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SYMPOSIUM  
"ZOOS AND CONSERVATION"

REPORT



Held in  
The Lecture Hall of  
The Zoological Society of London  
June 23rd, 24th and 25th, 1964

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## “ZOOS AND CONSERVATION SYMPOSIUM”

June 23rd—25th, 1964

The Symposium was sponsored by:—

The International Union for the Conservation of Nature.  
The International Union of Directors of Zoological Gardens.  
The International Council for Bird Preservation.

It was attended by delegates from the three sponsoring bodies and also by delegates from:—

The American Association of Zoological Parks and Aquariums.  
The Fauna Preservation Society.  
The Zoological Society of London.  
The Royal Zoological Society of Scotland.  
The Institute of Biology.  
The World Wildlife Fund.

A total of 39 delegates attended.

38 Observers were also present, including observers from:—

The Medical Research Council.  
The Universities Federation for Animal Welfare.  
The International Society for the Protection of Animals.  
The Royal Society for the Prevention of Cruelty to Animals.  
The British Airline Pilots Association.  
British Overseas Airways Corporation.

And commercial firms of dealers in wild animals from four continents.

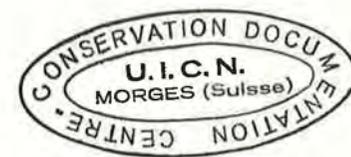
## “Zoos and Conservation Symposium”

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# ZOOS AND CONSERVATION SYMPOSIUM

## SESSIONS

- Tuesday, June 23rd**  
**1st session**  
**2.30 p.m.** Presided over by H.R.H. The Duke of Edinburgh, K.G., K.T.  
**Theme 1.** "The breeding of endangered species in captivity."  
Introductory speaker: Dr. Lang.  
Summing up: Professor Bourlière.
- Wednesday, June 24th**  
**2nd session**  
**10 a.m.** Presided over by Professor Bourlière, President I.U.C.N.  
**Theme 2.** "The import, export, transport and sale of wild animals."  
Introductory speaker: Mr. J. F. Lipscomb.  
Summing up: Colonel Vincent.
- 3rd session**  
**2.30 p.m.** Presided over by Mr. G. S. Mottershead, President I.U.D.Z.G.  
**Theme 3.** "Conservation education in zoos."  
Introductory speaker: Mr. W. Van den bergh.  
Summing up: Mr. S. Andersen.
- Thursday, June 25th**  
**4th session**  
**10 a.m.** Presided over by Professor Dillon Ripley, President I.C.B.P. (Monsieur J. Delacour deputised after Professor Ripley had to retire owing to a bad cold.)  
**Theme 4.** "Moral and financial support for conservation through zoos."  
Introductory speaker: Mr. Peter Scott.  
Summing up: Mr. Peter Scott.

## PRESENT

H.R.H. The Duke of Edinburgh, K.G., K.T.  
PRESIDENT, The Zoological Society of London.

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Sir Solly Zuckerman, K.C.B., D.Sc., F.R.S.  
SECRETARY, The Zoological Society of London.

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## DELEGATES

### The International Union for the Conservation of Nature

Professor F. Bourlière;	President, I.U.C.N.
Professor J. -G. Baer;	Past President, I.U.C.N.
Mr. Peter Scott;	Chairman, Survival Service Commission, I.U.C.N.
Mr. J. M. M. Fisher;	Survival Service Commission, I.U.C.N.
Mr. Noel Simon;	Editor, I.U.C.N. "Red Book" of Endangered Species.

### The International Union of Directors of Zoological Gardens

- Mr. G. S. Mottershead; President I.U.D.Z.G., and Director-Secretary, North of England Zoological Society.  
Mr. S. Andersen; Director, Zoologisk Have Kobenhavn.  
Dr. F. J. Appelman; Zoo Liaison Committee, I.U.C.N.  
Dr. A. C. V. van Bemmelen; Scientific Director, Stichting Koninklijke Rotterdamse Diergaarde.  
Dr. D. J. Brand; Director, Pretoria Zoo.  
Dr. E. M. Lang; Director, Zoologischer Garten Basel, and Chairman, Zoo Liaison Committee. I.U.C.N.  
Mr. J. G. Nieuwendijk; Amsterdam Zoo.  
Mr. W. Van den bergh; Director, Société Royale de Zoologie d'Anvers.

### The International Council for Bird Preservation

- Professor S. Dillon Ripley; President, Smithsonian Institution.  
Monsieur Jean Delacour; President Emeritus, American Museum of Natural History.  
Miss Phyllis Barclay-Smith; Secretary, I.C.B.P.  
Mr. Kai Curry-Lindahl; Director, Nordiska Museet and Skansen.  
Dr. W. H. Thorpe; University of Cambridge, Department of Zoology.  
Colonel J. Vincent; Liaison Officer, I.C.B.P.—I.U.C.N., and Secretary, Survival Service Commission.

### The Zoological Society of London

- Dr. L. Harrison Matthews; Scientific Director.  
Mr. Oliver Graham-Jones; Veterinary Officer.  
Miss Caroline Jarvis; Editor, *International Zoo Yearbook*.  
Dr. Desmond Morris; Curator of Mammals.  
Mr. E. H. Tong; Director, Whipsnade Park.  
Mr. J. J. Yealland; Curator of Birds.

### The World Wildlife Fund

- Sir Landsborough Thomson; Past President, Zoological Society of London.  
Mr. Ian S. MacPhail; Campaigns Director, World Wildlife Fund.

### The Fauna Preservation Society

- Mr. R. S. R. Fitter; Hon. Secretary, Fauna Preservation Society.  
Lt. Col. C. L. Boyle; Past Chairman, Survival Service Commission I.U.C.N.  
Mr. Gerald Durrell; Director, Jersey Zoological Park.  
Dr. W. Lane-Petter; Medical Research Council Laboratories.

### The American Association of Zoological Parks and Aquariums

- Dr. Theodore H. Reed; Director, Smithsonian Institution, National Zoological Park.  
Mr. Robert Bean; Director, Chicago Zoological Park.  
Mr. William G. Conway; Director, New York Zoological Park.  
Mr. R. Lindemann; Director, Catskill Game Farm.

### The Royal Zoological Society of Scotland

- Dr. John Berry; The Nature Conservancy, Edinburgh.  
Dr. J. C. Smyth; Paisley College of Technology.

### Institute of Biology

- Dr. E. Hindle; Founder-President, Institute of Biology.

### Scottish Branch of the Institute of Biology

- Dr. L. L. de Kock; Dept. of Natural History, Aberdeen.

Apologies for inability to attend were received from the following who had been invited by participating bodies as delegates:—

- Dr. Tso-Hsin Cheng; Secretary-General, Zoological Society of China.  
Sir Hugh Elliott; Acting Secretary-General, I.U.C.N.  
Mr. G. D. Fisher; Director, Zoological Park, Edinburgh.  
Professor Dr. Grzimek; Director, Zoologischer Garten, Frankfurt am Main.  
Dr. Juro Hayashi; Director, Ueno and Tama Zoological Gardens, Tokyo.  
Dr. E. F. Jacobi; Director, Natura Artis Magistra, Amsterdam.  
Mr. David James; Member of Parliament, U.K.  
Mr. Antonio Jonch; Director, Barcelona Parque Zoológico.  
Dr. Boonsong Lekagul; Association for the Conservation of Wild Life, Bangkok.  
Dr. Carleton Ray; Curator, New York Aquarium.  
Dr. C. R. Schroeder; Director, San Diego Zoological Gardens.  
Sayed M. K. Shawki; Director, Forest Department, Khartoum.  
Mr. T. Spence, M.R.C.V.S.; Royal Zoological Society of Scotland.  
Mr. V. D. Treus; Director, Askaniya Nova, Kahovka, Ukraine.  
Dr. Z. Veselovsky; Director, Zoologická zahrada v Praze.  
Dr. D. Wasawo; Makerere University, Kampala, Uganda.

### OBSERVERS

- Mr. T. R. Baines; Director, Calgary Zoological Garden.  
Mr. G. Clough; Department of Zoology, Cambridge.  
Maj. General C. J. G. Dalton; Controller, Zoological Society of London.  
Miss A. Daubercies; World Wildlife Fund.  
Mrs. R. Fitter; Editor "Oryx", Fauna Preservation Society.  
Mr. H. A. Fosbrooke; Conservator, Ngorongoro, Tanganyika.  
Miss P. Grieson; Fauna Preservation Society.  
Major I. Grimwood; Chief Game Warden, Kenya.  
Dr. A. M. Harthoorn; Veterinary Research, University of East Africa.  
Mr. G. D. Hayes; President, Fauna Preservation Society of Malawi.  
Mr. R. W. Hobson; Director-General, British National Appeal, World Wildlife Fund.  
Major C. W. Hume; Secretary-General, Universities Federation for Animal Welfare.

