



THE ZOOLOGICAL SOCIETY OF LONDON

## Annual Report 1986-1987

This Report covers the period from 1 April 1986 to 31 March 1987. Animals in the Collection, however, will continue to be recorded on a calendar year basis.

Published by

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The Zoological Society of London was founded in 1826, largely as the result of the energy and initiative of Sir Stamford Raffles, Sir Humphry Davy (President of the Royal Society) and eminent naturalists. It was incorporated by Royal Charter in 1829, its stated purpose being

'the advancement of Zoology and Animal Physiology and the introduction of new and curious subjects of the Animal Kingdom'.

A new Charter was granted to the Society in 1963.

The Society's Gardens in Regent's Park—now known all over the world as the London Zoo—were opened in 1828. A hundred years later the Society acquired and, in 1931 opened, Whipsnade Park, an area of some 500 acres of farm and downland where the rural setting forms a splendid background for animals that are able to roam in large paddocks. Whipsnade Park and the London Zoo are complementary and together house one of the finest and most comprehensive collections of wild animals in the world.

The Society was formed as a scientific society and this remains its prime purpose. Throughout its existence members of its staff, as well as many eminent zoologists and other visiting scientists, have studied material derived from the Collection and have made important contributions to our knowledge of taxonomy, comparative anatomy and physiology, human and veterinary medicine, pathology, ecology and animal behaviour. The Wellcome Institute of Comparative Physiology and the Nuffield Institute of Comparative Medicine were founded during the 1960's. These well-equipped laboratories, with the Veterinary Hospital and the Curators' research units, were joined in 1977 to form The Institute of Zoology, thus greatly extending the scope of research which can be undertaken by the Society.

Scientific meetings are held on the second Tuesday in the months February to June and October to December. At these meetings the results of new research are communicated and discussed, and specimens and films of zoological interest are exhibited. Symposia on special subjects are also arranged. The Society owns one of the finest zoological libraries in the world, which has been built up over the 160 years of its existence.

The Society's publications include:

The *Journal of Zoology*, which contains papers covering all fields of zoology. Three volumes (12 parts) are published annually.

The *Symposia* record the papers read at the Symposia.

The *Zoological Record*, a comprehensive bibliography of zoological literature with subject and systematic indices, is available either as a complete volume or separately in 27 parts dealing with the different animal groups. The *Record* is published in conjunction with BIOSIS (BioSciences Information Service/Biological Abstracts, Philadelphia, USA).

The *Nomenclator Zoologicus* contains the names of all the genera and subgenera in zoology from the 10th Edition of Linnaeus 1758 to the end of 1965, with a bibliographical reference to the original description of each. The work contains approximately 280,000 entries and is published in 7 volumes.

The *International Zoo Yearbook*, published annually, provides authoritative information on developments in the zoo world.

# Report of the Council

The Council has pleasure in presenting its 158th Annual Report to the Annual General Meeting of the Society to be held on 30th September 1987 at 4.00 pm in the Society's Meeting Room at Regent's Park.

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PATRON: HER MAJESTY THE QUEEN

COUNCIL 1986-87

*President:* Sir William Henderson, DSc, FRCVS, FIBiol, FRSE, FRS  
*Treasurer:* The Rt Hon Lord Peyton of Yeovil  
*Secretary:* R. M. Laws, CBE, MA, PhD, FIBiol, FRS  
 The Rt Hon Peter Archer, QC, MP  
 Professor R. J. Berry, MA, PhD, DSc, FRSE, FIBiol, FLS  
 Lady Casson, RIBA, FSIA  
 The Rt Hon Lord Charteris of Amisfield, GCB, GCVO, OBE, QSO,  
*Vice President*  
 The Earl of Cranbrook, MA, PhD, FLS  
 Professor B. A. Cross, CBE, ScD, MRCVS, FRS  
 Professor Sir Eric Denton, CBE, ScD, FRS  
 Sir Arthur Drew, KCB, JP  
 D. C. Evered, BSc, MD, FRCP, FIBiol  
 The Rt Hon Michael Heseltine, MP  
 Professor P. A. Jewell, MA, PhD  
 Anne L. McLaren, MA, DPhil, FRS  
 Katherine, Viscountess Macmillan, DBE  
 J. F. Peake, BSc  
 Professor Sir Richard Southwood, MA, DSc, PhD, ARCS, FIBiol, FRS,  
*Vice-President*  
 T. A. P. Walker  
 The Hon Sir Ronald Waterhouse, LL.D.  
 Sir Richard Way, KCB, CBE, *Vice-President*

HONORARY FELLOWS

*Date of Election*

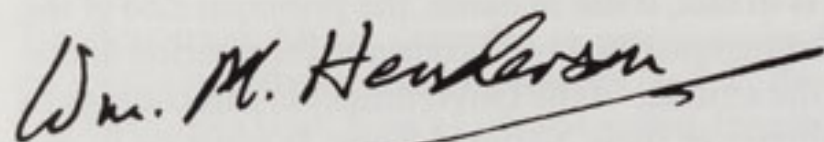
- 1977 HRH The Prince Philip, Duke of Edinburgh, KG, KT  
 1971 His Majesty Emperor Hirohito of Japan, KG  
 1975 Professor Jean Anthony  
 Muséum National d'Histoire Naturelle,  
 55 rue de Buffon, Paris 53, France  
 1975 Professor L. D. Brongersma  
 Rijksmuseum van Natuurlijke Historie,  
 Leiden, Holland  
 1978 Professor José Carvalho  
 Museu Nacional,  
 Quinta da Boa Vista  
 Rio de Janeiro, Brazil 20940  
 1975 Professor Jean Dorst  
 Muséum National d'Histoire Naturelle  
 (Mammifères et Oiseaux),  
 55 rue de Buffon, Paris 53, France  
 1978 Sir Charles Fleming  
 Balivean, 42 Wadestown Road,  
 Wellington, New Zealand  
 1952 Professor Sven Otto Hörstadius  
 Zoologiska Institutionen, Uppsala, Sweden  
 1984 Professor George Evelyn Hutchinson  
 Dept of Biology, Osborn Memorial Laboratories,  
 Yale University, P.O.B. 6666, New Haven,  
 Connecticut, USA  
 1984 Professor Ernst Mayr  
 Museum of Comparative Zoology,  
 Harvard University, Cambridge  
 Massachusetts, USA  
 1974 Dr Roger Tory Peterson  
 Route 4, Box 131, Neck Road, Old Lyme,  
 Connecticut, USA  
 1984 Professor Lord Zuckerman, OM, KCB, FRS  
 University of East Anglia, Earlham Hall, Norwich

## Introduction by the President

In 1980, the then President, Lord Zuckerman, wrote an Introduction to the Annual Report to draw attention to the pressing financial problems that faced the Society. Since then, making this the seventh consecutive year, the President's Introduction has been very largely concerned with the financing of the operational expenses of the Society. The year covered by this report is the third since the Government's recognition of the Society's need for assistance in the short term and in the long term. In the last months, much work has gone into providing the information necessary for a review of progress. The inescapable conclusion is that the conditions necessary for the Society to regain a substantial degree of financial independence will require some radical changes being made. The Treasurer of the Society, Lord Peyton of Yeovil, has the principal responsibility for financial matters. In view of the many developments that are taking place, it is appropriate that the Treasurer contributes a separate report, see page 4.

In view of an Appeal being launched in the future by the Development Trust, I shall not be asking for additional support from Fellows for the Presidential Appeal for their Project on the North Bank that was launched in August 1986. I am most grateful to those Fellows who contributed and, needless to say, we shall never refuse donations at any time, but each member of the Society will be sent a Development Appeal brochure in due course and I would hope that there will be an outstanding response to this. If we are to succeed, we must lead by example.

Professor John Hearn, Director of Science, had his leadership and competence recognized by being invited to become Deputy Secretary to the Agricultural and Food Research Council towards the end of this report year—see page 15. John Hearn was Director of Science and Head of the Institute of Zoology for over five years. During this period he and various members of the staff were very successful in their applications to grant-awarding bodies. This success was a reflection of the Institute as a centre of excellence and of the scientific merit of their publications. On behalf of the Society, it gives me great pleasure to thank him for his contribution and to wish him well in the demanding task which he is now undertaking. The new Director of Science, Dr A. P. F. Flint, Head of the Physiology Department of the AFRC Institute of Animal Physiology and Genetics, Babraham, takes up his appointment on 1 September 1987.



President

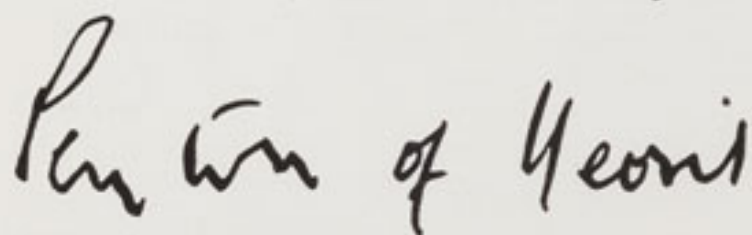
# Treasurer's Report

At the end of 1984, the Government accepted that the Society required support in the long term as well as the short. It also agreed to make certain grants to the Society: these have amounted to some eight million, three-hundred thousand pounds in the past three years; they have saved the Society from bankruptcy. The arrangements, which were back-dated to April 1984, were to be reviewed after three years. In order to avoid the uncertainty which would have resulted from a hiatus, the process was begun in October of last year.

The review has shown that while budgets have been met and housekeeping greatly improved, progress in raising funds from outside sources has been disappointing. Three factors have contributed to this lack of progress. First, the Society, which has never in the one hundred and sixty years of its existence, appealed to the public for money, lacked both the experience and organization required for money raising. It has taken time to set up a Development Trust, to find a capable Chairman, suitable Trustees and a competent Fund-raising Director. A second source of difficulty and uncertainty has been the Society's need for a lease of its premises in Regent's Park covering a reasonable span of time. Donors would be reluctant to come forward to help an institution which does not have the security of tenure. Thirdly, there has been some difficulty recently with regard to Planning. The Society's programme for the future is for the present held up by a recent decision of the Westminster City Council to refuse permission for the demolition of the Parrot House.

We have made some progress with these difficulties. Sir Derek Palmar has taken office as Chairman of the Development Trust; ten other outside Trustees have been appointed; Mr Patrick Newel has taken post as Fund-raising Director. I have raised with Mr William Waldegrave, Minister of State who has oversight of the Society's affairs, both orally and in writing the question of the Regent's Park Lease. He has now assured me of the Government's commitment in principle to extending the lease. Discussions with the Westminster City Council have now started; it is to be hoped that the mutual understanding necessary to progress will result.

Towards the end of the review, the Minister proposed, and I agreed, that the Government should jointly with the Society appoint Consultants to examine the long term prospects of what is in fact, if not in name, the principal Zoo of the United Kingdom. The Minister has agreed that meanwhile the support arrangements should continue for a period of one year. Such an examination is welcome, since it will inevitably focus upon the attitude of the Government in this country to comparable institutions and the attitudes of Governments in other countries to their National Zoos. It must be to our advantage that the facts should be established and our difficulties recognized. I hope that from the examination there will emerge an arrangement which will help us to avoid periodic and damaging lurches into uncertainty.



Treasurer

# Review of the Year

## Annual General Meeting

The Annual General Meeting was held on 24 September 1986, with the President, Sir William Henderson, in the Chair.

In accordance with Article 10 of the Charter and Byelaw 25, the following Fellows retired as Ordinary Members of the Council: HG The Duke of Wellington and Sir Philip de Zulueta (Ordinary Fellows); Professor B. K. Follett, Professor N. A. Mitchison and Dr C. E. Gordon Smith (Scientific Fellows).

In accordance with Article 11 of the Charter and Byelaw 26, the following Fellows were elected Members of Council: The Rt Hon Michael Heseltine and The Hon Sir Ronald Waterhouse (Ordinary Fellows); Professor R. J. Berry, Professor P. A. Jewell and Dr Anne McLaren (Scientific Fellows).

The President presented the following awards for contributions to zoology:

**THE PRINCE PHILIP PRIZE** (awarded for an account of practical work involving some aspect of animal biology, by a pupil under 19 years of age of a school in the United Kingdom) to *Mr Simon Pratt*, of The College, Cheltenham, for his essay 'A study of the butterflies of Crickley Hill'.

**THE STAMFORD RAFFLES AWARD** (awarded to an amateur zoologist for distinguished contributions to zoology) to *Dr A. F. Millidge*, for his distinguished contributions to arachnology.

**THE THOMAS HENRY HUXLEY AWARD** (for original work submitted as a doctoral thesis) to *Dr N. P. D. Upton*, University of Cambridge, for his thesis 'Sexual competition and harem formation in a marine isopod *Paragnathia formica* Hesse'.

**THE SCIENTIFIC MEDAL** (awarded to persons under 40 years of age for distinguished work in zoology) to *Dr J. P. Brookes*, MRC Cell Biophysics Unit, King's College London, for work on development of the nervous system; and to *Dr R. C. Tinsley*, Queen Mary College, for contributions to the systematics and biology of anuran amphibians and their parasites and the interactions between the two.

**THE SILVER MEDAL** (awarded for contributions to the understanding and appreciation of zoology) to *Dr L. Harrison Matthews*, for contributions to popular knowledge of the biology of a wide range of mammals.

**THE ZOOLOGICAL SOCIETY OF LONDON FRINK MEDAL FOR BRITISH ZOOLOGISTS** (awarded to zoologists for significant and original contributions to zoology in its wider implications) to *Professor J. D. Smyth*, London School of Hygiene & Tropical Medicine, for distinguished contributions to parasitology.

## Obituaries

The Council records with deep regret the deaths of Professor Robert Courrier, Honorary Fellow since 1957; Professor George Myers, Corresponding Member; Professor Ronald Hare, Scientific Fellow, formerly Professor of Bacteriology at St Thomas's Hospital and a former member of the Governing Body of the Nuffield Institute of Comparative Medicine; Dr Leonard Harrison Matthews, Scientific Fellow, former Vice-President, and Scientific Director of the Society 1951 to 1966, Silver Medallist 1985; Professor John Phillips, Scientific Fellow and

Secretary of the Society 1982 to 1984; Professor J. M. Dodd, Scientific Fellow and former member of Council; Professor William Thorpe, Life Scientific Fellow and recipient of the Frink Medal in 1980; Professor Leslie Harvey, Scientific Fellow; Dr John Smart, Life Scientific Fellow; Dr Henry Southern, Life Scientific Fellow; Mr Christopher Hentschel, Scientific Fellow for 63 years; The Rt Hon The Viscount Bearsted, Life Fellow; Mr Tony Dale, Ordinary Fellow and former Public Relations Officer at London Zoo.

## Amendments to the Regulations

The Resolutions to increase the annual subscriptions for Fellows and Associates from 1 January 1987 were agreed at the Annual General Meeting of the Society held on 24 September 1986.

The consequential amendments to the Regulations, which were passed by the Council, are given in Appendix 6.

## Membership

At the end of the subscription year (31 December 1986) there were 2,423 Fellows and 3,687 Associates, including 208 Student Associates.

Considerable gains in the efficiency of the Membership Department were achieved by computerising the records of the Membership and of the Friends of the Zoos and by the introduction of the Direct Debit System for payment of subscriptions. The Council is grateful to the large proportion of Fellows and Associates who have cooperated with these changes and would urge all those who have not yet done so to adopt the Direct Debit System and thus help to reduce administrative costs.

## Friends of the Zoos

By 31 March 1987 there were 1,881 Family Friends, 4,161 Adult Friends, 76 Student Friends and 400 Junior Friends.

## Events

Four evening openings were held at London Zoo, one of which was also open to the public. Two evening openings were held at Whipsnade. The series of lunch-time talks at London Zoo continued to be popular, and during the summer weekends, talks were also given at London and Whipsnade by the duty officers. July was National Zoo Month. A different group of animals was featured each week and the invertebrate week included another of the popular open evenings in the Insect House. Later in the year an open evening was held at the Cotton Terraces. The carol concert in December was again given by the Chandos Singers and was a most enjoyable occasion.

## Finance

Government grants for the period totalled £2.03 million made up of a revenue grant of £2 million for the year ended 31 March 1987 and a capital grant of £34,300 to match £ for £ what the Society has raised from private sources in 1985/86. Financial support will continue for 1987/88 and will comprise a revenue grant of £2 million and further capital grants to match £ for £ what the Society has raised from private sources in 1986/87, approximately £150,000. During the forthcoming financial year the Society and Government, at Government's expense, are to ask consultants to produce a radical strategy for the options for future management and funding of London Zoo and Whipsnade Park. The study will concentrate on the commercial possibilities whilst

maintaining the Society's interests and objectives as laid down in its Charter.

The Society's operating deficit before other and exceptional income for the year is £2.03 million compared with the operating deficit for the restated year from 1 April 1985 to 31 March 1986 of £2.16 million. After deducting Government revenue grants of £2 million and transferring £235,000 to the Building and Equipment Fund, which is in respect of consultancy fees and interest earned on capital funds, the surplus for the year is £63,300. The balance brought forward at 31 March 1986 of £278,900 has been increased to £342,200.

The total number of visitors to both Zoos over the corresponding financial year is down by 4.2% partially as a result of a very wet spring in 1986 and also there being no Easter in the financial year under review. Fortunately lower fuel costs and increased income from both catering and retail more than offset the decrease in gate revenue.

### **Donations, Grants and Gifts**

Council wishes to express its thanks to all those who made contributions to the Society's general funds and in particular to the South Bedfordshire District Council who granted £20,444 by way of a 50% discretionary relief during this financial year which they are to repeat in the forthcoming financial year.

£13,500 was received from the Executors of the late Mrs Margaret Melford, Herne Bay, Kent and £5,000 from the Executors of the late Miss Heather Holliday (ex Whipnade staff); £2,000 from Mr S. N. Weller, £1,800 from Mr and Mrs G. Muller and £1,719 from the Hertfordshire, Bedfordshire and Buckinghamshire Brownie Group.

Grants amounting to £548,000 were received to support the important work of the Institute of Zoology; additional details are shown in Appendix 7.

As always, many additions to the Collections were presented by members of the public and by government, local authorities and other establishments.



# The London Zoo

Visitors during the year: 1,199,000

## General

Attendances during the last financial year totalled 1,261,000 and the disappointing decrease of 4.9% is considerably better than at one time might have been expected. There is no Easter in this reporting year but fortunately the atrocious spring weather in 1986 was somewhat offset by a good autumn and record attendances in February 1987, which enabled the Society to improve on its earlier position.

Media coverage, aimed at informing the visitor of the opportunities for a full and satisfying day out, was mainly through television advertising at peak periods, assisted by advertising posters in local areas. Television advertising is expensive and as reported elsewhere the Society is fortunate that free coverage embracing London Zoo and the work of the Institute of Zoology continues to attract considerable media attention.

Amongst the varied exhibits of the year a popular display 'Venom' attracted many visitors to take a closer look in the Reptile House and the 'Meet the Animals' programme was most successful in enhancing visitors' knowledge and enjoyment of the animals exhibited. Education is a major part of the Society's work and daily events are important in informing and entertaining visitors of all ages.

The National Zoo Month in July, organised again by the Federation of Zoos of Great Britain and Ireland, created keen competition amongst the Society's varied sections and the enthusiasm and imagination shown by the staff was much appreciated.

The plans to create the new Aquarium are being delayed mainly on account of shortage of funds, but also because the Westminster City Council have refused the Society's application to demolish the old Parrot House to make space for the Aquarium. The reason given is that demolition would be detrimental to the character and appearance of this part of the Regent's Park conservation area. The Parrot House is not a listed building and an appeal has been lodged. Meanwhile the Parrot House has been closed as it is not up to the standard required by the Zoo Licensing Act, and the parrots have been transferred elsewhere.

The Society receives continued requests for information and assistance from both national and international sources. It continues to advise on design and management of new zoos but no new development work is being obtained in the Middle East, probably due to the weaker oil price. Services are still being provided to Doha Zoological Gardens in Qatar.

## The Collection

### MAMMALS

The general trend of improvement in husbandry and display practices continued. Of the mammals present at London Zoo at the start of 1987, at least 93% were born in captivity, and fewer than 7% taken from the wild. The latter category includes some of the longest residents, such as the male Gibbon and Capuchin Monkey, four Orang Utans, two Echidnas, a Masked Palm Civet and a Black Rhino, all of whom have lived here for between 20 and 27 years. Half the mammal species bred during the 1986/87 year. Those which did not reproduce included species deliberately prevented from breeding (such as Lions, Tigers, and Golden Lion Tamarins); those where inter-birth intervals are long (such as Gaur, Colobus Monkey, and Rhino); those where animals are

purposely kept only with same-sex companions (such as Elephants and Llamas); those where only one of the sexes is currently kept (such as Giant Panda, Margay, and Wombat); and those where pairs or groups have only recently been established (such as Gorillas, Gibbons and Red Pandas).

There were a number of births of considerable conservation importance, including Brush-tailed Bettong, White-throated Wallaby, Goeldi Monkey, Mandrill, Chimpanzee, Orang Utan, Vicuna, Gaur and Bighorn Sheep. Other births of note included a Springhaas (the first ever at London Zoo in the 87 years since they were first kept here), Pygmy Marmoset twins, a White-faced Saki Monkey, a Giraffe, and sadly a stillborn Gorilla. Polecat Ferrets, Harvest Mice and Black Rats particularly were bred in profusion in the Clore Pavilion, and Ring-tailed Lemurs and Pig-tailed Macaques in the Sobell Pavilions. With currently known pregnant animals including one Gorilla, two more Orang Utans, and Okapi, Gibbon, Bongo, Roan Antelope, Aardvark, and doubtless many others, the coming year will be even busier.

Although most offspring are reared naturally by their mothers, a few had to be handreared, a task involving devotion and hard work by their keepers. The Sobell Pavilion staff were particularly busy with three baby Chimpanzees and a Spider Monkey. The Chimpanzee group had problems with some mothers being neglectful, while some individuals were over-keen to take charge of other mothers' babies instead. The Spider Monkey was born by Caesarean section, an operation which makes difficult the development of the necessary mother-infant bond. Similarly the anaesthesia necessary to assist in the birth of a Bongo meant that the calf had to be handreared. A Goeldi Monkey, abandoned at birth by the youngest-recorded mother in this species, was successfully handreared and subsequently reintegrated into her family group, and is now gaining social experience with her subsequently-produced sibling. A Californian Sealion pup and a Roan Antelope calf were both handreared after failing to thrive with their natural mothers.

The most significant arrivals were a male and three female Arabian Oryx, which came after the loss of the only female of this species in Britain (after producing two male calves here). The new animals, born in Zurich and Hannover Zoos, spent their three-week ungulate quarantine period at Poole after importation. So did a pair of Lowland Anoa and a female Pudu from Rotterdam Zoo, and a male Bongo from Dvur Kralove in Czechoslovakia. A male Red Panda was imported from Taronga Zoo in Sydney and went through the customary six-months rabies quarantine period before being introduced to our hand-reared female in their outdoor enclosure. A male Bruijn's Echidna was received from Dallas Zoo. This species is listed as 'vulnerable' in the IUCN Mammal Red Data Book and the new male joins the only other three animals in captivity outside Australia and New Guinea. He has already been observed mating. Other animals imported from outside UK were three Slender Loris from Bochum University in Germany and from Skansen Aquarium in Stockholm, a male Margay from Brookfield Zoo, Chicago, and a group of Bush Hyrax from Switzerland.

Moves of animals within Britain included the arrival of a young Asiatic Lion from Chester as the first stage in the transition to this endangered subspecies; a young female Orang Utan from Chester Zoo to add to the social group of adolescents; the return of a male Gaur from Howletts Zoo (which subsequently managed to jump out across the paddock moat, but fortunately

leapt back); the transfer of a replacement male Roan Antelope from Marwell Zoo; and the arrival of a mate for the bereaved Lar Gibbon male.

The long-term adult pair of White Rhinos has departed. At the request of the Captive Breeding Specialist Group of IUCN, 33-year-old male 'Ben', who belongs to the almost extinct Northern race, *Ceratotherium simum cottoni*, was sent to Dvur Kralove to join the World's only breeding group of this race in captivity. The carefully-planned road journey was uneventful, and he has apparently settled in well into his new environment. At the time of his departure, his companion female (of the Southern race) was sent to join a new male at Glasgow Zoo.

Among changes to animals' environments, the Tapir and Bongo paddocks were both refurbished, the contact area in the Children's Zoo was doubled in size, Agoutis were established in the grassy Elephant Moat, and a first-ever public display of Naked Mole Rats was set up.

The Elephant management regime continued successfully. Both animals are walked around everywhere in the Zoo, singly or together, among visitors and other animals, covering well over four miles on their daily perambulations. 'Dilberta', seven years old and reaching puberty, now exceeds two tons in weight, as is known from the daily public weighings during the summer. 'Layang-Layang', at three years old has adapted superbly to the change from a Malaysian forest camp to the variety of a London Zoo summer.

The 'Meet the Animals' sessions continued to be very popular. Over 1,000 appearances were made by 50 keepers and helpers, using 17 different species of handleable animal which they discussed with a presenter and introduced to visitors. Further animal contact was provided as usual during the summer by the major riding operation involving Camels, Llamas, Ponies and Donkeys.

#### BIRDS

There was an increase in the number of species and individuals bred in the period under review compared with the previous one. Among the 43 species bred were a number of special importance. Of particular interest was the artificial incubation and handrearing of the Bare-faced Curassow. This was the first successful breeding in Britain, though this forest-living dimorphic, South American bird has been bred, somewhat irregularly, in a few European countries and in America. However, there is little published information on its life history either in the wild or in captivity, and new information is of considerable value. Of equal interest was the rearing of another South American bird, the Inca Tern. The parents had nested in the Snowdon Aviary, but in a situation where they were likely to desert the nest because of continual disturbance. The two eggs were therefore removed for artificial incubation, and one hatched after 24 days. Fed on a diet of sprats, and occasionally whitebait, supplemented with mineral and vitamins, the chick thrived.

Another noteworthy breeding success was the rearing of seven White-faced Scops Owls. At the beginning of 1986 there were less than 10 individuals of this shy African species in this country, and all but two were female. A rather aggressive male, on loan from another collection was, with a great deal of patience and perseverance, introduced to a female. The outcome was three young, parent-reared in May, and a further four in August. Of these, five were female and two were male.

Other parent-reared birds included Sacred Ibis, Hawaiian

Geese, Brent Geese, Eider Ducks, Grey-headed Gulls, Speckled Pigeons, Crested Pigeons, Perfect Lorikeets, a Barraband Parrakeet, Rock Peplars, Splendid Grass Parrakeets, Fischer's Lovebirds, a White-cheeked Turaco, Heck's Grass Finches, and seven species and subspecies of Owl.

The most notable species successfully reared from artificially incubated eggs included Blackfooted and Humboldt's Penguins, Chilean Tinamou, Abdim's Storks, Indian Grey Francolins, many Pheasants, Stone Curlew, and a Goosander.

Species introduced into the collection included three Kiwi from Wellington Zoo, New Zealand, a pair of Pygmy Falcons, three Vulturine Guineafowl, four Avocets, two Fire-tufted Barbets, two Black-necked Aracaris, a Saffron Toucanet, two Swainson's Toucans, two Citron-throated Toucans, a number of Doves and Passerines, as well as a number of single birds to make up pairs.

The Pelicans were moved from the Mappin Terrace Pool to new quarters near the Parrot House, and all settled in well.

The Bird House, opened in 1883 as a Reptile House and converted to its present use in 1926, was repainted inside, the aviaries refurbished, and new graphics installed. The painting highlights the Victorian elements of this building, in particular the cast-iron columns and prefabricated wide-span roofing structure. The graphics provide information on birds, their main characteristics and their different ways of life, and on the history of the House.

The Snowdon Aviary underwent extensive repairs to cables and mesh, and a programme of replanting and landscaping has begun.

In July a successful Bird Week was arranged, with the focus of events on the Bird House though other parts of the Bird Department were also incorporated.

#### REPTILES

During 1986 27 species (including subspecies) and 259 individuals were bred. This was an improvement on the previous year, even though there had been some selection and an emphasis on breeding those species not bred before in this Collection. Particularly pleasing therefore was the first-time breeding of the Namib Sand Gecko, Golden Water Skink, Gila Monster, Children's Python, Greater Plated Lizard, and Eastern Indigo Snake. The first four species had not been bred before in the United Kingdom. The Gila Monster which hatched successfully, died a few days later due to a rupture of the umbilicus which caused the yolk to enter the peritoneum.

Notable acquisitions during the period included: from Taronga Zoo, Sydney, two captive-bred Rhinoceros Iguanas, a pair of Leaf-tailed Geckos, a male Lesueur's Water Dragon, a male Spiny-tailed Gecko and a female Diamond Python—all to augment existing potential breeding groups. The Diamond Python was especially welcome as it is the only female in the country, and it will join one of the four males already in the Collection.

Other acquisitions included: a male Blue-ringed Python received on breeding loan as a mate for the female and three Uracoan and seven Neotropical Rattlesnakes presented by Dallas Zoo, Texas; six Round Island Skinks received on breeding loan from Jersey Wildlife Preservation Trust; two Diamond Pythons, six General Hardwicke's Dabb Lizards, six Eyed Skinks, six Andes Smooth-throated Lizards, one Shingleback Skink, one White-lipped Herald Snake, eight Fan-footed Geckos, four Egyptian Geckos, 13 Elegant Geckos, 10 Dwarf Geckos, five

Five-lined Skinks and one Grey Monitor were received from H.M. Customs.

Five Sand Lizards were received under a licence issued by the Nature Conservancy Council with the agreement that they remain the property of the NCC and that any progeny may only be released or transferred at their discretion.

The Society's Giant Tortoises were sent on loan to other collections until new permanent quarters are available here.

The Venomous Snakes exhibition opened for the 1986 Spring Bank Holiday and has proved to be most successful. The cages were completely refurbished and new graphics were installed. Information was provided on the different kinds of venomous snakes, their fangs and venom, and on those species which are most dangerous to man.

Throughout the season the volunteers made a real contribution to the enjoyment of the visitors to the Reptile House. Two of them have offered their services as specialist volunteers and are undergoing instruction on the natural history and management of reptiles. During Reptile Week, in addition to the usual feeding commentaries and popular talks by volunteers and staff, there were venomous snake handling demonstrations, and also lizard and snake handling sessions for visitors who could, in addition, have their photograph taken with a Boa Constrictor.

A number of other exhibits were presented, including snake bite, handling reptiles, restrictions on reptile imports, reptile reproduction, British snakes, work behind the scenes, and one discouraging the public from keeping exotic reptiles.

British Reptiles is the theme of the latest exhibition, and here the emphasis is on the need for protection and conservation of our native species. Graphics also give information on identification, numbers and distribution, behaviour, and try to allay some of the fears and misconceptions that many people have about reptiles, especially with regard to the one British venomous snake, the Adder.

During the period covered by the report, the Reptile Joint Management Group met at the Cotswold Wildlife Park, and at Bristol and Glasgow. Species coordinators were appointed for tortoises, crocodilians, Rhinoceros Iguanas and Heloderms. A number of zoos are cooperating with the transfer of specimens to form breeding groups. Recent advances in management were also discussed.

#### AQUARIUM

During the year, the Collection of fish has been made more varied such that at the beginning of January 1987 it consisted of over 2,200 specimens from over 230 species. Additions of particular interest include Bowfins, North American Brook Charr, several different species of marine Ray and Leopard Sharks.

In co-operation with the Design and Information Unit a series of simple but effective labels has been produced, which has allowed the displays to have greater educational impact and to be more interesting to the casual visitor. To this end, a number of adjacent tanks have been arranged with common 'themes', including fish breeding habits and artificial selection by Man.

Amongst the more impressive displays, the Paddlefish, Moray Eels, Arapaima, South American Catfish, and Piranhas continue to thrive, with feeding displays several times a week. Several of the tropical marine tanks in the Seawater Hall have been refurbished, and experiments are being carried out on the best methods for the maintenance and display of these types of delicate fish and invertebrates, which will be relevant to the New

Aquarium. Good results have been achieved, and several species of coral fish have been observed spawning.

During the year the Aquarium has attracted a large amount of publicity, and over 30 behind-the-scenes tours and over 20 late night functions (including an Open Evening and a Christmas Carol Service) took place there. As a part of National Zoo Month, Aquarium Week proved very successful, with a range of special in-house events.

