES & PEOPLE

In Jambi, Sumatra, our work on tigers living in agricultural landscapes continues to develop. Working in partnership with oil-palm company PT Asiatic Persada, we have recruited skilled and dedicated Indonesian staff and, with funding from CDC Capital Partners, we are constructing a purpose-built office and accommodation building.

With the help of grants from 21st Century Tiger and the Tufton Charitable Trust, we launched the first ever radiotelemetry study of Sumatran tigers, aiming to find out how the tigers are using these habitats. In May we captured and radio-collared a magnificent male tiger, *Slamet*, who is now being regularly tracked. Camera-trap studies, with support from the Save the Tiger Fund, tell us that there are at least nine additional tigers in the areas so far surveyed.

In Tanzania, our new Carnivore Programme, run jointly by ZSL and the Tanzania Wildlife Research Institute (TAWIRI) and funded by the Darwin Initiative, is now well under way with the carnivore centre built and running and two new project scientists recruited. Tourists and local people are encouraged to contribute information on carnivore sightings to the database through programme materials such as the first edition of the *Carnivore Bites* newsletter, Cheetah and Wild Dog Watch leaflets and Carnivore Atlas sheets, all of which have been widely distributed (www.habari.co.tz/carnivores).

Our long-running Cheetah Conservation Programme in Tanzania has also been spearheading new census techniques for cheetahs, to provide hard evidence of the decline in cheetah numbers and so persuade governments to strengthen conservation action. The project is also working through the use of leaflets and posters to influence tourist behaviour, in order to reduce harassment of cheetahs in the Serengeti National Park.

In Chile, genetic research funded by the Darwin Initiative has shown that the critically endangered Darwin's fox, which survives in only two small populations totalling about 500 animals, is a full species in its own right. The foxes are in contact with domestic dogs whose health status is extremely poor, and who may well be carrying canine distemper. We have radio-collared both foxes and dogs to study their interactions and are carrying out a programme of disease testing. Wildlife health is also a focus of our jackal study in Namibia, where canine distemper has contributed to high mortality; and in Croatia we are helping to establish sound population estimates for bears and wolves using faecal DNA analysis.

In 2003, working with Anglo-Russian charity AMUR, we completed a Foreign Office funded study of the

top: Researchers believe that sonar exposure may be responsible for the stranding of cetaceans, like this sperm whale.
Matthew Perkins ZSL

bottom: Checking diversity of the fish population in the Babai River Valley, Nepal.
ZSL

socio-economic factors associated with conservation in the Russian Far East. This information will feed into conservation strategies for both Amur leopards and Amur tigers.

Closer to home, ZSL is co-ordinating the European Association of Zoos and Aquariums' current conservation campaign, which is raising funds for tiger conservation. A hundred and twenty-three participating zoos in more than 20 European countries had raised over £190,000 by the end of the year; the campaign is so popular that it has been extended for a second year in Europe, and was adopted by the Australasian Zoo Association. We channel the money to nine wild tiger projects through 21st Century Tiger (a fundraising partnership between ZSL and Global Tiger Patrol).

We are working with the IUCN/SSC Cat Specialist Group to develop an online *Cat Conservation Projects Database*. This is now capable of storing data on the funding, activities and achievements of conservation projects targeted at any species of wild cat. It will be made publicly available as soon as tiger data entries for 2003 are complete, and will provide a valuable tool for conservation practitioners and funders.

MARINE & FRESHWATER

Our DEFRA-funded research on disease threats to turtles and marine mammals gave rise to some ground breaking findings: marine mammals can get 'the bends'. In a high profile paper in *Nature,* we reported the first evidence of gas bubbles and associated tissue trauma in six dolphins, a porpoise and a beaked whale from UK waters. The paper also reported the pathological findings following an investigation conducted by the University of Las Palmas (Gran Canaria) into a mass stranding of beaked whales in the Canary Islands in September 2002. Further research is needed to confirm the actual mechanism of these novel findings in both studies, but the coincidence of the Canaries beaked whale mass stranding with a naval exercise using mid-frequency active sonar suggests that sonar exposure may have had a role.

In March, we undertook our second expedition to the Babai River Valley, Nepal. Situated in the Royal Bardia National Park, the Babai River is a rare warm water system. The Babai fish populations were shown to be diverse with 49 species recorded, including the much prized mahseer. Following implementation of our earlier recommendations for the management of the fish pass, fish movements through the dam were improved. The current threats to the fish were the increasing levels of poaching, frequently using pesticide poisoning, which is also a

top: A Cabo Delgado Biodiversity and Tourism Project to monitor and protect turtle nests on Rongui and Vamizi Islands in Mozambique has resulted in thousands of juvenile turtles hatching and returning to the sea.
CDBTP

middle: Large fringing reefs were healthy and productive with 125 coral species and reef populations were extremely diverse.
CDBTP

bottom: The Project Islands lie across a shallow, deltaic system of mudflats and mangroves from the mainland. Eastwards, the majority of the islands are bounded by bathymetric intrusions providing proximity to deep water of the Mozambique Channel.
Adaptation of an Admiralty Map by ZSL

public health concern. However, due to political insecurity in the region the project has had to be put on hold.

In Mozambique, the Cabo Delgado Biodiversity and Tourism Project (CDBTP) has carried out scientific surveys of coastal and marine habitats around the islands of Vamizi, Rongui and Macaloe, which have confirmed their exceptional conservation value. Large fringing reefs were found to be healthy and productive with over 125 coral species, and reef fish populations were extremely diverse (354 reef species identified to date, of which 21% have never been recorded in Mozambique before). By working with the resident communities, local fishers were selected by community leaders to be employed and trained as turtle monitors. This new programme has been highly successful, resulting in the protection of over 160 nests of green and hawksbill turtles to date.

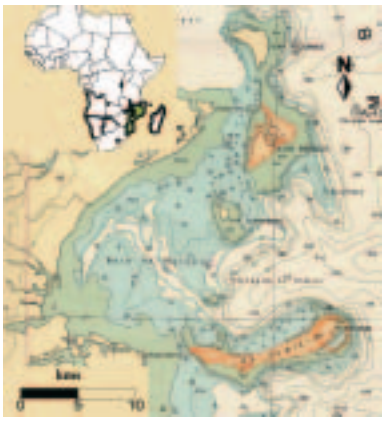
The Community Fund supported conservation work of *Project Seahorse* continues in the Philippines. A further three community-based Marine Protected Areas (MPA) are being established, and baseline surveys of two were completed to establish site boundaries, map substrate type, and evaluate the health of the fish and coral populations. The bi-annual monitoring of the six existing MPAs continued. As part of the aquaculture initiative, a pilot study was undertaken to investigate seahorse ranching to afford protection for the pregnant male seahorses prior to giving birth and thereby assist the recruitment of juveniles into the diminishing populations. The trials determined that ranching in this manner stressed the sea-horses, making them more vulnerable to diseases, and the system was abandoned.