Lord Hurcomb; Vice-President, Fauna Preservation Society.  
 Mr. G. E. Joss; Veterinary Consultant, British Overseas Airways.  
 Dr. H.-G. Klös; Director, Berlin Zoological Gardens.  
 Mr. Maxwell Knight; Author and Naturalist.  
 Mr. R. Leighton-White; British Airline Pilots Association.  
 Mr. J. Mallinson; Jersey Wildlife Preservation Trust.  
 Mr. G. Munro; Dealer, Calcutta.  
 Mrs. C. Niven; Fauna Preservation Society, South Africa.  
 Professor J. Nouvel; Muséum d'Histoire Naturelle, Paris.  
 Dr. Fairfield Osborn; President, New York Zoological Society.  
 Miss E. M. Owen; Zoological Society of London.  
 Mr. C. R. S. Pitman; Former Chief Game Warden, Uganda.  
 Mr. I. C. Player; Chief Conservator, Zululand, Natal Parks.  
 Major K. R. C. Priestley; Chief Administrator, International Society for the  
 Protection of Animals.  
 Major W. Scott; Scientific Director, Universities Federation for  
 Animal Welfare.  
 Mr. G. Schomberg; Fauna Preservation Society.  
 Mr. J. Seago; Dealer, Nairobi.  
 Mr. Freeman Shelly; Director, Philadelphia Zoological Garden.  
 Mr. K. Smith; Director, Exmouth Zoo, Devon.  
 Mr. Van den Brink; Dealer, Hardewijk (Holland).  
 Mr. R. M. Watson; Biologist, Tanganyika National Parks.  
 Mr. N. Whittaker; Manager, London Airport Hostel, Royal Society for  
 the Prevention of Cruelty to Animals.  
 Lord Willingdon; President, Fauna Preservation Society.  
 Dr. W. Windecker; Director, Zoologischer Garten Köln.  
 Mr. W. H. Woodford; Veterinary Surgeon, Expedition "Oryx."  
 Mr. F. J. Zeehandelaar; Dealer, New York.

**Organising Secretary:**  
 Mr. J. F. Lipscomb.

## ZOOS AND CONSERVATION

Foreword by

Professor Sir Solly Zuckerman,  
 Secretary, Zoological Society of London.

The Symposium to consider the relation of zoos to problems of animal conservation stimulated wide international interest. The Zoological Society of London welcomed the opportunity of acting as host to the representatives of the zoos and other organisations who came together with the object of formulating a co-ordinated policy for the future.

The overwhelming threat to wildlife arises not so much from the activities of trappers, hunters and zoos, as from the fact that the growth of human population and the spread of civilization inevitably make permanent inroads into the natural habitats of wild species. This conflict underlies all aspects of conservation. But where, through knowledge and action, destruction of a natural habitat can be avoided or a compromise reached, it is clearly to man's ultimate benefit that this should be done. No one wishes to contemplate a world whose surface has been entirely transformed into centres of population and industry, into areas of mechanised agriculture, and into endless stretches of concrete road.

But quite apart from aesthetic, moral and sentimental considerations, the need to conserve wildlife can be argued on practical grounds. We still know very little about the environment in which we live. We dare not tamper with it without considering what the long-term consequences might be. Were we to destroy it, much of the raw material of biology, zoology and ecology would be gone for ever.

The problems of animal conservation are too complicated, too important, and too extensive to be solved piecemeal or by isolated action. Success will come only if conservationists, the directors of zoos, and academic zoologists discuss their various difficulties and co-operate wholeheartedly with others working in the same field.

This first meeting of zoo personnel, animal dealers and conservationists opened up avenues of discussion and thought. It is a fruitful beginning. We must now turn our minds to the practical issues, and decide how we, particularly those of us who are concerned with the management of animals in captivity, can play our part. Effective action will necessitate co-operation within and between countries, and within and between continents. It imposes upon us the duty of recording and disseminating information between ourselves and all interested organisations; of studying conditions under which species can be maintained in captivity, and of ensuring by every possible means that such conditions are provided.

The most important result of the Symposium, therefore, is the decision to form a federation of zoos, research institutions, animal dealers, conservation societies, game departments, and of other organisations that may be concerned with wild animals. This resolution of the Symposium must now be implemented without delay. It is my personal hope, and that of my Society, that no time should be lost in achieving a constitutional framework which will make the federation a working reality. In the long run, it is only by vigilance, coupled with energetic and concentrated action, that we shall be able to play the essential part required of us to ensure that the remaining wild fauna of the world is conserved.

## FORMAL BUSINESS

1. The Symposium has produced two recommendations which are likely to have far reaching results when action is taken to implement them. It is therefore desirable to recount briefly the steps which led to the Symposium being held and it is perhaps relevant to note that five years have elapsed since the suggestion to hold such a meeting was first made.

The idea stemmed from a memorandum of the Survival Service Commission of the I.U.C.N. dated August 14th, 1959, which proposed the discussion of "Four requirements which should be fulfilled before species on the endangered list should be taken for breeding in captivity."

According to a later Survival Service Commission memorandum this proposal led to "Heated arguments at a subsequent meeting of Zoo Directors which brought to a head the need for co-operation between the Survival Service Commission and the Zoo Directors".

Following further discussion at the I.U.C.N. General Assembly in Warsaw in 1960, and at Survival Service Commission meetings in 1961 and 1962, there was correspondence between Professor Baer, at that time President of I.U.C.N., Mr. Mottershead, as President of I.U.D.Z.G., Dr. Harrison Matthews as Scientific Director of the Zoological Society of London, and Colonel Boyle in his then dual capacity of Chairman, Survival Service Commission and Secretary of the Fauna Preservation Society.

Contact was later made with the Royal Zoological Society of Scotland and with the Scottish branch of the Institute of Biology who had jointly been planning to call a meeting with similar objectives. At about the same time the American Association of Zoological Parks and Aquariums approached the President, I.U.C.N. with a proposal designed to prevent the purchase by zoos of illegally captured animals or very rare species.

As the result of applications made in 1962 and 1963 by I.U.C.N., funds were provided by UNESCO and the International Union of Biological Sciences to make the Symposium a possibility, and the final impetus came once more from the Survival Service Commission, of which Mr. Peter Scott had become Chairman after the I.U.C.N. General Assembly in Nairobi in September 1963.

It is clear, therefore, that there was a widely felt need in the minds of many people in different parts of the world for a meeting to reconcile possibly conflicting viewpoints about the trade in wild animals, with particular reference to rare and endangered species, and to compare notes on the technical problems of breeding wild animals in captivity.

Finally, in February, 1964, an *ad hoc* committee was set up to organise the Symposium and decided to broaden the scope of the discussions to cover a number of allied problems.

2. The report that follows is not a summary of proceedings in the usual sense of the phrase, but is a statement of the views of delegates and of observers as expressed either in their speeches at the Symposium or in letters and memoranda submitted by them both before and after the Symposium took place. Two recommendations

were formally approved without dissent but no other formal conclusions were recorded, although on other points a very general measure of agreement emerged. Indeed the whole of the proceedings were marked by unanimity of purpose and a remarkable degree of agreement as to the means required to achieve the desired objectives.

3. The two recommendations read as follows:

A. **Proposed by Mr. Conway on behalf of A.A.Z.P.A.**

**This Symposium Recommends** that an international organization of zoological gardens, animal collections and animal traders should be developed through the agency of the I.U.C.N. Zoo Liaison Committee; that this federation should be formed, among other purposes, for developing a method of distributing certain rare animals for exhibition in co-operation with the I.U.C.N. Survival Service Commission and for co-operating with the I.U.C.N. and various national governments in the administration of this method.

B. **Proposed by Mr. Curry-Lindahl on behalf of I.C.B.P.**

**This Symposium Recommends** effective governmental control of the importation and transit of rare animals. An essential part of such control should be to set up in each country an expert committee to advise Governments as to the species to which this control should be applied.

4. The only other matter dealt with formally was the approval of a proposal made by the I.C.B.P. that a letter should be written to the Commissioner of the Bureau of Science and Industry in the Philippines, which reads as follows:—

Your Excellency,

I enclose for your information a copy of the Agenda of a Symposium that has just taken place in London and also a copy of the list of delegates who attended it.

The attention of the Symposium was directed mainly to the conservation of endangered species of mammals and birds and during the discussions several species were particularly mentioned as being in extreme danger.

At the head of this list stands the Philippine Monkey-eating Eagle, and I was instructed to write to you requesting you to use your good offices with the Philippine Government to take urgent steps to protect the few remaining members of the species.

The Symposium was informed that although the export of these birds has been somewhat diminished by measures recently enacted by your Government, an internal market still exists for stuffed specimens of the eagle. It was stated that many eagles are being killed to meet this demand.

Any assistance you can give in ensuring the survival of this unique eagle will be greatly appreciated throughout the world.

5. During the Symposium Sir Landsborough Thomson, Past President of the Zoological Society of London, made the following announcement which was greeted with enthusiastic applause.

The Zoological Society of London has received a grant of £100,000 from the Wolfson Foundation, to enable it to adapt and extend its present administrative offices so as to provide a national headquarters for organisations which, like itself, are concerned with the conservation of wildlife. An additional building will be erected as an extension of the existing offices of the Society, and this building will be provisionally known as the Wolfson Centre for Wildlife Conservation.

This development has the support of the Council for Nature, the British National Appeal for the World Wildlife Fund and the Fauna Preservation Society, all of whom will have offices in the new centre.

6. At the conclusion of the Symposium the thanks of the participating organisations were warmly expressed to UNESCO and I.U.B.S. for providing the funds required to stage the conference, and to the Zoological Society of London for providing the meeting place and the necessary office facilities.

Appreciation was also expressed for the official luncheon given on the second day jointly by the Fauna Preservation Society and the Zoological Society of London.

7. The expense of publishing this report has been met by the three sponsoring bodies, I.U.C.N., I.U.D.Z.G. and I.C.B.P., assisted by a donation from the Fauna Preservation Society which gave every encouragement and support from the earliest stages. The Zoological Society of London has continued to provide office facilities.