Minor improvements to the heating system of the Aquarium have resulted in more stable water temperatures, which were severely tested during one of the coldest Januarys on record.

Breeding successes amongst the amphibians included the Axolotls and the Oriental Fire-bellied Toads. Three pairs of Great Crested Newts have been obtained for display and breeding purposes.

#### INSECT HOUSE

The Insect House provides an unrivalled opportunity for changing displays, and the staff have been very active in this area. The only public exhibition of Medicinal Leeches (a species now threatened in its wild state) was set up. The stages of the life-cycle of the Silkworm were exhibited, with eggs, small and large larvae, cocoons, moths and silk. A Leafcutter Ant colony was installed in such a way that the fungus gardens can be clearly seen inside glass chambers. New displays were set up of groups of *Eurycantha* Stick Insects, Lubber Locusts, Desert Locusts, Hissing Cockroaches, Belostomid Water Bugs, Togo Land Crabs, *Androctonus* Desert Scorpion, and large tropical moths.

Many of the numerous acquisitions were held in the New Arrivals area. These included Polydesmid Tree Millipedes, a Madagascar Pill Millipede, giant Centipedes, some carnivorous *Euglandina* snails, a Slavemaker Ant colony, a Paper Wasp nest with adults and larvae, Funnel Web Spiders, Desert Beetles, a previously undescribed new species of *Avicularia* spider from Peru, and a confiscated consignment of 430 Jungle Scorpions.

During the summer, the observation Bee hive was in use and was a focus of great interest. The outdoor butterfly area displayed a wide variety of the species which might be seen in an English garden. Throughout the year the indoor enclosure showed tropical butterflies, many of them Heliconids bred in the House. Much breeding took place, particularly notable success being achieved with Orb Spiders, Red-backed Widow Spiders, *Opisthasanthus* Scorpions, most of our wide variety of Stick Insects, and many others. Animals were provided for several other institutions, including the stocking of the Whipsnade Discovery Centre.

New graphics were prepared for most of the exhibits. Some of the larger species featured in the 'Meet the Animals' sessions, and produced a striking response from the audience.

#### Building, Services and Grounds

The continued allocation of funds for backlog maintenance allowed further work to be carried out in connection with the repair, renovation and refurbishment of some of the buildings and structures throughout the Zoo. A full survey of the Snowdon Aviary was undertaken, some cables were repaired or replaced, and the mesh relaced. The demolition of the TV Offices was completed, leaving the First Aid Post as a separate building with increased accommodation. The adjoining old boiler house serving the Bird House was also demolished, so providing a useful service yard.

The old lodge at the East Service Gate has been completely refurbished with new roofs, damp proof membranes and plaster-work etc, and should shortly be brought back into full and useful service, after many years of neglect. Major repairs are currently being carried out on the adjoining Pavilion Building.

The Pathology Theatre and the new staff changing rooms in the Wellcome Laboratories Building were completed in 1986. Other work included the erection of a new sales kiosk at the side of the Reptile House, and the new bar in the Pavilion Building carried out by Compass Services.

A start has been made on the complete refurbishment of the Penguin Pool. Originally designed in 1934 by Berthold Lubetkin, a member of the Tecton group of Architects, it is now being reinstated under his direction, with the cooperation of Ove Arup, the original Structural Engineers. The work is being jointly financed by Mr Peter Palumbo and English Heritage.

The south end of the East Tunnel, including the screen wall and pediment, designed by Decimus Burton in 1829, has been fully restored with the aid of a grant from the Westminster City Council.

The programme of improving the Zoo's extensive heating and electrical services continued throughout the year. New boilers have been installed for the heating of the Bird House, the First Aid post, adjoining and other Lavatories, together with other work throughout the Grounds. During the course of the year, Emstar Ltd started replacing the remainder of the old and inefficient heating equipment, and will take over the management of the energy services at London Zoo. Work is also about to start on the replacement of the 60 year old, and potentially dangerous, electrical switchgear throughout the Zoo.

A large abstract glass fish sculpture, created and donated by Catherine Yass, has been hung in the main hall of the Aquarium.

As well as dealing with numerous current requests, the Works Department was involved in several larger projects. It undertook the complete refurbishment of the Print Room, the refurbishment and repainting of the Children's Zoo, and the major upgrading of the Staff Canteen. Improvements were made to some of the Cotton Terraces Paddocks, where bark chips are being used on the Bongo and Tapir Paddocks. It is hoped that this softer material may be better suited to the feet of these particular animals.

The ground work for the Nature Walk, carried out by the British Trust for Conservation in conjunction with the Gardening Department, came close to completion. The seeding and planting of this area, which will include a spring flowering meadow, pool and woodland glade, will continue throughout the rest of the year. Other major improvements carried out by the Gardening Department include the newly planted areas adjoining the Main Gate and Broad Walk, and following the demolition of the various buildings, the completion of the landscaping along the eastern boundary. Work has now started on the replanting in the Snowdon Aviary.

The propagation of shrubs in the nursery has been modified in line with recent progress in horticultural methods which should lead to a more abundant supply of plants for the Gardens at lower cost.

# Whipsnade Park

Visitors during the year: 352,000  
Cars brought into the Park: 37,600

## General

Attendances this financial year totalled 352,000 as against 358,400 last year, a decrease of 1.8%. The remodelling of Whipsnade for the greater attraction of visitors, reported last year, was set back by the poor spring of 1986, delaying completion of the new buildings which were not ready for the season under review. Consequently attendances, adversely affected by the weather, must be regarded as disappointing.

The Institute of Zoology building is in use and the new Giraffe House, to replace the 1934 building, has been constructed with excellent indoor viewing facilities. The first of three Ungulate buildings to house the Grevy's Zebra herd was completed on 9 December 1986 but half of it was destroyed by fire the same night, despite prompt and determined action by staff living on the premises which limited the damage. Regrettably two recently imported Bontebok, a pregnant Grevy's Zebra and a young male Congo Buffalo died. The building, which was adequately insured, is being repaired and should be available to the viewing public by early summer.

The second house and yards were finished in January and accommodate Roan Antelope, Nyala and Arabian Oryx. The paddock adjacent to the building is being improved, and both of these developments add to the area for the display of animals from the African region. The third house for African antelopes has been built but yards and services remain to be completed.

The little used ground floor of the original (1855) Hall Farm building has been adapted by the Society's staff to form the new 'Discovery Centre'. The theme is the display and illustration of the way in which different species adapt to their particular habitat and niche. The centre is split into four main zones—Man and his environment; adaptation of desert species; life in British coastal waters and the tropical rain forest from ground and water level to the tree canopy. At least 40 different species will be exhibited here from Scorpions and Leafcutter Ants to Fennec Foxes, Electric Eels and Marmosets. The desert and the tropical tree canopy areas were opened during the year and drew much favourable comment.

The new house for the flock of Greater Flamingos was erected and occupied in November. The plate glass windows enable visitors to view the birds clearly even in the depths of winter when they are being kept indoors. Work is being completed on the pond and its surrounds which will be used by the Flamingos in the warmer weather.

## The Collection

Moves to concentrate the exhibits in the centre of the Park in order to reduce labour costs continued and the policy towards keeping species most in need of preservation was further implemented. Three hundred Bennett's Wallabies were sold or exchanged for other animals. The Chimpanzee colony has grown to eight, all living together, of which four have now been born at Whipsnade. The Cape Hunting Dog exhibit has been temporarily closed but will be incorporated into the African zone. Two litters of Cheetah were born bringing the total number of births since 1967 to 118 in 34 litters. Two White Rhinos were born, but the herd numbers were reduced by transferring individuals to other collections. The remaining nine animals have been moved

to the new Rhino house adapted from the old 'Asian' house on the north-west side of the Park.

In what was probably the most important animal move of the year, 25 Whipsnade bred Père David's Deer, together with 14 animals from Chester, Knowsley, Marwell, Glasgow and Longleat, were transported by air to the People's Republic of China where they have been placed in the Da Feng reserve. All the animals were donated by the collections involved and most of the other costs were found by the World Wildlife Fund (WWF). The species may have been extinct in the wild in China for many centuries and it is hoped that this herd will form the breeding nucleus from which animals can be drawn eventually to populate other reserves in China.

Breeding successes amongst the birds included 20 Humboldt's Penguins, bringing the total hatched since 1968 to 222, two King Penguins, five Rosy Flamingos, eight Cranes of three species, and two Scarlet Macaws.

During the year two young male goats from Windsor White Goat herd were presented to the 3rd and 4th Battalions of the Royal Regiment of Wales to be trained as mascots. The Society looks after the only herd of this particular breed on behalf of HM the Queen, whose permission is required before offspring are released.

# Scientific and Educational Activities

## Scientific Meetings

There were eight Scientific Meetings held during the year, covering a very wide variety of subjects. On most occasions, three main speakers were invited to each meeting to talk about recent work on topics related to a broad theme. These themes were: 'Muscle physiology' (April), 'Biological control of pests and weeds' (May); 'Animal architects' (June); 'Colour vision in primates' (October); 'Recent work on corals' (November); 'Exporting the Zoological Society of London' (December); 'Flight' (February); and 'How to start and when to finish—developmental problems in mimicry' (March). The Society is extremely grateful to all the speakers who contributed to the year's programme. Particular thanks go to Dr N. W. Hussey for coping with the last-minute absence of a second speaker by extending his extremely interesting talk on biological control; and to Dr John Sparks of the BBC Natural History Unit, Bristol, who showed several short extracts from recent or forthcoming BBC natural history films that were of particular interest, and offered to continue doing so at future meetings. Attendances at meetings were generally good; however, the June and December meetings which had a more evident appeal to the non-specialist, attracted considerably larger audiences. This opportunity is taken to inform Fellows that other meetings throughout the year, while apparently more specialized, have much to offer of general interest.

## Symposia

Two Symposia were held in the year: 'Reproductive energetics in mammals', held on 10 and 11 April 1986, and organized by Dr A. Loudon and Professor P. A. Racey; and 'Mammal population studies', held in association with the Mammal Society on 28 and 29 November 1986 and organized by Dr S. Harris.

## Publications

*Journal of Zoology* During the year, Volumes 208 Part 4, 209, 210, and 211 Parts 1 to 3 of *Series A* were published, and together contained 151 papers. *Series B*, Volume 1 Parts 3 and 4 were published and together contained 9 papers. On the advice of the Society's publishers, Oxford University Press, it was decided to discontinue the separate publication of *Series B*. From the beginning of January 1987, *Series A* was expanded so that the longer contributions which had previously appeared in *Series B*, and before that in the *Transactions*, could be incorporated into *Series A*. The designation 'Series A' was discontinued, and the title of the combined publication became simply *Journal of Zoology*.

Once again, the very high number of papers submitted for publication in the *Journal* requires the Editor to make very considerable demands on the many referees who help to assess them. Council is most grateful for this invaluable help.

*Symposia*. One volume in the series *Symposia of the Zoological Society of London* was published during the year: No. 56, 'Immune mechanisms in invertebrate vectors', edited by Dr A. M. Lackie.

*Zoological Record*. The programme to bring the *Record* up-to-date has been successful. It represents a significant achievement in the history of this bibliography, and is a most rewarding outcome of the association between the Society and BioSciences Information Service.

Twenty sections of Volume 122 (1985 literature) have been distributed and the remaining seven sections will be despatched in June 1987. Work is in progress on Volume 123 which will be published by the end of 1987. Previous volumes of the *Record* have each covered literature from one calendar year but the elimination of the back-log has necessitated a change. Future volumes will deal with literature received during the indexing period rather than literature published in a particular year; for example, Volume 123 will contain entries for the years 1986 and 1987.

The annual meeting of the Advisory Committee was held in October 1986 at the BIOSIS Headquarters in Philadelphia.

The Council is greatly indebted to the Director General of the Document Supply Centre, British Library, Boston Spa and to the Director of the British Museum (Natural History) for help and accommodation so generously provided.

## International Zoo Yearbook

The double volume 24-25 of the *International Zoo Yearbook*, which was published in the late summer of 1986, was well received.

Work on Volume 26 was greatly expedited by the use of the new computer which has proved useful not only for the recording and updating of the reference data but also for preparing copy for the printer. The volume is expected to be published by mid 1987.

An unusual and particularly interesting selection of papers, some dealing with invertebrate species never before covered in the *Yearbook*, was received for section 1 'Aquatic exhibits'. The 29 articles include descriptions of the housing and husbandry of a wide range of water-living organisms from algae, corals and cephalopods to aquatic vertebrates as varied as Wolf-eels and Walrus. The articles on housing cover both elaborate and costly new developments, such as a circular aquarium for deep-sea fishes, a simulated atoll reef, a spectacular Amazon gallery and major exhibits for penguins and pinnipeds, as well as simpler and less expensive ideas for the development of aquarium tanks to display 'difficult' or familiar species to better advantage. The section carries a strong emphasis on public education.

Section 2, New developments in the zoo world, contains 24 papers covering a number of aspects on the breeding, husbandry, hand-rearing, housing and display of reptile, bird and mammal species, including articles on two rarely bred, zoologically interesting animals, the Tuatara and the Koala, and the extremely rare Volcano Rabbit.

The reference section includes the list of zoos and aquaria of the world, the list of new buildings and exhibits, the lists of vertebrates bred and the census of rare species in captivity and the rapidly increasing list of studbooks for rare or endangered species in captivity.

## The Library

The Library continues to supply a full service to members of the Society, and also to the Society's staff, for whom numerous references are obtained from other Libraries. Annual payments continue to be made in respect of reference tickets, which entitle use of the Library.

The large-scale rearrangement of stock in the Library stacks was completed, and the Manpower Services Commission sanctioned the renewal for a further year of the project to organize and microfilm the Society's archives, using finance supplied by the Commission.

The Oxford University Press published a book by Professor Paul Johnsgard on the pheasants of the world. This was illustrated by colour plates of paintings by Major Henry Jones, one of the greatest bird artists, whose collection of over 1,200 watercolours was bequeathed to the Library in 1921. It is hoped that this will be only the first of a number of volumes resulting from cooperation between the Society and the Oxford University Press, using reproductions from the Society's collection.

The Society is most grateful to those who have donated books to the Library. Among the donors for this year are: Mr A. Baker, Mr A. W. Baker, Dr J. Batty, Mr J. Boswall, Mr R. Cinderey, Mr J. E. Cooper, Professor Stacey B. Day, Mr J. Edwards, Dr H. Fox, Dr M. Gorgas, Dr I. F. Keymer, Mrs S. Lackner, Mr F. W. Lane, Dr R. M. Laws, Mr P. H. Maxwell, Mr W. C. Passanisi, Mr P. B. Riddett, Mr K. Ryz, Mr B. Seshadri, Professor J. Stanley, Mr R. E. Stebbings, Mr M. Tomkies, Professor A. Van Tienhoven, Dr H. G. Vevers, Mr G. Wood, The Bahrain Natural History Society, Biological Laboratory Imperial Household of Japan and the Jersey Wildlife Preservation Trust.

### Education Department

#### PROGRAMME FOR SCHOOLS

The conversion of the former staff canteen at Whipsnade into an Education Centre was completed by the beginning of the Summer Term, 1986. At the end of the Summer Term Dr Jane Mainwaring left the teaching staff, and was replaced by Mr Michael Down, whose secondment by the Inner London Education Authority had come to an end.

Attendances during the year continued to be affected by the industrial action by teachers, although to a lesser extent than in 1985/6, those from London secondary schools being hardest hit. Nevertheless, programmes for both primary and secondary schools were actively promoted during all three terms of the year at both zoos and new tape-slide programmes were introduced. At Whipsnade the improved facilities and expanded programmes proved very popular, attracting a record number of pupils during the Summer Term, 150% more than in the previous year. Although educational visits to Whipsnade are inevitably more affected by the weather than similar visits to the London Zoo, an encouraging number of schools also visited Whipsnade during the Autumn Term, 1986 and the Spring Term, 1987. At the London Zoo attendances during the same two terms showed an

increase of 78% on the totals for the same terms in 1985 and 1986. The numbers of school children taught during the year are set out on the accompanying table.

During the Summer Term special facilities were provided at the London Zoo for schools from the Inner London Education Authority. Two advisory teachers were in attendance, and schools were encouraged to pursue projects entailing several visits by the pupils concerned. Pupils from 17 schools were involved, and made a total of 4,800 pupil-visits. This total is additional to the numbers taking part in the Society's other programmes. At the end of the term an exhibition of the work produced during the project was assembled in the former Mappin Café.

#### OTHER COURSES AND EVENTS

During the year special lectures and demonstrations were organized at the London Zoo for students from Barking College of Technology, Byam Shaw College of Art, Cambridge University Institute of Education, Chiswick Adult Education Centre, the City Literary Institute, Clapham and Battersea Adult Education Institute, the College of Distributive Trades, De Havilland College, Digby Stuart College, Hatfield Polytechnic, Hertfordshire College of Further Education, King's College London, the London Foot Hospital, North East London Polytechnic, North East Surrey College, Oxford University Department of Zoology, Paddington Technical College, Queen Mary College London, Rose Bruford College, the Royal Veterinary College, South Thames College, Sussex University, University of Bath, University College Cardiff, University College London, University of London Department of Extra-Mural Studies, University of London Institute of Education, Waltham Forest College, Whitelands College and Wolverhampton Polytechnic. At Whipsnade similar lectures and demonstrations were arranged for Berkshire College of Agriculture, Harlow College and Willesden College of Technology. The subjects covered in these sessions varied widely, and included regular instruction for a half-course unit of the London BSc Zoology degree, lectures on the evolution of locomotion and limbs for students of chiropody, and demonstrations of teaching methods for teachers in training. Altogether 1,480 students took part.

A Sixth Form Symposium entitled *The Natural History of Primates*, organized jointly with the Primate Society, was held in

	London Zoo			Whipsnade			Total
	Summer	Autumn	Spring	Summer	Autumn	Spring	
Primary school pupils taught by volunteers	4,005	707	1,199	3,114	75	0	9,100
Other primary school pupils	15,936	5,222	4,415	5,639	599	1,229	33,040
Secondary school pupils	5,355	8,875	9,885	2,415	629	236	27,395
Total	25,296	14,804	15,499	11,168	1,303	1,465	69,535

January 1987. The demand for tickets exceeded the supply, and 228 sixth form pupils took part. This total is, of course, additional to the 4,708 pupils who took part in sixth-form lecture-demonstrations at the London Zoo and Whipsnade. In March, 1987 the Education Department participated for the third successive year in the organization of a special day at the London Zoo for several thousand members of the British Association for the Advancement of Science's Young Scientists.

At both Zoos courses for teachers took place. During the Spring Term of 1987 special courses were organized at each of the Inner London Education Authority's ten divisional teachers' centres. At the London Zoo an open day was held for primary school teachers from ILEA and the private sector. The 475 teachers who took part were shown the educational facilities and materials used in the Department's work with schools.

From September 1986 the Education Department assumed responsibility for training the keepers at both Zoos, who are required to study the National Extension College's animal management course, leading to the City and Guilds qualification in this subject. At each zoo 25 sessions of instruction were held.

Meetings were organized for younger Friends of the Zoos and material for younger Friends was produced in the Education Department for publication in 'Zoo News'.

#### VOLUNTEER ACTIVITIES

Additional volunteers were recruited at both zoos and trained to carry out activities which enhance the enjoyment of the Zoos by visitors, and also to conduct Zoo tours for primary school pupils. At London recruitment was encouraged by posters designed by a volunteer, Ms Sheila Jackson. During 220 days of the summer season at the London Zoo an average of 7.8 volunteers were on duty each day, operating the Information Bureau, the Brass-Rubbing Centre and the Art Cart, and demonstrating handling materials. Specialist volunteers gave talks to members of the public. These activities reached a peak during Zoo Month. Receipts from brass-rubbing and mask-making totalled £3,567, and 14,000 *Zoo Guides* were sold at the Information Bureau. At Whipsnade similar activities were carried out and an average of 5.4 volunteers were on duty each day throughout the 1986 season. The Volunteers' Steering Group continued to meet regularly at London under the Chairmanship of Mr J. Barrington-Johnson, and provided valuable advice on the running of the volunteer programme.



# Research

## THE INSTITUTE OF ZOOLOGY

The Institute has as its purpose the furtherance of zoology, comparative physiology and medicine, conservation, and animal welfare. The Report that follows gives a brief account of the activities of various Units within the four main Research Groups. The next Scientific Report, from which a full account may be obtained, will be published in mid-1988.

Professor J. P. Hearn, who became Director of Science in 1980, relinquished his appointment in January 1987 to become Deputy Secretary of the Agricultural and Food Research Council. He will, however, retain his research links with the Institute which has increased greatly in stature as a centre of excellence during his tenure as Director. He has been appointed an Honorary Research Fellow of the Society. At the time of writing a new Director of Science is being sought and Dr G. R. Smith is serving in an acting capacity.

The death of Gordon Henderson in a climbing accident in June 1986 is recorded with sadness. He had served as Pathologist since October 1984.

## Veterinary Science

### LONDON ZOO AND WHIPSNAD PARK

More than 2,000 animals were examined, treated or given prophylactic medicines during the year. Detailed analyses of the nutrient intakes of the Great Apes, Elephants, Greater Kudu and other species were made, with a view to improving the diets. The Keeper staff weighed the foods consumed over a 14-day period and the nutrient intakes were calculated by means of the Nutritional Biochemistry Unit's computer database. Studies at Whipnade led to new dietary regimes for the Black Rhinoceros, Swamp Deer and Waterbuck.

Study of the physiological effects of drugs used to sedate animals for capture or examination continued at Whipnade, especially in the Formosan Sika Deer, Red-necked Wallaby, and White Rhinoceros. The efficacy of new alpha 2 antagonist drugs as reversing agents for a widely used sedative was examined.

Because little is known about the rate of elimination of antibiotics by zoo animals, estimation of the correct therapeutic dose is often difficult. In Wallabies being treated for necrobacillosis, oxytetracycline persisted in the blood much longer than in domesticated animals. Observations on the Indian Elephant showed that effective concentrations of metronidazole in the blood were maintained for 24 hours after rectal administration.

### PATHOLOGY

In all, 926 animals from the Collections at London Zoo and Whipnade were examined *post-mortem* during the year. The computer-based storage of the pathology and microbiology records was completed. The system, which may be further refined in the future, is already being used as a powerful tool for the rapid retrieval of data on the incidence of diseases in particular species or in the Collection as a whole.

Haemosiderosis (the accumulation of iron deposits) is a common *post-mortem* finding in the livers of birds. A survey on this topic was initiated, together with a study of the relation between hepatic concentrations of iron and its absorption from the gut. It was found that captive birds often had—and appeared to tolerate—very high iron levels compared with those found in mammals, and that this was due to a difference in the regulation of absorption.

At Whipnade a chronic wasting syndrome of Muntjac and Hog Deer was identified and is being investigated.

### HAEMATOLOGY

The Unit continued to provide a diagnostic haematology service for animals referred to the Hospital. To facilitate analysis of the accumulated data, results are now being computerized. To date, approximately 6,000 records have been added to the database. The program calculates and displays normal reference values for each species for which healthy individuals have been tested. The current availability of this facility for more than 330 mammalian and avian species has greatly enhanced the value of the service. A comparative study of erythrocyte membrane permeability was begun.

### CONSERVATION GENETICS

The Unit designs breeding programmes for threatened species in captivity. Management guidelines were set out for a number of species including Goeldi's Monkey and the Arabian Oryx, and population analyses were made on the Cotton-topped and Emperor Tamarins, Addax, Diana Monkey, Przewalski's Horse and Great Apes. Studbook data for a wide range of species in British zoos are being computerized.

Research into methods for pedigree construction and assessment of genetic diversity included electrophoretic studies in collaboration with University College, London and DNA fingerprinting with Nottingham University. Computer programs devised within the Unit have also been applied to the management of wild populations such as the Arabian Oryx reintroduced into Oman.

A new example of the evolution of mimicry in the butterfly *Papilio dardanus* was found. Observations were made on the question of genetic versus taxonomic findings in classifying butterflies, and on the decline in the melanic form of the Peppered Moth, probably due to the implementation of the Clean Air Acts.

## Comparative Physiology

### DEVELOPMENTAL BIOLOGY

The application of *in vitro* fertilization techniques to the Marmoset Monkey proved successful. Fertilization rates were as high as 83%, and a pregnancy rate of 66% was achieved when embryos were transferred to recipients. The results will form the basis of future work on mechanisms of oocyte maturation and fertilization in the Marmoset.

Considerable progress was made in elucidating the development of the trophoblast cell layer of the Marmoset embryo. Attention was focused particularly on the mechanisms of control of chorionic gonadotrophin secretion, which has an essential role in the establishment of pregnancy in primates. Micromanipulative procedures enabled 10–20 trophoblast cells to be removed from the embryo. Cells obtained in this way could be used for determining sex or the presence of inherited disorders in the embryos of primates including Man. Studies now in progress will show whether the removal of trophoblast cells is compatible with normal foetal development.

The local effects of substances that may suppress or stimulate the function of the primate corpus luteum were examined *in vivo* in the Marmoset by means of a novel micro-cannula infusion system. The application of embryo transfer technology to the breeding of small Camelidae is now being studied.

#### GAMETE BIOLOGY

Investigations continued in the use of monoclonal antibodies as markers of sperm maturation and function. By means of the culture of epididymal epithelium it was possible, for the first time, to promote sperm maturation *in vitro* and to demonstrate the transfer of specific epididymal secretion to the sperm surface. Antibodies generated against specific components of Hamster spermatozoa were shown to cross-react with human spermatozoa and to block their attachment to human zona pellucida. It is hoped that the antigen concerned can be characterized by means of gene-cloning techniques and used as the basis for a contraceptive vaccine.

Significant changes in sperm membranes during cooling and freezing were identified by means of a cryomicroscope and by measuring membrane phase transition temperatures. These studies helped in the design of improved cryopreservation techniques. The successful artificial insemination of Budgerigars with fresh and frozen semen is expected to have considerable application to endangered avian species.

Assessment of the effects of testicular toxicants on mammalian sperm function, which continued during the year, should lead to improved methods for monitoring the effects of industrial and other environmental chemicals on fertility.

#### ENDOCRINOLOGY AND BEHAVIOUR

Studies in the Marmoset Monkey provided new insights into the factors regulating follicular development in the primate ovary. Collaborative studies with the Developmental Biology Unit led to the development of methods for controlling the timing of ovulation in this species, as a practical aid to the collection of oocytes and embryos.

A comparative study of the reproductive physiology of the Rhinoceros was initiated, with a view to the development of practical methods for assessing reproductive status. Progress was made in simplifying hormone assays for both laboratory and field application.

Social suppression of fertility in subordinate female Marmoset Monkeys was overcome by the use of a miniature syringe pump, which induced ovulation by infusing pulses of gonadotrophin-releasing hormone, and led to pregnancy. Neuro-endocrine investigations suggested that the suppression of fertility was brought about by neural inhibiting mechanisms of two types, namely steroid-dependent and -independent. For the first time hormonal evidence was obtained to account for the suppression of ovulation in subordinate female Naked Mole Rats. The use of blood cortisol measurements as a means of assessing stress in animals was examined. Animal chemical signals were investigated as potential pest control agents.

#### PHYSIOLOGICAL ECOLOGY

Studies on seasonal embryonic diapause in Bennett's Wallaby continued. Manipulation of photoperiod demonstrated that the previous photoperiodic history of the Wallaby was the major factor in determining reproductive response, and that the main role of photoperiod was to regulate an underlying rhythm of reproductive activity and embryonic quiescence. By means of manipulation with purified hormone or dopamine agonists and antagonists, prolactin was shown to be the principal agent maintaining reproductive quiescence throughout the year. Research began on improved methods of measuring prolactin, and on the

*in vitro* culture of granulosa and luteal cells for the assessment of possible direct effects of prolactin on the ovary.

Seasonal physiological rhythms in reproduction and metabolism were also studied in Red Deer and Père David's Deer. Treatment of Red Deer with melatonin in July advanced both breeding and the decline of appetite and body weight; dopamine agonists prevented the spring-time rise in appetite and delayed the termination of the breeding season. The seasonal pattern of luteinizing hormone (LH) secretion in Père David's Deer was studied with the aim of characterizing changes in LH pulse frequency throughout anoestrus. Such work will be of value in devising techniques for the induction of ovulation in this and similar endangered species.

#### Comparative Medicine

##### APPLIED IMMUNOLOGY

The wide ranging collaborative projects on the development of simple immunodiagnostic methods were extended to new areas. As an example, a field method for the identification of the source of blood in biting insects was developed in collaboration with the Liverpool School of Tropical Medicine. Field Studies in Africa indicated a high degree of reliability of the method. Work also began on the development of a simple test for the measurement of blood quinine levels in treated patients. It is hoped that this will serve as a model for drug monitoring in Man and animals.

Basic research included investigations on the use of monoclonal antibodies to detect tumour antigens and infectious agents. Work began on the evaluation of monoclonal antibodies to the HY sex-determinant antigen.

##### MICROBIOLOGY

*Clostridium botulinum* type C causes botulism frequently in animals but rarely in Man, possibly because large amounts of toxin are produced in nature mainly in rotting organic matter. Factors affecting toxin production in carrion—one of the main sources of animal botulism—were studied in the laboratory. It was shown that 37°C (the temperature of an extreme tropical climate) was much less favourable than 23°C (the temperature of a warm English summer) for producing highly toxic carcasses, probably because of the role played by the mixed microflora of carrion. The toxigenesis dynamics of type C in carrion were quite different from those of type E—an organism of importance in human botulism.

Evidence was obtained in mice that occasionally, though not usually, botulism in adult animals results from toxin production in the intestine rather than on foodstuffs.

*C. botulinum* could not be demonstrated in samples (45) of mud and soil from Signy and Coronation Islands, South Orkney Islands, collected by members of the British Antarctic Survey. In the context of surveys made in Europe, parts of Africa and the Middle East by the Institute, this finding was unique.

##### NUTRITIONAL BIOCHEMISTRY

The nutritional database now contains data on over 1500 foods, broken down into 36 general nutrients and 48 fatty acids. It was used to study and monitor the food intakes of many zoo animals, including the Chimpanzee, Gorilla, Elephant, Rhinoceros, Bison and Kudu. It also found application in human medicine—in relation to pregnancy and to lipid-related disorders such as multiple sclerosis, coronary heart disease and cystic fibrosis—by virtue of its content of specialized information on dietary fats.

High-performance liquid chromatography was used to provide, as an 'in-house' service, a means of measuring the plasma vitamin A and E concentrations in animals. More than 100 animals belonging to 41 species were examined.

Further evidence was obtained of the different properties shown by essential fatty acids of the 18 carbon chain length and of the 20 and 22 carbon chain length. The evidence suggested a metabolic pool for prostaglandin synthesis, possibly derived from both long- and short-chain fatty acids, in addition to the membrane precursor pool. A collaborative study of human blood lipid in different regions of China was undertaken in relation to variations in the incidence of cancers.

#### RADIOLOGY

The use of ultrasound as a non-invasive method of diagnosing pregnancy continued to expand. It also began to play an increasing role in the diagnosis of disease. Examples include heart disease and abscesses in Snakes, liver and spleen abnormalities in Killer Whales, and liver disease in a Crab-eating Macaque. Studies of ovarian function in Common Marmosets continued and the knowledge previously gained was applied to other species, for example, the Golden Lion Tamarin.

An X-ray study of the skeletal health of reptiles in the Collection began; and the retardation of skeletal development in subordinate Naked Mole Rats was also studied. As a result of the recent gift of a gamma camera, nuclear medicine will soon form a part of the research and diagnostic services.

#### Conservation and Welfare

##### MAMMALS, AQUARIUM AND INSECTS

The routine collection of breeding data by Keepers provides a wealth of information to be analysed in relation to topics such as birth season, sex ratio, and inbreeding. Staff are constantly investigating ways in which the objectives of animal management and display can be even better achieved. In the Aquarium efforts focussed mainly on improving lighting, water circulation and water quality, and on keeping fish and aquatic invertebrates in natural communities.

Voluntary research assistants carried out short-term applied studies of small mammal activity periods, Gibbon pairing and duetting, Naked Mole Rats' use of their environment, stereotypes, and Dwarf Mongoose social behaviour. As part of their training, students from a variety of institutions carried out observational projects on animals within the Collection, particularly on primates. The UFAW-ZSL Behaviour Enrichment Programme resulted in the identification of a variety of environmental changes aimed at making zoo animals' lives more varied and interesting.