The fishers' alliance KAMADA, established and supported by *Project Seahorse*, continues to grow in status and has been active in trying to help the government in fighting illegal fishing and to enforce fishery laws. Responding to the fishers' concerns, the Governor of Bohol agreed to help deputise them as fish wardens and consequently join the Coastal Law Enforcement Council operations in their respective areas. In July, *Project Seahorse* hosted a national workshop and brought together twenty-six institutions to develop a minimum set of measures and indicators to assess the environmental impact of sustainable livelihood approaches. The workshop resulted in the first national network of livelihood practitioners in the Philippines.

Successful reproduction is essential for the production of viable offspring and propagation of the species; good quality gametes (sperm and eggs) are therefore vital. In the majority of fish species, where external fertilisation is the norm, the gametes are released into the external environment and are therefore vulnerable to the detrimental effects of environmental pollutants, fluctuations in water temperature and alterations in salinity. We have been conducting research on how fish sperm quality (motility and morphology) is affected by heavy metals and salinity, and more recently we have been investigating the effects of water-borne hormonally-active compounds on sperm production and fertility in freshwater fish.

UK NATIVE SPECIES

Our ongoing support for breeding species in the English Nature Species Recovery Programme continued: field crickets, dormice, Barberry carpet moths, and corncrakes were all reared and released. Moreover, ZSL vets carried out health screening of birds, mammals and invertebrates from many institutions, prior to reintroductions.



this page: Young queen of the Great Yellow Bumble Bee (Bombus distinguendus), *a scarce bumble bee species now almost entirely confined in the UK to Scottish islands, which is being studied by IoZ scientists in collaboration with Cambridge University and RSPB.*
Andrew Bourke ZSL

Our high levels of success in rearing and releasing 2,210 field crickets (into three sites) continued, but it was particularly satisfying this year to have benefited from the warm weather to produce over 3,000 Barberry carpet moth larvae – by far our largest over-wintering stock. Even more satisfying, given the hard lessons learned in 2002, was the successful rearing of over 60 concrake chicks from breeding birds at Whipsnade, of which 50 were released into the Nene Washes. We now wait to see if they find their way back after migrating to Southern Africa for the winter. Ospreys have done it, let's hope the corncrakes will too!

Work continues at our own zoos to improve habitats for native species. The Woodland Walk at London Zoo now offers a picturesque path to a picnic area, with labelled trees, bird and bat boxes. In the canal-side shrubbery, warblers have been recorded during monthly bird surveys, and confirmed which areas are important for house sparrows within London Zoo – one of the few sites where they are to be found in Regent's Park. The recovery of the Vallence End site at Whipsnade continues to progress well. Vegetative surveys are carried out each year by the Ecologist from the Bedfordshire County Council, and animal species are recorded by Whipsnade staff. This area is adjacent to the Site of Special Scientific Interest on the chalk grasslands at Whipsnade, an area which is actively managed with input from English Nature.

Several bumble bee species in the UK have undergone steep declines in recent decades. However, many aspects of the basic biology of these important pollinators, which could be of use in their conservation, remain poorly known. One mysterious aspect of bumble bee biology concerns the number of colonies that utilise a given area for foraging. Do one or a few colonies send workers to gather pollen and nectar at a site, or do many colonies share resources there? ZSL scientists devised and implemented a genetic technique for answering this question. We showed that, for two common bumble bee species, the buff-tailed bumble bee (*Bombus terrestris*) and the common carder bee (*B. pascuorum*), the number of colonies whose workers visit foraging sites (cemeteries, gardens, parks and wasteground in London) is high (between 65 and 100 colonies per hectare). This implies that urban areas could be very valuable for bumble bee conservation. In addition, since bumble bees appear to forage over wide areas, conservation efforts in any environment should involve the provision of a network of foraging sites. We are now trying to apply the technique and these conclusions to studies of scarce bumble bees in the UK.

In collaboration with the Wildfowl and Wetlands Trust, we have been studying the behaviour of foraging geese as their

top: Over 2000 field crickets were released at three separate sites in West Sussex and the Isle of Wight.
Dave Clarke ZSL

middle: Over 60 corncrake chicks were successfully reared at Whipsnade of which 50 were released into the Nene Washes.
ZSL

bottom: Partula suturalis. *One of 56 endemic tree snail species made extinct on the Society Islands.*
ZSL

food resource becomes depleted. Our latest work based on photographic sequences of barnacle goose flocks over time, combined with computer-intensive analysis shows that the most successful foragers in a flock are largely unaffected by food depletion, while the least successful foragers experience foraging conditions that are increasingly unfavourable in larger or longer established flocks.

ISLAND ECOSYSTEMS

A contract has now been signed with the French Polynesian government to produce a long-term strategy and action plan for conservation of endemic snails. This is a welcome commitment for conservation of this invertebrate group, and allows ZSL to continue monitoring the status of *Partula* snails, and the invasive predatory snail that has already eliminated many endemic species. Staff in *B.U.G.S!* (formerly *Web of Life*) also contributed funds to this field work through their *Friendly Spider Programme* fund-raising.

Worldwide, endemic island fauna are at increasing risk from introduced diseases. Funded by a Darwin Initiative grant, ZSL is establishing a wildlife pathology laboratory in the Galápagos to help identify and manage disease threats to the endemic biodiversity of the islands, in collaboration with the Galápagos National Park, and University of Guayaquil, Ecuador. In addition to building the laboratory, we will train Ecuadorean veterinarians, scientists and National Park staff in wildlife pathology and disease surveillance techniques. The facility and staff will contribute to a disease-monitoring programme that will act as an early warning system, giving Ecuadorean researchers the long-term capacity to identify and respond to wildlife disease in the archipelago.

GREEN TEAMS AT ZSL

Terms of Reference were agreed for Green Teams at both Whipsnade and Regent's Park, which meet monthly, and an internal newsletter (electronically circulated!) now keeps staff apprised of issues and planned action. A ZSL environment policy is being formulated, and the Environmental Audit of Whipsnade carried out by Cranfield University is being reviewed. Specific action has been taken to reduce energy and water use, which has already resulted in a saving of £40,000 at the Regent's Park site this year.

SCIENTIFIC REPORT

Full details of research work in the Institute of Zoology is published annually in *Science for Conservation*, the annual scientific report, which is available on request.