J. F. Lipscomb,  
*Organising Secretary.*

August, 1964.

### Welcome to Delegates and Observers

H.R.H. The Duke of Edinburgh welcomed the Delegates and Observers on behalf of the Zoological Society of London, and expressed his thanks to UNESCO and the International Union of Biological Sciences for the financial assistance which had made the Symposium possible.

He felt that the Symposium marked a new stage in the general progress of zoos by securing widespread recognition of the fact that zoos not only have a special part to play in the conservation of wild life, but also a particular responsibility to ensure that conditions in zoos are such as will enable them to play this part effectively.

He hoped that the delegates would take the opportunity, outside the formal sessions, of allowing their minds to wander over a wide field and suggested, as one subject for thought, the need for closer co-operation between zoos on the one hand and National Parks and Game Reserves throughout the world on the other.

He also suggested the possibility of establishing International Zoos in countries which could not afford to establish their own zoos, not least in those countries which have large numbers of wild animals but where the bulk of the population have little or no opportunity of seeing animals in the wild. This would be one way of helping them to realise the importance and urgency of conservation.

He emphasised that conservation and the public interest must be the long term objective.

## Theme 1.

### "The breeding of endangered species in captivity."

Chairman: H.R.H. The Duke of Edinburgh, K.G., K.T.  
Introduced by: Dr. E. M. Lang.  
Summed-up by: Professor F. Bourlière.

The following also spoke:

Mr. Andersen.	Dr. Fairfield Osborn.
Professor Baer.	Mr. Player.
Colonel Boyle.	Professor Ripley.
Mr. Conway.	Mr. Peter Scott.
Mr. Fisher.	Sir Landsborough Thomson.
Mr. Fitter.	Dr. Thorpe.
Mr. Graham-Jones.	Mr. Van den Brink.
Major Grimwood.	Mr. Van den bergh.
Mr. Lindemann.	Colonel Vincent.
	Sir Solly Zuckerman.

The following contributed notes:

Dr. Appelman.	Dr. Veselovsky.
Dr. Lang.	Mr. Woodford.
Professor Bourlière.	

#### A. General Discussion.

1. The modern zoological garden is essentially different from its forerunners. Whereas, at the beginning of the current century, zoos were predominantly museums exhibiting single specimens of as many animals as possible, or were merely amusement parks, some of them today are research and educational centres and can be regarded as the links between the modern world and the receding domain of nature. Now they face the claims of still another function which has, in many cases, been of no importance or of only secondary importance to them in the past. This function is that of saving threatened species from extinction by affording refuges for animals whose natural habitats are disappearing under the pressure of increasing human populations, or because vast areas of land where wild animals formerly lived undisturbed have become degraded, often due to the incursion of domestic stock combined with very low standards of animal husbandry.

2. It may only be possible to preserve and breed some species in captivity for a limited time, but at least they can be studied scientifically during that time and something can be learned of their biology before they die out. At best it may be possible to establish populations in captivity from which, in the course of time, fresh wild populations can be established in suitable areas. This has already been done in a few cases and further opportunities are likely to arise.

3. The difficult task of deciding which species are endangered is being tackled by the Survival Service Commission of I.U.C.N. during the compilation of its "Red Books", the two volumes of which at present in hand are largely devoted to mammals and birds. The information in these books is constantly being revised and brought up to date but is still sometimes incomplete because organizations and individuals who possess the necessary knowledge fail to communicate it to the I.U.C.N. headquarters at Morges in Switzerland. But these books do provide a firm foundation on which to base conservation and breeding policies.

4. Care needs to be exercised to ensure that the breeding in captivity of rare species, when every individual is precious, is not undertaken by inexperienced people whose activities might be positively harmful. This is particularly necessary in connection with primates required for the testing of drugs and the production of vaccines, whose breeding in captivity is desirable as a means of cutting down the demand for animals from the wild. There is at present no machinery to watch and control such activities. In most civilised countries regulations exist to control the keeping of domestic animals but few countries have regulations to control the keeping of wild animals in captivity.

5. A distinction must be made between the sporadic breeding of relatively small numbers of animals for the purpose of producing spare specimens for sale or exchange, and the extensive breeding of relatively large numbers of a rare species for the express purpose of repatriating some of them at a future date to their original biotope. But both purposes are legitimate activities for zoos and will result in a smaller demand for captured wild animals. Already a measure of success has attended inter-zoo distribution of stocks of a few species bred up in captivity from small original numbers.

6. Many zoos are urban and have inadequate space for developing herds of any one species while the financial necessity of staging a public exhibition may militate against the provision of sufficient privacy for shy breeding animals.

7. The ability of zoos to embark on breeding programmes depends in many instances on the terms of the charters under which they are established or the financial conditions under which they operate. Many are closely dependent on municipalities and similar authorities who may well consider that a zoo's duties to the public must outweigh other considerations. This dependence on elected bodies, whose membership and policies can be subject to sudden change, is a weakness that might be overcome by the introduction of a system of international ownership for species of rare animals whose numbers have been reduced to danger point.

8. Successful breeding on a wide scale will require close co-operation between zoos over exchanges and pooling of stock. This co-operation needs to be accompanied by the establishment of Stud Books on the lines of breed stud books for domesticated animals. Indeed much may be learned from the experience that has been gained in the breeding of domestic animals, more particularly from the transplanting of breeds of animals originating in temperate countries to other parts of the world. In the case of wild animals the traffic is usually in the opposite direction but many of the problems are similar.

9. The techniques of returning animals to the wild and re-establishing appropriate species in National Parks in suitable areas are still in a very early stage of development but experience gained so far gives sound hope that they can be successful.

Animals appear to retain their natural instincts and their powers of survival in the wild state, even after several generations of breeding in captivity.

#### B. Breeding.

1. The degree of success achieved with the breeding of both mammals and birds in captivity varies enormously. But universally, in zoos in which a real interest in breeding is taken and in which the facilities are steadily improved, the rate of success rises markedly. At Basle, for instance, where 75% of 79 species are now breeding regularly, the percentage has been raised in the course of a few years from the previous figure of 50% solely by more careful attention to details of management. But the figures of success over the whole field of the breeding of wild animals in captivity are low and uneven.

2. A few species of mammals breed readily and present no problems, but they are exceptions. The known figures for common species of antelopes show considerable variations, and a substantial proportion of primate species have yet to be bred in captivity. Even in the best regulated zoos only about 40% of the primates have bred while the results secured in research establishments are believed to be considerably lower. Breeding results for primates in the pet trade are not known but are believed to be very poor.

3. In birds the recorded curve in successful breeding has been rising rapidly and there is good cause to expect that the number of birds at present listed by I.C.B.P. as unlikely to breed in captivity will be steadily reduced during the next ten years. But, even so, only around 60%—65% of the very large number of species of parrots in captivity are known to have bred, and considerable doubt exists as to whether successful breeding of large birds of prey will prove to be possible. Records show that only a very small percentage of them have ever bred in captivity. On the whole the private and commercial aviaries have been more successful in breeding birds than have zoos.

4. There will be less genetic variation in a species of animal bred in captivity than in the same species bred in the wild because of the smaller numbers involved. But apparent variations will be abundant if the species is widely dispersed among zoos. These apparent variations will be brought about by factors such as climate, nutrition, health and housing. Precisely the same factors have caused apparent variations in domesticated animals when transferred from their environments of origin to strange environments, but genetic variations have been negligible unless brought about by selective breeding aimed at fixing special characteristics. The progeny of animals which have not been selectively bred for special characteristics soon revert to the original appearance of the breed when returned to their original environment.

5. When considering the possibility of variations, actual or apparent, the rate of breeding of any species must be remembered as an important aspect. In some rapid breeding species, which have been multiplied in captivity from only a few originals, albinos and other freaks have appeared in the course of a few generations. In the wild state such freaks would be eliminated and given no chance to breed. They must meet the same fate in captivity if the true strain is to be maintained.

6. But freaks and abnormalities, particularly abnormalities of health, can be guarded against, though not entirely prevented, by the introduction of fresh blood from other zoos or, better still, occasionally from the wild. This is also a safeguard against declining fertility which often is the result of excessive inbreeding.

7. At any given moment any one animal in a zoo represents just one combination of the genes in the species. By collecting small numbers of a species and breeding from them without the periodic introduction of fresh blood a reduction in the variation of the genes is certain and a reduction in the stamina of the progeny is almost equally certain.

8. In the breeding of rare species in which individual animals are of considerable value there may well be valid objections to pooling them or exchanging them or lending them for breeding purposes. Therefore, in order to avoid the loss of valuable breeding potential, there is a need for artificial insemination techniques for wild animals to be further developed and more widely practised.

#### C. Diet.

1. In the diets of animals in captivity the chemical composition of the diet, and a correct balance of proteins, carbohydrates, fats, minerals, vitamins and trace elements is more important than the actual ingredients although, to secure optimum results, digestibility and palatability must always be kept in mind.

2. It is seldom possible or necessary to duplicate in captivity the diet preferred by any animal in the wild state. Moreover zoos cannot afford fancy diets for the normal run of animals. And anyway, observations of diets in the wild are more usually directed to factors relevant to migrations and ecological balances than to nutrition. Only in special cases when a rare species fails to thrive in captivity and some special deficiency is suspected, as of a trace element, is study of the natural diet likely to be profitable once the essential composition of the diet is known. There may be a place for some field studies of this aspect but the indications are that a correctly balanced basic diet will usually confer good health and breeding fertility. Where exceptions occur, as with some species of monkeys, some exceptional cause must be sought and it may not be attributable to diet.