##### BIRDS AND REPTILES

Of special interest was the hand-rearing of an Inca Tern, a Bare-faced Curassow and five Abdim's Storks from artificially incubated eggs. Several collaborative projects included studies in the hatching requirements of eggs (with the Royal Veterinary College); free-living Red Junglefowl, the ancestor of the domestic fowl, (with Oxford University); sexual selection in the Blue Peafowl (Open University); age-dependent changes in display plumage (Liverpool University); and pigment patterning in avian embryos (Middlesex Hospital Medical School).

Studies in the nutrition and health of reptiles included trials of vitamin and mineral supplements for Lizards, and the use of

ultraviolet light. A new snake-handling stick, which provides a more secure and more gentle grip, was designed and is now in manufacture.

#### WHIPSNADE PARK

Increasing use continued to be made of Whipsnade for research by Institute staff and collaborating university scientists, and for the training of students. Many of these activities are mentioned elsewhere in this Report.

#### FIELD STUDIES

Five members of the Institute and Keeper staff conducted a biomedical survey of the Aldabra Giant Tortoise on Curieuse Island in the Seychelles. This was aimed at providing hitherto unknown background information on healthy animals to assist with studies to improve their captive management and to provide a database for work on the wild population.

In Kenya the major programme to assess the ecological needs of the Black Rhino has begun on the Ol Ari Nyiro ranch at Laikipia. The study, which is being carried out as part of the Kenya Government's conservation programme for this highly endangered species, is taking place in partnership with the Gallmann Memorial Foundation who own the ranch. The research is funded largely by the World Wildlife Fund (WWF). Between 50 and 60 Rhinos live on the ranch and constitute the only remaining undisturbed indigenous population of the species in Kenya.

For three years the Society has provided veterinary advice and regular visits to the Giant Panda research centre in Wolong, Szechuan and these visits continued throughout 1986, again with assistance from WWF.

The progress of the large group of Père David's Deer sent to Da Feng in China is being continually monitored by Institute staff prior to their release into the main reserve. In Tunisia, periodic monitoring is taking place of the Scimitar-horned Oryx sent to the Bou-Hedma National Park by a consortium of British zoos in 1985.

The work of our staff in Qatar is now extending beyond the confines of the management of the national zoo to assist the university and government departments with the sizeable job of cataloguing the fauna of that country.

# General Matters

## Catering Department and Zoo Restaurants Limited

### LONDON ZOO

The catering operation of London Zoo continues to be ably managed on behalf of the Society by Compass Services, with record sales being recorded during the period in all areas.

The number of functions held in the Regency Suite (the former Members' Restaurant) increased to 303 this financial year compared with 253 the previous year.

### WHIPSNAD PARK

Whipsnade Park Catering Department recorded another disappointing year due mainly to the limitations imposed by the need to replace the deteriorating kitchen equipment.

On 1 March 1987, however, following competitive proposals, the catering operation was placed with J. Lyons Catering to manage on behalf of the Society.

In the course of the coming year, Lyons will be conducting an extensive market research programme to identify customer needs prior to investment in new facilities and equipment. A fruitful relationship with J. Lyons Catering is envisaged with increased profitability.

## Zoo Enterprises Limited

Zoo Enterprises Ltd, which operates the Retail Departments at both London Zoo and Whipsnade Park, reported another successful year.

At Whipsnade the Company acquired the Confectionery Kiosk at the entrance to the Park and its operation was taken over by the Park Shop. This acquisition, together with a further extension of the self service facility, produced a turnover of £254,732 showing an increase of some 43% over the previous year.

At London a new Ice Cream Kiosk by the Reptile House and an extended self service facility in the Zoo Shop increased turnover by some 8% to £987,065.

## The Design and Information Unit

The Design and Information Unit is responsible for interpreting the Collection and providing information graphics at both London Zoo and Whipsnade Park.

At London Zoo, a popular display entitled 'Venom' encouraged visitors to take a closer look at venomous snakes and endeavoured to correct misconceptions about these animals. For the Bird House, old prints were selected from the Library's fine art collection to illustrate a Tropical Birds Exhibition. The prints included the work of the artists Gould, Lear, Keulemans and Frohawk. Work commenced on providing new information panels for the Insect House and the Unit helped create a Design Brief for the proposed new Aquarium.

A souvenir brochure replaced the old Whipsnade Zoo Guide. The design and content of the brochure reflect the zoo-geographical theme which the Park is developing. Eye-catching, innovative graphics have been developed to help visitors identify each region and these were introduced in the brochure. The Unit has contributed greatly to the development of the new Discovery Centre at Hall Farm, Whipsnade Park, where emphasis is placed upon the importance of conservation of natural habitats world-wide.

## Public Relations

### LONDON ZOO

Media coverage, particularly on television, of London Zoo and the Institute of Zoology was extensive. The fund raising 'Rhino Minder Project' was supported by Suzuki Vehicles and launched by Dennis Waterman and Rula Lenska. A wide range of media covered this project, from tabloid newspapers and children's television to *The Times*.

Naked Mole Rats and Père David's Deer were featured on widely-viewed BBC TV programmes, with footage from China where the Deer were released. It was gratifying to observe that the media's interest in scientific and conservation work appears to be increasing; examples of coverage included social suppression of fertility in Marmosets and the freezing of Blackbuck and Budgerigar semen.

The Central Office of Information held a press conference at London Zoo to inform London correspondents from the foreign media about the work of the Society.

The Adopt an Animal scheme continues to flourish, raising £87,200 during this financial year. Celebrities adopting animals included Daley Thompson, Fiona Fullerton, Derek Jacobi and Roy Kinnear. One Elephant was adopted for £5,000 by Ferrero, the chocolate manufacturing company.

Special events, some for the public, some for Friends and Members, included individual Open Animal Houses in the evenings, promotions with Capital Radio, publishers and other commercial sponsors.

'Zoo News', the quarterly magazine, is now circulated to 18,000 addresses, including the press list of 500.

### WHIPSNAD PARK

Media coverage of Whipsnade Park has continued to grow, with many more local newspapers taking a greater interest in the Park's activities. Photo-calls held for the Birds of Prey Display, the birth of the Indian and White Rhino calves and the departure of the Père David's Deer to China, attracted national as well as local interest.

Local radio stations have continued to support Whipsnade with Chiltern's fortnightly 'Kid's Stuff' and BBC Radio Bedfordshire's newly established monthly zoo based natural history programme.

Filming at Whipsnade has included BBC Television's 'Treasure Houses', ITV's 'Intimate Contact' and BBC children's television's 'Caterpillar'.

Animal adoptions are continuing to increase in popularity with over 1,000 Whipsnade adoptions on record since the programme was launched in November 1982, generating revenue in excess of £37,000.

## Staff

At 31 March 1987 there were 380 full-time members of staff. A list of senior members of staff is given in Appendix 2.

### GENERAL

Introduction of the Team Briefing system improved internal communications. Training for this and the programme of management and supervisory courses was provided mainly by the Industrial Society and we are grateful to the Manpower Services Commission for their provision of a grant which went a considerable way towards meeting the cost of the training programme.

Five trainee keepers under the Youth Training Scheme completed their course and we are grateful to Mrs Ryan and Mr Higgins of Paddington College for the attention they gave to the off-the-job training.

The career and promotion structure for keeper staff was reviewed and revised. The nationally recognized City and Guilds qualification in Animal Management, based on a National Extension College correspondence course but supplemented with on-site tuition organized by the Education staff, was substituted for the Zoo Animal Management Certificate courses which the Society had run for many years in conjunction with Paddington College.

A reduction in standard working hours to 1957.5 hours per annum (the equivalent of a 37½ hour week) for all manual staff was implemented from October.

Mr John Toovey, Architect to the Society for the past 20 years, left in February to undertake consultancy work. The Sobell Pavilions and New Lion Terraces at London, the Water Mammals and the African and Asian Houses at Whipsnade, together with a host of smaller projects, were constructed during his time.

#### AWARDS

Professor J. P. Hearn was awarded the Osman Hill Medal of the Primate Society of Great Britain. The completion of 25 years' continuous service was recognized by the presentation of gold watches to Mr A. Billington, Headkeeper, Whipsnade; Mr M. Hennessy, Senior Keeper, London; Mr D. Gold, Gardener, London; Mr A. Morris, Senior Keeper, Whipsnade; Mr A. White, Overseer, Whipsnade.

#### RETIREMENTS

Retirements (years of service in brackets) included: Mr E. Swain (43), Headkeeper, New Lion Terraces; Mr R. Barrow (40), Overseer of Birds; Mr S. Newson (40), Works Craftsman; Mr J. Warwick (28), Driver/Stores Assistant; Mr E. Oliver (20), Service Gatekeeper; Mr J. Fitzgerald (15), Head Gatekeeper; Mr W. Dixon (35), Senior Keeper, Whipsnade.

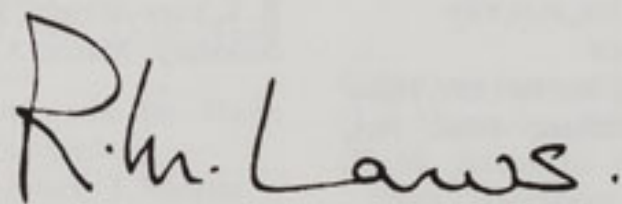
#### OBITUARIES

We regret to record the death of Mr Gordon Henderson, Pathologist, and of the following pensioners: Mr C. Jones, Mr F. Morton and Mrs H. Wisdom.

#### Acknowledgements

The Council is most fortunate to have the help and support of all those who give their time to serve on the advisory committees. This immeasurably aids the work of the Society and is greatly appreciated.

The considerable help given by many firms and organizations and by scientists and veterinarians is gratefully acknowledged. Details of this help may be found in Appendix 7.



Secretary

# Committees 1986-1987

## Management Committee

*Terms of Reference:* To advise Council on all financial, commercial and marketing aspects of the Society's activities; to be responsible for the preparation of the Society's annual operational budget for the Council's approval and to monitor its progress; to monitor expenditure on capital projects provided for under separate funds; to be responsible for the planning and monitoring of all the Society's commercial activities, including pricing policy and the advertising, promotion and marketing programmes.

Sir David Attenborough, CBE, FRS

C. J. Benson, JP, FRICS

D. L. Donne

The Hon. William McAlpine

R. G. Parker

C. J. Perrin, MA, *Deputy Chairman*

The Rt Hon. Lord Peyton of Yeovil, *Chairman*

W. J. Shively

Sir Richard Way, KCB, CBE

*Secretary:* J. L. Boyer, OBE

## Animal Welfare and Conservation Committee

*Terms of Reference:* To advise Council on matters relating to animal welfare, husbandry and breeding records in the Collections, at both London Zoo and Whipsnade Park, particularly in relation to the work of the Society's Curators, Veterinary Officers and Pathologist.

Professor D. M. Broom, MA, PhD

T. Clutton-Brock, MA, PhD

J. E. Cooper, BVSc, FRCVS, DTVM, FIBiol

C. M. Dawes, BSc, PhD

R. Ewbank, MVSc, MRCVS, FIBiol

M. J. Ford, MA, DPhil

I. F. Keymer, PhD, FRCVS, FRCPath, FIBiol

J. M. Knowles

Miss Judy A. MacArthur, BVMS, DLAS, MRCVS

Professor D. E. Noakes, BVetMed, PhD, MRCVS

A. J. Stevens, MA, BVSc, MRCVS, DipBact,  
*Chairman*

A. D. Walker, BSc, PhD, ARCS, FRSC, MIBiol

*Secretary:* D. M. Jones, BSc, BVetMed, MRCVS,  
FIBiol

## Awards Committee

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

Professor R. McNeill Alexander, MA, PhD, DSc,  
FIBiol, FRS

Professor A. d'A. Bellairs, DSc, MRCS, FLS  
Professor G. Chapman, MA, PhD, ScD, FIBiol  
Professor B. K. Follett, PhD, DSc, FRS  
P. H. Greenwood, DSc, FIBiol, FLS, FRS  
Professor K. Simkiss, PhD, DSc, FIBiol  
Mrs Margaret Varley, MA, PhD  
Professor J. E. Webb, DSc, PhD, *Chairman*  
*Secretary:* Marcia A. Edwards, PhD, FLS

## Education Committee

*Terms of Reference:* To advise Council on all matters relating to the Society's educational activities.

E. D. Barlow, MA, MB, BChir, FRCPSych

J. Barrington-Johnson

W. Chapman, TD, MSc, BSc(Econ), DipEdAd,  
MBIM

M. J. Coe, BSc, PhD

S. F. Everiss, MBE, MA, MSc, FIBiol

Mrs P. Fisher, DipEd

Mrs K. Heath, BA, DipASE

Mrs J. King

D. Marshall, BSc, FIBiol

D. O'Dell, BSc, PhD

J. Sparks, BSc, PhD

D. J. Stanbury, BSc, ARCS, *Chairman*

*Secretary:* M. K. Boorer, BSc, DipEd

## Gardens and Park Committee

*Terms of Reference:* To consider matters relating to the layout, appearance, animal housing and amenities other than catering of the Gardens, London Zoo and Whipsnade Park; to consult where necessary with other committees and to report to Council so that the advice of the Committee can be taken into account in future planning.

Lady Casson, RIBA, FSIA

R. d'Erlanger

Mrs Maldwin Drummond

E. Hutchison, MA(RCA), DipLA, ALI

C. Masson

Lady Rupert Nevill

J. R. A. Niles

N. Sitwell

HG The Duke of Wellington, MVO, OBE, MC,  
*Chairman*

*Secretary:* J. W. Toovey, AA(Dipl Hons), FRIBA  
(until 15.2.1987)

J. C. Wears, DipArch(Dunelm) (from  
16.2.1987)

## Institute of Zoology Committee

*Terms of Reference:* To advise Council on all matters relating to the Institute of Zoology.

Professor P. P. G. Bateson, MA, PhD, ScD, FRS

Professor B. A. Cross, CBE, ScD, MRCVS, FRS

Professor B. K. Follett, PhD, DSc, FRS

Professor R. L. Gardner, MA, PhD, FRS

J. S. Garrow, MD, PhD, FRCP

Professor G. E. Lamming, MS, PhD, DSc, FIBiol

Professor N. A. Mitchison, DPhil, FRS,  
*Chairman*

W. Plowright, CMG, DVSc, FRVC, FRS

Professor A. J. Zuckerman, MD, DSc

*Secretary:* Professor J. P. Hearn, MSc, PhD,  
FIBiol (until 14.1.1987)

*Acting Secretary:* G. R. Smith, PhD, MRCVS,  
DVSM, DipBact (from 15.1.1987)

## International Zoo Yearbook Editorial Board

*Terms of Reference:* To advise on the content and production of the Yearbook.

The Countess of Cranbrook

S. F. Everiss, MBE, MA, MSc, FIBiol

Miss Janet Kear, PhD, *Chairman*

J. M. Knowles

J. J. C. Mallinson, MIBiol

Professor R. D. Martin, BA, DPhil, FIBiol

Miss Jane Thornback

Ir. D. van Dam

*Secretary:* P. J. S. Olney, BSc, DipEd, FIBiol, FLS

## Publications Committee

*Terms of Reference:* To advise Council on matters concerning the publication of zoological research; to serve as an editorial board for the *Journal of Zoology* of the Society; to make recommendations on Library policy.

Professor R. McNeill Alexander, MA, PhD, DSc,  
FIBiol, FRS

Professor C. Arme, BSc, PhD

Professor R. J. Berry, MA, PhD, DSc, FRSE,  
FIBiol, FLS, *Chairman*

Professor P. J. Butler, BSc, PhD, FIBiol

C. K. Catchpole, BSc, PhD

Professor A. J. E. Cave, MD, DSc, FRCS, FLS

Professor G. Chapman, MA, PhD, ScD, FIBiol

Miss Barbara M. Gilchrist, PhD

Professor P. A. Jewell, MA, PhD

J. B. Messenger, MA, PhD

Professor J. D. Pye, BSc, PhD, FLS

P. J. Whitfield, MA, PhD

*Secretary:* Marcia A. Edwards, PhD, FLS

## Zoological Record Advisory Committee

*Terms of Reference:* To advise the Society and Biological Abstracts Inc. under the terms of the Agreement between them; to consider and make recommendations with respect to the activities and future development of the *Zoological Record*.

H. E. Kennedy, PhD

R. A. Neal, DSc, PhD

R. O. Nesheim, PhD, *Chairman*

Professor J. R. Nursall, PhD

R. I. Vane-Wright, BSc

*Secretary:* Marcia A. Edwards, PhD, FLS

## Zoological Record Editorial Board

*Terms of Reference:* To advise on the scope, content and format of the *Zoological Record*.

R. W. Crosskey, DSc

Professor G. Owen Evans, DSc, PhD, FIBiol,  
MRIA

Professor J. Green, DSc, PhD

J. P. Harding, PhD, FLS

D. Macfarlane, BSc

R. A. Neal, DSc, PhD, *Chairman*

V. R. Southgate, PhD

R. I. Vane-Wright, BSc

*Secretary:* Marcia A. Edwards, PhD, FLS

## Staff

*Chief Executive Officer:* J. L. Boyer, OBE  
*Director of Science:* Professor J. P. Hearn, MSc, PhD, FIBiol (to January)\*  
*Acting Director of Science:* G. R. Smith, PhD, MRCVS, DVSM, DipBact (from January)\*  
*Director of Zoos:* D. M. Jones, BSc, BVetMed, MRCVS, FIBiol\*  
*Assistant Director of Science (Publications & General):* Marcia A. Edwards, PhD, FLS\*  
*Architect:* J. W. Toovey, AADipl(Hons), FRIBA (to February)  
 J. C. Wears, DipArch(Dunelm)(from February)  
*Commercial Manager:* J. P. Griffin, BSc (to December)  
*Curator of Birds/Reptiles:* P. J. S. Olney, BSc, DipEd, FLS, FIBiol\*  
*Curator of Mammals/Aquarium/Insects:* B. C. R. Bertram, MA, PhD, FIBiol\*  
*Curator, Whipsnade Park:* V. J. A. Manton, MRCVS, FIBiol\*  
*Education Officer:* M. K. Boorer, BSc, DipEd  
*Establishment Officer:* M. E. McInerney, FBIM  
*Finance Officer:* P. J. Duckett, FCCA  
*Head of Design & Information Unit:* W. J. Griffiths, BSc, FETC  
*Librarian:* R. A. Fish, FLA\*  
*Marketing Manager:* M. Allen (from December)  
*Retail Manager:* J. F. Brown

### London Zoo

*Assistant Curator, Aquarium:* C. R. Andrews, PhD\*  
*Assistant Curator, Reptiles:* D. Ball, AIAT, MIBiol\*  
*Assistant Education Officers:* Alison J. Mainwaring, BSc, PhD, (to July); J. M. L. Down, BSc, MSc, MEd (from August); Frances A. Rogers; D. T. J. Smith, BSc, MSc; Gillian E. Standring, MA, CertEd  
*Head Gardener:* P. Summers, DipHort(Kew)  
*Maintenance Manager:* C. R. Hazlehurst, MCIQB (to October)  
*Overseer of Birds:* R. Barrow (to August); R. E. Hutton, RANA (from August)  
*Overseers of Mammals:* T. B. Kichenside; W. B. James  
*Public Relations Officer:* Julie Fitzherbert-Brockholes, BSc  
*Public Services Manager:* J. P. McCorry  
*Purchasing & Transport Supervisor:* R. R. Smith, FIAT

### HEAD KEEPERS

*Aquarium:* R. Dumbelton  
*Aquatic Birds & Birds of Prey:* D. N. Wood  
*Bird House:* A. W. James  
*Children's Zoo:* P. Anscombe (to May); Linda Sharp (from November)  
*Cotton Terraces for Hoofstock:* J. Nicklin  
*Elephant & Rhino Pavilion:* B. Harman  
*Insect House:* P. Pearce-Kelly (Acting)

*New Lion Terraces:* E. F. Swain (to April); D. M. Richardson (from November)  
*Parrot House (to September):* D. Eyre (Acting)  
*Pheasantry & Ostrich House:* B. Blackburn (to December); D. Eyre (from February)  
*Reptiles:* S. B. Savage  
*Sobell Pavilions for Apes & Monkeys:* M. Carman

### Whipsnade Park

*Park Manager:* O. C. Chamberlain  
*Veterinary Officer:* R. A. Kock, MA, VetMB, MRCVS\*  
*Catering Manager:* Sharon Taverner (to February)  
*PRO/Assistant Education Officer:* M. F. Ricketts, BSc, CertEd  
*Senior Overseer:* J. Datlen  
*Overseer:* A. White

### HEAD KEEPERS

*Central Ungulate Section:* V. Curzon  
*Southern Ungulate Section:* A. W. Billington  
*Northern Ungulate Section:* P. J. Williams  
*Carnivore Section:* G. Lucas  
*Elephant Section:* J. Weatherhead  
*Bird Section:* C. Bates

### Publications

*International Zoo Yearbook:*  
*Editor:* P. J. S. Olney, BSc, DipEd, FIBiol, FLS\*  
*Assistant Editors:* Pat Ellis; Benedicte Sommerfelt, BSc  
*Journal of Zoology, Symposia, Nomenclator Zoologicus, Zoological Record:*  
*Editor:* Marcia A. Edwards, PhD, FLS\*  
*Assistant Editors:* Angela J. Stroud, BSc; Unity M. M. McDonnell, MA

**Institute of Zoology** (Note the Institute includes the Nuffield Laboratories of Comparative Medicine; the Wellcome Laboratories of Comparative Physiology; the Veterinary Hospital; the Curators' Research Units; and the MRC/AFRC Comparative Physiology Research Group)

*Director:* Professor J. P. Hearn, MSc, PhD, FIBiol (until 14.1.1987)  
*Acting Director:* G. R. Smith, PhD, MRCVS, DVSM, DipBact (from 15.1.1987)  
*Administrative Assistant:* Connie Nutkins  
*Laboratory Superintendent (Nuffield):* P. R. E. Wallace, FIST  
*Laboratory Superintendent (Wellcome & Hospital):* G. F. Nevill, HNC  
*Computer Consultant:* G. F. Moore, BA, MSc (until December 1986)

### COMPARATIVE PHYSIOLOGY

(J. P. Hearn, MSc, PhD, FIBiol—until 14.1.1987)  
 (P. M. Summers, BVSc, MSc, PhD, MRCVS—  
 from 15.1.1987)

### Developmental Biology

*Research Fellows:* J. P. Hearn, MSc, PhD, FIBiol (until January 1987); P. M. Summers, BVSc, MSc, PhD, MRCVS; Georgina E. Webley, PhD

*Research Associates:* Philippa T. K. Saunders, PhD (until January 1987); K. Shrimanker, PhD (from February 1987)

*Honorary Research Fellow:* J. P. Hearn, MSc, PhD, FIBiol

*Visiting Research Fellow:* A. Lopata, MS, BS, PhD(Australia) (until January 1987)

*Visiting Research Associate:* Alison M. Shephard, BA, MSc

*Postgraduate Research Students:* Tracy Curds, BSc; Johanna Price, BSc (Joint Studentship with University of Aberdeen)

### Endocrinology and Behaviour

*Research Fellows:* D. H. Abbott, PhD; J. K. Hodges, PhD (Zuckerman Research Fellow)

*Research Associate:* Helen J. Shaw, PhD

*Postgraduate Research Students:* C. J. Faulkes, MIBiol; Helen Holmes, BSc; Caroline E. Liddell, BSc (until September 1986); Evelyn Wangare Wanjohi, BSc (USA)

*Visiting Research Worker:* Liang Ying-nan (China) (until June 1986)

### Gamete Biology

*Research Fellows:* W. V. Holt, PhD; H. D. M. Moore, PhD (Zuckerman Research Fellow)

*Research Associates:* Caroline A. Smith, PhD; Alison J. Holloway, PhD

*Visiting Research Associate:* M. Curry, PhD  
*Postgraduate Research Scholar:* J. H. Samour, DVM, MVZ(Mexico)

*Postgraduate Research Student:* Linda M. Baggott, BEd, MSc

### Physiological Ecology

*Research Fellows:* J. D. Curlew, BVSc, PhD, MRCVS; A. S. I. Loudon, BA, PhD

*Research Assistant:* Alison M. White, MSc  
*Honorary Research Fellow:* C. R. Thouless, PhD

### COMPARATIVE MEDICINE

(G. R. Smith, PhD, MRCVS, DVSM, DipBact)

### Applied Immunology

*Honorary Research Fellow:* A. Voller, PhD, DSc, MRCPATH

*Research Associate:* D. E. Bidwell, PhD

*Postgraduate Research Scholar:* A. Eslava, MD, MSc

### Microbiology

*Research Fellow:* G. R. Smith, PhD, MRCVS, DVSM, DipBact

### Nutritional Biochemistry

*Research Fellows:* M. A. Crawford, PhD; Wendy Doyle, SRD; W. R. Hare, PhD (until July 1986)

*Research Associate:* E. Anne Lennon, PhD

*Research Assistant:* M. J. Leighfield, MSc

*Visiting Research Fellow:* W. R. Hare, PhD

*Visiting Research Associate:*

K. Ghebremeskel, MSc, PhD (Eritrea)

### Radiology

*Research Fellow:* G. H. du Boulay, CBE, MB, BSM, FRCP, DMRD, FRCR

*Radiographer:* Olivia L. Wilson, DSR

\*Also members of the Institute of Zoology

CONSERVATION AND WELFARE

(D. M. Jones, BSc, BVetMed, MRCVS, FIBiol)

*Birds/Reptiles*

*Curator:* P. J. S. Olney, BSc, DipEd, FIBiol, FLS

*Assistant Curator, Reptiles:* D. Ball, AIAT, MIBiol

*Postgraduate Research Student:* Jacqueline A. Wastell, BSc (until September 1986)

*Mammals/Aquarium/Insects*

*Curator:* B. C. R. Bertram, MA, PhD, FIBiol

*Assistant Curator, Aquarium:* C. R. Andrews, PhD

*Ethologist:* Susan M. Dow, MA, PhD (until September 1986)

*Honorary Research Fellow:* A. J. E. Cave, MA, DSc, FRCS, FLS

*Postgraduate Research Student:* D. P. Moltu, BSc(Norway) (until August 1986)

*Whipsnade Park*

*Curator:* V. J. A. Manton, MRCVS, FIBiol

*Field Studies*

*Consultant Veterinary Officer:* J. A. Knight, BVetMed, MRCVS

*Research Fellow:* R. A. Brett, BA, PhD

*Honorary Research Fellow:* R. A. Eley, PhD

VETERINARY SCIENCE

(J. K. Kirkwood, BVSc, PhD, MRCVS)

*Clinical Studies*

*Senior Veterinary Officer:* J. K. Kirkwood, BVSc, PhD, MRCVS

*Veterinary Officer (Whipsnade):* R. A. Kock, MA, VetMB, MRCVS

*Veterinary House Surgeon (London):* Frances M. D. Gulland, VetMB, MRCVS

*Postgraduate Research Student:* Margaret J. Leighton, BSc

*Visiting Veterinary Officer (Whipsnade):* Karen Emmanuelson, DVM(USA)

*Conservation Genetics*

*Honorary Research Fellows:* Sir Cyril A. Clarke, KBE, MD, FRCP, FRS; Georgina M. Mace, DPhil

*Visiting Research Associate:* P. M. Bennett, DPhil

*Haematology*

*Research Fellow:* Christine M. Hawkey, PhD

*Visiting Research Fellow:* I. Shine, MD

*Pathology*

*Pathologists:* G. M. Henderson, BA, VetMB, MRCVS (until June 1986);

J. C. M. Lewis, VetMB, MA, PhD, MRCVS (from January 1987)

**Consulting Staff**

*Honorary Herpetologist:* Professor A. d'A. Bellairs, DSc, MRCS, FLS

*Honorary Veterinary Consultant:* W. H. G. Rees, BSc, DVSM, MRCVS

*Medical Referee:* K. H. Lewis, MA, BM, BCh



# Publications by Society's Staff and Research Workers

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- ABBOTT, D. H. & HODGES, J. K. (1986). Ovarian function in marmosets and tamarins. *Primate Report* 14: 145 (Abstract).
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- BERTRAM, B. C. R. & MOLTU, D.-P. (1986). Reintroducing red squirrels into Regent's Park. *Mammal Rev.* 16: 81-88.
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# Animals in the Collections

column 1	Number of animals in the Collection at 1st January 1986.
column 2	Number of animals received in 1986 by presentation, exchange, purchase or transfer between the Society's two Collections. The figures in brackets indicate animals which have been so transferred.
column 3	Number of animals born or hatched in 1986.
column 4	Number of animals which died in 1986 within 30 days of birth or hatching. The figures in brackets indicate animals born or hatched during December 1985 and which died during January 1986. Stillbirths are not included.
column 5	Number of animals which died from natural causes during 1986 apart from those included in column 4.
column 6	Number of animals disposed of in 1986 by presentation, exchange, deposit, sale or transfer between the Society's two Collections, as well as culled animals and those killed by vermin or vandals. The figures in brackets indicate animals which have been transferred between the two Collections.
column 7	Number of animals in the Collection at 31st December 1986 showing sexes where these are known, e.g. 1/3/1 indicates 1 male, 3 female, 1 sex unknown.