EDUCATION & INFORMATION

Education is central to ZSL's mission and covers every area of our activity. Through the two zoos we reach around 1.3 million visitors each year, providing them with information on wildlife, habitats and conservation. Through our programme for schools and through a variety of public presentations, touch tables, and interactive interpretation we stimulate interest in the natural world. ZSL's work is also brought to an international audience through our scientific lectures, talks, courses and publications.

ZSL EDUCATION

This year saw the amalgamation of the Whipsnade and London education teams into a single ZSL-wide Education Department. The informal collaboration of the last few years evolved into the start of a formal planning process to develop a ZSL-wide strategy for educational programmes and interpretation. An analysis of educational visits by schools and colleges on both sites enabled us to plan for expansion, particularly at Whipsnade, and to prepare for the new aquarium at Silvertown Quays.

SCHOOLS & COLLEGES

Attendances by schools at London Zoo and Whipsnade fell slightly this year. However, we still exceeded 30,000 educational visits to Whipsnade, a level achieved for the first time only last year. Schools visits at London were 74,000.

In addition to the Outreach programme at Whipsnade, which continues to be popular, we supplemented the tours in the Park with new activities for schools. Over 2,500 children participated.

New activities introduced to the programme at London include one with a literacy focus and two aimed at the Citizenship curriculum for primary children. New A-level talks use the wealth of case studies provided by ZSL's field work to provide current examples of conservation.

The Greater London Authority (GLA) continues to fund free school visits for London children and an additional six staff at Regent's Park. The provision of a permanent lunchroom (in the old Parrot House) and staff to welcome and orientate groups on arrival is greatly appreciated by schools; this is apparent from the feedback we receive from teachers who also comment very favourably on the quality and delivery of our educational programme.

In November, we held our annual *Careers with Animals Day* for children in Year 10 and an A-level symposium at which ZSL staff gave presentations on a variety of aspects of conservation. Education Officers also played key roles in the Christmas promotion, playing characters from the Nativity; over 4,700 children attended this event which is very popular with schools.

VISITOR EDUCATION & INTERPRETATION

The major interpretative projects this year revolved around the development of new exhibits. New enclosures for otters, meerkats and marmosets at London Zoo presented an excellent opportunity to develop interpretation around the theme of family life and how these very social animals hunt for food in three very differing habitats – river, desert and rainforest. Interactive devices enable visitors to feel for prey like an Oriental short-clawed otter, understand the physical adaptations of an otter to water and match the enlarged incisors of pygmy marmosets to their favourite food – gums and resins.

A second major project at London was the development of the canal banks for native species. This corridor of trees along the Regent's Canal provides ideal habitat for local species of bat (common and soprano pipistrelles and Daubenton's bat), all three part of the Camden Biodiversity Action Plan of which ZSL is a partner. Native bluebells, foxgloves, primroses and honeysuckle were planted and bramble and nettle beds encouraged as habitats and food plants for a variety of invertebrates. A Woodland Walk was created along the south bank, providing a pleasant path for

top: Interpretation board at the new Otter enclosure.

middle: The canal banks were developed and a Woodland Walk created which leads visitors past a series of information panels on native species.
Claire Robinson ZSL

bottom: Display of recent ZSL stories designed for regular updates as projects unfold.
Claire Robinson ZSL

visitors and the location for a series of information panels on native species.

Other interpretation included a display of recent stories illustrating the work of ZSL's scientists, projects in the field and breeding successes. This board is designed to be updated regularly as projects unfold. During the summer, an artist re-created some bowerbird nests that were displayed naturally amongst plants around the Zoo.

At both London and Whipsnade, the education team ran activities for visitors throughout the summer to raise awareness of ZSL's field work under the banner *21st Century Tiger.* Interpretation panels and an activity in which visitors spun a wheel to discover the varying fates of tigers in Sumatra were part of the activities at Regent's Park, while Whipsnade provided crafts and face-painting and a tiger talk. Over £7,000 was raised in total.

Both the Whipsnade and London guidebooks were updated; more emphasis was given to highlighting ZSL's wide-ranging conservation work.

VISITOR INFORMATION

At Regent's Park, all directional signs were refurbished and the new maps were re-orientated north-south and simplified, making them easier for visitors to find their way round the site. We took this opportunity to re-brand all signage around the Zoo with the ZSL logo.

VOLUNTEERS

Much work was done to bring into line all the procedures and policies relating to the many volunteers who give their time so freely to ZSL. The majority of our 250 volunteers help extend the educational role of the zoos by running touch tables, presenting live animals such as cockroaches, snails, ferrets and llamas and providing commentaries and tours for visitors. Some 30 volunteers also assist the keeping staff at London in the preparation of food and cleaning enclosures while an additional nine help in the Library and in offices. Whipsnade volunteers continued their fundraising efforts on behalf of ZSL and this year started raising funds for a new tiger den at the Park.

REPRESENTING ZSL

Both Whipsnade and London Zoo continue to be represented on the Education Committee of the Federation of Zoos, with the Head of Education holding the position of vice-chair of the Committee. The Education team attended the British and Irish Zoo Educators Conference in November and presented papers on the successful management of volunteers and health and safety.

QUALIFICATIONS & TRAINING

This year saw the launch of a new, nation-wide course for training zoo keepers, the Advanced National Certificate in the Management of Zoo Animals. It was developed by the Federation of Zoos Education Committee in conjunction with Sparsholt College, Hampshire, which actually runs the course. It covers the most up-to-date aspects of animal husbandry and is more demanding than the previous course. ZSL was appointed the Regional Co-ordinator for East Anglia and the South East and provides tutoring for all the zoos in this region. A new feature is a week-long residential programme at Sparsholt at which keepers receive training in health and safety, an introduction to software used in

breeding programmes and other practical skills. Seventeen keepers from ZSL are currently enrolled.

We built on the enormous success of our Masters Course in Wild Animal Health (jointly run with the Royal Veterinary College) by commencing a non-veterinary stream (MSc in Wild Animal Biology), prompted by the increasing number of enquiries from non-veterinarians for tuition in this field. The distinctive feature of this new course is that the veterinary skills element has been replaced with training in research methodologies relevant to the study of wildlife.

In place of the clinical sessions on the original course, Wild Animal Biology students are attending courses designed to develop generic research skills and carry out a literature-based project in addition to their final research project over the summer months. Wild Animal Biology students are, nevertheless, benefiting from the high quality teaching provided by sharing many of their classes with their Wild Animal Health MSc colleagues. This includes principles of biological science, veterinary interventions in wildlife (including social, welfare, ethical and legal aspects), management of captive and free-living wild animals, epidemiology, diagnosis, treatment and control of wildlife disease, as well as wildlife research methodology.

The course will be relevant to those wishing to follow careers in wildlife management, wildlife rehabilitation centres, wildlife-related research and zoo management, as well as those proceeding to study for a PhD. We hope that this course will fulfil a need for wild animal training for non-veterinarians with a strong interest in wild animal-related research.