3. These arguments presuppose that animals will accept the diets offered to them but this may not always be the case. Refusal to accept a diet may be due to lack of palatability or to psychological reasons arising from the environment in which the animal is kept.

4. But, as a general rule, if an animal readily consumes an adequate quantity of a balanced diet, and keeps healthy on that diet, it is a potential breeder. Working on the principles of modern agricultural science Ratcliffe of Philadelphia examined the nutritional requirements of zoo animals and introduced fool-proof rations which have since been improved and adapted by Wackernagel of Basel, among others. As a general rule existing commercial feeds, composed for domestic animals by nutrition experts, can be used for zoo animals.

5. Visitors to zoos should be prevented, as far as possible, from feeding animals.

#### D. Health.

1. Not only is it important to keep animals alive once they are in captivity, particularly animals of rare species which are difficult and expensive to replace, but it is certain that they will not breed satisfactorily, and they may not breed at all, if they are not thoroughly healthy.

2. Health, in animals bred in captivity, is a matter of care, attention and good management. Health, in animals brought in from the wild, may be difficult to secure because of the incidence of internal parasites to which the animal can be host in the wild without loss of health but which may become dominant and lethal when the animal is kept under captive conditions.

3. It is therefore desirable that animals should be brought under proper veterinary care as soon as possible after capture so that they may be treated for both internal and external parasites before infestations build up and become uncontrollable and possibly fatal. It is also desirable that countries of origin should warn zoos of diseases to which captive animals may be liable so they can be watched for symptoms after arrival at their destinations.

4. Modern veterinary science helps to combat parasites and infectious diseases while skilful surgery lengthens the life span of many animals. In recent years intensive research has been carried out in these fields and is now bearing fruit in practical results. In addition, applied pharmaceutical knowledge has brought about indispensable improvements in methods of capture and in the care of wild animals immediately after capture, thereby substantially decreasing the risk of loss and injury in these early stages.

5. There is at present no means whatever of ensuring that rare animals only get into the hands of those zoos and other institutions which can be trusted to give them proper veterinary care and attention. Lack of such control may prove to be very wasteful in terms of diminishing resources but the only speedy method of obtaining such control is by co-operation and voluntary effort, preferably guided by some central agency.

6. Looking to the future, when restocking may become more prevalent, it will be essential to ensure that stocks which are released are first immunised as thoroughly as possible against local endemic diseases that would otherwise prove fatal.

#### E. Environment.

1. The term environment covers not only the climatic and other natural or artificial conditions under which animals live but also the social conditions under which they live and the psychological stresses to which they may be subjected. All these factors will have their influences in deciding whether an animal will or will not breed in captivity.

2. Animals which are taken into captivity when young, or which live long periods in isolation, are less likely to breed than animals which have opportunities to observe the social habits of their kind. The opportunities to observe and learn are enhanced if animals which have been born and have matured in the wild state are added to the group from time to time.

3. A great deal has been learnt in recent years about the social habits of mammals and birds, and about the importance of these habits in the breeding context. For instance, some species of birds must have adequate air space to be able to indulge in display flights, and the provision of large enough aviaries may be one answer to the past lack of breeding success with birds of prey. Similarly, adequate facilities for exercise for certain mammals may be an essential need.

4. Climatic conditions and the immediate surroundings in which animals are confined may, if they are uncongenial, be the reason why some animals which have bred readily in one place may not breed in another place to which they are moved. Some species are, of course, far more sensitive to climatic and residential conditions than others, but it is a subject about which very little is known.

5. The human element is of paramount importance in creating conditions of captivity in which animals can be contented, and without contentment there is unlikely to be satisfactory breeding. If the human relationship with the animal is one of interest and sympathy the animal will thrive; otherwise it will not. For example, in recent years about two hundred Square-lipped Rhinos have been captured in Zululand and distributed to many countries. A recent survey of them, carried out by the Conservator responsible for their capture, showed that some were—in his words—“happy and thriving” while others were definitely “unhappy”. Attendants are more likely to be really interested in the animals under their charge if they can be sent to study these animals in the wild and not only be sent on visits to other zoos.

6. Animals have their likes and dislikes for the humans with whom they come into contact. They also have their likes and dislikes for each other and it is no good placing a male and a female together and expecting them to breed if they show that their temperaments are mutually incompatible. Here, again, is another argument for co-operation and exchange between zoos, and neither co-operation nor exchange need mean change of ownership.

7. If the breeding of wild animals—and not only the breeding of endangered species—is going to become a major preoccupation of zoos as a means of sustaining their stocks, it is possible that the practical importance of the environmental factor in securing satisfactory breeding results may force zoo managements to clear their own minds on their policies, and to adopt a greater degree of specialisation. Specialisation would then develop both in function and composition.

8. Already there are zoos which have the nature more of farms or parks than of traditional zoos. Others have preferred to develop a limited number of group exhibits rather than a larger number of individual exhibits. These degrees of specialisation may or may not have originated as ways and means towards better breeding programmes but they would now appear to be essential developments towards that end.

9. Some of the larger zoos may prefer to cater for both demands by maintaining a large numerical display of different species for public exhibition while also maintaining a farm or park for breeding purposes. There are already, of course, well established examples of this policy but it will be beyond the financial resources of many zoos and they may have to consider whether they prefer to specialise in the group policy that seems to be essential for breeding on any scale, or whether they prefer to be purely exhibitions, possibly allied with research and educational functions, and to depend on purchase to maintain their stocks. There would seem to be room for all sorts.

#### F. Research.

1. Field research in National Parks is of immense value to conservation. Zoos need to keep closely in touch with the work that is being carried out, but the return that the breeder of animals in captivity can get from these studies will depend on

their being extended to cover breeding groups of considerable size. However, an aspect that could be of considerable importance to zoo breeders is the influence exerted on breeding cycles and potentiality by seasonal changes in the food supply and its composition. A practical example of a similar factor in agriculture is the well-known practice of flushing ewes before mating.

2. Returns of greater practical value to zoos are likely to be obtained from research carried out in zoos on captive animals, and not least on the susceptibility of some animals to diseases of civilisation and on the incidence of diseases in animals bred in captivity.

3. Another argument in favour of group specialisation in zoos is the wider field for research provided by groups of animals rather than by single specimens. It would be interesting to find out which zoos would wish to work primarily on which species of mammals and birds, and on which related species. Greater progress might be made, and the general pool of knowledge increased, if the work was parcelled out between those zoos most competent to undertake it and if regular exchanges of information were thereafter organised.

#### G. Indicated Conclusions.

1. A policy of breeding endangered species in captivity is desirable but needs careful control of capture and transport, and thereafter careful scientific control.

2. Increased experience and the development of new techniques result in breeding success being attained with increasing percentages of species of both mammals and birds.

3. In general it is easier to provide conditions for the successful breeding of mammals in captivity than for birds.

4. Greater specialisation in the functions and the composition of zoos would assist in making better use of limited breeding material.

5. Delegation by agreement of the study and breeding of particular species of mammals and birds to particular zoos is desirable and might lead to breeding results being obtained from species previously regarded as virtually hopeless.

6. The existing knowledge of breeding techniques cannot be condensed into a text book but those who wish to learn would be well advised to visit those who are being successful under conditions most nearly comparable to their own.

7. An agency for the collection, collation and distribution of information on the breeding of animals in captivity and on allied problems is desirable.

8. The Red Books maintained by the Survival Service Commission of I.U.C.N. may be regarded as the authority for declaring any species to be rare or endangered.

9. A code of rules and standards for zoos and other institutions owning and breeding rare and endangered species is urgently needed, and efforts should be made to obtain voluntary adherence to such rules and standards.

10. In the event of the Survival Service Commission of I.U.C.N. considering that insufficient voluntary adherence to such rules and standards is being obtained within a reasonable period after their compilation, national legislation should be requested in all countries where abuses continue to exist.

## Theme 2.

### “The Import, Export, Transport and Sale of Wild Animals.”

Chairman: Professor F. Bourlière. President, I.U.C.N.

Introduced by: Mr. J. F. Lipscomb.

Summed-up by: Colonel J. Vincent.

The following also spoke:

Mr. Andersen.	Mr. Lindemann.
Professor Baer.	Dr. Matthews.
Mr. Bean.	Mr. Mottershead.
Colonel Boyle.	Mr. Munro.
Mr. Conway.	Dr. Reed.
Mr. Curry-Lindahl.	Dr. Thorpe.
Mr. Fitter.	Mr. Scott.
Major Grimwood.	Mr. Van den Brink.
Mr. Joss.	Mr. Van den Bergh.
Dr. Lane-Petter.	Mr. Zeehandelaar.
Dr. Lang.	

The following contributed notes:

Major Grimwood.	Major Priestley.
Mr. Joss.	Mr. Seago.
Dr. Lane-Petter.	Mr. Whittaker.
Mr. Leighton-White.	

#### A. General Discussion.

1. The trade in endangered species of wild animals for zoos cannot be considered in isolation from the whole trade in wild animals because, in the public eye, zoos are the main reason for the trade. They are, therefore vulnerable to criticism whenever anything goes wrong at any stage of the trade.

2. In actual fact the significance of the zoo trade within the whole trade varies widely. While zoo demands constitute practically 100% of the demand for some species of large mammals, such as rhinos, they constitute only a small fraction of the demand for certain species of birds—required primarily for the pet trade—and for certain species of primates—required primarily for research purposes and drug preparation.