## Key

G Genus new to the Collection  
 S Species new to the Collection  
 SS Sub-species new to the Collection

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

## LONDON ZOO

		1	2	3	4	5	6	7
<b>Mammals</b>								
<b>MONOTREMATA</b>								
<i>Tachyglossus aculeatus</i>	Australian Echidna	1	—	—	—	—	—	1/0
<i>Zaglossus bruijni</i>	Bruijn's Echidna	3	1	—	—	—	—	2/2
<b>MARSUPIALIA</b>								
<i>Monodelphis domestica</i> S	Grey Short-tailed Opossum	—	2	6	—	1	—	2/5
<i>Metachirops opossum</i>	Grey Four-eyed Opossum	1	—	—	—	1	—	—
<i>Phalanger gymnotis</i>	Grey Ground Cuscus	2	3	—	—	—	1	2/2
<i>Petaurus breviceps</i>	Sugar Glider	12	1	—	—	6	—	5/2
<i>Dasyuroides byrnei</i>	Byrne's Pouched Mouse	5	—	—	—	—	—	2/3
<i>Sarcophilus harrisi</i>	Tasmanian Devil	2	—	—	—	—	—	1/1
<i>Vombatus ursinus</i>	Common Wombat	1	—	—	—	—	—	0/1
<i>Potorous tridactylus</i>	Long-nosed Potoroo	4	—	—	—	—	4	—
<i>Bettongia penicillata</i>	Brush-tailed Bettong	6	—	1	—	—	—	4/3
		1	2	3	4	5	6	7

		1	2	3	4	5	6	7
<i>Macropus parma</i>	White-throated Wallaby	3	—	1	—	—	1	1/1/1
<i>Macropus fuliginosus</i>	Western Grey Kangaroo	2	—	1	1	1	1	—
<i>Dendrolagus goodfellowi</i>	Goodfellow's Kangaroo	1	—	—	—	—	—	0/1
INSECTIVORA								
<i>Echinops telfairi</i>	Pygmy Hedgehog Tenrec	2	—	—	—	2	—	—
<i>Erinaceus europaeus</i>	European Hedgehog	1	4	—	—	3	—	0/0/2
<i>Paraechinus aethiopicus</i>	Desert Hedgehog	5	—	—	—	1	1(1)	1/2
CHIROPTERA								
<i>Pteropus giganteus</i>	Indian Fruit Bat	22	—	6	—	3	10	4/11
<i>Carollia perspicillata</i>	Seba's Short-tailed Bat	37	—	22	12	9	—	16/15/7
SCANDENTIA								
<i>Tupaia belangeri</i>	Common Tree Shrew	16	1	5	1	3	5	6/6/1
<i>Tupaia tana</i>	Large Tree Shrew	5	—	—	—	1	—	2/2
PRIMATES								
<i>Lemur catta</i>	Ring-tailed Lemur	5	—	5	—	—	—	5/5
<i>Lemur fulvus</i>	Brown (Mayotte) Lemur	9	—	6	2	—	3	3/4/3
<i>Lemur mongoz</i>	Mongoose Lemur	2	—	—	—	—	—	1/1
<i>Varecia variegatus</i>	Ruffed Lemur	4	3	—	—	—	—	4/3
<i>Cheirogaleus medius</i>	Fat-tailed Dwarf Lemur	1	—	—	—	—	—	1/0
<i>Microcebus murinus</i>	Grey Mouse Lemur	7	—	1	—	—	—	5/3
<i>Loris tardigradus</i>	Slender Loris	3	3	—	—	2	—	2/2
<i>Nycticebus coucang</i>	Slow Loris	10	—	1	—	—	—	3/7/1
<i>Galago crassicaudatus</i>	Thick-tailed Bushbaby	1	—	—	—	—	—	1/0
<i>Galago senegalensis</i>	Senegal Bushbaby	2	2	—	—	—	—	2/2
<i>Aotus trivirgatus</i>	Douroucouli	6	—	1	—	—	2	2/3
<i>Pithecia pithecia</i>	White-faced Saki Monkey	6	—	2	—	—	—	3/3/2
<i>Cebus apella</i>	Brown Capuchin	8	—	1	—	—	—	4/4/1
<i>Saimiri sciureus</i>	Squirrel Monkey (Olive-capped form)	14	—	4	—	—	1	6/5/6
<i>Ateles geoffroyi</i>	Black-handed Spider Monkey	2	—	1	—	—	—	2/1
<i>Callithrix jacchus</i>	Common Marmoset	20	—	3	1	3	3	4/8/4
<i>Callithrix argentata</i>	Silvery Marmoset	1	—	—	—	1	—	—
<i>Cebuella pygmaea</i>	Pygmy Marmoset	4	—	6	4	—	—	2/2/2
<i>Saguinus oedipus</i>	Cotton-headed Tamarin	4	—	2	2	—	—	2/2
<i>Saguinus illigeri</i>	Red-mantled Tamarin	7	—	5	3	—	—	3/2/4
<i>Saguinus imperator</i>	Emperor Tamarin	4	—	2	2	—	—	2/2
<i>Leontopithecus rosalia</i>	Golden Lion Tamarin	9	—	—	—	1	—	3/5
<i>Callimico goeldii</i>	Goeldi's Marmoset	4	—	1	—	—	—	2/3
<i>Macaca silenus</i>	Lion-tailed Macaque	5	—	—	—	1	4	—
<i>Macaca nemestrina</i>	Pig-tailed Macaque	19	—	6	3	—	1	6/13/2
<i>Cercocebus torquatus</i>	Sooty Mangabey	7	—	1	—	—	1	2/5
<i>Mandrillus sphinx</i>	Mandrill	9	—	1	—	—	2	3/5
<i>Cercopithecus diana</i>	Diana Monkey	7	1	1	—	—	3	2/3/1
<i>Cercopithecus talapoin</i>	Talapoin Monkey	2	—	—	—	—	2	—
<i>Colobus polykomos</i>	Western Black & White Colobus Monkey	4	—	—	—	—	—	3/1
<i>Hylobates lar</i>	Lar Gibbon	2	1	—	—	1	—	1/1
<i>Pongo pygmaeus</i>	Orang Utan	11	1	—	—	—	2	4/6
<i>Pan troglodytes</i>	Chimpanzee	8	—	3	—	—	—	5/6
<i>Gorilla gorilla</i>	Gorilla	3	—	—	—	—	—	1/2
EDENTATA								
<i>Myrmecophaga tridactyla</i>	Giant Anteater	2	—	—	—	—	—	0/2
<i>Choloepus didactylus</i>	Two-toed Sloth	1	—	—	—	—	—	0/1
<i>Dasypus novemcinctus</i>	Nine-banded Armadillo	3	—	—	—	1	—	1/1
<i>Chaetophractus villosus</i>	Hairy Armadillo	2	—	—	—	—	—	1/1
LAGOMORPHA								
<i>Ochotona rufescens</i>	Afghan Pika	—	14	1	—	9	6	—
		1	2	3	4	5	6	7

		1	2	3	4	5	6	7
RODENTIA								
<i>Sciurus vulgaris</i>	Red Squirrel	4	—	3	3	1	—	0/3
<i>Ratufa bicolor</i>	Malayan Giant Squirrel	2	—	—	—	—	—	1/1
<i>Callosciurus finlaysoni</i>	Finlayson's Squirrel	1	—	—	—	1	—	—
<i>Callosciurus prevosti</i>	Prevost's Squirrel	2	—	—	—	—	—	1/1
<i>Marmota marmota</i>	Alpine Marmot	4	—	—	—	1	—	1/2
<i>Cynomys ludovicianus</i>	Prairie Marmot	8	—	—	—	—	—	4/2/2
<i>Tamias sibiricus</i>	Siberian Chipmunk	2	2	—	—	—	1	2/1
<i>Tamias townsendi</i>	Townsend's Chipmunk	—	2	4	—	—	—	1/1/4
<i>Glaucomys sabrinus</i>	Northern Flying Squirrel	8	—	1	—	—	—	3/6
<i>Castor canadensis</i>	American Beaver	4	—	—	—	1	—	1/2
<i>Pedetes capensis</i>	Springhaas	3	6	1	—	2	—	2/6
Sp. inc.	Deer Mouse	—	5	—	—	—	—	3/2
<i>Peromyscus maniculatus</i>	White-footed Mouse	17	—	1	1	8	—	6/3
<i>Sigmodon hispidus</i>	Cotton Rat	17	—	32	—	5	22	7/12/3
<i>Phodopus sungorus</i>	Dwarf Hamster	23	4	56	4	17	10	18/16/18
<i>Cricetulus barabensis</i>	Chinese Hamster	16	—	19	—	5	—	18/12
<i>Meriones libycus</i>	Libyan Jird	1	1	—	—	—	—	1/1
<i>Meriones unguiculatus</i>	Clawed Jird	34	—	2	—	21	3	4/6/2
<i>Dicrostonyx torquatus</i>	Collared Lemming	—	5	11	—	2	2	1/3/8
<i>Clethrionomys glareolus</i>	Bank Vole	22	—	17	—	21	1	2/9/6
<i>Microtus orcadensis</i>	Orkney Vole	28	—	10	1	8	6	10/9/4
<i>Microtus agrestis</i>	Field Vole	29	—	29	3	21	4	7/12/11
<i>Phloeomys cumingi</i>	Philippine Cloud Rat	3	—	—	—	1	—	2/0
<i>Apodemus sylvaticus</i>	Field Mouse	33	—	14	—	14	11	9/12/1
<i>Micromys minutus</i>	Harvest Mouse	6	—	68	1	12	6	32/23
<i>Acomys cahirinus</i>	Arabian Spiny Mouse	50	—	9	—	19	19	0/0/21
<i>Acomys russatus</i>	Golden Spiny Mouse	16	—	25	1	2	3	12/11/12
<i>Lemniscomys barbarus</i>	Zebra Mouse	4	—	—	—	1	—	0/3
<i>Arvicanthis niloticus</i>	Nile Rat	48	—	14	—	6	31	5/7/13
<i>Rattus rattus</i>	Black Rat	11	—	423	—	2	282	0/0/150
<i>Glis glis</i>	Fat Dormouse	4	—	—	—	1	—	0/3
<i>Jaculus jaculus</i>	Arabian Jerboa	15	—	5	1	9	—	3/7
<i>Hystrix cristata</i>	Crested Porcupine	1	—	—	—	1	—	—
<i>Hystrix indica</i> × <i>H. cristata</i>	Hybrid Indian × Crested Porcupine	2	—	—	—	—	—	1/1
<i>Atherurus africanus</i>	African Brush-tailed Porcupine	3	—	1	—	—	—	1/2/1
<i>Kerodon rupestris</i>	Rock Cavy	24	—	18	4	14	11	5/3/5
<i>Dolichotis patagonum</i>	Mara	3	1	—	—	—	—	2/2
<i>Cuniculus paca</i>	Spotted Paca	1	—	—	—	—	—	1/0
<i>Dasyprocta aguti</i>	Orange-rumped Agouti	4	—	6	2	—	—	2/6
<i>Myoprocta pratti</i>	Green Acouchi	12	—	8	2	3	2	5/2/6
<i>Chinchilla laniger</i>	Chinchilla	9	—	12	2	3	5	6/4/1
<i>Geocapromys brownii</i>	Jamaican Hutia	3	—	—	—	2	—	1/0
<i>Octodon degus</i>	Degu	13	—	11	9	9	—	1/2/3
<i>Proechimys guairae</i>	Casiragua	10	—	2	—	4	3	4/1
<i>Heterocephalus glaber</i>	Naked Mole Rat	59	27	86	67	1	—	31/33/40
CARNIVORA								
<i>Canis lupus</i>	Grey Wolf	6	—	3	—	—	—	3/6
<i>Fennecus zerda</i>	Fennec Fox	4	—	—	—	—	2(2)	1/1
<i>Thalarctos maritimus</i>	Polar Bear	2	—	—	—	—	2	—
<i>Ailuropoda melanoleucus</i>	Giant Panda	1	—	—	—	—	—	1/0
<i>Ailurus fulgens</i>	Red Panda	—	2	—	—	—	—	1/1
<i>Potos flavus</i>	Kinkajou	3	—	1	—	—	1	1/1/1
<i>Mustela nivalis</i>	Weasel	5	—	—	—	1	2	1/1
<i>Mustela putorius</i>	Polecat Ferret	10	—	24	1	—	18	2/8/5
<i>Arctonyx collaris</i>	Hog Badger	2	—	—	—	—	2	—
<i>Amblonyx cinerea</i>	Oriental Small-clawed Otter	5	—	1	1	—	2	1/2
<i>Genetta tigrina</i>	Blotched Genet	1	2	—	—	—	—	2/1
<i>Arctogalidia trivirgata</i>	Small-toothed Palm Civet	3	—	—	—	—	—	1/2
<i>Paguma larvata</i>	Masked Palm Civet	1	—	—	—	—	—	1/0
<i>Suricata suricatta</i>	Suricate Meerkat	8	—	—	—	1	2	4/1
<i>Helogale parvula</i>	Dwarf Mongoose	—	8	—	—	—	—	4/4
<i>Mungos mungo</i>	Banded Mongoose	2	—	—	—	—	2	—
<i>Cynictis penicillata</i>	Yellow Mongoose	3	—	—	—	—	—	1/2
		1	2	3	4	5	6	7

		1	2	3	4	5	6	7
<i>Felis caracal</i>	Caracal Lynx	1	—	—	—	—	—	1/0
<i>Felis serval</i>	Serval	4	—	—	—	—	2	1/1
<i>Felis wiedi</i>	Margay	2	1	—	—	—	1	1/1
<i>Felis concolor</i>	Puma	1	—	—	—	—	1	—
<i>Panthera leo</i>	Lion	4	1	—	—	1	—	1/3
<i>Panthera tigris</i>	Tiger (Sumatran form)	5	—	—	—	—	1	1/3
<i>Panthera pardus</i>	Leopard	4	—	—	—	2	—	1/1
<i>Panthera onca</i>	Jaguar	3	—	—	—	—	—	1/2
<i>Acinonyx jubatus</i>	Cheetah	—	3(3)	—	—	—	1(1)	1/1
PINNIPEDIA								
<i>Zalophus californianus</i>	Californian Sealion	7	3	1	—	—	5(2)	2/4
TUBULIDENTATA								
<i>Orycteropus afer</i>	Aardvark	3	—	1	1	—	—	1/2
PROBOSCIDEA								
<i>Elephas maximus</i>	Asian Elephant	2	—	—	—	—	—	0/2
HYRACOIDEA								
<i>Heterohyrax brucei</i>	Bush Hyrax	—	7	3	1	2	—	2/5
<i>Procavia capensis</i>	Rock Hyrax	8	—	4	—	2	—	4/6
PERISSODACTYLA								
<i>Equus burchelli</i> *	Common Zebra	3	—	—	—	—	2	0/1
<i>Equus przewalskii</i> *	Przewalski's Horse	4	—	—	—	1	—	1/2
<i>Tapirus terrestris</i>	Brazilian Tapir	4	—	—	—	1	1	1/1
<i>Ceratotherium simum</i>	White Rhinoceros	2	—	—	—	—	2	—
<i>Diceros bicornis</i>	Black Rhinoceros	1	—	—	—	—	—	0/1
ARTIODACTYLA								
<i>Sus scrofa</i>	Wild Boar	9	—	5	1	—	—	6/7
<i>Choeropsis liberiensis</i>	Pygmy Hippopotamus	1	—	—	—	—	—	0/1
<i>Lama glama</i>	Llama	5	—	—	—	—	—	5/0
<i>Lama guanicoe</i>	Guanaco	2	—	—	—	—	—	2/0
<i>Lama pacus</i>	Alpaca	1	—	—	—	—	—	1/0
<i>Vicugna vicugna</i>	Vicuna	6	—	1	—	—	2	3/2
<i>Camelus bactrianus</i>	Bactrian Camel	7	—	—	—	—	—	1/6
<i>Pudu pudu</i> *	Pudu	4	1	—	—	1	—	2/2
<i>Rangifer tarandus</i>	Reindeer	5	2(2)	2	1	1	4(2)	1/2
<i>Okapia johnstoni</i>	Okapi	3	—	—	—	—	—	1/2
<i>Giraffa camelopardalis</i>	Giraffe	6	—	1	—	—	1	2/4
<i>Tragelaphus euryceros</i> *	Bongo	3	1	2	1	—	—	2/3
<i>Tragelaphus strepsiceros</i> *	Greater Kudu	6	—	—	—	1	—	2/3
<i>Bubalus depressicornis</i> *	Anoa	—	2	—	—	—	—	1/1
<i>Bos gaurus</i> *	Gaur	4	1	—	—	—	1	2/2
<i>Bison bison</i>	American Bison	2	—	1	—	—	—	1/2
<i>Hippotragus equinus</i> *	Roan Antelope	9	1	2	—	—	5(5)	1/6
<i>Oryx leucoryx</i> *	Arabian Oryx	5	4	—	—	2	3(3)	1/3
<i>Addax nasomaculatus</i> *	Addax	2	—	1	—	1	2	—
<i>Damaliscus dorcas</i> *	Bontebok	2	—	—	—	—	—	1/1
<i>Damaliscus dorcas</i> *	Blesbok	—	1(1)	—	—	—	—	0/1
<i>Antilope cervicapra</i> *	Blackbuck	22	—	8	2	7	5(5)	2/14
<i>Rupicapra rupicapra</i>	Chamois	4	—	—	—	—	4	—
<i>Capra falconeri</i>	Markhor	8	—	—	—	—	8	—
<i>Ovis canadensis</i>	Bighorn Sheep	7	—	3	1	—	—	4/5
DOMESTIC								
	Pig: Gloucester Old Spot	2	—	5	—	—	5	1/1
	Miniature	3	—	11	5	—	3	3/3
	Cattle: Friesian	2	—	1	—	—	1	0/2
	Jersey	1	—	1	—	1	—	0/1
	Goat: Common	5	—	8	—	1	7	0/5
	Golden Guernsey	2	—	1	—	1	1	1/0
	Nubian	1	—	—	—	—	—	0/1
		1	2	3	4	5	6	7

		1	2	3	4	5	6	7
Sheep:	Dorset Down	6	—	8	1	1	4	2/6
	Black Welsh Mountain	1	—	—	—	—	—	1/0
	Jacob's	1	—	—	—	—	—	1/0
Rabbit		23	—	69	6	17	46	5/18
Guineapig		13	7	13	2	6	9	7/9
Donkey		3	—	—	—	—	2	1/0
Pony:	Cream	5	—	—	—	—	1	2/2
	Shetland	1	1	—	—	—	1	0/1
Total-Mammals		1214	138(6)	1165	156	319	639(21)	1403

## Birds

### STRUTHIONIFORMES

<i>Struthio camelus</i>	Ostrich	2	—	—	—	—	—	1/1
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### CASUARIIFORMES

<i>Casuarus bennetti</i>	Bennett's Cassowary	1	—	—	—	—	—	0/1
<i>Casuarus unappendiculatus</i>	One-wattled Cassowary	1	—	—	—	—	—	1/0
<i>Dromaius novaehollandiae</i>	Emu	2	—	—	—	—	—	1/1

### APTERYGIFORMES

<i>Apteryx australis mantelli</i>	North Island Brown Kiwi	1	3	—	—	1	—	1/0/2
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### TINAMIFORMES

<i>Nothoprocta perdicaria</i>	Chilean Tinamou	5	—	1	—	2	—	1/1/2
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### SPHENISCIFORMES

<i>Spheniscus demersus</i>	Blackfooted Penguin	27	—	3	—	1	—	16/12/1
<i>Spheniscus humboldti</i>	Humboldt's Penguin	5	—	1	—	—	3(3)	1/1/1

### PELECANIFORMES

<i>Pelecanus onocrotalus</i>	Eastern White Pelican	6	—	—	—	—	—	3/3
<i>Pelecanus crispus</i>	Dalmatian Pelican	2	—	—	—	—	—	1/1
<i>Pelecanus occidentalis</i>	Brown Pelican	6	—	—	—	1	—	0/1/4
<i>Morus bassanus</i>	Gannet	3	—	—	—	—	—	0/0/3
<i>Phalacrocorax carbo</i>	Cormorant	5	—	—	—	—	—	2/1/2
<i>Phalacrocorax aristotelis</i>	Shag	2	—	—	—	—	—	2/0

### CICONIIFORMES

<i>Nycticorax nycticorax</i>	Night Heron	3	—	—	—	—	1	0/1/1
<i>Ardeola ibis</i>	Cattle Egret	8	—	—	—	1	—	1/4/2
<i>Butorides striatus</i>	Striated Heron	1	—	—	—	—	—	0/0/1
<i>Ardea cinerea</i>	Grey Heron	5	—	—	—	1	—	0/0/4
<i>Ciconia abdimii</i>	Abdim's Stork	19	—	8	3	—	—	4/4/16
<i>Ephippiorhynchus asiaticus</i>	Black-necked Stork	2	—	—	—	—	—	1/1
<i>Threskiornis aethiopicus</i>	Sacred Ibis	34	—	6	—	5	—	3/3/29
<i>Carphibis spinicollis</i>	Straw-necked Ibis	1	—	—	—	—	1	—
<i>Eudocimus ruber</i>	Scarlet Ibis	6	—	—	—	1	—	3/2
<i>Phoenicopterus chilensis</i>	Chilean Flamingo	43	—	—	—	1	—	9/7/26

### ANSERIFORMES

<i>Dendrocygna bicolor</i>	Fulvous Whistling Duck	1	—	—	—	—	—	1/0
<i>Dendrocygna viduata</i>	White-faced Tree Duck	10	—	—	—	—	—	5/5
<i>Dendrocygna arborea</i>	Cuban Tree Duck	2	—	—	—	—	—	1/1
<i>Dendrocygna autumnalis</i>	Red-billed Whistling Duck	1	—	—	—	—	—	0/1
<i>Anser caerulescens atlanticus</i>	Greater Snow Goose	2	—	—	—	—	2(2)	—
<i>Anser canagicus</i>	Emperor Goose	2	—	—	—	—	—	1/1
<i>Branta sandvicensis</i>	Hawaiian Goose	9	1(1)	3	—	3	2(2)	3/2/3

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		1	2	3	4	5	6	7
<i>Branta leucopsis</i>	Barnacle Goose	6	—	—	—	—	6(6)	—
<i>Branta bernicla orientalis</i>	Brent Goose	9	—	2	—	—	2(2)	4/2/3
<i>Branta ruficollis</i>	Red-breasted Goose	2	—	—	—	2	—	—
<i>Cereopsis novaehollandiae</i>	Cape Barren Goose	3	—	—	—	—	—	1/1/1
<i>Aix sponsa</i>	Carolina Duck	4	2	—	—	—	1	4/1
<i>Aix galericulata</i>	Mandarin Duck	4	—	—	—	—	1	2/1
<i>Callonetta leucophrys</i>	Ringed Teal	10	—	6	—	—	—	5/5/6
<i>Chenonetta jubata</i>	Maned Goose	2	—	—	—	—	—	1/1
<i>Anas penelope</i>	Wigeon	9	—	—	—	—	—	6/3
<i>Anas sibilatrix</i>	Chiloe Wigeon	12	—	—	—	2	—	7/3
<i>Anas strepera</i>	Gadwall	3	—	—	—	1	—	1/1
<i>Anas crecca</i>	Teal	2	—	—	—	—	—	1/1
<i>Anas flavirostris oxyptera</i>	Sharp-winged Teal	2	—	—	—	—	—	1/1
<i>Anas platyrhynchos laysanensis</i>	Laysan Duck	2	—	—	—	—	—	1/1
<i>Anas acuta</i>	Pintail	5	—	—	—	2	—	2/1
<i>Anas bahamensis</i>	Bahama Pintail	1	—	—	—	—	—	0/1
<i>Anas versicolor puna</i>	Puna Teal	8	—	2	—	3	—	2/2/3
<i>Anas querquedula</i>	Garganey	5	—	—	—	1	—	3/1
<i>Anas clypeata</i>	Shoveler	2	—	—	—	—	—	1/1
<i>Marmaronetta angustirostris</i>	Marbled Teal	4	—	—	—	—	—	3/1
<i>Netta rufina</i>	Red-crested Pochard	3	—	—	—	—	—	1/2
<i>Aythya valisineria</i>	Canvasback	4	—	—	—	—	—	2/2
<i>Aythya ferina</i>	European Pochard	3	—	—	—	—	—	2/1
<i>Aythya fuligula</i>	Tufted Duck	5	—	—	—	—	—	1/4
<i>Somateria mollissima</i>	Eider Duck	10	—	9	—	2	—	9/8
<i>Bucephala clangula</i>	Goldeneye	2	—	—	—	—	—	1/1
<i>Mergus merganser</i>	Goosander	3	—	2	2	—	—	1/1/1
<i>Oxyura jamaicensis</i>	North American Ruddy Duck	5	—	—	—	—	—	3/2

FALCONIFORMES

<i>Milvus migrans migrans</i>	Black Kite	1	—	—	—	—	—	1/0
<i>Haliastur indus</i>	Brahminy Kite	1	—	—	—	—	—	0/1
<i>Haliastur indus intermedius</i>	Javan Brahminy Kite	1	—	—	—	1	—	—
<i>Neophron percnopterus percnopterus</i>	Egyptian Vulture	2	—	—	—	1	—	1/0
<i>Terathopius ecaudatus</i>	Bateleur Eagle	3	—	—	—	—	—	1/1/1
<i>Polyborides typus</i>	Harrier Hawk	2	—	—	—	—	—	1/1
<i>Butastur rufipennis</i>	Grasshopper Buzzard	1	—	—	—	—	—	0/1
<i>Heterospizias meridionalis</i>	Savannah Hawk	1	—	—	—	—	—	1/0
<i>Buteo buteo</i>	Buzzard	1	—	—	—	—	—	0/1
<i>Buteo rufinus</i>	Long-legged Buzzard	2	—	—	—	1	—	1/0
<i>Polyborus plancus plancus</i>	Common Caracara	2	—	—	—	—	—	2/0
<i>Polihierax semitorquatus</i>	African Pygmy Falcon	—	2	—	—	—	—	1/1

GALLIFORMES

<i>Penelope purpurascens</i>	Crested Guan	2	—	—	—	—	—	1/1
<i>Crax fasciolata</i>	Bare-faced Curassow	2	—	1	—	—	—	1/1/1
<i>Lophortyx californica</i>	Californian Quail	2	—	—	—	1	—	1/0
<i>Alectoris rufa</i>	Red-legged Partridge	6	1	—	—	3	—	0/1/3
<i>Francolinus pondicerianus</i>	Indian Grey Francolin	17	—	12	—	1	24	1/1/2
<i>Coturnix delegorguei</i>	Harlequin Quail	1	—	—	—	1	—	—
<i>Rollulus rouloul</i>	Crested Wood Partridge	3	1	—	—	—	—	2/2
<i>Bambusicola thoracica</i>	Chinese Bamboo Partridge	2	—	—	—	—	—	1/1
<i>Tragopan satyra</i>	Satyr Tragopan	2	—	—	—	—	—	1/1
<i>Pucrasia macrolopha</i>	Koklass Pheasant	1	2	—	—	—	1	1/1
<i>Lophophorus impeyanus</i>	Impeyan Pheasant	2	—	1	—	—	1	1/1
<i>Gallus sonneratii</i>	Sonnerat's Jungle Fowl	3	1	—	—	1	1(1)	1/1
<i>Lophura leucomelana leucomelana</i>	Nepal Kalij Pheasant	1	—	—	—	—	—	1/0
<i>Lophura nycthemera</i>	Silver Pheasant	2	—	2	—	—	2(2)	1/1
<i>Lophura imperialis</i>	Imperial Pheasant	3	—	—	—	1	—	2/0
<i>Lophura swinhoii</i>	Swinhoe's Pheasant	2	—	2	—	—	2	1/1
<i>Lophura ignita ignita</i>	Bornean Crested Fireback	2	—	—	—	—	—	1/1
<i>Lophura diardi</i>	Siamese Fire-back Pheasant	2	—	4	—	—	4	1/1
<i>Crossoptilon auritum</i>	Blue Eared Pheasant	2	—	—	—	—	—	1/1
<i>Catreus wallichi</i>	Cheer Pheasant	2	—	—	—	—	—	1/1
<i>Syrmaticus ellioti</i>	Elliot's Pheasant	2	—	—	—	1	—	1/0
<i>Syrmaticus humiae</i>	Hume's Bar-tailed Pheasant	2	—	6	—	—	6	1/1

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		1	2	3	4	5	6	7
<i>Syrnaticus mikado</i>	Mikado Pheasant	3	—	1	—	1	2	1/0
<i>Syrnaticus soemmerringi scintillans</i>	Scintillating Copper Pheasant	2	—	2	—	1	2	1/0
<i>Syrnaticus reevesi</i>	Reeves's Pheasant	2	—	—	—	—	—	1/1
<i>Chrysolophus pictus</i>	Golden Pheasant	3	—	—	—	—	—	2/1
<i>Polyplectron chalcurom</i>	Bronze-tailed Peacock Pheasant	2	—	—	—	1	1	—
<i>Polyplectron bicalcaratum</i>	Grey Peacock Pheasant	1	—	—	—	—	—	1/0
<i>Pavo cristatus</i>	Common Peafowl	3	1(1)	—	—	1	1(1)	1/1
<i>Afropavo congensis</i>	Congo Peafowl	7	—	—	—	1	1	2/3
<i>Acryllium vulturinum</i>	Vulturine Guinea-fowl	4	3	—	—	2	—	3/2
GRUIFORMES								
<i>Grus antigone</i>	Sarus Crane	2	—	1	—	1	—	1/1
<i>Grus rubicunda</i>	Brolga	1	—	—	—	—	—	0/1
<i>Anthropoides virgo</i>	Demoiselle Crane	6	—	—	—	—	—	3/3
<i>Anthropoides paradisea</i>	Stanley Crane	2	—	—	—	—	—	1/1
<i>Balearica pavonina</i>	West African Crowned Crane	2	—	—	—	—	—	1/1
<i>Balearica regulorum</i>	South African Crowned Crane	8	—	4	2	3	3(3)	2/2
<i>Laterallus leucopyrrhus</i>	White-breasted Crake	2	—	—	—	—	—	1/1
<i>Porphyrylla alleni</i>	Allen's Gallinule	1	—	—	—	1	—	—
<i>Porphyrio porphyrio poliocephalus</i>	Grey-headed Gallinule	2	—	—	—	2	—	—
<i>Lissotis melanogaster melanogaster</i>	Black-bellied Bustard	1	—	—	—	—	—	0/1
CHARADRIIFORMES								
<i>Haematopus ostralegus</i>	Oystercatcher	5	—	—	—	—	—	1/2/2
<i>Himantopus himantopus</i>	Black-winged Stilt	1	—	—	—	—	—	0/0/1
<i>Recurvirostra avosetta</i>	Avocet	2	4	—	—	—	—	3/3
<i>Burhinus oedicnemus</i>	Stone Curlew	8	1	3	—	—	4	3/3/2
<i>Glareola pratincola</i>	Collared Pratincole	1	—	—	—	—	—	0/0/1
<i>Charadrius hiaticula</i>	Ringed Plover	1	—	—	—	—	—	0/0/1
<i>Numenius arquata</i>	Curlew	2	—	—	—	—	—	1/0/1
<i>Tringa totanus</i>	Redshank	1	—	—	—	—	—	0/0/1
<i>Arenaria interpres</i>	Turnstone	2	1	—	—	—	—	0/0/3
<i>Philomachus pugnax</i>	Ruff	5	—	—	—	3	—	0/2
<i>Catharacta skua antarctica</i>	Antarctic Skua	2	—	—	—	—	2	—
<i>Larus cirrocephalus poiocephalus</i>	Grey-headed Gull	23	—	2	—	2	—	7/7/9
<i>Larus novaehollandiae</i>	Silver Gull	2	—	—	—	1	—	0/1
<i>Larosterna inca</i>	Inca Tern	3	—	1	—	—	—	1/1/2
<i>Uria aalge</i>	Guillemot	2	—	—	—	1	—	0/0/1
COLUMBIFORMES								
<i>Columba livia</i>	Rock Dove	1	—	—	—	1	—	—
<i>Columba guinea</i>	Speckled Pigeon	40	—	4	—	7	2	2/3/30
<i>Columba picazuro</i>	Picazuro Pigeon	2	—	—	—	—	—	1/1
<i>Streptopelia vinacea</i>	Vinaceous Dove	—	2	—	—	—	—	1/1
<i>Streptopelia tranquebarica humilis</i>	Dwarf Turtle Dove	1	—	—	—	—	—	1/0
<i>Streptopelia chinensis chinensis</i>	Chinese Necklace Dove	5	—	—	—	2	—	0/0/3
<i>Turtur tympanistria</i>	Tambourine Dove	—	2	—	—	—	—	1/1
<i>Oena capensis</i>	Cape Dove	—	3	—	—	—	—	2/1
<i>Phaps elegans</i>	Brush Bronzewing	2	—	—	—	1	—	0/1
<i>Ochophaps lophotes</i>	Crested Pigeon	5	—	2	—	—	—	1/1/5
<i>Geopelia cuneata</i>	Diamond Dove	2	—	—	—	1	—	1/0
<i>Zenaidura macroura</i>	Violet-eared Dove	3	—	—	—	—	—	0/3
<i>Columbina cruziana</i>	Gold-billed Ground Dove	—	3	—	—	2	—	1/0
<i>Geotrygon versicolor</i>	Mountain Witch Dove	3	—	—	—	—	—	0/1/2
<i>Gallicolumba luzonica</i>	Blood-breasted Pigeon	2	—	—	—	1	—	0/0/1
<i>Ducula badia cuprea</i>	Jerdon's Imperial Pigeon	6	—	—	—	—	—	1/0/5
<i>Ducula bicolor</i>	Pied Imperial Pigeon	1	—	—	—	—	—	0/0/1
PSITTACIFORMES								
<i>Pseudeos fuscata</i>	Dusky Lory	1	—	—	—	—	1	—
<i>Trichoglossus euteles</i>	Perfect Lorikeet	4	—	3	1	1	4	1/0
<i>Lorius garrulus</i> × <i>Lorius domicellus</i>	Scarlet Lory × Purple-capped Lory	1	—	—	—	—	1	—
<i>Lorius garrulus flavopalliatu</i>	Yellow-backed Lory	1	—	—	—	—	1	—
<i>Calyptorhynchus funereus</i>	Funereal Cockatoo	1	—	—	—	—	—	0/1
		1	2	3	4	5	6	7

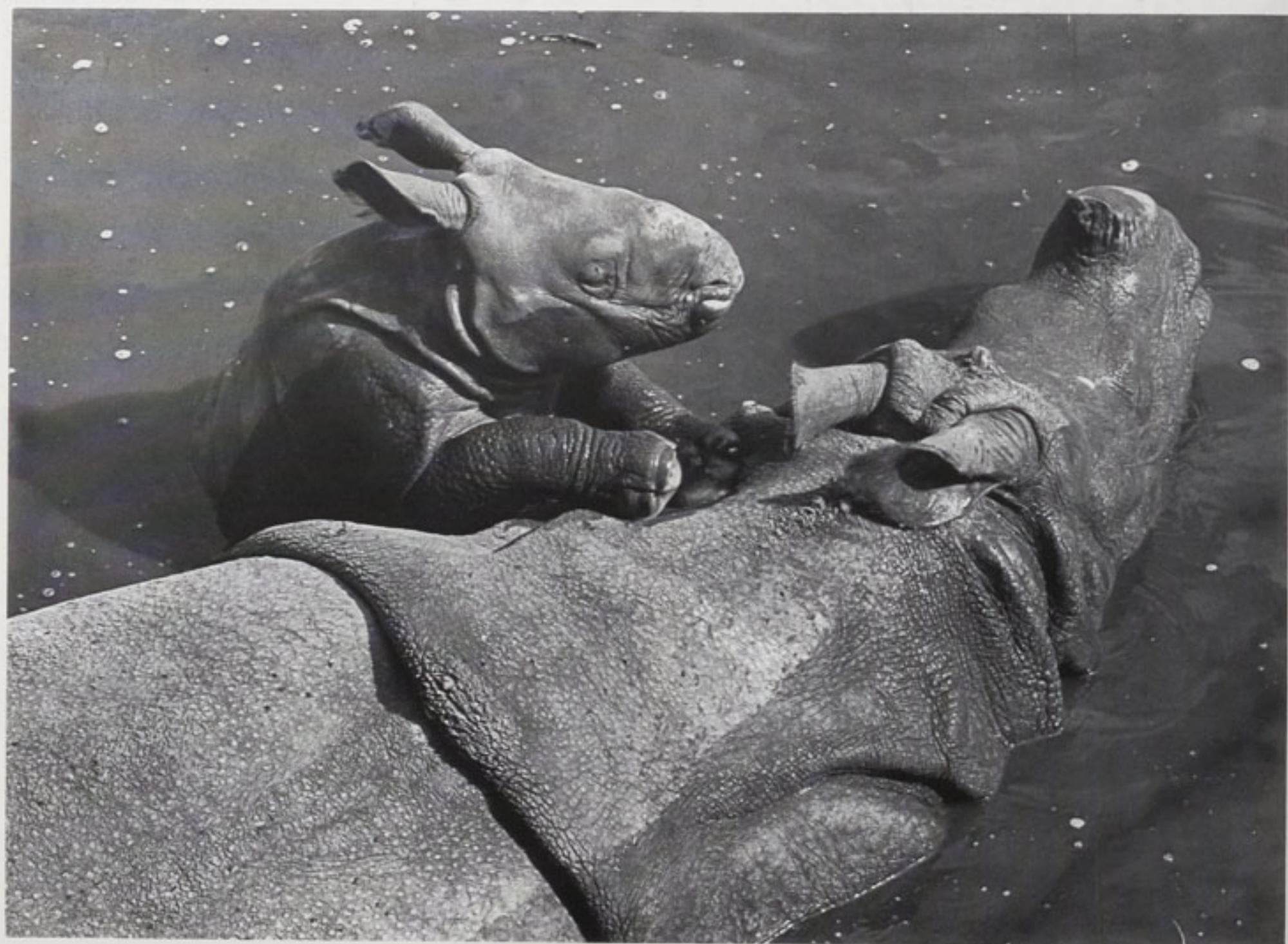


The male Red Panda, *above*, was acquired to establish a breeding pair. Planning as well as skilful care lies behind breeding successes such as the Bongo (*right*), and (*below*) the Spider Monkey, which was adopted by Derek Jacobi under the Animal Adoption Scheme.