To meet the requirements of a larger number of students from two Masters Courses, we have re-developed the Wellcome Building of the Institute of Zoology, creating a new computer room with ten computer workstations and a new reference library facility. Lectures now take place in London Zoo's Education Building.

The Master of Science Course in Wild Animal Health continues to attract interest and to be well attended as it enters its tenth year. The participants spend a great deal of time and energy on the research project, in many cases producing results of real value to wildlife conservation and welfare. However, the busy careers of graduates frequently hinder progress in publication from thesis to preparing a journal paper. In an effort to improve on this situation, the students on the 2002/03 course were required to submit their research project in a form suitable for publication. This change has produced instant dividends, and two projects have already been submitted: Rea Tschopp's important study on the epidemiology of infectious keratoconjunctivitis in chamois, *Rupicapra rupicapra*, and ibex, *Capra ibex*, in Switzerland, and Kaori Flores Miyamoto's interesting work on the digestive strategy of lowland anoa, *Bubalus depressicornis*, which has significant implications for the way in which this species is fed in captivity. Three other projects will soon be submitted, increasing the output of this popular course.

PHD AWARDS

Three PhD students were awarded their degrees in 2003: Dr Paul Jepson for his work on the *Pathology and toxicology of stranded harbour porpoises* (Phocoena phocoena) *in UK waters*; Dr Angus Carpenter for his thesis entitled *The population dynamics and economics of harvesting in Malagasy chameleons*; and Dr Tom Maddox for research on *The ecology of cheetahs and other large carnivores in a pastoralist-dominated buffer zone*.

top: The 2003 Stamford Raffles Lecture was given by Professor Steven Sanderson.
Brian Aldrich

bottom: A range of ZSL publications.

MEETINGS & PUBLICATIONS

An important part of ZSL's work is facilitating the communication of information between researchers, professional zoologists and the general public. We achieve this through our varied programme of meetings and the publication of scientific books and journals.

Our 2003 Stamford Raffles Lecture, *The contemporary experience of wild nature and its implications for conservation,* was given by Professor Steven Sanderson, President and Chief Executive Officer of the Wildlife Conservation Society, New York. This event was generously sponsored by the Singapore Tourism Board and Singapore Airlines, and we are most grateful for their continuing support.

Scientific Meetings are held monthly through the academic year and in 2003 we were delighted to announce sponsorship by the Mitsubishi Corporation Fund for Europe and Africa. The partnership was launched with Professor David Macdonald's lecture *The lion king: is his throne secure?* Other meetings held covered a diverse range of subjects, such as *Marine predators and the wow factor: new technology, new insights; Conservation and biology of bumble bees* and *National Parks in the sea.*

In February ZSL hosted a two-day international symposium *Phylogeny and conservation*, organised by Andy Purvis, John Gittleman and Thomas Brooks. With speakers from five continents and case studies from a wide range of taxa and regions, this was the first meeting to bring together the different conservation uses of phylogenies.

The ***Journal of Zoology***, ZSL's pre-eminent international journal dedicated to academic zoology, continues to receive increasing numbers of high-quality papers from top researchers. The *Journal* promotes hypothesis-driven studies that are of interest to all readers of zoology, and provides comprehensive coverage of the latest research and developments.

ZSL's quarterly journal, ***Animal Conservation***, provides a forum for rapid publication of rigorous empirical or theoretical studies relating to species and population biology. The journal brings together innovative research and ideas from evolutionary biology and ecology that contribute to the scientific basis of conservation biology.

The ***Conservation Biology book series***, published in association with Cambridge University Press, includes titles which reflect our research interests and provide an important contribution to a particular field. We published the eighth book in the series, *Reproductive Science and Integrated Conservation,* edited by William Holt, Amanda Pickard, John Rodger and David Wildt.

Volume 38 of the ***International Zoo Yearbook*** was published. The special section, *Zoo Challenges: Past, Present and Future,* includes 15 articles that address the historical trends and future aims of zoos in relation to animal management and conservation. Articles in Section 2, *The Developing Zoo World,* range from the artificial insemination of koalas to food consumption, growth and food passage times in Pacific walrus. The reference section contains a list of *Zoos and Aquariums of the World*, a list of national and regional zoo associations and a register of international studbooks.

this page: Otters in their new pool at London Zoo.
Tony Blurton

opposite page top: The Malayan tapir pregnancy was confirmed by ultra sound.
ZSL

opposite page middle top: Southern tamandua bred successfully for the first time at London Zoo.
Frank Wheeler ZSL

opposite page middle bottom: The first Francois' langur monkey born at London Zoo.
Brian Aldrich

opposite page bottom: Reptile staff identified a new species of cobra, Naja nubiae*, within the London Zoo collection.*
ZSL

THE ZOOS AT WORK

This was an extremely productive year for the zoos in all facets of our work, including breeding successes, the acquisition of new species, staffing issues and physical developments at both London and Whipsnade as well as the development of improved business practice.

ANIMALS

The year produced extraordinary breeding results throughout the collection, many of these being the culmination of several years of planning and careful husbandry. The Malayan tapir pregnancy was diagnosed from an ultra-sound examination but, as no matings had been observed, predicting the birth was not easy. Despite this being her first calf the female proved to be an exemplary mother. Two of the three bearded pig females reared a total of five offspring as a first breeding in the UK of this species. The acquisition of a pair of southern tamandua led to another ZSL first breeding and saw an unusual anteater double with the birth of the fourth giant anteater. Other mammal 'firsts' included the Lake Alaotran lemur, red-bellied lemur and Francois' langur. ZSL's contribution to an increasingly important group of animals, the antelope, was provided with births for okapi, Nile lechwe, bongo and gemsbok. Other significant births included six species of callitrichids, red pandas, pottos, tree shrews, common hippo and Grevy's zebra.

Male gorillas were exchanged with Bristol Zoo and female black rhinos were transferred to produce a new pairing at Whipsnade, both moves being part of the respective European Endangered Species Programmes (EEPs).

Following on from the successful hand-rearing of black-necked aracari last year, two chicks were parent-reared this year. This is believed to be a first in the UK and a fine example of evolving husbandry practices within the collection. Also in the Bird House, a single clutch of three toco toucans were all parent-reared. Successful rearing of two Abdim's storks and scarlet ibis were the first for some years and are encouraging signs for the viability of the colonies of these important species. Another first time breeding for ZSL came with the rearing of a Madagascan teal.

The bird focus at Whipsnade this year was obviously the corncrakes (see *picture on p15*). However, there were a number of other successes, particularly with waterfowl, the superb starlings and Manchurian cranes. At London Zoo, encouraging signs for the future in the Bird Department were seen in a number of new species to breed.