3. But, even when the demand is confined to zoos, their combined demands may exceed a reasonable level of supply in relation to the reduced population of the species in the wild. Taking black rhinos from East Africa as an example, the current demand by zoos is between three and four times the reasonable level of supply.

4. It was in connection with this point that the President of I.U.D.Z.G., Mr. Mottershead, first put forward the proposal for a Federation aimed at regulating demand and supply both in the interests of conserving wild stocks and in directing available supplies to the most suitable destinations.

5. Subsequent discussion widened the scope of the original proposal to include all institutions and persons dealing with wild animals in captivity for any purpose. (See page 9).

#### **B. Demand.**

1. The percentage of animals in captivity which have been bred in captivity is still very small. At the same time the demand for wild animals is steadily rising because of the increase in the number of zoos and of other institutions which own animals either for research purposes or commercial purposes.

2. The greater public concern being shown today about the conservation of wild life and the perpetuation of endangered species is creating a competitive market for endangered species which increases both the demand and the value of the animals in demand.

3. Some demands could be curtailed by greater co-operation between zoos, in particular over the sale, loan or exchange of animals for breeding purposes. It might be possible to include research institutions in such co-operation.

4. In some species of small mammals and birds the demands of zoos are insignificant in comparison with the demands of the pet trade and private aviaries. But information available is insufficient for any conclusion to be drawn as to the extent to which endangered species may be involved.

5. In the case of some large primates, however, private and institutional demands for certain endangered species are known to be large, especially in the U.S.A., and such figures as are available indicate that these demands are being met.

6. The demands of museums for specimens from collectors are an unknown quantity and need looking into, although it is presumed that most museums are conservation conscious.

7. Some research organisations prefer wild monkeys brought quickly to them by air immediately after capture. This is because it has been found that some monkeys are liable to pick up human viruses during acclimatisation or if bred in captivity. This difficulty could probably be overcome by better transport and housing conditions.

8. Some research institutions do not order and house their own stocks of monkeys with which to meet their requirements but prefer to obtain them from dealers when needed. This represents a variable demand on dealers and does not encourage optimum housing or breeding conditions.

#### **C. Publicity.**

1. While the publicity given recently to endangered species has tended to increase the demand for some of them, it is considered that the advantages of publicity greatly outweigh the disadvantages.

2. But the situation needs to be watched because there is evidence that unscrupulous people are trying to cash in on the value given to certain species by publicity.

3. An examination needs to be made of the type of publicity which exerts the greatest beneficial appeal, and of the types of animals which exert the greatest appeal. It might be found to be connected with the size of mammals or with species of birds which are attractive as pets. Greater discrimination in publicity could then be exercised so as to emphasise certain aspects of conservation, capture and captivity in relation to the most attractive types.

4. On the other hand it has been shown that arguments put forward to the public and politicians that a particular habitat contains a unique species do get sympathetic consideration and may well save the destruction of the habitat even in under-developed countries and when the endangered species is something quite obscure.

5. If conflict of opinion arises between conservationists and zoos about the publicity to be given to rare animals it causes confusion in the public mind. For instance, the exhibition of rare animals by zoos has led to criticism by some ardent conservationists and to demands for the total prohibition of imports of certain animals. The Survival Service Commission of I.U.C.N. has carefully considered this situation and is of the opinion that total prohibition of import of certain species would be undesirable and that the exhibition of rare animals by zoos is an essential part of publicity.

6. In Switzerland a campaign to discourage the keeping of certain types of monkeys as pets met with considerable success and this is a type of discriminating publicity which can be used to discourage some of the less desirable features of the pet trade.

#### **D. Legislation.**

1. The I.U.C.N. Commission on Legislation has accumulated a great deal of information about conservation legislation and its enforcement. The Commission recommends an International Convention and this recommendation was endorsed by the I.U.C.N. General Assembly in Nairobi in September, 1963. But this is a long-term move which will take time to prepare and in the meantime the best possible use must be made of existing national legislation.

2. Much national legislation is inadequate as well as being ineffectively operated. But this fact, which is widely recognised, should not discourage efforts to get all national legislation brought up to the standard of content and execution which obtain in a few countries where effective control of export has proved to be practicable.

3. Just as export control legislation can be shown to be effective in a few countries, but not in others, import control legislation can also be shown to be in effective operation in some instances. It must be realised, however, that in many countries—particularly in Europe—the only import legislation dealing with wild animals actually in existence is veterinary legislation, and no other type of control is operated.

4. Customs authorities, in countries which are trying to implement import legislation dealing with wild animals, encounter considerable difficulties over legal interpretations. One such difficulty is that of defining the country of origin of animals in transit. This difficulty has proved so great in connection with new British legislation that any definition of country of origin has had to be omitted.

5. An allied difficulty arises in any country which has a number of alternative ports of entry at which different interpretations of legislation and differing standards of willingness to enforce them may operate.

6. It is essential to associate research institutions and commercial interests with any efforts made by zoos and conservationists to secure better legislative control of the trade in wild animals because their influence over governments may well be greater than that of zoos and conservationists combined.

#### E. Practical Control.

1. Control is required at all stages of the trade; capture, export, transit and import. Capture and transit are dealt with below under separate headings.

2. All measures of export and import control that can reasonably be implemented must be equally applicable to zoos, dealers, research institutions and all others trafficking in wild animals.

3. While it is generally agreed that, in theory, export is the proper time at which to exercise the necessary control over the trade in those animals which survive capture and initiation into captivity, there are wide differences of opinion as to whether this control can, in actual practice, be better exercised at the export or import end. The balance of opinion inclines towards import control although substantial difficulties are recognised.

4. One suggestion is that all importing countries should be asked to forbid the importation of any animal appearing in the "Red Books" of endangered species unless it is accompanied by an export certificate from the country in which it was captured.

5. But, among other difficulties that arise over this suggestion, are, firstly, the questionable ability of most customs officials to recognise particular species of animals, and, secondly, fraudulent declarations of species.

6. It has been suggested that these and similar difficulties might be overcome by restricting in any country the ports of entry at which the import of wild animals is permitted, and by enrolling at those ports volunteer inspectorates drawn from the staffs of zoos, natural history societies, and similar organisations.

7. Although the time may come when exporting countries will be so jealous of their possession of wild animals that they will prohibit exports of them except under special circumstances, that time has not yet arrived. In the meantime it would be in the long-term interests of conservation for importing countries to give a lead by imposing strict control over imports in collaboration with I.U.C.N.

8. It was at this stage that the I.C.B.P. recommendation was put forward. (See page 9).

#### F. Capture.

1. Capture may be undertaken by properly organised expeditions fitted out for the purpose of collecting particular species to meet known requirements, or may be undertaken by responsible dealers to meet orders from reputable zoos and other clients, or may be undertaken by individuals, including native hunters and trappers, to whom the immediate financial return is all that matters.

2. According to the methods used, and the skill and care exercised, losses and injuries during capture may be as low as 5% but can be as high as 80% or even more.

3. The efforts of the authorities in some countries to control trapping and to eliminate irresponsible operators are complicated by the frequency with which they are confronted with "orphans", with specimens said to have been "rescued" from various situations, and with animals said to have been captured alive by peasants in defence of their crops.

4. Methods of capture are important in relation to losses, but equal importance attaches to the quarters in which captive animals are housed pending shipment and in which they may have to be partially tamed before further movement, or be treated for internal and external parasites, or be inoculated against various diseases. Suffering and losses at this stage can be considerable unless animal holding grounds in countries of origin are maintained at a high standard and are under proper veterinary supervision.

5. The capture of animals and their acclimatisation to captive conditions is by nature a slow business requiring a high degree of skill and sympathetic understanding of animals.

6. The ramifications of the pet trade and its magnitude in some countries are believed to be responsible for heavy losses at this stage, especially among small primates and birds.

7. Losses at this stage among monkeys required for research purposes and the production of vaccines have been considerably reduced in recent years by better regulations more strictly enforced, but there is no room for complacency about the situation. The remarkably good results now being obtained in some places should be equally obtainable in all other places.

8. The application of modern drugs to capture methods and their use during the acclimatisation period has reduced losses and improved chances of survival in general, but such drugs are still in the experimental stage and should not be freely available to amateurs.

9. For further points on the subject of capture see Appendix (c).

#### G. Transport.

1. Shipping and air lines cannot concern themselves with the legality or otherwise of the ownership of animals committed to their care. Provided that customs and health requirements have been met and shipping documents are in order they must accept animals offered for carriage on services which normally cater for such traffic.

2. Some airlines run special animal freight services with skilled attendants to attend to the needs of the animals in transit, and conditions on such services are normally good.

3. But many animals are transported in conditions far different from these special services. Unfortunately incidents do occur and are frequently due not so much to any breach of existing regulations as to the fact that no effective regulations exist.

Many countries have no effective air transit regulations for animal transport and some airlines are reluctant to impose too stringent regulations themselves for fear of losing lucrative trade to competitors.

4. Countries which possess effective regulations cannot always apply them to cover animals in transit between countries which do not themselves enforce satisfactory conditions.

5. Regulations must cover not only conditions of transport but, equally important, the type of containers employed. Some countries—Great Britain, for example—have recently examined the problem of suitable containers and have reached certain conclusions. But if packaging procedures and systems are to be even reasonably effective they must be adopted on an international basis and be recognised by the International Air Traffic Association. They must also be made applicable to both consignor and consignee in joint and several responsibility.