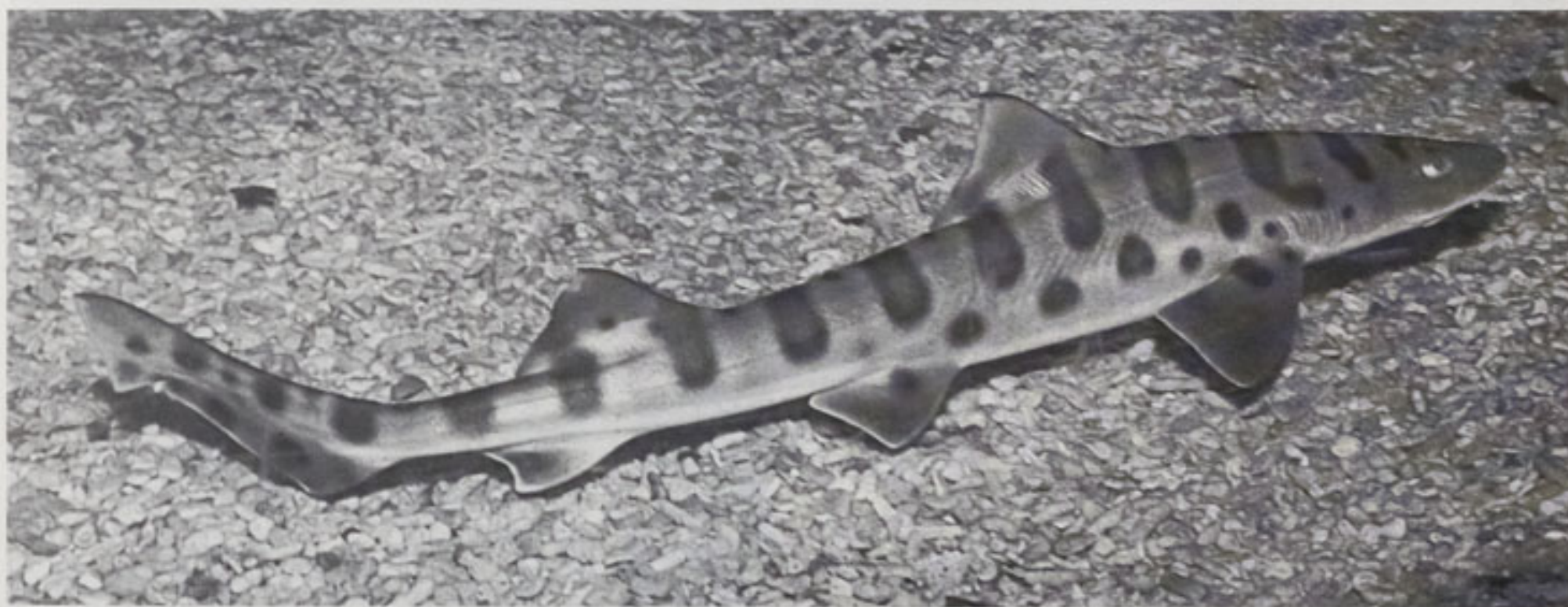


At Whipsnade Park new attractions included Birds of Prey Flying Displays, presented daily in summer by Adrian Walker of the Falconry Centre; *left*, a Chilean Eagle Buzzard waits its turn. *Above*, a young visitor to the Discovery Centre. *Below*, 'Rama', the Indian Rhinoceros born in August, enjoying a wallow when one month old with his mother 'Roopa'.

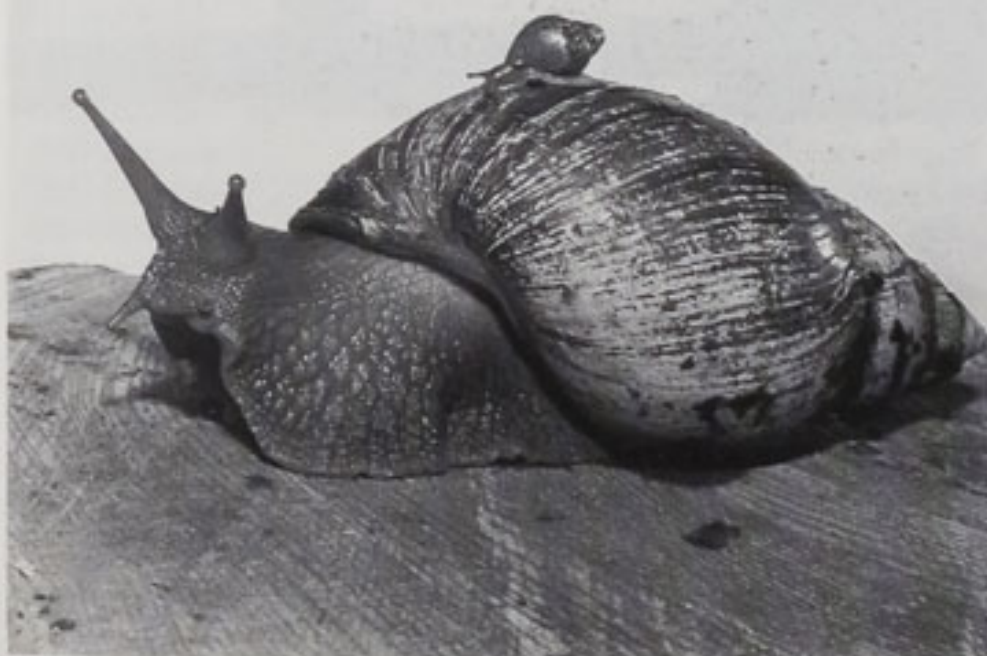




More breeding successes: *above*, hatching of the Namib Sand Gecko – the first time this species has been bred in the United Kingdom: *right*, White-faced Scops Owl with chick (on the right), one of the seven chicks of this species reared in the year.



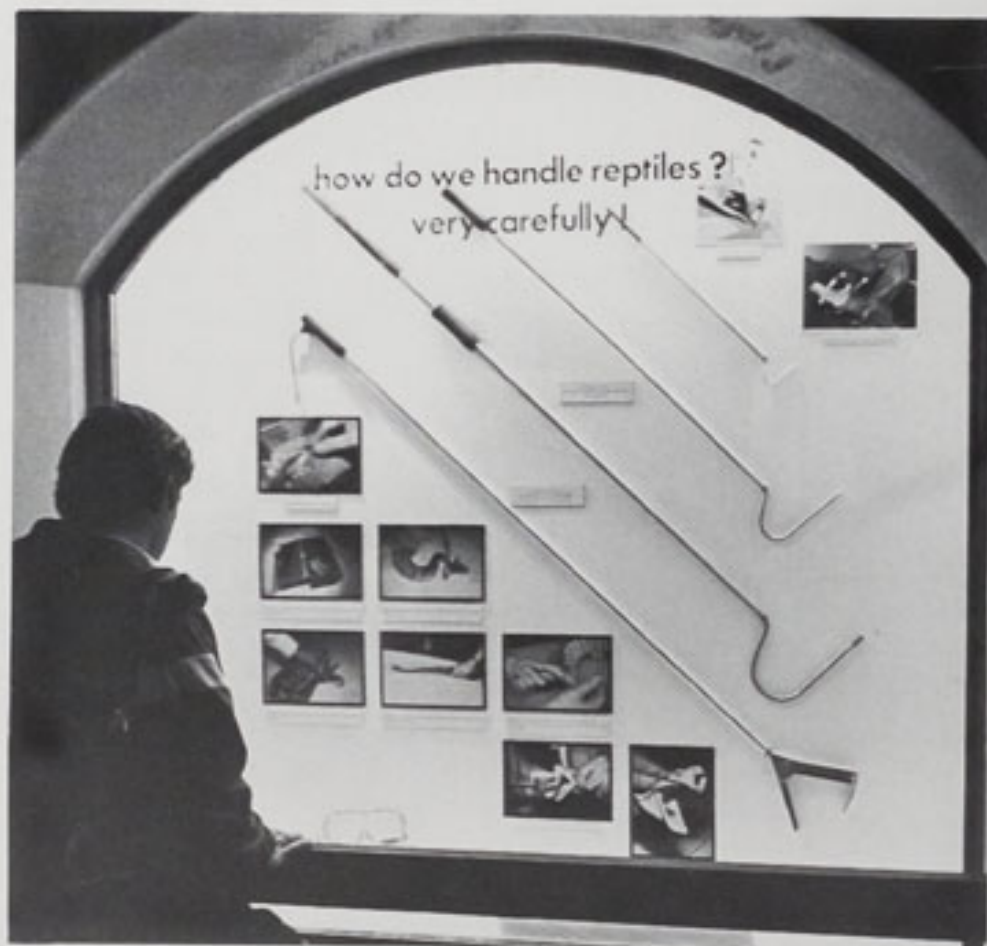
*Above*, a Leopard Shark, a recent addition to the Aquarium which now exhibits over 230 different species. The Insect House also constantly offers many new species and displays, not only insects but other invertebrates such as (*left*) a Giant Land Snail with young.





*Above*, Dr Bill Holt (Institute of Zoology) and Michael Sinclair (Air New Zealand) with Blackbuck 'Indi'. Frozen Blackbuck semen was flown to Auckland Zoo for an artificial insemination programme.

Well-designed, informative displays provide extra interest for visitors: *right*, part of the Venomous Snakes exhibition in the Reptile House.



*Left*, the sculptor Anita Mandl with her bronze 'Young Hippopotamus', the Society's Stamford Raffles Award, and Dr A. F. Millidge, who received this award in 1986 for his work on spiders.

		1	2	3	4	5	6	7
<i>Callocephalon fimbriatum</i>	Gang Gang Cockatoo	1	—	—	—	—	1	—
<i>Eolophus roseicapillus</i>	Roseate Cockatoo	2	—	—	—	—	—	1/1
<i>Cacatua leadbeateri</i>	Leadbeater's Cockatoo	2	—	—	—	—	—	1/1
<i>Cacatua moluccensis</i>	Moluccan Cockatoo	2	—	—	—	—	2	—
<i>Cacatua alba</i>	White-crested Cockatoo	1	—	—	—	—	1	—
<i>Cacatua sanguinea sanguinea</i>	Bare-eyed Cockatoo	1	—	—	—	—	—	1/0
<i>Cacatua tenuirostris pastinator</i>	Western Slender-billed Cockatoo	3	—	—	—	—	—	2/1
<i>Nymphicus hollandicus</i>	Cockatiel	20	—	—	—	1	—	3/1/15
<i>Nestor notabilis</i>	Kea	3	—	—	—	—	—	1/2
<i>Eclectus roratus</i>	Eclectus Parrot	2	—	—	—	1	1	—
<i>Polytelis swainsoni</i>	Barraband Parrakeet	3	—	1	—	—	—	1/1/2
<i>Polytelis anthopeplus</i>	Rock Peplar	13	—	4	—	2	—	1/2/12
<i>Polytelis alexandrae</i>	Princess of Wales' Parrakeet	3	—	—	—	—	—	1/2
<i>Platycercus eximius eximius</i>	Eastern Rosella Parrakeet	4	—	—	—	—	—	3/1
<i>Psephotus haematonotus</i>	Red-rumped Parrakeet	2	—	—	—	—	—	1/1
<i>Neophema bourkii</i>	Bourke's Parrakeet	1	—	—	—	—	—	1/0
<i>Neophema chrysostomus</i>	Blue-winged Grass Parrakeet	2	—	—	—	—	2	—
<i>Neophema splendida</i>	Splendid Grass Parrakeet	2	—	1	—	—	2	0/0/1
<i>Melopsittacus undulatus</i>	Budgerigar	—	12	4	—	7	—	0/0/9
<i>Coracopsis vasa</i>	Vasa Parrot	1	—	—	—	—	1	—
<i>Psittacus erithacus</i>	Grey Parrot	4	—	—	—	1	1	1/1
<i>Poicephalus cryptoxanthus cryptoxanthus</i>	Southern Brown-headed Parrot	2	—	—	—	—	—	0/0/2
<i>Poicephalus senegalus versteri</i>	Orange-bellied Senegal Parrot	1	—	—	—	—	1	—
<i>Poicephalus rueppellii</i>	Ruppell's Parrot	2	—	—	—	—	—	1/0/1
<i>Agapornis fischeri</i>	Fischer's Lovebird	32	—	8	—	10	30	—
<i>Loriculus vernalis</i>	Vernal Hanging Parrot	2	—	—	—	—	—	1/1
<i>Loriculus galgulus</i>	Blue-crowned Hanging Parrot	1	—	—	—	—	—	1/0
<i>Psittacula eupatria nipalensis</i>	Alexandrine Parrakeet	2	—	—	—	—	2	—
<i>Psittacula krameri krameri</i>	African Ring-necked Parrakeet	1	—	—	—	—	—	1/0
<i>Psittacula krameri manillensis</i>	Indian Ring-necked Parrakeet	7	—	—	—	—	—	3/1/3
<i>Psittacula cyanocephala</i>	Plum-headed Parrakeet	2	—	—	—	1	1	—
<i>Anodorhynchus hyacinthinus</i>	Hyacinthine Macaw	4	—	—	—	—	—	2/2
<i>Ara ararauna</i>	Blue & Yellow Macaw	2	—	—	—	—	2	—
<i>Ara ambigu</i>	Buffon's Macaw	2	—	—	—	—	—	1/1
<i>Ara macao</i>	Scarlet Macaw	2	—	—	—	—	2	—
<i>Ara chloroptera</i>	Green-winged Macaw	2	—	—	—	—	—	1/1
<i>Aratinga erythrogenys</i>	Red-masked Conure	1	—	—	—	—	—	0/1
<i>Aratinga solstitialis</i>	Sun Conure	3	—	—	—	—	—	3/0
<i>Cyanoliseus patagonus byroni</i>	Greater Patagonian Conure	4	—	—	—	—	—	2/2
<i>Pyrrhura frontalis</i>	Red-bellied Conure	1	—	—	—	—	—	0/1
<i>Brotogeris versicolurus chiriri</i>	Canary-winged Parrakeet	2	—	—	—	—	—	1/0/1
<i>Brotogeris pyrrhopterus</i>	Orange-flanked Parrakeet	3	—	—	—	—	1	1/1
<i>Amazona ochrocephala</i>	Yellow-fronted Amazon Parrot	1	—	—	—	—	—	0/0/1
<i>Amazona amazonica</i>	Orange-winged Amazon Parrot	2	1	—	—	1	—	0/1/1
CUCULIFORMES								
<i>Tauraco corythaix corythaix</i>	Knysna Turaco	1	—	—	—	—	—	1/0
<i>Tauraco erythrolophus</i>	Red-crested Turaco	3	—	—	—	—	—	1/2
<i>Tauraco hartlaubi</i>	Hartlaub's Turaco	2	5	—	—	2	—	4/1
<i>Tauraco leucotis</i>	White-checked Turaco	6	2	1	—	—	1	1/1/6
<i>Eudynamis scolopacea chinensis</i>	Chinese Koel	1	—	—	—	—	—	0/0/1
STRIGIFORMES								
<i>Tyto alba</i>	Barn Owl	2	—	10	—	—	9	1/1/1
<i>Otus leucotis</i>	White-faced Scops Owl	4	—	7	—	2	1	1/7
<i>Bubo virginianus</i>	Great Horned Eagle Owl	2	—	2	—	—	2	1/1
<i>Bubo bubo bubo</i>	European Eagle Owl	2	—	—	—	—	—	1/1
<i>Bubo bubo turcomanus</i>	Turkmenian Eagle Owl	2	—	—	—	—	—	1/1
<i>Bubo capensis mackinderi</i>	Kenya Eagle Owl	2	—	—	—	—	—	1/1
<i>Bubo africanus africanus</i>	Spotted Eagle Owl	3	—	1	—	—	1	1/1/1
<i>Bubo africanus cinerascens</i>	Abyssinian Spotted Eagle Owl	2	—	2	—	1	—	1/2
<i>Bubo poensis</i>	Fraser's Eagle Owl	1	—	—	—	1	—	—
<i>Bubo vosseleri</i>	Nduk Eagle Owl	3	—	—	—	—	—	1/2
<i>Ketupa zeylonensis</i>	Brown Fish Owl	1	—	—	—	—	—	1/0
<i>Ketupa ketupu</i>	Javan Fish Owl	2	—	—	—	—	—	0/2
<i>Scotopelia bouvieri</i>	Vermiculated Fishing Owl	2	—	—	—	—	—	1/1
		1	2	3	4	5	6	7

		1	2	3	4	5	6	7
<i>Pulsatrix perspicillata</i>	Spectacled Owl	2	—	—	—	—	—	1/1
<i>Nyctea scandiaca</i>	Snowy Owl	2	—	2	—	—	2(2)	1/1
<i>Ninox novaeseelandiae</i>	Boobook Owl	2	—	3	—	—	3	1/1
<i>Athene noctua</i>	Little Owl	7	—	—	—	—	3(3)	1/1/2
<i>Athene brama</i>	Spotted Owl	4	—	—	—	—	—	2/2
<i>Speotyto cunicularia</i>	Burrowing Owl	1	—	—	—	1	—	—
<i>Ciccaba woodfordii</i>	African Wood Owl	3	—	—	—	—	1	1/1
<i>Strix aluco sylvatica</i>	Tawny Owl	2	—	1	1	—	2	—
<i>Strix hylophila</i>	Rusty Barred Owl	2	—	—	—	—	—	1/1
<i>Strix nebulosa lapponica</i>	Great Grey Owl	—	1	—	—	—	—	1/0
<i>Asio otus</i>	Long-eared Owl	2	—	—	—	—	—	1/1
<i>Asio flammeus</i>	Short-eared Owl	1	1	—	—	1	—	0/1
APODIFORMES								
<i>Amazilia lactea</i>	Sapphire Spangled Emerald Hummingbird	—	2	—	—	2	—	—
<i>Amazilia amazilia</i>	Amazilia Hummingbird	1	—	—	—	1	—	—
CORACIIFORMES								
<i>Dacelo novaeguineae</i>	Kookaburra	2	—	—	—	—	—	1/1
<i>Momotus momota</i>	Blue-crowned Motmot	4	—	—	—	—	1	1/2
<i>Coracias caudata</i>	Lilac-breasted Roller	1	—	—	—	—	—	0/0/1
<i>Tockus alboterminatus</i>	Crowned Hornbill	2	—	—	—	1	—	0/1
<i>Tockus erythrorhynchus</i>	Red-billed Hornbill	4	—	—	—	1	—	2/1
<i>Tockus deckeni jacksoni</i>	Jackson's Hornbill	1	—	—	—	—	—	1/0
<i>Penelopides panini</i>	Tarctic Hornbill	6	—	2	—	4	—	1/3
<i>Aceros undulatus</i>	Wreathed Hornbill	2	—	—	—	—	1	0/1
<i>Anthracoseros malayanus</i>	Black Hornbill	2	—	—	—	—	1	0/1
<i>Anthracoseros coronatus convexus</i>	Southern Pied Hornbill	1	—	—	—	—	—	0/1
<i>Bycanistes bucinator</i>	Trumpeter Hornbill	1	—	—	—	—	1	—
<i>Bycanistes subcylindricus</i>	Black and White Casqued Hornbill	2	—	—	—	—	—	1/1
<i>Buceros bicornis</i>	Great Indian Hornbill	1	—	—	—	—	—	0/1
<i>Buceros hydrocorax</i>	Rufous Hornbill	2	—	—	—	—	—	1/1
PICIFORMES								
<i>Psilopogon pyrolophus</i>	Fire-tufted Barbet	—	2	—	—	—	—	0/0/2
<i>Tricholaema lacrymosum</i>	Spotted-flanked Barbet	1	—	—	—	—	—	1/0
<i>Lybius guifsobalito</i>	Black-billed Barbet	1	—	—	—	—	—	0/1
<i>Lybius bidentatus</i>	Double-toothed Barbet	2	—	—	—	2	—	—
<i>Trachyphonus darnaudii</i>	D'Arnaud's Barbet	—	1	—	—	—	—	0/0/1
<i>Pteroglossus aracari</i> S (Linnaeus)	Black-necked Aracari	—	2	—	—	—	—	1/1
<i>Pteroglossus castanotis</i>	Chestnut-eared Aracari	1	—	—	—	—	—	0/0/1
<i>Bailloni bailloni</i> S	Saffron Toucanet	—	1	—	—	—	—	0/0/1
<i>Ramphastos vitellinus ariel</i>	Ariel Toucan	1	—	—	—	—	1(1)	—
<i>Ramphastos vitellinus culminatus</i>	Yellow-ridged Toucan	1	—	—	—	1	—	—
<i>Ramphastos tucanus</i>	Red-billed Toucan	2	—	—	—	—	—	1/1
<i>Ramphastos swainsonii</i>	Swainson's Toucan	2	2	—	—	—	—	1/2/1
<i>Ramphastos citrolaemus</i>	Citron-throated Toucan	—	2	—	—	—	—	0/2
<i>Melanerpes candidus</i>	White Woodpecker	3	—	—	—	1	—	2/0
PASSERIFORMES								
<i>Procnias nudicollis</i>	Naked-throated Bellbird	1	—	—	—	—	—	1/0
<i>Motacilla alba</i>	Pied Wagtail	1	—	—	—	—	—	0/0/1
<i>Pycnonotus leucogenys</i>	White-eared Bulbul	1	—	—	—	—	—	0/0/1
<i>Pycnonotus cafer bengalensis</i>	Red-vented Bulbul	2	—	—	—	—	—	0/0/2
<i>Hypsipetes madagascariensis</i>	Black Bulbul	3	—	—	—	1	—	1/0/1
<i>Chloropsis aurifrons</i>	Golden-fronted Leafbird	2	—	—	—	1	—	0/1
<i>Irena puella</i>	Fairy Bluebird	3	—	—	—	—	—	2/1
<i>Copysychus malabaricus indicus</i>	White-rumped Shama	1	—	—	—	—	—	1/0
<i>Turdus olivaceus</i>	African Thrush	5	—	—	—	1	—	1/1/2
<i>Turdus pilaris</i>	Fieldfare	1	—	—	—	—	—	0/0/1
<i>Turdoides striatus</i>	Jungle Babbler	1	—	—	—	—	—	0/0/1
<i>Garrulax albogularis</i>	White-throated Jay Thrush	1	—	—	—	—	—	0/0/1
<i>Garrulax leucolophus</i>	White-crested Laughing Thrush	8	1	—	—	3	—	3/3
<i>Garrulax pectoralis</i>	Necklaced Laughing Thrush	1	—	—	—	—	—	0/0/1
		1	2	3	4	5	6	7



		1	2	3	4	5	6	7
<i>Garrulax chinensis</i>	Black-throated Laughing Thrush	3	—	—	—	—	—	1/2
<i>Garrulax cinerascens</i>	Moustached Laughing Thrush	1	—	—	—	—	—	0/1
<i>Garrulax poecilorhynchus</i>	Rufous Laughing Thrush	1	—	—	—	1	—	—
<i>Garrulax canorus</i>	Melodious Jay Thrush	1	—	—	—	—	1	—
<i>Leiothrix lutea</i>	Pekin Robin	7	1	—	—	—	—	1/0/7
<i>Malurus cyaneus</i>	Superb Blue Wren	2	—	—	—	—	—	1/1
<i>Malurus splendens</i>	Splendid Fairy Wren	1	—	—	—	—	—	1/0
<i>Zosterops erythropleura</i>	Chestnut-flanked White-eye	—	2	—	—	1	—	0/0/1
<i>Zosterops flava</i>	Javan White-eye	3	—	—	—	1	1	0/1
<i>Zosterops simplex</i>	Chinese White-eye	—	2	—	—	—	—	0/0/2
<i>Emberiza rutila</i>	Chestnut Bunting	1	—	—	—	—	—	1/0
<i>Sicalis flaveola</i>	Saffron Finch	—	2	—	—	—	—	1/1
<i>Volatinia jacarini</i>	Jacarini Finch	—	1	—	—	—	—	1/0
<i>Sporophila torqueola</i>	White-collared Seedeater	—	2	—	—	—	—	0/0/2
<i>Sporophila luctuosa</i>	Black & White Seedeater	—	2	—	—	—	—	1/1
<i>Sporophila telasco</i>	Chestnut-throated Seedeater	—	1	—	—	—	—	0/0/1
<i>Gubernatrix cristata</i>	Green Cardinal	1	—	—	—	—	—	0/1
<i>Paroaria coronata</i>	Red-crested Cardinal	2	—	—	—	—	—	1/1
<i>Tachyphonus rufus</i>	Black Tanager	1	—	—	—	1	—	—
<i>Ramphocelus nigrogularis</i>	Masked Crimson Tanager	1	—	—	—	—	—	1/0
<i>Ramphocelus carbo</i>	Silver-beaked Tanager	2	—	—	—	—	—	1/1
<i>Ramphocelus flammigerus icteronotus</i>	Lemon-rumped Tanager	1	—	—	—	—	—	0/1
<i>Thraupis episcopus</i>	Blue Grey Tanager	2	—	—	—	—	—	0/0/2
<i>Cyanerpes caeruleus</i>	Purple Honeycreeper	1	—	—	—	1	—	—
<i>Cyanerpes cyaneus</i>	Red-legged Honeycreeper	1	—	—	—	—	—	0/1
<i>Cacicus melanicterus</i>	Mexican Cacique	1	—	—	—	—	—	0/1
<i>Molothrus bonariensis</i>	Shiny Cowbird	3	—	—	—	1	—	2/0
<i>Fringilla coelebs</i>	Chaffinch	1	—	—	—	—	1	—
<i>Serinus mozambicus</i>	Green Singing Finch	—	7	—	—	—	—	4/3
<i>Serinus flaviventris</i>	St. Helena Seedeater	—	1	—	—	—	—	1/0
<i>Carduelis chloris</i>	Greenfinch	4	—	—	—	—	—	0/1/3
<i>Carduelis carduelis</i>	Goldfinch	1	—	—	—	—	—	0/0/1
<i>Acanthis flammea</i>	Redpoll	2	—	—	—	—	2	—
<i>Pytilia phoenicoptera</i>	Red-winged Pytilia	—	1	—	—	—	—	1/0
<i>Mandingoa nitidula schlegeli</i>	Schlegel's Twin-spot	1	—	—	—	1	—	—
<i>Lagonosticta rufopicta</i>	Bar-breasted Fire Finch	—	1	—	—	—	—	1/0
<i>Lagonosticta senegala</i>	Red-billed Fire Finch	1	—	—	—	1	—	—
<i>Uraeginthus bengalus</i>	Red-cheeked Cordon Bleu	1	—	—	—	—	—	0/1
<i>Estrilda caerulescens</i>	Lavender Finch	—	1	—	—	—	—	1/0
<i>Estrilda melpoda</i>	Orange-cheeked Waxbill	3	1	—	—	—	—	1/1/2
<i>Estrilda troglodytes</i>	Red-eared Waxbill	3	2	—	—	1	—	1/2/1
<i>Amandava amandava</i>	Avadavat	1	—	—	—	—	—	1/0
<i>Amandava formosa</i>	Green Avadavat	—	2	—	—	—	—	1/1
<i>Amandava amandava punicea</i>	Strawberry Finch	2	—	—	—	—	—	1/1
<i>Amandava subflava</i>	Golden-breasted Waxbill	5	—	—	—	—	—	1/2/2
<i>Neochima ruficauda</i>	Star Finch	2	—	—	—	—	—	1/1
<i>Poephila guttata</i>	Zebra Finch	2	—	—	—	—	—	1/1
<i>Poephila bichenovii</i>	Bicheno's Finch	2	—	—	—	—	—	1/1
<i>Poephila acuticauda hecki</i>	Heck's Grass Finch	4	—	2	1	—	—	2/2/1
<i>Lonchura malabarica cantans</i>	African Silverbill	1	—	—	—	—	—	1/0
<i>Lonchura striata (domesticated)</i>	Bengalese Finch	2	—	—	—	1	—	1/0
<i>Lonchura molucca</i>	Moluccan Mannikin	—	1	—	—	—	—	0/0/1
<i>Lonchura malacca</i>	Tri-coloured (Chestnut) Mannikin	1	—	—	—	1	—	—
<i>Lonchura maja</i>	White-headed Mannikin	3	—	—	—	—	—	1/1/1
<i>Lonchura pallida</i>	Pallid Finch	—	2	—	—	—	—	1/1
<i>Padda oryzivora</i>	Java Sparrow	1	2	—	—	—	—	1/1/1
<i>Amadina fasciata</i>	Cut-throat Finch	3	—	—	—	1	—	0/1/1
<i>Ploceus cucullatus</i>	Spotted-backed weaver	1	—	—	—	—	—	1/0
<i>Quelea quelea</i>	Red-beaked Weaver	1	1	—	—	—	—	1/0/1
<i>Euplectes afer</i>	Napoleon Weaver	—	2	—	—	—	—	1/1
<i>Euplectes albonotatus</i>	White-winged Whydah	1	—	—	—	1	—	—
<i>Vidua chalybeata</i>	Combassou	2	3	—	—	—	—	3/2
<i>Lamprotornis purpureus</i>	Purple Glossy Starling	5	—	—	—	—	—	4/1
<i>Lamprotornis chalybaeus</i>	Green Glossy Starling	4	1	—	—	—	—	4/0/1
<i>Spreo superbus</i>	Superb Glossy Starling	7	1	—	—	3	1	2/2
<i>Creatophora cinerea</i>	Wattled Starling	9	—	—	—	3	—	2/4
<i>Sturnus contra</i>	Asian Pied Starling	2	—	—	—	1	—	1/0