The 'expert eye' of the Reptile staff received due recognition with the identification of a new species of cobra, *Naja nubiae*. This event received considerable interest, enhanced by the successful breeding of this species. Another species of reptile only maintained at London Zoo is the Egyptian gecko and these also bred successfully this year.

Breeding of the Fregate Island beetle continued with the population reaching the fifth generation. Other significant breeding of invertebrates was seen in the field cricket and Barberry carpet moth colonies.

New species for the collection included three pairs of Panay cloud rats as part of our support for the Philippines programme, a trio of grey kangaroos in the Children's Zoo, white-winged ducks and Madagascan rainbow frogs, elongate tortoises and gila monsters in the Reptile House.

top: Whipsnade continued its success in breeding a further three Grevy's zebra foals a short time apart.
ZSL

middle: Barclay *enjoying the refurbished* Splash Zone *at Whipsnade.*
ZSL

bottom: Preparations in hand for the new Komodo dragon exhibit at London Zoo.

ORGANISATION & AWARDS

New Curators of Herpetology and Mammals were appointed to the curatorial team during the year. In collaboration with other departments, a number of species groups have either developed or been initiated to enhance the management of the animal collection. A greater focus has been put on the role of research projects that might assist the husbandry of species. Considerable overlap will be seen with this and groups such as the Nutritional Group, the Environmental Enrichment Group and the Training Group.

The management of the Animal Department in London Zoo underwent a significant restructure when the two bird sections were amalgamated into one and the five mammal sections into two.

ZSL received two awards from the Federation of Zoos: a meritorious award in recognition of Significant Advances in Sustained Breeding, for the breeding of Przewalski's wild horse; and a commendation in Successful Conservation Projects for assisting the conservation of black rhino in Kenya, with special reference to the Ngulia Rhino Sanctuary Site Support Link Project.

Staff have been extremely active through the year with a wide range of activities including presenting papers at a number of zoo conferences, providing support and expertise in Kabul Zoo, the production of studbooks and husbandry guidelines, for example Nile lechwe and owls respectively, co-ordinating European Breeding Programmes, chairing Taxon Advisory Groups and working for and supporting ZSL's Conservation Programmes projects.

BUILDINGS & EXHIBITS

The two major developments undertaken at Whipsnade and London were both well received by animals and visitors alike. The extension and modification to the sealion pool at Whipsnade greatly improves the visitor experience during the demonstrations, as well as enabling the sealions to have access to the outside pool at times when these are not taking place. It also addressed some health and safety issues.

At London Zoo, the new otter enclosure was celebrated by a second litter within the year bringing the group to a total of 12. The new areas for the meerkats, marmosets and tamarins were significant improvements to their existing facilities. The overall development completely transformed this tired area of the zoo.

The ongoing challenge of finding an appropriate use for a few of the ageing animal facilities on both sites continued. Significant improvements to the life support systems in the Aquarium and changes to the management of a number of the off-show areas in the Reptile House were initiated. At Whipsnade, the removal of the last of the Congo buffalo herd allowed their area, originally built for Indian rhinos, to be demolished and the site cleared. It will now be left 'fallow'.

By the end of the year work on the new chimpanzee enclosure at Whipsnade was well underway and preparations had started for the Komodo dragon facility at London Zoo. To make way for this, the Southern Aviary was emptied and demolished, thus eliminating a major maintenance issue. Both new developments will open in 2004.

Considerable improvements have been made to the London Zoo site in order to

this page: ZSL veterinary staff co-ordinated a primate healthcare workshop in Uganda.
Wayne Boardman ZSL

meet the requirements of the Disability Discrimination Act (DDA). These include induction loops in public display areas and meeting rooms, automatic doors to animal houses, additional ramps and wide turnstiles at the exits. The needs of visitors with disabilities are, of course, included in the planning and design of all new developments.

Staff worked hard throughout the year to continue the programme of improvements to the animal facilities, the transformation of one row of inside aviaries of the Bird House being an excellent example of what can be achieved with these small projects.

VETERINARY WORK

The Veterinary Department continued to be very busy. Changes to a variety of core activities are gradually being implemented and operating procedures for all facets of our work are being developed.

Quarantine procedures were reviewed; all new arrivals now undergo a more thorough health review before joining the collection. By doing this we gain important information, minimise the possibility of disease being introduced and ensure the animals are healthy.

Pathology and clinical records are now being computerised using a database developed in New Zealand and MedARKS, which links into ARKS, the zoo-wide record keeping database. Both these databases will lead to increased efficiency in managing data and complement the new more efficient filing system. Veterinary staff were also involved in developing a ZSL diet manual and initiating a new welfare assessment process for all animals in the collection. Both of these will take some time to finalise.

Specific conservation projects continue to benefit from veterinary department assistance and include work with English Nature, RSPB and the UK Marine Mammals Strandings Project. Pre-release checks were performed on field crickets, dormice and corncrakes.

Internationally, staff were involved in organising and convening a primate health care workshop in Entebbe, Uganda, for the Pan African Sanctuaries Alliance, investigating disease and anaesthetic development in black-backed jackal *Canis mesomelas* (in combination with Institute of Zoology staff) and – in collaboration with Marwell Zoo – translocating and assessing the health status of introduced scimitar-horned oryx in Tunisia.

Clinically, an outbreak of avian malaria in black-footed penguins presented many problems; treatment and prophylactic measures were, however,

this page left: Detail of the restored Mappin Café.

this page right: New membership cards were introduced.

opposite page top: The 2003-4 series of Scientific Meetings was launched by a lecture with a reception afterwards in B.U.G.S! *(formerly Web of Life).*

opposite page bottom: A reception was held by The British Land Company plc to mark the completion of restoration works on the Mappin Café.

Brian Aldrich

generally successful. Malaria had been seen in other collections in the UK. Raika, the female Sumatran tiger, underwent reproductive assessments and treatments to induce oestrous thanks to the Institute of Zoo and Wildlife Research in Berlin.

BUSINESS

Significant investment was made in business systems at both zoos. A ticketing system was installed, going 'live' in the spring. This allows for improved customer service at the gates and an increase in the level of Gift Aid we can process and claim. It has also led to greater efficiency with educational and other group bookings. A retail system was also installed which has led to improved profitability through reduced stock levels, the elimination of weaker selling lines and a reduction in the number of suppliers.

Major changes were made to day visitor catering. At Whipsnade, a small café was opened by the admission gates, a vending facility was installed by the penguin pool and improvements made to the Lookout Café. These changes led to significantly improved income.