6. The Council of Europe is in the process of setting up a committee of experts to enquire into the whole subject of animal transport within Europe (not only the transport of wild animals). But it is essential that the approach to wild animal transport should be international so that standardised regulations can be adopted throughout the world covering air, sea, road and rail transport.

7. For further details on the subject of Transport see Appendix (d).

#### H. Indicated Conclusions.

1. Every encouragement must be given to the breeding of wild animals in captivity in order to reduce the demands on wild stocks.

2. Publicity given to endangered species and to efforts to control the trade in them enhances the probability of survival for those species.

3. A quota system to regulate the capture and disposition of animals which appear in the "Red Books" of endangered species needs to be instituted without delay.

4. A propaganda campaign is required to reduce the demands of (a) research establishments, (b) the pet trade, for animals of endangered species which have to be captured in the wild.

5. There is evidence that national legislation is being improved and more effectively enforced today in more countries than formerly but there is room for much more improvement before the world picture can be considered to be at all satisfactory.

6. In spite of the difficulties involved in enforcement, improved import control in the chief importing countries is likely to prove to be the most effective method of curbing demand and controlling undesirable elements in the trade.

7. There is a need, in those exporting countries which do try to control their end of the trade, for guidance from importing countries as to the dealers, zoos and other institutions from which orders can safely be accepted and which can be relied upon to care properly for the animals they receive.

8. Zoos and other importers of wild animals will help to eliminate cruelties and losses if they deal only with exporters whose holding facilities in the countries of origin are known to be of a high standard. A central organisation is needed to maintain a register of reputable exporters.

9. An alliance of major zoos, research institutions and dealers could formulate a common policy on all matters covered under the broad heading of "trade" and would be strong enough to enforce widespread compliance with it.

10. A system of voluntary control, as advocated in the Symposium's first recommendation, if accepted by a substantial proportion of all those concerned, could be brought into operation much more rapidly than by campaigning for stricter legislative control and would almost certainly prove to be quite effective. But legislative support will still be necessary on the lines of the Symposium's second recommendation.

### Theme 3.

#### "Conservation Education in Zoos."

Chairman: Mr. G. S. Mottershead. President I.U.D.Z.G.  
Introduced by: Mr. W. Van den bergh.  
Summed-up by: Mr. S. Andersen.

The following also spoke:

Professor Baer.	Dr. Matthews.
Professor Bourlière.	Dr. Morris.
Dr. Brand.	Dr. Fairfield Osborn.
Mr. Conway.	Dr. Reed.
Mr. Fisher.	Mr. Scott.
Mr. Fitter.	Sir Landsborough Thomson.
Mr. Mallinson.	Mr. Van den Brink.
Dr. Lang.	

The following contributed notes:

Mr. Van den bergh.

#### A. Introduction.

1. Educating the public to take an interest in wild animals is an integral part of the function of zoos. From a limited interest in wild animals, generated by zoos, some of them will develop a wider interest in conservation. The fauna of the world is a vast living organism of which zoos possess only an embryo. In so far as zoos are the curators of this embryonic living organism they have a responsibility towards the animals in their care and a moral duty to show similar concern for animals living in the wild.

2. Education of the public can be subdivided into several headings:

- Education in general.
- Education of adult visitors to zoos through attractive displays and informative labelling.
- Education of children, including the education of their teachers.
- Education of a select public through Zoological Societies, lectures and publications.

#### B. Education in general.

1. There is need for an organisation which could, inter alia, examine the wide variety of methods employed by zoos in carrying out their educational functions. The results of the examinations could then be collated and information published on the methods that appear to be securing the best results, and on their cost. The publication of this information might possibly be combined with the publication of the *International Zoo Yearbook*.

2. Zoos which are primarily exhibitions of animals should be encouraged to pay more attention to expounding the relevance and meaning of conservation. It could be done, for instance, by devoting a room in the zoo to a conservation display showing how the destruction of animals and their habitats can, and often does, lead to the degradation of the countryside and a descent into desert or quasi-desert conditions. As a result the countryside is not only lost to animals but becomes virtually useless to man. The replacement of animals by man may well be to the lasting disadvantage of mankind through the destruction of forests, grass cover and water resources. The displacement of wild animals by domestic animals can have, and frequently does have, the same disastrous results.

3. All forms of education, other than straight-forward labelling, constitute additional calls on the finances of zoos but the majority of zoos can afford to undertake some additional projects to reinforce their educational functions.

4. In general the public does not come to a zoo to be educated but to be entertained. For the majority, therefore, the educational aspect and objective must be wrapped up in attractive displays.

5. The larger zoos might consider the example of the New York Zoo and set up a Department of Exhibition with responsibility for all matters of exhibition and education and for putting approved plans into effect. One of the difficulties faced by zoos is the immense competition of other forms of entertainment in modern societies, and a Department of Exhibition would aim at attracting a larger proportion of potential visitors.

6. Figures of zoo attendances appear to be related not so much to the genuine interest of the local population in animals as to the availability or lack of alternative amusements. There is evidence, however, that zoos which set out to stage especial attractions do secure attendance figures which owe something to a regular clientele of visitors who return at intervals to see whether any new attraction has been staged.

7. When rare species are being exhibited the public may well ask why, if they are rare, they are in a zoo at all. There are two answers. Firstly, that the sight of an animal in the flesh has more impact on the public mind than either pictures in magazines or on television, and the exhibition of a limited number of rare animals is therefore justifiable for publicity purposes. Secondly, that they are not only being kept for exhibition but are also being used for breeding in order to maintain the species. The second answer is, of course, far more convincing than the first by itself.

8. The impact of television is considerable and so, to a lesser extent, are sound broadcasts. There is little evidence that television broadcasts about any particular zoo result immediately in increased attendances at that zoo, but it is considered that the cumulative effect is appreciable and that substantially greater interest in zoos and in wild animals is created through these media.

9. Evidence collected about zoos in connection with television programmes indicates that there are fairly definite limits to the amount that the public can take in either visually or mentally. It also indicates that greater impact is made by specialised exhibits of small numbers in elegant surroundings than by a wider coverage which tends to become numerically indigestible or monotonous. This may well apply not only to television programmes but also to viewing in zoos.

10. Although it is generally recognised that a very large percentage of those who visit zoos are only momentarily interested in the animals they see, there is always a proportion who have special interests and it is important that there should be zoos to cater for them. Such visitors include those who want to study particular species and those who are most likely to take practical steps to support and further conservation. The zoo which has a large numerical collection, among which they can be sure of finding the animals they want to see, is more attractive to people of these types than the zoo with limited group exhibits.

#### C. The education of adult visitors to zoos.

1. It is obviously desirable that zoo personnel should themselves be sufficiently educated in the subject of the animals under their charge to enable them to give sensible answers to questions from the average uninstructed visitor. Intelligent and informative answers may lead to greater interest thereafter.

2. Taking into consideration the admitted fact that it is only a small proportion of visitors to zoos whose interest can be aroused to the extent that a permanent impression is made on their minds, it is important to plan displays with definite objectives in mind.

3. The animals of common interest which always attract the crowds are elephants, giraffes, monkeys, lions and tigers, and some of the aquatic animals such as sea lions. If the objective is to attract attention to endangered species which are not themselves spectacular, and which might therefore pass unnoticed, it might be advantageous to display them prominently among the common but universally attractive species.

4. On the other hand, if the objective is to increase the interest in wild animals in general, the necessary impact on the mass mind may best be secured by attractive displays of common animals in surroundings which look something like the natural conditions in which they live in the wild.

5. The mere display of large numbers of animals in captivity may be of great interest to the educated observer and also be of great scientific interest as a living museum, but it is difficult to combine this aspect of zoos with the mass education aspect.

6. For the purpose of mass education the system of labelling needs to be simple and uncomplicated because few visitors will absorb more than a few labels or more than a minimum of information about any particular animal. But it is important that the more informed and more interested visitors should be able to obtain information in greater detail without difficulty or delay.

7. For this purpose coin-in-the-slot machines might be installed to dispense maps showing the world distribution of various species, and booklets giving more precise and more complete information than can be conveyed by simple labelling. I.U.C.N. might be the best authority to produce the maps and booklets which would need to be available in a number of languages.

8. Greater use might be made of the technique of taped information, as now employed in some museums, so that the visual impact is augmented by the spoken word. To be effective on any scale this would need to be more widely and freely applied than the coin-in-the-slot machines already installed in a number of zoos.

9. A special type of label has been developed in the U.S.A. for all animals in the "Red Books" of endangered species. It is hoped that this sign will be copied by as many zoos as possible throughout the U.S.A. so that it becomes widely recognised.

10. The development of an internationally recognised label for endangered species, characterised by a symbol suitable for both mammals and birds, might well follow. If the symbol was emphasised by an eye-catching colour, such as red for danger, or by a generally understood sign, such as stars, it would have a better chance of universal acceptance. It is worth having such a sign even if it only registers with a small handful of those who see it.

11. Care must be taken not to confuse the public mind by labelling too many species as endangered. A limited list of species selected for their probable appeal would be likely to make a deeper impression than a comprehensive list. But different selections would almost certainly be necessary in different parts of the world, and zoos everywhere would need to be kept informed about which species were being spotlighted in different countries.

12. "Gimmicks", such as the empty cage labelled with the names of extinct species, or a mirror labelled "The Most Dangerous Animal", have public appeal and make an impression.