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		1	2	3	4	5	6	7
<i>Sturnus vulgaris</i>	Common Starling	1	—	—	—	—	—	1/0
<i>Leucopsar rothschildi</i>	Rothschild's Grackle	5	2	—	—	—	—	5/2
<i>Acridotheres cristatellus cristatellus</i>	Chinese Crested Mynah	1	1	—	—	—	—	1/1
<i>Gracula religiosa religiosa</i>	Javan Hill Mynah	1	—	—	—	—	—	0/0/1
<i>Gracula religiosa intermedia</i>	Nepal Hill Mynah	3	—	—	—	—	—	1/0/2
<i>Struthidea cinerea</i>	Grey Struthidea	2	—	—	—	2	—	—
<i>Cyanocorax cyanopogon</i>	Pileated (White-naped) Jay	2	—	—	—	1	—	0/1
<i>Pica pica pica</i>	Magpie	1	—	—	—	—	—	0/0/1
<i>Pyrrhocorax graculus</i>	Alpine Chough	2	—	—	—	1	—	0/0/1
<i>Corvus frugilegus</i>	Rook	1	—	—	—	—	1	—
<i>Corvus corone corone</i>	Carrion Crow	1	—	—	—	—	1	—
<i>Corvus corax corax</i>	Raven	2	—	—	—	—	—	1/1
<i>Corvus albicollis</i>	White-necked Raven	2	—	—	—	—	—	1/1
DOMESTIC								
	Common Duck	4	—	—	—	—	—	1/3
	Silky Bantam	3	—	—	—	1	—	1/1
	Old English Game Bantam	5	—	5	1	1	—	6/2
Total-Birds		1070	114(2)	150	11	156	173(28)	994

## Reptiles

### TESTUDINES

<i>Sternotherus odoratus</i>	Stinkpot	14	—	1	—	1	9	1/1/3
<i>Kinosternon subrubrum</i>	Eastern Mud Terrapin	1	—	—	—	—	—	0/0/1
<i>Kinosternon scorpioides</i>	Scorpion Mud Terrapin	2	—	—	—	—	—	1/1
<i>Pseudemys dorbignyi</i>	South American Ornate Terrapin	2	—	—	—	—	—	0/2
<i>Pseudemys scripta elegans</i>	Red-eared Terrapin	4	—	—	—	2	—	0/1/1
<i>Mauremys caspica leprosa</i>	Spanish Terrapin	1	—	—	—	—	—	0/1
<i>Emys orbicularis</i>	European Pond Tortoise	3	1	—	—	—	1	2/1
<i>Terrapene carolina</i>	Carolina Box Terrapin	1	—	—	—	—	—	0/1
<i>Terrapene carolina triunguis</i>	Three-toed Box Terrapin	2	—	—	—	—	—	1/1
<i>Geochelone gigantea gigantea</i>	Aldabra Giant Tortoise	5	—	—	—	1	1	1/2
<i>Geochelone elephantopus elephantopus</i>	South Albemarle Giant Tortoise	1	—	—	—	—	1	—
<i>Geochelone carbonaria</i>	Red-footed Tortoise	2	—	—	—	—	—	1/1
<i>Eretmochelys imbricata</i>	Hawksbill Turtle	1	—	—	—	—	—	0/0/1
<i>Chelus fimbriatus</i>	Matamata	1	—	—	—	—	—	0/1
<i>Chelodina longicollis</i>	Long-necked Terrapin	2	—	—	—	—	—	0/0/2
<i>Trionyx hurum</i>	Peacock Soft-shelled Turtle	2	—	—	—	—	—	1/1
<i>Trionyx sinensis</i>	Chinese Soft-shelled Turtle	2	1	—	—	1	—	1/1

### CROCODYLIA

<i>Alligator mississippiensis</i>	American Alligator	3	—	—	—	—	—	1/2
<i>Alligator sinensis</i>	Chinese Alligator	3	—	—	—	—	—	1/2

### SAURIA

Sp. inc.	Gecko	3	—	—	—	—	3	—
<i>Hemitheconyx caudicinctus</i>	Fat-tailed Gecko	18	—	19	9	3	4	3/7/11
<i>Chondrodactylus angulifer</i>	Namib Sand Gecko	12	—	29	—	7	—	4/7/23
<i>Phyllurus platurus</i>	Leaf-tailed Gecko	4	—	—	—	1	—	1/2
<i>Diplodactylus ciliaris</i>	Spiny-tailed Gecko	3	—	—	—	—	—	1/2
<i>Gekko gekko</i>	Tokay Gecko	2	—	—	—	1	—	1/0
<i>Tarentola mauritanica</i>	Moorish Gecko	1	—	—	—	—	—	0/0/1
<i>Phelsuma cepedianum</i>	Jewel Gecko	3	—	—	—	3	—	—
<i>Eublepharis macularius</i>	Leopard Ground Gecko	26	8(5)	56	—	1	66(5)	6/10/7
<i>Anolis richardii</i>	Richard's Anole	9	—	3	2	3	2	0/0/5
<i>Laemanctus longipes deborrei</i>	Casque-headed Lizard	1	—	—	—	—	—	0/1
<i>Basiliscus vittatus</i>	Banded Basilisk	5	—	—	—	3	—	1/1
<i>Basiliscus plumifrons</i>	Plumed Basilisk	8	—	16	—	2	17	2/2/1
<i>Liolaemus multiformis</i> S Cope 1876		—	8	—	—	—	—	0/0/8

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		1	2	3	4	5	6	7
<i>Cyclura cornuta</i>	Rhinoceros Iguana	4	—	—	—	1	—	3/0
<i>Iguana iguana</i>	Common Iguana	—	1	—	—	—	1	—
<i>Sauromalus obesus</i>	Chuckwalla	5	—	—	—	1	—	1/3
<i>Sceloporus poinsetti</i>	Crevice Spiny Lizard	1	—	—	—	1	—	—
<i>Sceloporus orcutti</i>	Granite Spiny Lizard	1	—	—	—	1	—	—
<i>Amphibolurus vitticeps</i>	Inland Bearded Dragon	1	—	—	—	—	—	1/0
<i>Physignathus lesueurii</i>	Lesueur's Water Dragon	7	—	—	—	1	—	2/2/2
<i>Physignathus cocincinus</i>	Cochin China Water Dragon	6	—	—	—	2	1	1/1/1
<i>Uromastix hardwicki</i>	General Hardwicke's Dabb-Lizard	—	6	—	—	—	—	0/0/6
<i>Chamaeleo fischeri</i>	Fischer's Chameleon	2	—	—	—	2	—	—
<i>Chamaeleo tempeli</i>	Tubercle-nosed Chameleon	2	—	—	—	2	—	—
<i>Egernia striolata</i>	Australian Tree Skink	11	—	11	—	3	12	1/1/5
<i>Sphenomorphus quoyii</i>	Golden Water Skink	3	—	4	—	1	—	1/1/4
<i>Trachydosaurus rugosus</i>	Shingleback	5	1	—	—	4	—	0/1/1
<i>Tiliqua scincoides scincoides</i>	Eastern Blue-tongued Skink	4	—	—	—	1	3	—
<i>Tiliqua scincoides intermedia</i>	Northern Blue-tongued Skink	1	—	—	—	—	—	1/0
<i>Tiliqua nigrolutea</i>	Blotched Blue-tongued Skink	4	—	—	—	—	—	0/0/4
<i>Mabuya brevicollis</i>	Short-necked Skink	1	—	—	—	—	—	1/0
<i>Ctenotus taeniolatus</i>	Copper-tailed Skink	7	—	—	—	3	—	0/0/4
<i>Leiopisma telfairii</i>	Round Island Skink	—	6	—	—	1	—	0/0/5
<i>Chalcides ocellatus</i>	Eyed Skink	—	6	—	—	2	—	0/0/4
<i>Gerrhosaurus major</i>	Greater Plated Lizard	2	2	1	—	—	—	3/1/1
<i>Lacerta sp.</i>		1	1	—	—	—	1	0/0/1
<i>Lacerta agilis</i>	Sand Lizard	—	5	—	—	—	—	1/1/3
<i>Lacerta lepida</i>	Eyed Lizard	10	—	20	—	—	22	2/2/4
<i>Lacerta vivipara</i>	Common Lizard	—	4	5	—	3	—	2/1/3
<i>Lacerta princeps</i>	Zagros Lizard	1	—	—	—	—	—	1/0
<i>Podarcis milensis</i>	Milos Wall Lizard	3	—	—	—	2	1	—
<i>Podarcis lilfordi</i>	Lilford's Wall Lizard	2	—	—	—	—	—	1/1
<i>Algyroides nigropunctatus</i>	Corfu Lizard	5	—	—	—	3	—	1/1
<i>Trogonophis wiegmanni</i>	Wiegmann's Burrowing Lizard	1	—	—	—	—	—	0/0/1
<i>Varanus exanthematicus albigularis</i>	Bosc's Monitor	—	1	—	—	—	1	—
<i>Varanus bengalensis</i>	Bengal Monitor	—	1	—	—	—	1	—
<i>Heloderma suspectum</i>	Gila Monster	2	—	1	1	—	—	1/1
<i>Ophisaurus apodus</i>	European Glass Snake	2	—	—	—	—	—	0/0/2
<i>Anguis fragilis</i>	Slow-worm	1	2	—	—	—	—	0/0/3
<i>Cordylus giganteus</i>	Sungazer	1	—	—	—	1	—	—
<i>Cordylus warreni breyeri</i>	Breyer's Girdled Lizard	3	—	—	—	—	—	1/0/2
<i>Pseudocordylus microlepidotus</i>	Small-scaled Girdled Lizard	5	—	—	—	3	—	0/2

SERPENTES

Sp. inc.	Snake	—	1	—	—	1	—	—
<i>Liias fuscus</i>	Australian Water Python	4	—	—	—	—	—	2/2
<i>Liias childreni</i>	Children's Python	8	—	13	—	—	13	3/2/3
<i>Liias boa</i>	Blue-ring Python	1	—	—	—	—	—	0/1
<i>Morelia spilotes spilotes</i>	Diamond Python	2	2	—	—	—	—	4/0
<i>Morelia spilotes variegata</i>	Carpet Python	3	—	—	—	1	—	1/1
<i>Python reticulatus</i>	Reticulated Python	—	1	—	—	—	1	—
<i>Python molurus molurus</i>	Indian Python	2	—	—	—	—	2	—
<i>Python molurus bivittatus</i>	Malaysian Rock Python	3	—	10	3	—	7	1/2
<i>Python regius</i>	Royal Python	2	2	—	—	—	1	3/0
<i>Calabaria reinhardtii</i>	Calabar Ground Python	2	—	—	—	—	—	1/1
<i>Eunectes notaeus</i>	Yellow Anaconda	3	—	—	—	—	—	1/2
<i>Boa constrictor</i>	Boa Constrictor	12	—	—	—	—	—	3/5/4
<i>Eryx colubrinus</i>	Theban Sand Boa	—	3(3)	—	—	1	—	0/0/2
<i>Natrix natrix helvetica</i>	Grass Snake	2	2	—	—	3	—	0/1
<i>Nerodia fasciata confluens</i> S (Blanchard)	Broad-banded Water Snake	—	2	—	—	—	2	—
<i>Thamnophis sp.</i>	Garter Snake	—	1	—	—	—	1	—
<i>Thamnophis sirtalis parietalis</i>	Red-sided Garter Snake	1	—	—	—	—	1	—
<i>Drymarchon corais couperi</i>	Eastern Indigo Snake	2	—	1	—	—	—	1/1/1
<i>Elaphe guttata</i>	Corn Snake	2	—	17	—	—	17	1/1
<i>Elaphe obsoleta obsoleta</i>	Black Rat Snake	2	—	—	—	—	—	1/1
<i>Elaphe obsoleta quadrivittata</i>	Yellow Rat Snake	—	1	—	—	—	1	—
<i>Coluber najadum</i>	Dahl's Whip Snake	1	—	—	—	—	—	0/0/1
<i>Spalerosophis arenarius</i>	Diadem Snake	—	4	—	—	4	—	—

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		1	2	3	4	5	6	7
<i>Pituophis melanoleucus melanoleucus</i>	Northern Pine Snake	3	—	10	—	—	10	2/1
<i>Hydrodynastes gigas</i>	Boiepevassu Snake	2	—	3	—	—	3	1/1
<i>Coronella austriaca</i>	Smooth Snake	1	—	—	—	—	—	1/0
<i>Lampropeltis getulus californiae</i>	Californian King Snake	4	—	10	—	—	10	1/2/1
<i>Lampropeltis triangulum sinaloae</i>	Sinaloan Milk Snake	9	1	7	—	—	7	3/3/4
<i>Lampropeltis triangulum hondurensis</i>	Honduras King Snake	4	—	3	—	—	3	2/2
<i>Lampropeltis triangulum annulata</i>	Mexican Milk Snake	5	—	—	—	—	—	3/1/1
<i>Lampropeltis triangulum campbelli</i> S	Pueblan King Snake	—	6	—	—	3	—	1/2
<i>Lampropeltis pyromelana pyromelana</i>	Arizona Mountain King Snake	4	—	2	—	—	—	2/1/3
<i>Lampropeltis mexicana alterna</i>	Grey-banded King Snake	8	—	3	—	1	—	1/4/5
<i>Malpolon monspessulanus</i>	Montpellier Snake	1	—	—	—	—	—	1/0
<i>Malpolon moilensis</i>	Moila Snake	1	—	—	—	—	1(1)	—
<i>Dispholidus typus</i>	Boomslang	1	—	—	—	—	—	1/0
<i>Oxyuranus scutellatus scutellatus</i>	Taipan	2	—	—	—	—	—	0/2
<i>Notechis scutatus scutatus</i>	Tiger Snake	4	—	—	—	2	—	0/2
<i>Walterinnesia aegyptia</i>	Innes' Cobra	3	—	—	—	—	—	1/2
<i>Naja melanoleucus</i>	Black & White Cobra	2	—	—	—	—	1	1/0
<i>Naja mossambica pallida</i> S Peters 1896	Mozambique Spitting Cobra	—	3	—	—	—	1	0/0/2
<i>Naja naja kaouthia</i>	Indian Cobra	4	—	6	—	—	6	1/1/2
<i>Dendroaspis viridis</i>	Hallowell's Green Mamba	2	—	—	—	—	—	1/1
<i>Dendroaspis angusticeps</i>	Common Green Mamba	1	—	—	—	—	1	—
<i>Dendroaspis poylepis</i>	Black Mamba	2	—	—	—	—	—	1/1
<i>Vipera berus</i>	Adder	1	1	—	—	1	—	0/1
<i>Vipera palaestinae</i>	Palestine Viper	3	—	—	—	1	—	1/1
<i>Vipera ammodytes meridionalis</i>	Long-nosed Viper	5	—	2	—	—	2	2/1/2
<i>Bitis arietans arietans</i>	Puff Adder	2	—	—	—	—	—	0/2
<i>Bitis gabonica</i>	Gaboon Viper	2	—	—	—	—	—	0/2
<i>Echis carinatus sochureki</i> SS Stemmler	Carpet Viper	—	3	6	—	1	—	1/1/6
<i>Agkistrodon contortrix mokeson</i>	Northern Copperhead	2	—	—	—	—	—	1/1
<i>Sistrurus catenatus tergeminus</i>	Western Massasauga	12	—	—	—	1	7	1/2/1
<i>Crotalus durissus culminatus</i> SS Klauber	Neotropical Rattlesnake	—	7	—	—	—	—	0/0/7
<i>Crotalus vegrandis</i> S Klauber	Uracoan Rattlesnake	—	3	—	—	—	—	0/0/3
<i>Crotalus atrox</i>	Western Diamond-backed Rattlesnake	—	1	—	—	—	—	0/0/1
Total-Reptiles		393	98(8)	259	15	87	245(6)	403

## Amphibians

### CAUDATA

<i>Necturus maculosus</i>	Mudpuppy	2	—	—	—	2	—	—
<i>Andrias japonicus</i>	Japanese Giant Salamander	1	—	—	—	—	—	0/0/1
<i>Triturus cristatus</i>	Crested Newt	—	7	—	—	—	—	0/0/7
<i>Triturus marmoratus</i>	Marbled Newt	1	—	—	—	—	—	0/0/1
<i>Triturus vulgaris</i>	Common Smooth Newt	—	8	—	—	2	—	0/0/6
<i>Triturus helveticus</i>	Palmate Newt	—	7	—	—	3	—	0/0/4
<i>Triturus alpestris</i>	Alpine Newt	—	3	—	—	1	—	0/0/2
<i>Cynops pyrrhogaster</i>	Japanese Newt	3	—	—	—	—	—	0/2/1
<i>Taricha granulosa</i>	Rough-skinned Newt	—	2	—	—	—	—	0/0/2
<i>Pleurodeles waltii</i>	Spanish Newt	—	4	—	—	—	—	0/0/4
<i>Salamandra salamandra</i>	Fire Salamander	7	—	—	—	1	—	0/0/6
<i>Ambystoma tigrinum</i>	Tiger Salamander	1	—	—	—	—	—	0/1
<i>Ambystoma mexicanum</i>	Axolotl	42	—	100	90	10	4	0/0/38
<i>Ambystoma maculatus</i>	American Spotted Salamander	1	—	—	—	—	—	0/0/1

### ANURA

<i>Xenopus laevis</i>	Clawed Frog	3	2	—	—	—	—	0/0/5
<i>Xenopus tropicalis</i>	Tropical Clawed Frog	9	—	—	—	—	—	0/0/9
<i>Pipa pipa</i>	Surinam Toad	3	—	—	—	1	—	1/1
<i>Bombina orientalis</i>	Oriental Toad	19	—	—	—	1	8	3/5/2
<i>Bufo viridis</i>	Green Toad	4	1	—	—	—	—	2/2/1
<i>Bufo bufo</i>	Common Toad	2	2	—	—	—	—	2/0/2

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		1	2	3	4	5	6	7
<i>Bufo asper</i>	Siamese Toad	—	2	—	—	1	—	0/0/1
<i>Bufo marinus</i>	Cane Toad	2	2	—	—	1	—	1/0/2
<i>Hyla arborea</i>	European Tree Frog	—	70	—	—	25	35	0/0/10
<i>Hyla cinerea</i>	Green Tree Frog	3	2	—	—	2	—	2/1
<i>Hyla versicolor</i>	American Grey Tree Frog	—	4	—	—	1	—	0/0/3
<i>Hyla rubra</i>	Daudin's Hyla	3	1	—	—	2	—	1/1
<i>Hyla septentrionalis</i>	Cuban Tree Frog	—	6	—	—	2	—	0/0/4
<i>Gastrotheca marsupiata</i>	Marsupial Frog	1	—	—	—	1	—	—
<i>Ceratophrys calcarata</i>	Horned Toad	—	1	—	—	1	—	—
<i>Rana ridibunda</i>	Marsh Frog	2	4	—	—	—	—	0/2/4
<i>Rana temporaria</i>	Common Frog	7	3	—	—	—	—	3/4/3
<i>Rana catesbeiana</i>	American Bullfrog	1	3	—	—	—	—	0/0/4
<i>Rana erythraea</i>	Gold Lined Frog	—	2	—	—	—	—	0/0/2
<i>Litoria caerulea</i>	White's Tree Frog	6	—	—	—	2	—	3/1
<i>Kaloula pulchra</i>	Malayan Bullfrog	1	1	—	—	1	—	0/0/1
<i>Polypedates leucomystax</i>	Bamboo Tree Frog	5	2	—	—	5	—	0/2
<i>Dendrobates spp.</i>	Poison Arrow Frog	2	4	—	—	3	—	0/0/3
<b>Total-Amphibians</b>		<b>131</b>	<b>143</b>	<b>100</b>	<b>90</b>	<b>68</b>	<b>47</b>	<b>169</b>

WHIPSNADE PARK

Mammals

MARSUPIALIA

<i>Macropus rufogriseus</i>	Red-necked Wallaby	395	—	313	—	57	268	13/17/353
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INSECTIVORA

<i>Paraechinus aethiopicus</i>	Desert Hedgehog	—	1(1)	—	—	1	—	—
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PRIMATES

<i>saimiri sciureus</i>	Squirrel Monkey (Black-capped form)	18	—	2	—	—	2	2/5/11
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<i>Callithrix jacchus</i>	Common Marmoset	—	4	3	1	—	—	2/2/2
<i>Pan troglodytes</i>	Chimpanzee	9	2	1	—	—	4	3/5

RODENTIA

<i>Cynomys ludovicianus</i>	Prairie Marmot	82	—	—	—	—	—	0/0/82
<i>Dolichotis patagonum</i>	Mara	19	—	9	2	7	1	6/7/5

CETACEA

<i>Tursiops truncatus</i>	Bottle-nosed Dolphin	2	—	—	—	—	—	1/1
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CARNIVORA

<i>Canis lupus</i>	Grey Wolf	15	—	9	—	1	1	4/15/3
<i>Fennecus zerda</i>	Fennec Fox	—	2(2)	—	—	—	—	1/1
<i>Lycaon pictus</i>	Cape Hunting Dog	3	—	—	—	3	—	—
<i>Ursus arctos</i>	Brown Bear	5	—	—	—	—	—	2/3
<i>Ailurus fulgens</i>	Red Panda	2	—	—	—	—	—	1/1
<i>Nasua nasua</i>	Ring-tailed Coati	14	—	—	—	—	6	1/7
<i>Panthera leo</i>	Lion	3	—	—	—	—	—	1/2
<i>Panthera tigris</i>	Tiger (Siberian form)	4	—	—	—	—	—	1/3
<i>Panthera onca</i>	Jaguar	4	—	3	—	—	2	3/2
<i>Acinonyx jubatus</i>	Cheetah	17	5(1)	8	—	2	10(3)	5/13

PINNIPEDIA

<i>Zalophus californianus</i>	Californian Sealion	1	2(2)	—	—	1	—	1/1
<i>Phoca vitulina</i>	Common Seal	1	—	—	—	—	—	1/0
<i>Halichoerus grypus</i>	Grey seal	1	—	—	—	—	—	0/1

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		1	2	3	4	5	6	7
PROBOSCIDEA								
<i>Elephas maximus</i>	Asian Elephant	1	—	—	—	—	—	0/1
<i>Loxodonta africana</i>	African Elephant	2	—	—	—	—	—	1/1
PERISSODACTYLA								
<i>Equus grevyi</i>	Grevy's Zebra	7	1	—	—	—	2	2/4
<i>Equus hemionus</i>	Onager (Persian form)	6	2	3	—	1	2	2/6
<i>Equus przewalskii</i>	Przewalski's Horse	13	—	—	—	—	4	1/8
<i>Rhinoceros unicornis</i>	Indian Rhinoceros	2	—	1	—	—	—	2/1
<i>Ceratotherium simum</i>	White Rhinoceros	13	—	2	1	1	4	2/7
<i>Diceros bicornis</i>	Black Rhinoceros	2	—	—	—	—	—	1/1
ARTIODACTYLA								
<i>Phacochoerus aethiopicus</i>	Wart Hog	1	—	—	—	—	—	1/0
<i>Tayassu tajacu</i>	Collared Peccary	11	—	—	—	—	3	4/4
<i>Hippopotamus amphibius</i>	Hippopotamus	2	—	1	1	—	—	1/1
<i>Choeropsis liberiensis</i>	Pygmy Hippopotamus	5	—	—	—	—	—	1/4
<i>Lama guanicoe</i>	Guanaco	10	1	—	—	—	—	3/8
<i>Camelus bactrianus</i>	Bactrian Camel	11	—	2	—	—	3	2/8
<i>Camelus dromedarius</i>	Arabian Camel	3	—	—	—	—	—	1/2
<i>Muntiacus reevesi</i>	Reeves's Muntjac	21	1	1	—	6	6	4/7
<i>Dama dama</i>	Fallow Deer	46	—	9	—	1	17	8/20/9
<i>Axis axis</i>	Axis Deer	35	—	13	6	12	2	11/14/3
<i>Axis porcinus</i>	Hog Deer	30	—	11	7	5	1	11/14/3
<i>Cervus duvauceli</i>	Barasingha	20	—	7	4	3	—	11/9
<i>Cervus nippon</i>	Sika Deer (Formosan form)	36	—	13	3	2	1	14/28/1
<i>Cervus elaphus</i>	Red Deer	24	—	—	—	—	—	0/24
<i>Elaphurus davidianus</i>	Pere David's Deer	51	7	12	—	—	34	6/30
<i>Rangifer tarandus</i>	Reindeer	13	4(2)	3	—	1	7(2)	3/9
<i>Hydropotes inermis</i>	Chinese Water Deer	125	—	50	—	40	21	0/0/114
<i>Giraffa camelopardalis</i>	Giraffe	3	—	—	—	—	—	1/2
<i>Tragelaphus angasi</i>	Nyala	—	4	—	—	1	—	3/0
<i>Tragelaphus spekei</i>	Sitatunga	14	—	2	—	2	3	3/8
<i>Boselaphus tragocamelus</i>	Nilgai	25	—	22	7	6	5	5/24
<i>Bos grunniens</i>	Yak	12	—	3	1	—	—	4/8/2
<i>Syncerus caffer</i>	African Buffalo	6	—	1	—	1	1	2/3
<i>Bison bonasus</i>	European Bison	12	—	2	—	—	2	3/9
<i>Hippotragus equinus</i>	Roan Antelope	—	6(5)	—	—	1	—	4/1
<i>Kobus ellipsiprymnus</i>	Common Waterbuck	6	7	—	—	1	4	2/6
<i>Oryx gazella</i>	Gemsbok	3	—	—	—	—	—	2/1
<i>Oryx tao</i>	Scimitar-horned Oryx	14	—	6	1	3	2	2/12
<i>Oryx leucoryx</i>	Arabian Oryx	—	3(3)	—	—	—	—	3/0
<i>Damaliscus dorcas</i>	Bontebok	—	2	—	—	—	2	—
<i>Damaliscus dorcas</i>	Blesbok	4	—	—	—	3	1(1)	—
<i>Antilope cervicapra</i>	Blackbuck	5	10(5)	—	—	2	1	12/0
<i>Gazella thomsoni</i>	Thomson's Gazelle	10	1	—	—	2	—	2/7
<i>Ovibos moschatus</i>	Musk Ox	5	—	—	—	1	—	0/4
<i>Ovis musimon</i>	Mouflon	31	—	22	8	5	8	9/19/4
DOMESTIC								
	Ponies	15	—	3	—	1	1	6/10
	Pygmy Donkey	2	—	—	—	—	—	1/1
	Ankole Cattle	—	3	—	—	1	—	2/0
	Windsor White Goat	20	—	12	—	4	13	2/13
Total-Mammals		1272	68(21)	549	42	178	444(6)	1225

## Birds

### STRUTHIONIFORMES

<i>Struthio camelus</i>	Ostrich	2	—	—	—	2	—	—
		<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>6</b>	<b>7</b>

		1	2	3	4	5	6	7
RHEIFORMES								
<i>Rhea americana</i>	Common Rhea	5	—	—	—	—	—	1/1/3
CASUARIIFORMES								
<i>Casuarus casuarus</i>	Australian Cassowary	2	—	—	—	—	—	1/1
<i>Dromaius novaehollandiae</i>	Emu	8	—	—	—	—	—	2/2/4
SPHENISCIFORMES								
<i>Aptenodytes patagonica</i>	King Penguin	12	—	2	1	—	—	4/4/5
<i>Eudyptes crestatus</i>	Rockhopper Penguin	8	—	—	—	—	—	5/3
<i>Spheniscus humboldti</i>	Humboldt's Penguin	51	3(3)	20	3	—	27	13/13/18
CICONIIFORMES								
<i>Ciconia ciconia</i>	White Stork	8	4	—	—	3	—	3/3/3
<i>Phoenicopterus ruber roseus</i>	Greater Flamingo	35	—	—	—	—	—	8/17/10
<i>Phoenicopterus ruber ruber</i>	Rosy Flamingo	65	—	5	—	5	6	20/20/19
ANSERIFORMES								
<i>Cygnus atratus</i>	Black Swan	14	—	—	—	—	1	3/10
<i>Cygnus melanocoryphus</i>	Black-necked Swan	2	—	—	—	1	—	0/1
<i>Cygnus cygnus</i>	Whooper Swan	4	—	1	—	—	2	1/1/1
<i>Anser anser</i>	Greylag Goose	5	—	4	—	—	4	1/2/2
<i>Anser indicus</i>	Bar-headed Goose	51	—	20	—	1	10	10/10/40
<i>Anser caerulescens caerulescens</i>	Lesser Snow Goose	12	—	5	—	4	1	2/3/7
<i>Anser caerulescens atlanticus</i>	Greater Snow Goose	2	2(2)	1	—	—	—	2/1/2
<i>Anser canagicus</i>	Emperor Goose	15	—	4	—	—	2	5/4/8
<i>Branta sandvicensis</i>	Hawaiian Goose	2	2(2)	—	—	—	2(1)	1/1
<i>Branta canadensis</i>	Canada Goose	20	—	3	1	—	22	—
<i>Branta leucopsis</i>	Barnacle Goose	35	6(6)	11	—	2	6	8/6/30
<i>Branta bernicla orientalis</i>	Brent Goose	—	2(2)	—	—	—	—	1/1
<i>Branta ruficollis</i>	Red-breasted Goose	28	—	—	—	4	1	15/7/1
<i>Cereopsis novaehollandiae</i>	Cape Barren Goose	4	—	—	—	1	1	1/1
<i>Alopochen aegyptiacus</i>	Egyptian Goose	8	—	8	—	1	3	2/2/8
<i>Tadorna cana</i>	South African Shelduck	18	—	—	—	1	1	6/6/4
<i>Tadorna variegata</i>	New Zealand Shelduck	6	—	—	—	1	1	3/1
<i>Tadorna tadorna</i>	Shelduck	9	—	1	—	—	—	5/3/2
<i>Plectropterus gambensis</i>	Spur-winged Goose	2	—	—	—	—	—	1/1
<i>Aix sponsa</i>	Carolina Duck	15	2	—	—	1	3	7/6
<i>Aix galericulata</i>	Mandarin Duck	8	10	—	—	2	2	6/8
<i>Chenonetta jubata</i>	Maned Goose	6	—	—	—	1	1	3/1
<i>Anas penelope</i>	Wigeon	6	—	—	—	3	1	1/1
<i>Anas sibilatrix</i>	Chiloe Wigeon	16	—	—	—	1	—	4/8/3
<i>Anas falcata</i>	Falcated Teal	5	—	—	—	—	1	2/2
<i>Anas strepera</i>	Gadwall	2	3	—	—	—	1	2/2
<i>Anas formosa</i>	Baikal Teal	3	—	—	—	1	2	—
<i>Anas crecca</i>	Teal	2	3	—	—	1	1	1/2
<i>Anas specularioides</i>	Crested Duck	7	—	—	—	1	—	2/3/1
<i>Anas acuta</i>	Pintail	3	4	—	—	—	3	2/2
<i>Anas bahamensis</i>	Bahama Pintail	2	3	—	—	—	1	2/2
<i>Anas querquedula</i>	Garganey	2	6	—	—	—	2	3/3
<i>Anas clypeata</i>	Shoveler	4	2	—	—	—	2	2/2
<i>Netta rufina</i>	Red-crested Pochard	9	—	3	—	—	1	7/4
<i>Aythya ferina</i>	Pochard	4	—	—	—	—	—	2/2
<i>Aythya fuligula</i>	Tufted Duck	6	—	—	—	2	—	1/3
<i>Aythya marila</i>	Greater Scaup	4	3	—	—	—	—	2/5
<i>Somateria mollissima</i>	Eider Duck	17	—	5	—	8	4	3/6/1
<i>Bucephala islandica</i>	Barrow's Goldeneye	4	—	—	—	—	—	2/2
<i>Oxyura jamaicensis</i>	North American Ruddy Duck	11	—	—	—	2	2	7/0
<i>Oxyura vittata</i>	Argentine Ruddy Duck	4	—	—	—	1	—	3/0
FALCONIFORMES								
<i>Gyps africanus</i>	African White-backed Vulture	2	—	—	—	—	—	2/0
<i>Gyps rueppellii</i>	Ruppell's Griffon Vulture	2	3	—	—	—	1	2/2
<i>Torgos tracheliotus</i>	Lappet-faced Vulture	2	—	—	—	—	—	1/1