At London Zoo, the day visitor catering contract was put out to competitive tender and awarded to Compass plc who currently manage banqueting on the site. The new arrangements took effect at the end of the year and a major refurbishment of the main Oasis Café was planned for opening in early 2004. The restoration of the derelict Mappin Café was completed, and this magnificent venue is now available for private functions.

Membership schemes were reviewed, which led to the merging of the separate *Friends* schemes on each site. The newly styled *Friends of ZSL* will be more efficient to administer and offer a greater range of benefits including the opportunity for unlimited admission to both Whipsnade and London Zoo.

Additional income streams are also being sought. The external hire of ZSL meeting rooms has been expanded and sales revenue has greatly increased. More aggressive marketing of both sites as commercial filming venues has also been successful in generating higher levels of income.

FUNDRAISING & GRANTS

As ZSL embarks on plans for site redevelopment, we have implemented strategies to provide the infrastructure for major capital campaigns and on-going sustainable and integrated support across all of the Society's mission areas: living collections, conservation programmes and research.

The Mitsubishi Corporation Fund for Europe and Africa, which generously supported *B.U.G.S!* (formerly *Web of Life*), has continued its support for ZSL with sponsorship of the 2003-4 series of Scientific Meetings. These cover a range of conservation and environmental issues and, as key vehicles for public education, are at the heart of ZSL's learned activities. These events are highly regarded and are attended by academics, students and conservation professionals from around the world, as well as the general public and ZSL members.

The series was launched in October with a lecture by Professor David Macdonald, a member of ZSL's Council and Director of the Wildlife Conservation Research Unit (WildCRU) at the University of Oxford. His talk on the work of the Hwange Lion research (also supported by the MCFEA) was extremely well attended. We were delighted that His Excellency The Ambassador of Japan, Mr Masaki Orita, joined us for the lecture and said a few words at the reception which followed in *B.U.G.S!* to mark the close collaboration between the UK and Japan in the fields of science and education.

Singapore Tourism Board and Singapore Airlines have for some years jointly provided support for a key annual event in the ZSL calendar, the Stamford Raffles lecture, through their sponsorship of the post-lecture reception. This year they generously agreed to continue this support, which emphasises ZSL's historical connection with Singapore through its founder Sir Stamford Raffles.

The restoration work on the Mappin Café, generously supported in 2002 by The British Land Company plc with an additional grant from English Heritage, was completed in the early summer. The Grade II listed building once again looks beautiful and has been a spectacular venue for numerous functions including the opening party kindly hosted by British Land.

A generous grant from the Bridge House Trust has enabled ZSL to embark on a programme of access improvements at London Zoo to bring the site further in line with the requirements of the Disability Discrimination Act. The programme of work, which will last until the end of 2004, includes ramps and automatic doors to many of the animal houses, induction loops to assist the hard of hearing, pedestrian access to the car park and a new wider turnstile on the north bank exit. These improvements will make access easier for all our visitors including those with wheelchairs or buggies.

At Whipsnade, the completion of the new terrapin enclosure sponsored by Finnforest was a great development in the care of these rare freshwater turtles. Finnforest, an international wood products company which supplies timber from well-managed forests around the world, is an excellent partner for ZSL, with its commitment to conservation and to helping to protect the world's forests. As well as supporting the new terrapin facility, Finnforest also provided sponsorship in-kind by providing wood for the refurbishment of the decking around the sealion pool. We look forward to continuing this successful partnership in future years.

Animals in Good Company, a pilot initiative with the support of The Learning Trust, has designed a programme of mentoring and self-development which offers East London secondary school pupils the opportunity to improve their skills in business management. The aim is to provide them with the motivation and support to encourage them to continue their education beyond 16, as well as to raise

top: NERC funded a research project to investigate adaptation in response to climate change in the brown argus butterfly (Aricia agestis).
Rob Wilson

bottom: The Island of Santa Fé in the Galápagos Archipelago.
ZSL

their awareness of conservation issues and to support the work of ZSL.

The project has provided an opportunity for a new type of corporate involvement in the Society's work which fulfils corporate social responsibility objectives, as well as initiating a new education programme to meet our mission of promoting worldwide animal and habitat conservation. News International have sponsored the project, providing funds, staff and in-kind resources for the mentoring programme and for the pupils' Zoo project, a new termite mound for the sloth bears at London Zoo. Veredus have provided mentors for the nine pupils from Hackney's Haggerston Girls' School. The mentoring will continue in to early 2004 and on its completion the sloth bears will be able to enjoy their new termite mound on the Mappin Terraces.

In addition to grants and corporate sponsorship, ZSL depends on the donations of individuals to help achieve vital animal conservation work. This year an appeal to Members and Adopters to donate to the newly established Field Conservation Fund received many generous donations. The Fund has been set up to channel money to where it is needed most, in our field projects in Britain and in over 30 countries. These projects receive no core-funding, and the Fund therefore plays an essential role in providing ongoing support for this work. If you would like to find out more about the Field Conservation Fund, please contact the Development Department on 020 7449 6582 or fundraising@zsl.org.

MAJOR GRANTS

The Institute of Zoology's research continues to be supported by the annual core grant from HEFCE. In 2003, this grant of £1.85 million, paid to the Institute via Cambridge University, contributed to the ongoing research programmes and enabled development of new ones. It also provided support for research staff to apply for competitive external research grants and studentships.

Successful applications awarded during 2003 included:

The Natural Environment Research Council (NERC) funded two new research projects. £51,207 was awarded to Dr Jon Bridle for a two-year period to fund his project entitled *Genetic tests for adaptation at the expanding range margin of the British butterfly* Aricia agestis. An award of £193,192 was also made to Dr Andrew Cunningham and Dr Matthew Fisher for their work with Imperial College on *Ecological and genetic determinants of* Batrachochytrium dendrobatidis *emergence in European amphibian populations.*

Darwin Initiative grants were awarded to Dr Simon Goodman and Dr Andrew Cunningham (£75,469) for *Building capacity and determining disease threats to endemic Galápagos fauna,* and Dr Richard Pettifor and Dr Raj Amin (£170,322) for *Building capacity for conservation of a critically endangered flagship species.*

DEFRA contributed £72,000 to Dr Andrew Bourke and Dr Bill Jordan for a five-year project entitled *Genetic censuses of bumble bee numbers at experimentally sown plots of wildflowers.* DEFRA also awarded a three-year BBSRC LINK grant (£572,584) to Dr Bill Holt, for work on *Increasing the efficiency of artificial*

insemination: Improving sperm survival by oviduct components, with two commercial sponsors, Sheffield University and the Royal Veterinary College.

Scottish Natural Heritage awarded £107,306 to Dr Marcus Rowcliffe and Dr Richard Pettifor for their two-year project *Review of the Scottish National Goose Policy Framework: modelling changes in the Artic breeding goose populations that winter in Scotland.*

English Nature extended its contribution to the funding for the *Species Recovery Programme* (£89,518) led by Tony Sainsbury.