#### D. The Education of Children.

1. The education of children about animals and conservation is more important than the education of adults and is likely to be more fruitful. The most direct way to childrens' minds is through the minds of their teachers. It should be possible for zoos to arrange advance instructive tours for teachers drawn from schools which are intending to send parties of children to them.

2. The Zoological Society of London has been carrying out a survey of childrens' reactions to animals and for this purpose sent out a few years ago a questionnaire to 87,000 children. The results are still being analysed, and no firm conclusions can yet be drawn, but they have been sifted sufficiently to indicate that children have strong instinctive hates and loves which are directed with remarkable unanimity towards certain animals.

3. The hate and love impulses in the minds of children preclude an entirely objective approach to their studies of animals and wild life, however desirable such an approach may be from the scientific point of view. But, for the practical purpose of making children interested in animal conservation, the emotional approach is likely to produce more lasting results just because these impulses can be given direction.

4. Furthermore, the reactions of children alter at the approach of puberty and again after puberty. In addition, they are sensitive to cults and today the education of children to a desire to protect wild life benefits from the fact that conservation has become fashionable and is more widely recognised than formerly as being a civilised practice.

5. Children are accustomed to receiving education both in scientific subjects which require an objective approach and in other subjects, such as art and music, which require an emotional approach. It may prove to be desirable to adopt an objective approach to the study of animals and a more emotional approach to the study of conservation.

6. The most perceptive children often exhibit tendencies, when quite young, towards special interests which, if encouraged, will exert a compelling influence, and possibly a dominating influence, over their minds in later life. The proportion who may be influenced in this way by what they see in zoos and learn in zoos will always be a small minority, but it is a minority whose opinions will count in the future when the position of wild animals in the world as a whole is likely to be even more precarious than it is today.

7. Many children, when visiting zoos, take notes of what they see and copy the inscriptions on labels into their notebooks. How many zoos make arrangements for subsequent questions to be answered, either by asking teachers to send in lists of questions for written answers, or by sending someone to the school to answer them?

#### E. The Education of a Select Public.

1. The number of societies and associations throughout the world which are dedicated to conservation is legion. Many of them represent a dispersion of effort and resources which would be more effectively deployed if they could be co-ordinated. Failure to co-ordinate may arise from lack of contacts.

2. Zoos are in a favourable position to assist in improving this situation by acting as centres of effort. They can do this because they are permanent and can provide facilities which would strain the resources of individual societies dependent on voluntary effort and subscriptions.

3. Some zoos are already active in this direction and are planning to increase their activities in it. For example, the large grant of funds from the Wolfson Foundation, which was announced by the Zoological Society of London during the Symposium, is specifically intended to provide a headquarters in Great Britain for the conservation effort.

4. Zoological Societies can materially assist in widening public support for their own scientific and educational functions by the support that they themselves give, through their journals, lecture programmes and films, to work in the wider field of conservation.

#### Theme 4.

##### “Moral and Financial Support for Conservation through Zoos.”

Chairman: Professor S. Dillon Ripley.  
(Monsieur J. Delacour deputised when Professor Ripley had to withdraw owing to indisposition.)

Introduced and  
Summed-up by: Mr. Peter Scott.

The following also spoke:

Mr. Andersen.	Sir Landsborough Thomson.
Mr. Bean.	Dr. Lang.
Dr. Berry.	Dr. Matthews.
Colonel Boyle.	Dr. Morris.
Mr. Conway.	Dr. Fairfield Osborn.
Mr. Fisher.	Dr. Thorpe.
Mr. Fitter.	Mr. Van den Bergh.
Mr. Graham Jones.	Mr. Zeehandelaar.

#### A. Introduction.

1. It is essential and natural that zoos should take a deep interest in conservation because, in the logical extremity, a situation could be reached in which there would be no animals left for zoos.

2. While a situation is unlikely to arise in this extreme form in the foreseeable future, it can easily arise in limited form over particular endangered species, especially when any species has only a restricted habitat and that habitat is suddenly destroyed.

3. There is need, therefore, for constant world-wide surveillance of all species because it may be difficult at times to appreciate that a species is becoming endangered. The Survival Service Commission of I.U.C.N. is providing surveillance to the extent that its finances will allow, but the service is limited and needs to be extended. Increased moral and financial support from zoos would greatly assist in this work.

4. The surveillance needs to cover not only mammals and birds in the wild but also those in captivity. Fashions in captive species can change and there is a possibility that a species—particularly of birds—might be allowed to die out in captivity and then be found to be extinct in the wild also.

5. The effect of man on the elimination of species is now far more devastating and far more rapid than the effects of nature through evolution, and the rate of devastation is accelerating.

6. Successful conservation increasingly depends on the manipulation of nature by man, and zoos need to be closely connected with the manipulation of animal populations.

7. Animals are the raw material of biology and this would be a sound reason for zoos to help to preserve species even if there were no other reasons. But there are other reasons—aesthetic and recreational, for example—and an important development in the attitude of civilised man towards his place in the world has been the growth of interest in wild animals and the evolution of conservation.

8. Zoos need the moral support of conservation organisations just as much as conservation needs the support of zoos. Their interests are complementary and in no way antagonistic.

9. Some zoos already embody the support of wildlife conservation among the aims and objects stated in their charters. This is an acknowledgment that might well be adopted more widely and receive more publicity.

#### B. The Moral Issue.

1. In a world in which human populations are increasing at an explosive rate it is inevitable that man should be usurping the habitats of wild animals. In doing so he changes the character of the environments he invades and adapts them to his own uses. The fact that by making the changes he not infrequently destroys the environments to such an extent that they can only support a human population at bare subsistence level is unlikely to deter him from continuing to oust the animals that previously occupied these environments without destroying them.

2. While the loss of rare and interesting species is unfortunate, the question has to be considered whether their elimination is not a part of the natural course of evolution in which some species of animals always have been and always will be on the road to extinction. This process of extinction has been taking place since life began and nothing we can do will stop it now.

3. Change is inevitable, and where species become extinct their places are taken by other animals, either existing species which spread into their environments or new animals which evolve to take their places in niches which from time to time are vacated.

4. Today one successful species—*homo sapiens*—dominates the physical world and is ousting all the unsuccessful species—the biological failures in the modern world. Man, as a biological agent, now has an influence of a power and range quite beyond that of any previous biological agent that has existed on earth.

5. Even so, not all animals are failures in the face of man's domination. Many species of mammals and birds, amphibia and fishes, to say nothing of invertebrates, are proving themselves to be biological successes in the modern world. Some become so successful that man classes them as vermin. Should not our interest and studies be devoted primarily to them? It should be a theme for fascinating study to find out why they are successful and can hold their own in the face of man's depredations.

6. By all means let us study the biological failures while there is yet time, but let the study be quite objective and not muddled by an emotional approach or by a guilt complex that drives people to try to put the clock back.

7. Moreover the emotional approach may well be deliberately exaggerated as a means of arousing sympathy and obtaining additional money for conservation purposes, and thereby produces an unbalanced picture of the true position.

8. Faced with steadily diminishing regions in which there is any hope of wild life surviving in the balance of nature undisturbed by man, the supporters of conservation have been setting up National Parks and Wildlife Reserves in which they endeavour to preserve a semblance of natural conditions. But even the largest reserve sooner or later develops imbalances in its animal populations and these imbalances can only be checked by management. This in itself is an interference with nature and produces an artificial man-made bias which does not preserve nature in the *status quo*.

9. In this situation can zoos seriously hope to preserve any significant proportion of the world's fauna? And is there any real likelihood that animals bred in captivity will later be released again in a wild state in which they can hope to survive? Is not this whole idea an illusion?

10. It could also be argued that the numbers of any species required for successful re-establishment in a wild state would be impossibly large, not only to meet the effects of release and natural wastage but also in order to provide the right psychological background so that they could breed and prosper.

11. However, while the importance of objectivity in science and of a scientific approach in this particular field can be whole-heartedly approved, the emotional viewpoint need not be wholly condemned. Man has got away from the primitive idea that animals were merely provided for his use either as food or clothing or for some other beneficial purpose, and there is no reason why this utilitarian outlook should be replaced without qualification by an outlook just as harsh.

12. Emotion does not necessarily imply muddled thinking as is sometimes averred. The distinction between the prevention of cruelty to animals and the prevention of the extinction of certain species of animals is quite clear in the minds of most conservationists. But the two objectives can well be allied when animals in captivity are under consideration.

13. Moreover it is impossible for conservationists to contemplate without some emotion the enormous acceleration in the rate of animal extinction during the current century and more especially during the last two or three decades. Now the stage has been reached where man, by the mere process of exploiting his new discoveries and adapting his environment in the perhaps hopeless attempt to provide a good life for his rapidly increasing millions, can easily increase the rate of animal extinction until it reaches landslide proportions.

14. But the conservationist maintains that while some of the losses are inevitable, by no means all are inevitable. If man sets his mind to it he will be able to control the process and keep it within more reasonable proportions, thereby preventing innumerable species of great value and scientific interest from disappearing prematurely from the earth, often before their interest and value are even faintly understood.

15. In the context of the modern world it is necessary to distinguish between true biological failures and species which are unable to adjust themselves sufficiently rapidly either by selection of genetic constitution or by adaptive change in habitat selection.

16. It is generally admitted nowadays that hardly anywhere in the world where men can intrude in any significant numbers is it possible to preserve the "balance of nature". It is recognised that in any National Park, however large, a considerable amount of management is not only desirable but essential, and it is maintained that there is nothing against wildlife management provided that all possible scientific and technical resources are utilised to the full as and where they are needed.