1 2 3 4 5 6 7

		1	2	3	4	5	6	7
GALLIFORMES								
<i>Meleagris gallopavo</i>	North American Turkey	18	—	—	—	3	—	0/0/15
<i>Francolinus erckelii</i>	Erckel's Francolin	6	—	—	—	—	3	3/0
<i>Lophophorus impeyanus</i>	Impeyan Pheasant	3	1	—	—	—	—	1/3
<i>Gallus gallus</i>	Red Jungle Fowl	19	—	30	—	—	—	18/31
<i>Gallus sonneratii</i>	Sonnerat's Jungle Fowl	9	1(1)	—	—	—	10	—
<i>Lophura nycthemera</i>	Silver Pheasant	8	2(2)	—	—	2	8	—
<i>Lophura imperialis</i>	Imperial Pheasant	2	—	—	—	1	—	0/1
<i>Lophura swinhoii</i>	Swinhoe's Pheasant	8	—	—	—	1	3	2/2
<i>Crossoptilon mantchuricum</i>	Brown Eared Pheasant	7	—	—	—	1	—	2/4
<i>Crossoptilon auritum</i>	Blue Eared Pheasant	7	—	5	—	—	6	1/1/4
<i>Catreus wallichi</i>	Cheer Pheasant	4	—	4	—	1	3	3/1
<i>Syrnaticus mikado</i>	Mikado Pheasant	4	—	—	—	2	—	1/1
<i>Chrysolophus pictus</i>	Golden Pheasant	8	—	—	—	2	4	1/1
<i>Chrysolophus amherstiae</i>	Lady Amherst's Pheasant	3	—	—	—	1	—	1/1
<i>Pavo cristatus</i>	Common Peafowl	105	2(1)	50	—	3	17(1)	0/0/137
<i>Numida meleagris</i>	Helmeted Guinea fowl	11	10	—	—	3	3	0/0/15
GRUIFORMES								
<i>Grus grus</i>	Common Crane	1	—	—	—	—	1	—
<i>Grus monacha</i>	Hooded Crane	1	1	—	—	—	—	1/1
<i>Grus canadensis</i>	Sandhill Crane	3	—	—	—	—	—	1/2
<i>Grus japonensis</i>	Red Crowned Crane	6	—	1	—	—	—	4/2/1
<i>Grus vipio</i>	White-naped Crane	7	—	4	—	1	—	4/3/3
<i>Grus rubicunda</i>	Brolga	3	—	—	—	—	—	1/2
<i>Bugeranus carunculatus</i>	Wattled Crane	3	—	4	1	1	—	1/1/3
<i>Anthropoides virgo</i>	Demoiselle Crane	4	12	—	—	3	—	0/1/12
<i>Anthropoides paradisea</i>	Stanley Crane	3	—	—	—	—	—	2/1
<i>Balearica pavonina</i>	West African Crowned Crane	1	—	—	—	1	—	—
<i>Balearica regulorum</i>	South African Crowned Crane	16	3(3)	—	—	4	—	3/11/1
<i>Choriotis kori</i>	Kori Bustard	2	—	—	—	—	—	1/1
PSITTACIFORMES								
<i>Pseudeos fuscata</i>	Dusky Lory	2	—	—	—	—	—	1/1
<i>Trichoglossus haematodus</i>	Swainson's Lorikeet	3	—	—	—	—	3	—
<i>Eolophus roseicapillus</i>	Roseate Cockatoo	15	—	—	—	—	—	7/8
<i>Cacatua leadbeateri</i>	Leadbeater's Cockatoo	1	—	—	—	—	—	1/0
<i>Cacatua sulphurea</i>	Lesser Sulphur-crested Cockatoo	1	—	—	—	—	—	0/1
<i>Cacatua galerita</i>	Greater Sulphur-crested Cockatoo	2	—	—	—	—	—	1/1
<i>Cacatua sanguinea</i>	Bare-eyed Cockatoo	3	—	—	—	—	1	1/1
<i>Nymphicus hollandicus</i>	Cockatiel	8	—	3	—	—	11	—
<i>Alisterus scapularis</i>	King Parrot	3	—	—	—	—	—	1/1/1
<i>Platycercus eximius ceciliae</i>	Golden-mantled Rosella	1	1	—	—	—	—	1/0/1
<i>Psephotus haematotus</i>	Red-rumped Parrakeet	12	—	—	—	4	8	—
<i>Psittacus erithacus</i>	Grey Parrot	4	—	—	—	1	1	0/1/1
<i>Psittacula eupatria nipalensis</i>	Alexandrine Parrakeet	2	—	—	—	1	—	0/1
<i>Psittacula krameri manillensis</i>	Indian Ring-necked Parrakeet	6	—	—	—	1	5	—
<i>Ara macao</i>	Scarlet Macaw	5	—	2	—	—	3	2/2
<i>Ara chloroptera</i>	Green-winged Macaw	4	—	—	—	—	2	1/1
<i>Amazona ochrocephala</i>	Yellow-fronted Amazon Parrot	1	—	—	—	—	1	—
<i>Amazona amazonica</i>	Orange-winged Amazon Parrot	3	—	—	—	2	1	—
STRIGIFORMES								
<i>Tyto alba</i>	Barn Owl	3	—	—	—	—	—	1/1/1
<i>Nyctea scandiaca</i>	Snowy Owl	2	3(2)	—	—	—	—	2/3
<i>Athene noctus</i>	Little Owl	—	3(3)	—	—	1	—	0/0/2
<i>Strix aluco sylvatica</i>	Tawny Owl	2	—	—	—	—	—	1/1
CORACIIFORMES								
<i>Dacelo novaeguineae</i>	Laughing Kookaburra	2	—	—	—	1	—	0/1
PICIFORMES								
<i>Ramphas vitellinus ariel</i>	Ariel Toucan	—	1(1)	—	—	—	—	1/0
		1	2	3	4	5	6	7



	1	2	3	4	5	6	7
PASSERIFORMES							
<i>Estrilda melpoda</i>	3	—	—	—	—	3	—
<i>Amandava subflava</i>	2	—	—	—	—	2	—
<i>Gracula religiosa</i>	1	—	—	—	—	—	0/0/1
<i>Urocissa erythrorhyncha occipitalis</i>	1	—	—	—	—	1	—
Total-Birds	943	98(28)	196	6	91	218(2)	922

## Reptiles

### TESTUDINES

<i>Testudo graeca</i>	32	4	17	1	4	6	8/12/22
<i>Testudo hermanni</i>	10	6	—	—	—	—	6/10

### SAURIA

<i>Eublepharis macularius</i>	—	5(5)	—	—	—	5(5)	—
<i>Basiliscus plumifrons</i>	—	6	—	—	—	—	0/0/6
<i>Iguana iguana</i>	—	1	—	—	—	—	0/0/1
<i>Agama stellio</i>	—	6	—	—	1	—	0/0/5
<i>Eumeces schneiderii</i>	—	4	—	—	—	—	0/0/4
<i>Scincus scincus</i>	—	6	—	—	—	—	0/0/6

### SERPENTES

<i>Python molurus molurus</i>	—	1	—	—	—	—	0/0/1
<i>Epicrates subflavus</i> (Stejneger) S	—	3	—	—	1	—	0/2
<i>Boa constrictor</i>	2	—	—	—	—	—	0/0/2
<i>Eryx colubrinus</i>	—	3	—	—	—	3(3)	—
<i>Malpolon moilensis</i>	—	1(1)	—	—	—	—	0/0/1

Total-Reptiles	44	46(6)	17	1	6	14(8)	86
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## Amphibians

### ANURA

<i>Bufo marinus</i>	—	4	—	—	—	—	0/0/4
<i>Ceratophrys cornuta</i>	—	3	—	—	1	—	0/0/2

Total-Amphibians	—	7	—	—	1	—	6
------------------	---	---	---	---	---	---	---

	1	2	3	4	5	6	7	Number of Species (excluding domestic)	
<b>Summary</b>									
London Zoo	Mammals 1214	138(6)	1165	156	319	639(21)	1403	147	
	Birds 1070	114(2)	150	11	156	173(28)	994	295	
	Reptiles 393	98(8)	259	15	87	245(6)	403	101	
	Amphibians 131	143	100	90	68	47	169	36	
	<b>Total</b>	<b>2808</b>	<b>493(16)</b>	<b>1674</b>	<b>272</b>	<b>630</b>	<b>1104(55)</b>	<b>2969</b>	<b>579</b>
Estimated number of fishes and invertebrates in the Collection at 31 December 1986:									
	Fishes	Approx 2290		239 species					
	Invertebrates (excluding some common species)	3040		104 species					
<b>Whipsnade Park</b>	Mammals 1272	68(21)	549	42	178	444(6)	1225	60	
	Birds 943	98(28)	196	6	91	218(2)	922	92	
	Reptiles 44	46(6)	17	1	6	14(8)	86	11	
	Amphibians —	7	—	—	1	—	6	2	
	<b>Total</b>	<b>2259</b>	<b>219(55)</b>	<b>762</b>	<b>49</b>	<b>276</b>	<b>676(16)</b>	<b>2239</b>	<b>165</b>
<b>Grand Total—</b>									
	Zoological Society of London	5067	712	2436	321	906	1780	5208	661*

\*The species common to London Zoo and Whipsnade are counted as one.

# Advisory and Consultant Services

## ANIMAL MANAGEMENT AND CONSERVATION

- Al-Areen Wildlife Park, Bahrain:* Advice on and assistance with animal management. Secondment of specialized staff.
- Andean Project, London:* Advice on husbandry and conservation of Andean fauna.
- Corporation of London Veterinary Department and Animal Quarantine Station:* Advice on identification, handling and management of reptiles.
- Doha Zoo, Municipality of Doha Qatar:* Management of the national zoo for the Qatar Government.
- Forest Department, Tunisia:* Collaborative project on reintroduction and monitoring of Scimitar-horned Oryx.
- H.M. Customs:* Housing and advice on identification of reptiles.
- Ministry of Forestry, People's Republic of China (with International Union for Conservation of Nature and Natural Resources/World Wildlife Fund /Woburn Estate/North of England Zoological Society/Oxford University):* Collaborative project on reintroduction of Père David's deer to the wild.
- Peruvian Zoological Trust:* Advice on husbandry of captive animals, and on wild status of endemic species.
- Police and Local Authorities:* Advice on wild animal capture techniques. Advice and assistance on identification, handling, management and capture of reptiles.
- John Radcliffe Hospital Nuffield Department of Clinical Medicine, Oxford:* Advice on housing and management of venomous snakes.
- The Alistair Reid Snake Venom Research Unit, WHO Collaborative Centre for the Control of Antivenoms, Liverpool School of Tropical Medicine:* Advice on housing and management of venomous snakes.
- Saudi Arabia:* Advice to the National Commission on wildlife conservation.
- Wolong Natural Reserve Panda Research Station, People's Republic of China (with World Wildlife Fund):* Advice on and assistance with the development of a management programme for the Giant Panda.

## COMPARATIVE MEDICINE AND PHYSIOLOGY

- American Institute of Cancer Research:* Collaborative project on nutrition and dietary fats.
- British Antarctic Survey:* Collaborative survey of Signy and Coronation Islands for *Clostridium botulinum*.
- Cambridge College of Art and Technology, Cambridge:* Collaborative studies on chemical communications in carnivores.
- Cambridge Life Sciences, Cambridge:* Provision of enzyme assay reagents.
- Cell Systems Ltd., Cambridge:* Collaborative studies on sperm cryopreservation.
- Centre for Early Human Development, Monash University, Australia:* Studies on sperm antigen.
- Charing Cross & Westminster Medical School, London:* Collaborative studies on the gonadotrophic control of primate ovarian function.
- Courtauld Institute of Biochemistry, London:* Analysis of urinary and faecal steroid metabolites.

- Dalgety (UK) Ltd., Cambridge:* Collaborative research on chemical communication in mammals.
- Edward Grey Institute of Field Ornithology, Oxford:* Laboratory examinations for diagnosis of botulism.
- Homerton Hospital, London:* Collaborative project on dietary fats and nutrition in pregnancy.
- Hospital for Tropical Diseases, London:* Laboratory service for testing of serum for diagnosis of *Toxocariasis*.
- Institute of Hormone & Fertility Disorders, Hamburg, FDR:* Collaborative studies on corpus luteum function in primates.
- Institute of Laryngology and Otolaryngology, London:* Studies on comparative anatomy of the mammalian vomeronasal organ.
- Institute of Obstetrics and Gynaecology, London:* Collaborative project on follicular development and granulosa cell function in primates.
- Institute of Primate Research, National Museums of Kenya:* Collaborative project on reproductive physiology of primates.
- Jersey Wildlife Preservation Trust:* Collaborative studies on the reproductive biology of Goeldi's monkey.
- King's College, London:* Studies on the role of opiates in control of reproductive suppression.
- Medical Research Council Clinical Research Centre, Harrow:* Collaborative research on haemosiderosis and iron absorption in birds.
- Medical Research Council Unit of Reproductive Biology, Edinburgh:* Collaborative research on the neuroendocrine basis of infertility in subordinate primates.
- Microbiology Laboratories, Harrow:* Collaborative study of antibiotic pharmacodynamics in zoo animals.
- Middlesex Hospital, London:* Collaborative studies on sperm function.
- Milk Marketing Board, Milton Keynes:* Advice on artificial insemination.
- Ministry of Agriculture, Fisheries & Food:* Laboratory examinations for diagnosis of botulism. (Cattle Breeding Centre, Reading): Development of enzyme assay techniques; studies on bull sperm fertility.
- Ministry of Defence (Directorate of Fleet Supply Duties of the Royal Navy):* Advice on dietary recommendations and ration scale for HM ships.
- National Institute of Medical Research, London:* Development of implantable electronic mini-pump device and miniaturised syringe pump.
- Regional Health Authorities:* Advice on dietary fats and nutrition in pregnancy.
- Royal Veterinary College, London:* Laboratory examinations for diagnosis of botulism.
- St Bartholomew's Hospital Medical College:* Collaborative study of bone growth in birds.
- St Mary's Hospital Medical School, London:* Collaborative studies on chorionic gonadotrophin secretion.
- St Thomas's Hospital (Rayne Institute), London:* Collaborative studies on dietary fats and nutrition.
- St Vincent's Hospital, Dublin:* Collaborative studies on the resistant ovary syndrome in women.
- Specialist Diet Services, Witham:* Collaborative studies of zoo animal diets and milk replacers.

*University of Adelaide* (Department of Anatomy): Study on Australian rodent sperm. (Department of Genetics): Investigation of meiosis in opossum oocytes.

*University of Cape Town*: Collaborative project on natural suppression of reproduction in the Naked Mole Rat.

*University College, London*: Collaborative research on hormonal basis of maternal behaviour in primates.

*University of Kent*: Collaborative research on endocrinology of puberty in primates and granulosa cell function in rodents.

*University of Nottingham School of Agriculture*: Collaborative studies on induction of ovulation in ungulates.

*University of Sydney*: Collaborative studies on primate early pregnancy proteins.

*Veterinary practices*: Laboratory examinations for diagnosis of botulism.

*Wellington Fertility Clinic, Humana Hospital, London*: Collaborative project on sperm and embryo physiology.

*World Health Organization*: The Institute of Zoology is a collaborating centre for malaria reference and research, comparative medicine and pathology of non-domestic vertebrates, reproduction and child health milk.

*Zoos*: Advice on and provision of reagents for enzyme assays. Laboratory examinations for diagnosis of botulism. Radioimmunoassay for monitoring hormonal status and pregnancy in mammals. Laparoscopic examination of monomorphic birds and reptiles for sex determination.

#### TRAINING AND INTERNATIONAL LIAISON

*British Council*: Training of visiting workers in hormone assays, nutritional biochemistry and serology.

*John Radcliffe Hospital, Oxford*: Training of technical staff in the handling and management of venomous snakes.

*University of Beijing, People's Republic of China*: Training of visiting workers in reproductive physiology and hormone assays.

*University of Brasilia*: Scientific exchange visits for specialist training in reproduction, behaviour and ecology of marmoset monkeys in the wild.

*Universities*: Training of students from the UK and overseas in microbiology, radioimmunoassay, gamete biology, behavioural studies, neuroendocrinology and veterinary medicine.

#### VETERINARY CONSULTANCY

*Longleat Safari Park*: Ultrasonography of mammals for pregnancy or disease.

*Marineland, Nice, France*: Ultrasonography of whale.

*Windsor Safari Park*: Ultrasonography of mammals for pregnancy or disease.

*World Wildlife Fund/Ministry of Forestry, People's Republic of China*: Advice on and assistance with the veterinary care of the Giant Panda.

*Zoo Dvur Kralove, Czechoslovakia* (with International Union for Conservation of Nature and Natural Resources): Advice on and assistance with anaesthesia of Northern White Rhinoceros for assessment of reproductive status and to provide material for genetic studies at San Diego Zoo.

*Consultant Histopathology, Pathology and Veterinary Advice*: Government departments; Research institutes; Zoological collections and Veterinary practices both in the UK and abroad.

#### REPRESENTATION ON SCIENTIFIC SOCIETIES, ZOOLOGICAL, CONSERVATION AND RESEARCH ORGANIZATIONS

The Society's staff, whether in an individual capacity or as representatives of the Council, play an active role in many organizations concerned with the publication of specialist journals, animal management, conservation and other specialist research activities.

*Action Research on Multiple Sclerosis (ARMS)*: Mr P. J. Drury (Computer Consultant)

*Agricultural and Food Research Council*: Professor J. P. Hearn (Member, Animals Research Board; Member, Animals Research Committee)

*Agricultural and Food, Science and Engineering, Natural Environmental Research Councils*: Professor J. P. Hearn (Member, Joint Policy Working Group on Agriculture and the Environment—until January 1987)

*Andean Project*: Miss F. M. D. Gulland (Veterinary Adviser)

*Anthropoid Ape Advisory Panel*: Dr B. C. R. Bertram (Convenor, Scientific Committee); Dr G. M. Mace (Scientific Adviser)

*Association for Animal Haematology*: Mr M. G. Hart (Committee)

*Association of British Wild Animal Keepers*: Mr V. J. A. Manton (Vice President)

*Association of Veterinary Anaesthetists*: Mr R. A. Kock (Committee)

*Australian Research Grants Scheme*: Professor J. P. Hearn (Member, Assessors' Panel)

*Biological Council*: Mr P. J. S. Olney (Member)

*British Andrology Society*: Dr H. M. D. Moore (Treasurer)

*British Deer Society*: Dr A. S. I. Loudon (Chairman, Scientific Advisory Panel); Mr V. J. A. Manton (Veterinary Adviser)

*British Dietetic Association*: Mrs W. Doyle (Member, Community and Paediatric Dieticians' Groups)

*British Industries Biological Research Association (BIBRA)*: Professor J. P. Hearn (Member, Research Policy Committee—until January 1987)

*British Journal of Experimental Pathology*: Dr G. R. Smith (Editorial Advisory Committee)

*British Nutrition Foundation*: Sir Cyril A. Clarke (Chairman, Task Force on Sugars and Syrups)

*British Ornithologists' Union*: Mr P. J. S. Olney (Vice President; Member, Meetings Committee)

*British Veterinary Zoological Society*: Dr J. K. Kirkwood and Mr V. J. A. Manton (Council); Mr R. A. Kock (Steering Committee, International Clinical Studies Group)

*Brooke Hospital for Animals, Cairo*: Mr D. M. Jones (Vice Chairman)

*Central Middlesex Hospital*: Professor M. A. Crawford (Hon. Secretary, Coronary Prevention Group (CPG); Member, Council of Management of ARMS/CPG Research Unit); Mrs W. Doyle (Member, Nutrition Committee, CPG)

*CoEnCo/Wildlife Link Committee*: Mr D. M. Jones (Observer)

*Department of the Environment*: Mr D. J. Ball; Dr B. C. R. Bertram; Mr D. M. Jones; Mr V. J. A. Manton (Secretary of State's List of Inspectors under the Zoo Licensing Act 1981)

*European Association of Aquatic Mammals*: Mr V. J. A. Manton (Editor, *Aquatic Mammals*)

*European Association of Radiology*: Professor G. H. du Boulay (President)

*Fauna and Flora Preservation Society*: Mr D. M. Jones (Vice Chairman)

- Florida State Museum (Program for Studies in Tropical Conservation)*: Dr B. C. R. Bertram (Member, Advisory Committee)
- German Research Council*: Professor J. P. Hearn (Member, Steering Committee of Primate Research Centre, Cöttingen)
- Harvard Medical School*: Professor J. P. Hearn (Member, Scientific Advisory Board of New England Primate Research Centre)
- Hawk Trust*: Dr J. K. Kirkwood (Member, Scientific Committee)
- Inner London Education Authority, Horniman Museum Advisory Committee*: Mr M. K. Boorer (Member)
- International Air Transport Association*: Mr V. J. A. Manton (Member, Live Animals Board)
- International Council for Bird Preservation*: Dr J. K. Kirkwood (Member, World Working Group on Birds of Prey); Mr P. J. S. Olney (Chairman, British Section)
- International Journal of Parasitology*: Dr A. Voller (Editorial Board)
- International Ornithological Committee (Committee of 100)*: Mr P. J. S. Olney (Member)
- International Primatological Society*: Professor J. P. Hearn (President)
- International Union for the Conservation of Nature and Natural Resources (Species Survival Commission)*: Dr B. C. R. Bertram (Member, Cat Specialist Group); Professor J. P. Hearn (Member, Genome Preservation and Primate Specialist Groups); Mr D. M. Jones (Member, Asiatic Elephant and Captive Breeding Specialist Groups); Dr A. S. I. Loudon (Member, Endangered Deer Specialist Group); Dr G. M. Mace (Member, Captive Breeding Specialist Group); Mr V. J. A. Manton (Member, Cat and European Bison Specialist Groups); Mr P. J. S. Olney (Member, Captive Breeding Specialist Group; Zoological Society Representative)
- International Union of Directors of Zoological Gardens*: Mr D. M. Jones (Zoological Society Representative)
- Institute of Biology*: Mr D. M. Jones (Deer Liaison Group)
- Journal of Clinical Laboratory Analysis*: Dr A. Voller (Editorial Board)
- Journal of Clinical Pathology*: Dr A. Voller (Editorial Board)
- Journal of Comparative Pathology*: Dr G. R. Smith (Editorial Board)
- Journal of General Microbiology*: Dr A. Voller (Editorial Board)
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- Journal of Reproduction and Fertility*: Dr H. D. M. Moore (Council of Management)
- Journal of Virological Methods*: Dr A. Voller (Editorial Board)
- Linnean Society of London*: Dr M. A. Edwards (Editorial Committee)
- London Food Commission*: Professor M. A. Crawford (Trustee)
- Mammal Society*: Dr B. C. R. Bertram (Council)
- Marwell Zoological Trust*: Mr D. M. Jones (Trustee); Dr G. M. Mace (Member, Management and Scientific Committee); Mr V. J. A. Manton (Vice President—Marwell Society)
- Medical Research Council*: Professor G. H. du Boulay (Member, Cell Board); Professor J. P. Hearn (Member, Simian Virus Committee; Member, Subcommittee on Policy on In-house Breeding of Animals; Member, Systems Board Grant Committee 'B')
- Medicina*: Dr A. Voller (Editorial Board)
- Metropolitan Police Firearms Unit*: Miss F. M. D. Gulland and Mr R. A. Kock (Veterinary Advisers)
- National Federation of Zoological Gardens of Great Britain and Ireland*: Mr J. Griffin (Member, Marketing Committee—until December 1986); Mr D. M. Jones (Treasurer); Mr V. J. A. Manton; Mr P. J. S. Olney (Members, Conservation and Animal Management Committee)
- National Hospital for Nervous Diseases, London*: Professor G. H. du Boulay (Honorary Consultant; Trustee, Queen Square Development Foundation)
- National Museums of Kenya*: Professor J. P. Hearn (Member, International Scientific Advisory Board for the Institute of Primate Research)
- National Trust*: Mr V. J. A. Manton (Chairman, Whipsnade Advisory Committee)
- Natural Environmental Research Council*: Professor J. P. Hearn (Member, Special Committee on Seals)
- Nature Conservancy Council*: Mr P. J. S. Olney (Member, Advisory Committee for Birds)
- Neuroradiology*: Professor G. H. du Boulay (Editor-in-Chief)
- Paddington Technical College*: Mr M. K. Boorer; Dr C. M. Hawkey; Mr D. M. Jones; Dr J. K. Kirkwood; Mr R. A. Kock (Lecturers)
- Pathological Society of Great Britain and Ireland*: Dr G. R. Smith (Committee; Member, Microbiological Sub-Committee—until July 1986)
- Primate Society of Great Britain*: Dr D. H. Abbott (Council; Member, Captive Care Working Party); Dr B. C. R. Bertram (Member, Captive Care Working Party; Member, Conservation Working Party); Professor J. P. Hearn (Council; Member, Primate Breeding and Welfare Committee); Dr J. K. Hodges (Council—until December 1986)
- Programme for Appropriate Technology in Health (USA)*: Dr A. Voller (Honorary Member)
- Radiological Research Trust*: Professor G. H. du Boulay (Director)
- Roehampton Institute of Higher Education*: Dr P. M. Summers (Visiting Lecturer in Biology)
- Royal Postgraduate Medical School, London*: Professor M. A. Crawford (Visiting Lecturer, Department of Clinical Medicine)
- Royal Society for the Prevention of Cruelty to Animals*: Mr V. J. A. Manton (Member, Wild Animals Advisory Committee)
- Royal Society of Medicine*: Dr G. R. Smith (Vice President, Section of Comparative Medicine)
- Society for the Study of Fertility*: Professor J. P. Hearn (Committee); Dr H. D. M. Moore (Committee representative for Institute of Biology)
- XIV Symposium Neuroradiologicum 1990*: Professor G. H. du Boulay (President Elect)
- Tropenmedizin und Parasitologie*: Dr A. Voller (Editorial Board)
- Universities Federation for Animal Welfare (UFAW)*: Professor J. P. Hearn (Member, Primate Working Party)
- University of Bristol*: Dr J. K. Kirkwood (Visiting Lecturer, Department of Animal Husbandry)
- University of London*: Dr D. H. Abbott (Course Lecturer, Zoology & Cell Biology Department, University College);

Professor G. H. du Boulay (Emeritus Professor of Neuro-radiology, National Hospital for Nervous Diseases); Miss F. M. D. Gulland (Visiting Lecturer, Department of Medicine, Royal Veterinary College); Dr C. M. Hawkey (Honorary Lecturer in Haematology, Royal Free Hospital School of Medicine); Professor J. P. Hearn (Visiting Professor, Zoology & Cell Biology Department, University College; Member, Board of Studies in Zoology & Botany); Mr G. M. Henderson (Visiting Lecturer, Department of Medicine, Royal Veterinary College—until June 1986); Dr J. K. Hodges (Course Lecturer, Zoology & Cell Biology Department, University College); Dr W. V. Holt (Visiting Lecturer, Department of Biology, King's College); Mr D. M. Jones (Member, Board of Studies in Zoology & Botany); Dr J. K. Kirkwood (Visiting Lecturer, Department of Medicine, Royal Veterinary College); Mr R. A. Kock (Visiting Lecturer, Department of Medicine, Royal Veterinary College); Dr A. S. I. Loudon (Course Lecturer, Zoology & Cell Biology Department, University College); Dr H. D. M. Moore (Course Lecturer, Zoology & Cell Biology Department, University College); Dr G. R. Smith (Visiting Lecturer, Microbiology Department, Royal Veterinary College); Dr P. M. Summers (Course Lecturer, Zoology & Cell Biology Department, University College); Dr A. Voller (Reader in Immunology of Parasitic Diseases, London School of Hygiene and Tropical Medicine; Council Member, London School of Hygiene and Tropical Medicine)

*University of Nottingham School of Agriculture:* Professor M. A. Crawford (Honorary Professor in Applied Biochemistry and Nutrition)

*University of Surrey:* Dr G. R. Smith (Visiting Lecturer, Microbiology Department)

*Vaccine:* Dr A. Voller (Editorial Board)

*Veterinary Deer Society:* Mr G. M. Henderson (Treasurer—until June 1986); Mr R. A. Kock (Assistant Editor)

*Wellington Fertility Clinic, Humana Hospital:* Dr H. D. M. Moore (Honorary Research Fellow)

*Wild Mammals in Captivity:* Dr B. C. R. Bertram (Editorial Board)

*World Health Organization:* Professor J. P. Hearn (Member, Institution Strengthening (Research Development) Committee; Adviser, Reproductive Physiology and Applied Primate Research, WHO Special Programme of Research in Human Reproduction); Dr A. Voller (Member of Expert Advisory Panel on Parasitology; Member of WHO/IUIS Subcommittee on Standardization of Reagents for Enzyme Immunoassays)

*World List of Scientific Periodicals:* Mr R. A. Fish (Council)

*World Pheasant Association:* Mr P. J. S. Olney (Council)

*World Wildlife Fund:* Professor J. P. Hearn; Dr A. S. I. Loudon (Scientific Advisers, Conservation Research Programme, China); Mr D. M. Jones (Trustee and Member of the Conservation Review Group, UK)

*Zoo Biology:* Professor J. P. Hearn (Editorial Board)

# Amendments to the Regulations

The following amended Regulations, effective from 1 January 1987, were made by the Council pursuant to the power granted in Article 8 of the Charter:

## ENTRANCE FEES AND SUBSCRIPTIONS

- 7 £5 out of the annual subscription of £30 shall be remitted in the case of Ordinary Fellows resident within the British Isles but outside a radius of 50 miles from Charing Cross.
- 8 £10 out of the annual subscription of £40 shall be remitted in the case of a Scientific Fellow who does not wish to receive the *Journal of Zoology*.
- 9 £5 out of the annual subscription of £25 shall be remitted in the case of Associates resident within the British Isles but outside a radius of 50 miles from Charing Cross, save for those Associates who qualify for student remission under Regulation 6 (vi) for whom the annual subscription shall be half the full rate.
- 12 **Overseas List**
- (i) An Ordinary Fellow who is resident outside the British Isles at the time of his election shall be registered on the Overseas List, in which case £17.50 out of the annual subscription of £30 shall be remitted.
  - (ii) An Ordinary Fellow who takes up residence outside the British Isles after election or intends at any time to reside outside the British Isles for a period of more than twelve months shall be transferred to the Overseas List. During his residence abroad, £17.50 out of the annual subscription of £30 shall be remitted, except in respect of the year in which he leaves the British Isles.
  - (iii) A Scientific Fellow who is resident outside the British Isles at the time of his election shall be registered on the Overseas List. If he does not wish to receive the *Journal of Zoology*, £27.50 out of the annual subscription of £40 shall be remitted.
  - (iv) A Scientific Fellow who takes up residence outside the British Isles after election or intends at any time to reside outside the British Isles for a period of more than twelve months shall be transferred to the Overseas List. If he does not wish to receive the *Journal of Zoology* during his residence abroad, £27.50 out of the annual subscription of £40 shall be remitted, except in respect of the year in which he leaves the British Isles.
  - (v) An Associate who is resident outside the British Isles at the time of his election shall be registered on the Overseas List, in which case £12.50 out of the annual subscription of £25 shall be remitted.
  - (vi) An Associate who takes up residence outside the British Isles after election or intends at any time to reside outside the British Isles for a period of more than twelve months shall be transferred to the Overseas List. During his residence abroad £12.50 out of the annual subscription of £25 shall be remitted except in respect of the year in which he leaves the British Isles.

## 13 Life Fellows

The following life composition fees shall be payable by any Fellow who wishes to compound his future subscriptions

Age group	18-29	30-39	40-49	50-59	60 years and over
	£720	£660	£580	£480	£245

provided that any Fellow who has reached the age of sixty-five and has at least twenty-five years membership may compound his future subscriptions by making a single payment of £60 subject, if he is a Scientific Fellow, to relinquishing the privilege of receiving the *Journal of Zoology* without charge.

Any Fellow on the Overseas List may compound his future subscriptions by a single payment bearing the same proportion to the full composition fee for his age group as his annual subscription bears to the full annual subscription, provided that the balance of the full composition fee for his age group shall be payable if and when he becomes resident in the British Isles.

## Life Associates

The following life composition fees shall be payable by any Associate who wishes to compound his future subscriptions

Age group	18-29	30-39	40-49	50-59	60 years and over
	£600	£550	£485	£400	£205

# Acknowledgements

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**ARCHITECTS' DEPARTMENT:** Westminster City Council, for financial help and advice with the refurbishment of the East Tunnel; British Trust for Conservation Volunteers, for their work in connection with the creation of the Nature Walk; Mr Peter Palumbo, donation in connection with the restoration of the Penguin Pool; English Heritage, grant for work in connection with the Penguin Pool.