The Rufford Foundation supported the IUCN Red List Programme and associated scientific work (£50,000).

Grants awarded and donations to ZSL's conservation programmes included:

The Community Fund contributed £116,461 to *Project Seahorse* (Dr Heather Hall) to support socio-economic research and fisheries modelling in the Philippines.

The US Fish and Wildlife Service awarded $29,810 to support gorilla monitoring and habituation at the Mikongo Conservation Centre, Gabon.

The Foreign and Commonweath Office contributed £34,200 for tiger and leopard conservation work in conjunction with AMUR in the Russian Far East (Sarah Christie).

DEFRA awarded £30,000 to ZSL via the IUCN Cat Specialist Group, to support the work of 21st Century Tiger and other ZSL big cat projects (Sarah Christie).

UNESCO provided grants of 30,000 and 10,000 to support the management of Garamba and Virunga National Parks in the Democratic Republic of Congo (Emmanuel de Merode).

DEFRA awarded two Darwin Initiative grants, contributing £40,459 as a first instalment of a grant over three years worth £187,921 to support conservation training in Mongolia (Dr Kate Oddie).

The Ernest Kleinwort Charitable Trust donated £10,000 to the Cabo Delgado Biodiversity and Tourism Project, Mozambique (Dr Julie Garnier).

The *Direction de l'Environnement*, French Polynesia, contributed £17,581 as a first instalment of a grant worth c. £50,000 over 3 years, to conservation of endemic tree snails in the Society Islands (Dr Trevor Coote).

The European Union contributed £58,781 to the Pan-African project for the Control of Epizootics (PACE, Dr Richard Kock).

The National Commission for Wildlife Conservation and Development, Saudi Arabia, contributed £123,726 for the management of the King Khalid Wildlife Research Centre (Dr Iyad Nader).

Grants were also received from:

Mrs Ann and Mr Bill Elfers
Bosack and Kruger
The Tufton Charitable Trust
Anglo American plc
The Marshgate Charitable Trust
The Kadoorie Charitable Foundation
USAID.

this page: Edward Lear's vitoe.
ZSL

opposite page top: Mark Catesby's Carolina Parrakeet.
ZSL

opposite page bottom: Testacea utriusque Siciliae, eorumque historia et anatome *by Poli.*
ZSL

LIBRARY

The Library's catalogue was made publicly accessible online over the web, greatly enhancing our services. It can be accessed from the Library page on the ZSL website www.zsl.org or directly by using the URL https://library.zsl.org. The catalogue gives details of all our serial (journal) holdings and almost 13,000 books. Details can be found for all the books added since 1991 and most books published before 1860.

Over 700 books and 4,400 serial issues have been added to our collections; many of these were received through the generosity of members. Each month Library staff compile a list of approximately 50 newly acquired books–this is e-mailed to staff and Fellows who request a copy. The lists for 2003 have now been made available on the ZSL website.

New lighting has been installed on the Library Gallery. This has resulted in much-needed improvement to light levels in winter. New and emergency lighting has been installed in the Library basement and ground floor making these locations much safer. Increased fire detection has also been installed.

The subject of the May *Tuesday Talk* was Brian Houghton Hodgson, and some of his drawings and notes were displayed in the Library over a three-week period. Over 70 people visited the exhibition on the day of the talk.

Some of the books illustrated by Edward Lear were displayed in the Foyer of the Meeting Rooms before the AGM so that Fellows had an opportunity to see them and collect a leaflet about Library services.

An article in the Spring issue of *Lifewatch* magazine featured Mark Catesby's *The natural history of Carolina, Florida and Bahama Islands* published between 1731 and 1743. We displayed these volumes in the Reading Room for a three-week period; similarly the Summer issue featured the two volumes of *Gleanings from the menagerie and aviary at Knowsley Hall,* illustrated by Edward Lear and Benjamin Waterhouse Hawkins. The Autumn/Winter issue featured *Testacea utriusque Siciliae, eorumque historia et anatome* by Poli, 1797-1827. These displays proved popular and attracted some members to the Library for the first time.

Interest in our archives has continued to increase with a variety of researchers visiting the Library, mainly to consult the Daily Occurrence books, the 19th century Council minutes, Minutes of Scientific meetings, Minutes of the Gardens Committee, Zoo guides and the letters collection. Again, there has been a steady stream of historical and genealogical enquiries throughout the year.

The Deputy Librarian/Archivist, Michael Palmer, received the Michael Brambell Travel Award. This enabled him to spend part of September in New York at the Library of the Wildlife Conservation Society at Bronx Zoo and visit other libraries in New York. He was also able to attend the meeting of zoo librarians at the American Zoos Association conference in Columbus, Ohio.

To celebrate 150 years of the world's first aquarium, the Fish House at London Zoo, there was a small display of material in the Library entrance lobby throughout much of the year.

In celebration of *Archives Awareness Month,* we displayed a selection of postcards from European zoos. The cards were collected by Stanley S Flower, probably between 1890 and 1910.

An article in the Autumn/Winter issue of *Lifewatch* magazine featured items in the archives concerning Winnie, the bear used as a basis for A A Milne's *Winnie the Pooh.* The items mentioned in the article were displayed in the Library during November and December.

A number of special *Behind the Scenes* tours were held for specialist groups including the EOSi User Group and the Fisheries Management and Freshwater Group.

As always, we are extremely grateful to our Library volunteers for all their hard work throughout the year; and to Fellows, organisations and members of the public who have made donations to the Library.

FINANCIAL INFORMATION

TREASURER'S STATEMENT

ZSL recorded a consolidated surplus on operations of £1.4 million and an overall surplus, after profits on valuation of investments, of £1.7 million after excluding the recovery of Value Added Tax (VAT) as noted below. These compare with figures of £1.2 million operating surplus and overall surplus of £0.7 million in 2002. In terms of the normal activity of ZSL this has been a less than satisfactory year as, although ZSL has achieved its budgeted surplus, it has been with the advantage of the success in our VAT case but offset by disappointing visitor numbers at London Zoo which have depressed the overall result.

Following the success of our claim against HM Customs & Excise, these results include the net benefit of our claim (including interest) going back to 1990 for retention of VAT on admission income, which has increased the surplus in the year by £10 million (net of professional fees of £0.5 million). It is our intention that these funds will be used to contribute to improvements to our animal exhibits, the infrastructure of both sites and improvements to maintenance which has suffered from being under-funded over the past ten years whilst we suffered VAT on our income.

ZSL remains dependent on the two zoos for the bulk of its income. In 2003, Whipsnade's visitor numbers reached 445,000, slightly lower than last year; however, in contrast the visitor numbers at London Zoo were 815,000, 75,000 lower than the preceding year. Income figures benefited from a further increase in Gift Aid recoveries and the retention of the full admission income with no VAT being payable to HM Customs & Excise. Gift Aid on day membership in 2003 amounted to £849,000; this source of income will be lost if the Chancellor cancels this allowance and will reduce our ability to improve and maintain our sites. Both the Institute of Zoology and Conservation Programmes increased their revenues with new grants in 2003, but these are effectively ringfenced.

There was increased expenditure in the year compared to 2002. This covers such items as spending on maintenance, expenditure on staff and facilities to improve the effectiveness of ZSL, and general wage and inflation rises.

The total cash outflow of £3.7 million on capital was largely spent on upgrading and refurbishment on both sites, but included restoration of the Mappin Café building, improved exhibits for otters, meerkats and sealions and the start of work for a new chimpanzee facility at Whipsnade. In addition we have installed a new EPOS system for retail, which has helped in reducing stock levels and margin improvements, and a new ticketing system which has reduced costs and increased efficiency in Gift Aid recovery.

The severe loss on the valuation of investments in 2002 in ZSL's Pension Fund has been partially reversed and the fund is still in a satisfactory position. However, in discussion with its Pension Fund trustees, ZSL has agreed to further increase its contributions to the Fund as a precautionary measure.

TRUSTEES' STATEMENT ACCOMPANYING THE GROUP SUMMARISED FINANCIAL STATEMENTS

The group summarised financial statements are not the statutory accounts but a summary of information relating to the Group Statement of Financial Activities, Group Statement of Cash Flows and the Group Balance Sheet. The full Trustees' report and financial statements, from which the summarised financial statements are derived, have been externally examined by Ernst & Young LLP and their audit report on them is unqualified. The full Trustees' report and financial statements and Ernst & Young LLP's audit report on them were approved by the Trustees on 20 April 2004. Ernst & Young LLP approved and signed their audit report on 21 April 2004. These will be submitted to the Charity Commission; copies can be obtained from the Finance Director at The Zoological Society of London, Regent's Park, London NW1 4RY.

Signed on behalf of the Trustees on 21 April 2004

Paul Rutteman CBE, BSc (Econ), FCA
Treasurer

Summary Group Statement of Financial Activities for the year ended 31 December 2003

	Year to 31.12.03 £000	Year to 31.12.02 £000
Incoming resources		
Incoming resources from operating activities of the charity:		
Activities in furtherance of objectives:		
Admission, membership and similar income	13,178	11,306
Recovery of Value Added Tax	7,524	–
Publication sales and similar income	437	363
Contract and fee income	656	820
Grants	3,629	2,983
Activities for generating funds:		
Merchandising income and catering	4,213	4,433
Facility fee and rental income	344	199
Other sales and fees	836	478
Donations, legacies and other income	529	326
Interest and investment income	2,874	400
Total incoming resources	**34,220**	**21,308**
Resources expended		
Cost of generating funds:		
Fundraising costs	110	79
Merchandising and catering costs	2,986	2,988
Charitable expenditure:		
Cost of activities in furtherance of objects:		
Animal collection costs	14,101	12,375
Science and research	4,055	3,555
Conservation programmes	1,249	758
Management and administration	307	327
Total resources expended	**22,808**	**20,082**
Operating surplus for the year	**11,412**	**1,226**
Gains/(losses) on investments	312	(536)
Surplus for the year	**11,724**	**690**
Total funds balance brought forward	**23,797**	**23,107**
Total funds balance carried forward	**35,521**	**23,797**

Summary Group Statement of Cash Flows for the year ended 31 December 2003

	Year to 31.12.03 £000	Year to 31.12.02 £000
Operating surplus for the year	**11,412**	**1,226**
Less: Recovery of Value Added Tax and related interest, net of professional fees	(9,995)	–
Add: Depreciation	1,518	1,285
	2,935	2,511
Less: Purchase of tangible fixed assets (net of disposals)	(3,714)	(1,993)
(Less)/Add: Purchase of fixed asset investments (net of disposals)	(128)	62
	(907)	580
Changes in other assets and liabilities	750	(22)
Net cash (outflow)/inflow	**(157)**	**558**

Summary Group Balance Sheet at 31 December 2003

	31.12.03 £000	31.12.02 £000
Fixed assets		
Tangible assets	15,399	13,354
Investments	3,074	2,634
	18,473	**15,988**
Current assets		
Stocks	346	431
Debtors	12,245	2,099
Cash at bank and in hand	7,878	8,035
	20,469	**10,565**
Creditors: amounts falling due within one year	**(3,421)**	**(2,583)**
Net current assets	**17,048**	**7,982**
Total assets less current liabilities	**35,521**	**23,970**
Creditors: amounts falling due after more than one year	**–**	**(173)**
Net assets	**35,521**	**23,797**
Funds		
Unrestricted – General	28,960	17,803
– Designated	2,900	2,705
Restricted – Endowments	887	779
– Other	2,774	2,510
Total funds	**35,521**	**23,797**

Independent Auditors' Statement to the Trustees of the Zoological Society of London

We have examined the group's summarised financial statements for the year ended 31 December 2003 which comprise the Summary Group Statement of Financial Activities, Summary Group Statement of Cash Flows and the Summary Group Balance Sheet.

This report is made solely to the Trustees. To the fullest extent required by the law, we do not accept or assume responsibility to anyone other than the Trustees, for our work, for this report, or for the opinions we have formed.

Respective responsibilities of trustees and auditors
The trustees are responsible as trustees for the preparation of the summarised financial statements. We have agreed to report to you our opinion on the summarised statements' consistency with the full financial statements, which were approved by the trustees on 20 April 2004 and on which we signed our audit report on 21 April 2004.

Basis of opinion
We have carried out the procedures we consider necessary to ascertain whether the summarised financial statements are consistent with the full financial statements from which they have been prepared.

Opinion
In our opinion the summarised financial statements are consistent with the full financial statements for the year ended 31 December 2003.

Ernst & Young LLP
Registered Auditor
London

28 April 2004

front cover: Plans were approved to develop a major new Komodo dragon exhibit at London Zoo for opening in 2004. This picture was taken at Regent's Park in the 1920s.
ZSL

this page: Plaque from the old Lion House displayed on the Lion Terraces.

THE ZOOLOGICAL SOCIETY OF LONDON
(Registered Charity no. 208728)

Regent's Park
London NW1 4RY
and at
Whipsnade Wild Animal Park
Dunstable
Bedfordshire LU6 2LF

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Conservation Programmes Director Dr Glyn Davies
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Assistant Editor Diane Bratby

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