*Gardening Department:* Mr D. Castleton, Superintendent, Regent's Park; Professor A. Bell, Director, Royal Botanical Gardens, Kew.

**CURATORS' DEPARTMENTS:** The Universities Federation for Animal Welfare for the funding of the UFAW-ZSL Behaviour Enrichment Programme; The many individuals and organizations who kindly donated animals; Mr R. Davies, Mr W. Passanisi, and Miss M. Smits for voluntary assistance to the Curator of Mammals; The many volunteers who worked with the Keepers; Mr W. Doss, Headkeeper of Elephants at Metrozoo, Miami, for guidance with the Elephant management programme; The three teams of sailors from HMS *Daedalus* who worked on the Tapir, Cheetah and Giant Panda enclosures and in the Snowdon Aviary; Lord Coke and Mr Dickerson of the Holkham Estate for providing evergreen oak for browsing mammals; The Parks Department of Regent's Park for help in obtaining branches and logs; Mr M. Polkinghorne and the Polkerris Scout Troup for collecting bamboo for the Giant Panda; Thames Water and Freshwater Biological Association for assistance in obtaining freshwater fish; Prestopets Ltd, Star Fisheries and Wildwoods for assistance in obtaining freshwater and tropical fish; British Cichlid Association, British Killifish Association, Anabantoid Association and the Southern Livebearers Aquatic Group for providing unusual tropical fish; Blackpool Aquarium, Aqualand (Torquay), MAFF Fisheries Laboratory at Lowestoft and Sea Life Centre at Weymouth for providing seawater fish and invertebrates; Mr P. Scholls (of the MAFF Lowestoft Laboratory) for his help in obtaining seawater; Aquarium Fishfoods and Salamander Books for their special help during Aquarium Week; Tropical Marine Centre and Aqua-Magic Ltd for their help and advice on filtration, and in obtaining tropical marine fish and invertebrates; British Museum (Natural History) for their help in identifying certain specimens; Mr T. Langton of the Flora and Fauna Preservation Society for his help in obtaining Great Crested Newts; The Tropical Development & Research Institute for supplying surplus insects.

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**EDUCATION DEPARTMENT—LONDON ZOO:** Mrs C. Aickin, Mrs A. Alexander, Mrs F. Audric, Mrs N. Barnett, Mr J. Barrington-Johnson, Mrs J. Bass, Mrs M. Bates, Mr M. Beanlands, Mrs P. Beanlands, Mr D. Bell, Mr R. Borris, Mrs D. Boyd-Gibbons, Mrs L. Bromwich, Miss S. Brough, Mrs M. Carmichael, Mr D. Charnick, Mrs P. Clark, Mrs V. Clark, Mr J. Clifford, Mrs J. Coffey, Miss J. Cottrell, Mrs P. Cox, Mrs I. Cruickshank, Mr M. Culpan, Mrs P. Cuncliffe, Mrs A. Darby, Mrs M. Davis, Mrs J. Deco, Mrs K. Dixon, Mr M. D'Souza, Mrs L. Dunkley, Mrs Y. Edwards, Mrs J. Eggmore, Mrs M. Elson, Mrs M. Fane, Mr D. Finlay, Mrs E. Foote, Miss E. Formoy, Mrs M. Godwin, Miss E. Grabow, Ms N. Green, Mr A. Hallsworth, Mrs B. Harrison, Ms A. Hazelrigg, Mrs P. Healy, Mrs S. Heinemann, Mrs K. Herbert, Mr J. Howell, Mrs P. Howell, Ms S. Jackson, Mrs M. Jenkins, Mrs S. Jespersen, Mrs J. Jones, Mr E. Jones, Ms B. Jordan, Miss G. Kalsi, Mr E. King, Ms W. Knowles, Mrs M. Lang, Mr T. Law, Ms J. Lewis, Mrs G. Lubin, Mr D. Lumley, Mrs J. Mann, Mrs B. May, Miss J. Melman, Mrs K. Mills, Mrs A. Montefiore, Mr H. A. Moore, Mrs K. Morrice, Ms A. Muhr, Mr D. McEvoy, Mrs W. McLerie, Mrs V. Neild, Mr S. Peirce, Mr M. Pilkington, Mrs G. Pirie, Miss S. Porges, Mrs Y. Porges, Mr F. Redmill, Mrs D. Reed, Mr F. Reed, Miss J. Roberts, Ms C. Sandberg, Mr J. Semmens, Mrs J. Sherman, Mrs S. Simon, Mrs A. Skidelsky, Miss M. Slinn, Mrs J. Smith, Mrs A. Steiner, Mr R. Sweet, Ms L. Taylor, Mr R. Tomlinson, Mrs M. L. Wallis, Mrs M. Wallis, Ms A. Waterfield, Ms C. Wayne, Miss M. Welsh, Mr P. Williams, Mrs R. Williams, Mrs C. Wilson, Mr K. Wilson, Mrs I. Wingrove, Mr D. Winston, Mrs H. Wohl, Mr D. Wooderson, Mr B. Yarham. Thanks are also due to the Inner London Education Authority and to Dr D. J. Chivers, Dr S. K. Bearder, Dr L. C. Aiello, Dr A. H. Harcourt and Dr A. D. Johns who spoke at our Symposium.

**EDUCATION DEPARTMENT—WHIPSNADDE PARK:** Mrs C. Addison, Mrs S. Austin, Miss T. Boundy, Mrs J. Broad, Ms P. Brobyn, Mr S. Cocks, Miss J. Crick, Mr M. Crick, Miss V. Dawson, Mrs B. Deacon, Mrs O. Dodd, Mr J. Edwards, Mrs J. Emery, Mrs P. Erwood, Mrs G. Favell, Mrs C. Fetigan, Miss R. Fielder, Mrs P. Francis, Ms L. Ford, Mrs K. Gale, Mrs E. Godman, Mrs A. Kane, Miss T. Kazim, Miss L. Laird, Mrs E. Lennon, Mrs G. Lumb, Mrs J. Lund, Mrs E. March, Mrs P. Mitchell, Mrs K. Morrice, Mrs J. Oldfield, Mrs J. Owen, Mrs A. Perrott, Mr L. Perrott, Mrs B. Pickup, Mrs B. Platten, Mrs A. Plunkett, Mrs I. Putnam, Mrs J. Roberts, Mrs D. Roberts, Mrs C. Sharpe, Miss F. Stuart, Mrs D. Tester, Mrs C. Thompson, Mr L. Thompson, Mrs F. Tomlin, Mrs S. Williams.



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PUBLIC RELATIONS OFFICE: Dennis Waterman and Rula Lenska; Joan and Mary Haywood; Elizabeth Whitehead; Judie King; Rena Staunton; Jo Durie; David Essex; Judith Hann; James Baker; Arabella Warner; Phil Parsons; Tommy Boyd; Timmy Mallet; Michaela Strachan; Regent's Park Open Air Theatre; Regent's College; Nick Wilson; Anneka Rice; Fiona Fullerton; Biddy Baxter; Panda; and all the representatives of the media and photographers, whose co-operation and interest in the work of the Society is gratefully acknowledged.

*Animal Sponsorship and Adoption:* Queen's Park Rangers Football Club; David Essex; Ferrero; Ken Follett; Inky Fingers; Wide Awake Club; Siouxi and Budgie of 'The Creatures'; Mrs Phyllis Brabner; The Wellcome Foundation and Derek Jacobi; all those other Adopters who have generously contributed money towards the maintenance and feeding of animals large and small.

WHIPSNAD PARK: British Red Cross Society; Radio Bedfordshire; Chiltern Radio; H.M.S. *Daedalus*; Dunstable Town Council; Dunstable Fire Brigade; Luton and Dunstable Hospital; Dr C. P. Royall; Mr V. Sheriff; Mr D. Summers, MAFF; Thames and Chiltern Tourist Board; Wellcome Foundation.

# Financial Statements

## Income and Expenditure Account For the Year ended 31st March 1987

	Notes	£'000s	Year ended 31 March 1987 £'000s	15 months ended 31 March 1986 £'000s
INCOME FROM ACTIVITIES	2		5,351.4	5,628.0
COST OF ACTIVITIES	2		7,304.7	8,639.3
NET DEFICIT ON ACTIVITIES			(1,953.3)	(3,011.3)
Administrative expenses			(78.3)	(109.9)
Other operating income	3		(2,031.6) 42.4	(3,121.2) 167.7
Income from investments	4	56.2		60.4
Interest receivable	5	222.4		251.5
			278.6	311.9
OPERATING DEFICIT FOR THE YEAR	6		(1,710.6)	(2,641.6)
GRANT—DEPARTMENT OF THE ENVIRONMENT	8		2,000.0	3,500.0
			289.4	858.4
EXCEPTIONAL ITEM				
Profit on sales of assets			8.9	125.5
EXCESS OF INCOME OVER EXPENDITURE			298.3	983.9
APPROPRIATION				
Transfer to Building and Equipment Fund			(235.0)	(450.0)
			63.3	533.9
BALANCE BROUGHT FORWARD			278.9	(255.0)
BALANCE CARRIED FORWARD			342.2	278.9

The notes on pages 55 to 63 form part of these accounts

# Balance Sheet at 31st March 1987

	Notes	£'000s	1987 £'000s	1986 £'000s
<b>FIXED ASSETS</b>				
Tangible assets	9		1732.7	1,420.4
Investments	10		548.8	507.2
			<u>2,281.5</u>	<u>1,927.6</u>
<b>CURRENT ASSETS</b>				
Stocks	11	137.0		124.6
Debtors	12	1,135.4		1,337.5
Cash at bank and in hand		1,356.5		1,452.6
		<u>2,628.9</u>		<u>2,914.7</u>
<b>CREDITORS: amounts falling due within one year</b>	13	<u>(1,151.8)</u>		<u>(1,362.4)</u>
<b>NET CURRENT ASSETS</b>			<u>1,477.1</u>	<u>1,552.3</u>
<b>TOTAL ASSETS LESS CURRENT LIABILITIES</b>			<u>3,758.6</u>	<u>3,479.9</u>
<b>CREDITORS: amounts falling due after more than one year</b>	14		<u>(36.9)</u>	<u>(44.6)</u>
			<u>3,721.7</u>	<u>3,435.3</u>
<b>FUNDS AND RESERVES</b>				
Deferred government grant	8		1,034.3	1,000.0
Funds	15		642.5	582.8
Building and Equipment Fund	16		1,702.7	1,573.6
Income and Expenditure Account			342.2	278.3
			<u>3,721.7</u>	<u>3,435.3</u>

Approved by Council 10th June, 1987

PEYTON  
Treasurer

SIR WILLIAM HENDERSON  
President

# Statement of source and application of funds for the year ended 31st March 1987

	£'000s	Year ended 31 March 1987 £'000s	15 months ended 31 March 1986 £'000s
<b>SOURCE OF FUNDS</b>			
Grant from the Department of the Environment		2,000.0	3,500.0
Deficit from operations		(1,710.6)	(2,641.6)
		<u>289.4</u>	<u>858.4</u>
Items not involving the movement of Funds			
Composition Fund—transfer	(0.8)		(0.8)
Depreciation	131.8		88.5
Transfer from Building and Equipment Fund	(120.9)		(45.8)
		<u>10.1</u>	<u>41.9</u>
Total generated by operations		<u>299.5</u>	<u>900.3</u>
Funds from other sources			
Sale proceeds of assets	8.9		125.5
Surplus on sale of Scientific Fund investments (note 15)	45.8		13.9
Funds income	14.7		15.4
Grants for purchase of fixed assets			
Department of the Environment	34.3		1,000.0
Other	15.0		58.2
		<u>118.7</u>	<u>1,213.0</u>
		<u>418.2</u>	<u>2,113.3</u>
<b>APPLICATION OF FUNDS</b>			
Net increase in investments	41.6		2.3
Purchase of tangible fixed assets	444.1		721.4
Lease finance	—		54.3
		<u>485.7</u>	<u>778.0</u>
		<u>(67.5)</u>	<u>1,335.3</u>
<b>MOVEMENT IN WORKING CAPITAL</b>			
Increase/(decrease) in stocks		12.4	76.1
(Decrease)/increase in debtors		(202.1)	798.9
Increase/(decrease) in creditors		218.3	(356.3)
		<u>28.6</u>	<u>518.7</u>
Movement in net liquid funds		<u>(96.1)</u>	<u>816.6</u>
(Decrease)/increase in bank balances and deposit		<u>(67.5)</u>	<u>1,335.3</u>

# Report of the Auditors

TO THE COUNCIL OF THE ZOOLOGICAL SOCIETY OF LONDON

We have audited the financial statements on pages 52 to 63 in accordance with approved auditing standards.

In our opinion the financial statements, which have been prepared under the historical cost convention, give a true and fair view of the state of affairs at 31st March 1987 and of the excess of income over expenditure and source and application of funds for the year ended on that date.

ARTHUR YOUNG *Chartered Accountants*

10th June 1987

## Notes to the Financial Statements

### 1. ACCOUNTING POLICIES

#### (a) *Changes in Accounting Policies*

The Society changed its accounting policy for fixed assets and depreciation to that stated in (d) below from January 1984. Freehold land and buildings acquired prior to December 1983 are fully depreciated; other buildings, plant, vehicles and fittings and furnishings were written off in the year of purchase.

#### (b) *Basis of Financial Statements*

The Society receives from the Department of the Environment a revenue grant of £2 million a year commencing in the Government's financial year to 31st March, 1985 subject to review in the third year, and additional contributions towards repayment of the Society's overdraft and capital expenditure within the same period. The financial statements have accordingly been prepared on a going concern basis and under the historical cost convention.

#### (c) *Consolidation*

The financial statements do not consolidate the results and the assets and liabilities of the Society's wholly owned subsidiaries, Zoo Restaurants Limited and Zoo Enterprises Limited.

Concession fees, covenanted profits and losses of these companies are included in catering and retail services income, Note 2(f).

#### (d) *Fixed Assets and Depreciation*

Fixed assets acquired by purchase or gift during the year are shown at cost or valuation depreciated on a straight line basis at rates appropriate to write off the cost over their expected useful lives. Freehold and leasehold buildings are depreciated over a range of 15 to 40 years; plant and equipment 5 to 10 years and motor vehicles 5 years.

#### (e) *Building and Equipment Fund*

The fund comprises grants received and appropriations from income and expenditure account, which are released back to revenue over the expected useful life of the relevant asset by equal annual amounts.

#### (f) *Grants*

Government grants received of a revenue nature are credited to the income and expenditure account for the year in which they are received. Grants for capital expenditure are credited to a deferred government grant account and are released to revenue over the expected useful life of the relevant asset by equal annual amounts.

#### (g) *Stocks*

Stocks are stated at the lower of direct cost and net realizable value with the following exceptions: no value is placed on the animals, farm and garden stocks and the library; stocks of scientific publications are included at nominal valuation.

#### (h) *Special Funds*

Special funds of the Society which have conditions attached to their use are not included in the balance sheet. Details of these are set out in Note 18.

#### (i) *Pension Scheme Arrangements*

The pension scheme of the Society is maintained as a separate trust fund. Payments made to the fund and charged in these financial statements are based on actuarial advice. The fund is actuarially valued every three years.

#### (j) *Leasing commitments*

Assets obtained under finance leases are capitalized in the balance sheet and are depreciated over their useful lives. The interest element of the rental obligations is charged to profit and loss account over the period of the lease and represents a constant proportion of the balance of capital repayments outstanding.

2. INCOME AND EXPENDITURE ON ACTIVITIES IS ATTRIBUTABLE AS FOLLOWS:

	Notes	Income £'000s	Expenditure £'000s	1987 Surplus/ (Deficit) £'000s	1986 Surplus/ (Deficit) £'000s
<i>Specific activities</i>					
<i>Zoological Gardens:</i>					
London Zoo	2(a)	3,379.2	3,767.0	(387.8)	(1,095.8)
Whipsnade Park	2(a)	880.2	1,570.3	(690.1)	(915.6)
Education	2(b)	92.8	158.6	(65.8)	(77.2)
Library	2(c)	0.4	75.9	(75.5)	(94.2)
Publications	2(d)	314.0	309.5	4.5	28.8
Institute of Zoology	2(e)	595.3	1,416.3	(821.0)	(964.0)
		<u>5,261.9</u>	<u>7,297.6</u>	<u>(2,035.7)</u>	<u>(3,118.0)</u>
<i>General activities</i>					
Members subscriptions and fees		111.0	7.1	103.9	122.4
Transfer: Composition fees	15	0.8	—	0.8	0.8
Donations		19.0	—	19.0	27.0
Less: Investment income (Institute of Zoology)	15	(41.3)	—	(41.3)	(43.5)
		<u>5,351.4</u>	<u>7,304.7</u>		
Net (deficit) on activities				<u>(1,953.3)</u>	<u>(3,011.3)</u>

2. (a) Zoological Gardens

	London Zoo		Whipsnade Park	
	1987 £'000s	1986 £'000s	1987 £'000s	1986 £'000s
<i>Income</i>				
Admission of visitors	2,770.9	3,040.9	670.6	690.7
Admission of cars	—	—	87.5	86.3
Catering and retail services (Note 2(f))	449.4	266.7	44.3	(13.5)
Miscellaneous income	60.4	67.9	77.8	91.9
Friends of the Zoos	98.5	90.3	—	—
	<u>3,379.2</u>	<u>3,465.8</u>	<u>880.2</u>	<u>855.4</u>
<i>Expenditure</i>				
Staff costs	1,847.0	2,194.4	763.0	881.4
Administration costs	317.7	379.9	149.6	165.0
Provisions	246.1	283.0	172.3	177.1
Less: Income from animal adoption scheme	(87.2)	(93.6)	(12.5)	(11.9)
Backlog maintenance	324.2	399.4	182.1	108.8
Minor works	56.1	53.8	8.2	12.0
Works materials	100.2	57.4	43.5	67.1
Gardening and forestry	9.8	7.0	5.0	4.2
Equipment and supplies	78.0	65.2	16.1	60.5
Miscellaneous direct expenses	52.7	54.6	36.8	14.5
Rates and insurances	65.2	76.2	14.8	36.6
Fuel, light, water and transport	413.5	671.3	108.2	148.9
Advertising and promotion	197.4	214.0	124.7	79.5
Graphics and information	79.0	87.7	10.8	15.0
Friends of the Zoos	28.1	84.2	—	—
Depreciation	88.2	71.9	17.3	12.3
Transfer from building and equipment fund	(49.0)	(44.8)	(69.6)	—
	<u>3,767.0</u>	<u>4,561.6</u>	<u>1,570.3</u>	<u>1,771.0</u>
Deficit	<u>(387.8)</u>	<u>(1,095.8)</u>	<u>(690.1)</u>	<u>(915.6)</u>

(b) Education

<i>Income</i>				
Education visits	76.6	95.8	16.2	0.3
	<u>76.6</u>	<u>95.8</u>	<u>16.2</u>	<u>0.3</u>
<i>Expenditure</i>				
Staff costs	111.4	127.6	13.5	11.2
Administration costs	19.2	22.1	2.5	2.0
Printing	—	2.2	—	—
Equipment and supplies	0.8	1.4	2.2	—
Sundry	6.7	6.4	2.3	0.4
	<u>138.1</u>	<u>159.7</u>	<u>20.5</u>	<u>13.6</u>
Deficit	<u>(61.5)</u>	<u>(63.9)</u>	<u>(4.3)</u>	<u>(13.3)</u>

(c) Library		
Income	0.4	—
<i>Expenditure</i>		
Staff costs	49.9	61.6
Administration costs	8.6	10.7
Equipment and supplies	17.4	21.9
	75.9	(94.2)
Deficit	(75.5)	(94.2)

(d) Publications

	Journal (Series A & B) Symposia	International Zoo Year Book	Zoological Record and Nomenclator	1987 Total	1986 Total
	£'000s	£'000s	£'000s	£'000s	£'000s
<i>Income</i>					
Sales	243.2	70.2	0.6	314.0	337.2
<i>Expenditure</i>					
Staff costs	56.3	34.2	17.4	107.9	125.7
Administration costs	9.8	5.9	3.0	18.7	22.0
Paper and printing	143.5	25.6	—	169.1	148.0
Sundry	13.1	0.2	—	13.3	12.4
Depreciation	—	0.5	—	0.5	0.3
	222.7	66.4	20.4	309.5	308.4
Surplus/(deficit)	20.5	3.8	(19.8)	4.5	28.8

(e) Institute of Zoology

	Veterinary Science	Wellcome Laboratories	Nuffield Laboratories	1987 Total	1986 Total
	£'000s	£'000s	£'000s	£'000s	£'000s
<i>Income</i>					
Fees	6.0	—	—	6.0	5.1
Scientific fund— investment income (Note 15)	—	41.3	—	41.3	43.5
Grants:					
Specific projects	7.4	295.7	244.9	548.0	626.6
Wolfson fund	—	—	—	—	75.0
	13.4	337.0	244.9	595.3	750.2
<i>Expenditure</i>					
Staff costs	210.4	346.1	450.7	1,007.2	1,136.6
Administration costs	36.1	21.9	50.6	108.6	135.4
Equipment and supplies	46.8	92.3	101.9	241.0	393.7
Miscellaneous direct expenses	5.7	7.4	11.4	24.5	30.2
Sundry	12.6	6.3	7.2	26.1	17.9
Depreciation	2.4	8.8	—	11.2	1.4
Transfer from building and equipment fund	—	(2.3)	—	(2.3)	(1.0)
	314.0	480.5	621.8	1,416.3	1,714.2
Deficit	(300.6)	(143.5)	(376.9)	(821.0)	(964.0)



(f) Catering and Retail Services

Included under this heading are concession fees and covenanted profits from Zoo Restaurants Ltd and its subsidiary company Zoo Enterprises Ltd. as follows:

	1987			1986		
	London Zoo	Whipsnade Park	Total	London Zoo	Whipsnade Park	Total
	£'000s	£'000s	£'000s	£'000s	£'000s	£'000s
Zoo Restaurants Ltd	73.8	12.3	86.1	82.0	(1.9)	80.1
Zoo Enterprises Ltd	262.8	54.7	317.5	190.1	31.7	221.8
	<u>336.6</u>	<u>67.0</u>	<u>403.6</u>	<u>272.1</u>	<u>29.8</u>	<u>301.9</u>
Less: Provision for loss on Zoo Restaurants Ltd	—	—	—	(5.4)	(43.3)	(48.7)
Add: release of provision	112.8	(22.7)	90.1	—	—	—
	<u>449.4</u>	<u>44.3</u>	<u>493.7</u>	<u>266.7</u>	<u>(13.5)</u>	<u>253.2</u>
Sales for the period amounted to:						
Zoo Restaurants Ltd						
— Own operations			308.2			259.8
— Concession operations			1,639.9			1,702.7
Zoo Enterprises Ltd			1,241.9			1,249.6
			<u>1,241.9</u>			<u>1,249.6</u>

	1987	1986
	£'000s	£'000s
3. OTHER OPERATING INCOME		
Income from consultancies	42.4	167.7
	<u>42.4</u>	<u>167.7</u>
No provision has been made for taxation on consultancy income received from abroad; the Society does not believe there to be a liability to overseas taxation.		
4. INCOME FROM INVESTMENTS		
Listed investments	56.2	60.4
	<u>56.2</u>	<u>60.4</u>
5. INTEREST RECEIVABLE		
Bank deposits	189.7	206.1
Zoo Restaurants Ltd and Zoo Enterprises Ltd.	32.7	45.4
	<u>222.4</u>	<u>251.5</u>
6. OPERATING DEFICIT		
After charging:		
Auditors' remuneration	8.0	13.2
Depreciation	131.8	88.5
	<u>139.8</u>	<u>101.7</u>

	1987 £'000s	1986 £'000s
7. STAFF COSTS		
Wages and salaries	3,559.1	4,173.2
Employers National Insurance Contributions	338.2	403.1
Other pension costs	325.4	452.7
	<u>4,222.7</u>	<u>5,029.0</u>

The average weekly number of employees during the period was made up as follows:

Zoological Gardens—London Zoo	194	193
—Whipsnade Park	97	95
Education	10	9
Library	4	4
Publications	10	10
Institute of Zoology	73	74
Administration	27	30
	<u>415</u>	<u>415</u>

8. DEPARTMENT OF THE ENVIRONMENT

Revenue grants were received as follows:

During three months to 31st March, 1985	—	1,500
During 12 months to 31st March, 1987	2,000	2,000
	<u>2,000</u>	<u>3,500</u>

Capital grants received in the 12 months to 31st March, 1987 amounted to £34,300 (1986—£1 million).

9. TANGIBLE FIXED ASSETS

	Freehold land and buildings £'000s	Short leasehold buildings £'000s	Plant and equipment £'000s	Motor vehicles £'000s	Leased plant £'000s	Total £'000s
<i>Cost</i>						
At 31st March, 1986	351.6	705.1	442.9	146.4	54.3	1,700.3
Additions during the year	193.5	164.0	49.4	37.2	—	444.1
Disposals	—	—	—	(0.3)	—	(0.3)
	<u>545.1</u>	<u>869.1</u>	<u>492.3</u>	<u>183.3</u>	<u>54.3</u>	<u>2,144.1</u>
<i>Depreciation:</i>						
At 31st March, 1986	86.6	60.3	37.7	95.0	0.3	279.9
Charge for the year	7.8	44.1	59.0	17.3	3.6	131.8
Disposals	—	—	—	(0.3)	—	(0.3)
	<u>94.4</u>	<u>104.4</u>	<u>96.7</u>	<u>112.0</u>	<u>3.9</u>	<u>411.4</u>
Net book value:						
At 31st March, 1987	<u>450.7</u>	<u>764.7</u>	<u>395.6</u>	<u>71.3</u>	<u>50.4</u>	<u>1,732.7</u>
At 31st March, 1986	<u>265.0</u>	<u>644.8</u>	<u>405.2</u>	<u>51.4</u>	<u>54.0</u>	<u>1,420.4</u>

## 10. INVESTMENTS

	1987 £'000s	1986 £'000s
Investments at cost:		
Quoted investments	548.8	507.2
Market valuation at 31st March, 1987	<u>1,324.6</u>	<u>1,069.8</u>
These investments are attributed to:		
Scientific Fund	1,304.9	1,055.4
Fantham Bequest	19.7	14.4
	<u>1,324.6</u>	<u>1,069.8</u>

## 11. STOCKS

Raw materials and consumables	136.0	123.6
Goods for resale	1.0	1.0
	<u>137.0</u>	<u>124.6</u>

## 12. DEBTORS

	1987 £'000s	1986 £'000s
Amounts due from Zoo Restaurants Ltd and Zoo Enterprises Ltd	374.3	490.8
Other debtors	396.6	231.6
Prepayments and accrued income	364.5	615.1
	<u>1,135.4</u>	<u>1,337.5</u>

13. CREDITORS: amounts falling due within one year  
VAT, PAYE and National Insurance contributions  
Other creditors  
Accruals and deferred income

VAT, PAYE and National Insurance contributions	—	120.6
Other creditors	463.7	719.3
Accruals and deferred income	688.1	522.5
	<u>1,151.8</u>	<u>1,362.4</u>

## 14. CREDITORS: amounts due after more than one year

	1987 £'000s	1986 £'000s
Finance lease obligations	36.9	44.6

15. FUNDS

	Heer Bequest £'000s	Fantham Bequest £'000s	Scientific Fund £'000s	Composition Fund £'000s	Staff Benevolent Fund £'000s	Total £'000s
Balance at 31st March, 1986	0.1	8.0	543.0	28.9	2.8	582.8
Investment income	—	0.4	53.5	—	0.3	54.2
Additional capital	—	—	0.4	1.4	—	1.8
Profit on sale of investments	—	—	45.8	—	—	45.8
Transfer to Income and Expenditure Account	—	—	—	(0.8)	—	(0.8)
Transfer to Institute of Zoology	—	—	(41.3)	—	—	(41.3)
Balance at 31st March, 1987	0.1	8.4	601.4	29.5	3.1	642.5

16. BUILDING AND EQUIPMENT FUND

	£'000s
Balance at 31st March, 1986	1,573.6
Grants received during the year for the purchase of fixed assets	15.0
Transfer from Income and Expenditure Account	235.0
	<hr/>
	1,823.6
<i>Less: Transfer to Income and Expenditure Account</i>	(120.9)
	<hr/>
Balance at 31st March, 1987	1,702.7

17. PENSION FUND

At the last triennial valuation at 30th June, 1984, the Pension Fund showed a surplus of assets over liabilities and was solvent in terms of benefits to be provided on winding up. The Society made a contribution of £232,074 to the Pension Fund during the year.

18. SPECIAL FUNDS

(a) De Arroyave Fund

The capital of the fund is held by the Official Custodian for Charities. The net income was £14,906.

(b) Davis Fund

The capital of the fund is held in trust by the Society but is not included on the balance sheet. The income from the fund was £57.

19. CAPITAL COMMITMENTS

	1987 £'000s	1986 £'000s
Expenditure contracted	—	202.7
Authorized but not yet contracted	—	—
	<hr/>	<hr/>

20. FINANCE LEASE OBLIGATIONS

Net amount payable:		
Next year	7.8	7.8
In the second to fifth years	31.0	31.0
Thereafter	6.8	13.6
	<hr/>	<hr/>
	45.6	52.4
	<hr/>	<hr/>

21. STATUS OF THE SOCIETY

The Society is incorporated by Royal Charter and is a registered charity, No. 208728. It is exempt from United Kingdom taxation.

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## THE ZOOLOGICAL SOCIETY OF LONDON

The Zoological Society of London was founded in 1826 by Sir Stamford Raffles, Sir Humphry Davy (President of the Royal Society) and other eminent naturalists. It was incorporated by Royal Charter in 1829 for the advancement of Zoology and Animal Physiology and the introduction of new and curious subjects of the Animal Kingdom. A new Charter was granted to the Society in 1963.

The Society was formed as a scientific society and this remains its prime purpose. Its aims are:

**To increase zoological knowledge through research, applying the results to animal management, conservation and comparative medicine.**

Throughout its existence members of the Society's staff, as well as many other eminent zoologists and visiting scientists, have studied material derived from the Collection and have made important contributions to knowledge in various fields of zoological science.

The Wellcome Institute of Comparative Physiology and the Nuffield Institute of Comparative Medicine were founded by the Society during the 1960's. These well-equipped laboratories, with the Veterinary Hospital and the Curators' research units, were joined in 1977 to form The Institute of Zoology. The wide range of research undertaken by the Institute is directed towards the conservation of rare and threatened species and the highest standards of animal husbandry and care.

**To increase public knowledge and appreciation of animals.**

The Society's Gardens in Regent's Park – now universally known as London Zoo – were opened in 1828. A hundred years later the Society acquired Whipsnade Park, which was opened in 1931. The Park, an area of some 500 acres of farm and downland, is a splendid setting for animals that are able to roam in large paddocks. Whipsnade Park and the London Zoo are complementary and together house one of the finest and most comprehensive collections of wild animals in the world.

The Society's Education Department plays a vital part in the provision of knowledge to the public. There is an extensive programme for schools and many other courses and events are arranged at London Zoo and Whipsnade Park.

**To encourage the spread of knowledge by arranging discussion meetings, by publishing the results of research and by maintaining a library.**

Scientific Meetings, at which the results of new research are communicated and discussed, are held on eight occasions during the year. Symposia on special subjects of international interest are also arranged and generally occupy two days of contributions and discussions.

The Society's publications include:

The *Journal of Zoology*, which publishes research in all fields of zoology, and is issued in monthly parts.

The *Symposia* series of books, each of which contains the papers presented at a Symposium and thus covers a particular topic in depth.

The *International Zoo Yearbook*, a work of reference as well as an authoritative record of developments in the zoo world.

The *Zoological Record*, a comprehensive annual bibliography of zoological literature with subject and systematic indexes; the *Record* is published in conjunction with BIOSIS, Philadelphia.

The *Nomenclator Zoologicus*, published at intervals to provide bibliographical details for all generic and subgeneric names in zoology.

**The Library** was established soon after the Society's foundation and is now one of the major zoological libraries in the world. It provides a full library service to members of the Society and to its staff.

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### ILLUSTRATIONS

*Cover: Okapi; from the original painting by Sir Harry Johnston*

*Drawings: David Boys and John Norris Wood*

*Photographs: Michael Lyster*

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