17. Conservation, in fact, is an extremely interesting facet of applied biology and, in the application of scientific principles to conservation, an enormous amount of new and valuable knowledge is acquired about the whole pattern of ecosystems, of which the animals, being the chief subject of conservation, are the central or at least an essential component.

18. While it may be true for certain species that re-establishment in the wild, after a long period of existence solely in captivity, might require a very large number to be bred in captivity and much research undertaken as to their physical and ethological requirements, it would be unduly pessimistic at this stage to assume that this applies to species in general. Knowledge on the subject is quite inadequate for any firm conclusions to be drawn.

19. A recently published book by Ernst Mayr, "*Animal Species and Evolution*", contains striking evidence for what he calls the founder principle. This concerns the possibility of viable and well adapted populations of animals being established from one or a few founders. While Mayr recognises the risk of extinction that such a founder unit or founder population encounters, and agrees that loss of viability, known as inbreeding depression, may occur if a normally outbreeding species is suddenly subjected to intense inbreeding, he is properly cautious in not considering this a fatal objection to the idea of a founder population.

20. So, while the experience of geneticists and animal breeders in the past should certainly not lead us to under-estimate the difficulties of attempting to re-establish species in the wild from artificially maintained stocks, there is no ground for giving up hope and abandoning threatened species to their fate.

21. On the contrary, there is a great deal to be said for launching as quickly as possible into the experimental study of the breeding of threatened species, taking every care to guard in advance against known and possible dangers.

22. Important arguments can be advanced in favour of conservation from the point of view of man's aesthetic and cultural needs. But, in addition, on a strictly practical and scientific level, the conservationist can be regarded as playing a vital part in securing the continued existence of a great variety of species and a great series of ecological systems, as material for study by future generations of biologists, naturalists, physiologists, ethologists and ecologists.

23. All reasonable conservationists recognise that they cannot hope to retain in perpetuity all species at present existing on earth but they hold that it is an act unworthy of man as a rational being to allow the extinction of a single species, or the loss of a single type of natural environment, if such extinction or such loss can be avoided.

24. It is unlikely that scientific advances, however rapid, will enable man in the foreseeable future to recreate animals which have become extinct or to create new and original species which are of interest outside a restricted field of genetics and biochemistry. But the preservation of at least some representatives of most animal groups, or even of near relatives of species liable to extinction, will retain the basis for genetical experiment which may well enable the reconstitution of species in forms if not identical with, at least very close to those which have been lost.

25. Man, in his fight to save hundreds of millions of his own species from a state of chronic malnutrition, may yet be forced to realise that there are large areas of the world, varying from mountain ranges to savannah plains, which are actually and potentially of far more value to mankind as catchment areas and forests, or as barriers against desert, than if inhabited by men habituated to destroying their environment. Although, on a world-wide perspective, conservation is still fighting a losing battle on this account, its continuing efforts can help to save further degradation in some such areas and may yet get the chance to reverse the process in others. Anything that can be done to improve that chance is therefore worthwhile.

26. Finally, although man is a biological entity, he is also a being which has acquired a technique of control of his environment of an altogether different order from that of any other animal that has previously existed. Ecological and selectional processes are being superseded in such a manner that the safeguards from extinction and natural equilibria built in to organisms through millenia of natural selection can now be overturned in a decade by human operations. These may often be as inadvertent as they are irrevocable, outside the range of normal biological process, so that to say that man and his activities are part of biology and nothing more is a half-truth and an inadequate guide to the situation.

### C. The Financial Issue.

1. When this subject was discussed, doubt was expressed as to whether self-supporting zoos are justified in raising money for other organisations. But this doubt was answered by the argument that the collection of funds by zoos for conservation should be limited to collections on behalf of the World Wildlife Fund, which is now recognised as the Community Chest for wildlife conservation, and which aims specifically at safeguarding endangered species, either directly or by conservation of their habitat.

2. It was felt that zoos could raise money for this aim in ways which would not conflict with their own interests, because donations would be attracted which would never be made to zoos. People who have paid entrance fees to a zoo do not expect to be asked to pay anything more to the zoo but are not averse to making donations to other specific objectives if the appeal is made in some novel and attractive manner.

3. The attraction of a good idea would be increased if it could be adopted by a large number of zoos so that it became a recognised feature of zoos and a "must" for visitors, particularly children, in any visit to a zoo.

4. One such attraction is a wishing well. The urge to throw coins into a wishing well is very widespread among human beings, and either an attractive fountain stocked with fish, or a penguin pool, is likely to yield a rich harvest.

5. Another idea which has been successfully adopted in a few zoos is the empty cage labelled with the names of mammals and birds which have become extinct. Replicas of the extinct animals may be shown nearby. If living examples of an endangered species, especially of a kind which has public appeal, can also be shown in conjunction with a handy collecting box, the results may well be substantial.

6. It was also suggested that children might be encouraged to buy albums for which pictures of both popular species and endangered species would be obtainable from slot machines. Maps, showing the distribution of such species, might also be obtainable in the same way, as mentioned in the discussion of Theme 3.

7. Other means whereby zoos can give support for conservation, and indirectly encourage donations to the World Wildlife Fund, are by the publication of conservation propaganda in zoo guides, by arranging lectures and television programmes, and by encouraging membership of the Wildlife Fund Youth Service.

8. It was also suggested that a system of surcharges might be instituted on all invoices sent by dealers to zoos on the purchase of wild animals, but doubts were expressed both as to the feasibility and the desirability of a system of this nature.

9. It was considered that the whole subject of the financial support that zoos can render to conservation needs to be further examined by the proposed inter-zoo organisation, when constituted, in conjunction with the World Wildlife Fund, with a view to drawing up a list of proposals that could be adopted by zoos without prejudicing their own financial interests or the terms of the charters under which they operate.

#### Appendix (a).

#### “Conservation of Asian Equids, with particular reference to the Przewalski Horse.”

By Dr. Zdenek Veselovsky, Director, Prague Zoological Gardens.

*In the absence of Dr. Veselovsky this paper was read to the Symposium by Dr. Harrison Matthews, Scientific Director, Zoological Society of London.*

First of all I should like to express my support for the idea of bringing the conservation organisations and zoological gardens together in order to further the cause of wild life conservation.

In my paper I should like to concentrate on the Przewalski horse—an excellent example of how much can be done to preserve a species that probably no longer exists in the wild. It is a particularly good example since it shows on the one hand how zoological gardens can successfully save a certain type of animal from extinction; on the other hand it is a good means of educating the public about the need for conservation of an interesting species.

The Prague Zoo has exhibited Przewalski horses for more than 40 years and recently our zoologists have been doing considerable research into the biology, ethology and reproduction of the species. We have also collected as much information as possible about the status of the species in the wild and in 1959 held an International Symposium on the Przewalski horse.

The last wild Przewalski horses were captured in Mongolia, between 1942 and 1945. Of these animals, only one mare was used for breeding and she is now living at the Askaniya Nova Zoo. Since 1945 there has been little information about the Przewalski horse in the wild. Both natives and hunters frequently mistake the wild ass or kulan for the wild horse. Photographs sent to me of so-called Przewalski horses captured recently in Mongolia and China in all cases turned out to be kulans. In 1960 I was told personally by the well-known Mongolian zoologist, Mr. O. Cevgedmed, that in the winter of 1959—1960 two herds of Przewalski horses were seen in the mountains of Bajtag-Bogdo and Tachin Shara Nuru. There were 14 horses in one herd and 6 in the other. In 1960 Professor Dementiev of Moscow organised a large expedition to these places and also to the Gobi desert. Neither he nor his colleagues discovered any traces of wild horses. The local shepherds said that they had last seen the horses in the forties.

I am recounting these facts in order to underline the fact that without the help of zoos this equid might have already become extinct. After the Second World War, the number of Przewalski horses in captivity was dangerously low. In 1956, when the Symposium for the Preservation of the Przewalski Horse took place, there were only 56 horses in captivity; on the 1st January, 1964, as stated in the most recent number of the Stud-book, there were 114. Thus, during the last 9 years, the number of these animals in captivity has doubled—which is good proof of the progress that zoological gardens have made in being able to help in the conservation of nature. As I see it, the increase of the number of Przewalski horses in captivity allows us to draw a number of conclusions and permits us to make certain plans for the future.

In the first place we should not cross our breeding lines with domestic horses, even if these resemble the Przewalski horses, simply to enlarge the herds. I do not believe that there is any real danger of a degeneration in the physical characteristics of the species because even where in-breeding has occurred, lethal genes have not yet appeared. A good reproductive rate and healthy progeny are in themselves a good guarantee for further successful breeding. However, this does not mean that the need for systematic genetic work on the Przewalski horse can be neglected. On the contrary, it is urgently necessary for us to decide what is the real "type" of Przewalski horse for future breeding.

Only a few skeletons or skins of wild-bred Przewalski horses exist in museums and the only known wild-bred horse today is the mare living at Askaniya Nova. As compared with captive-bred Przewalskis living in zoos, the wild-bred mare has a noticeably heavier head. Therefore one of our first and indeed very difficult tasks will be to prevent changes in the appearance of the horses kept in zoos. In this context it should be remembered that the diet and way of feeding of zoo horses differs considerably from those occurring in the wild. Thus in order to prevent changes occurring as the result of captivity (e.g. less muscular development of the jaw muscles through eating softer food provided in zoos) it is very necessary to strengthen genetically the typical physical characteristics of the Przewalski horse by careful selection of breeding stock.

With the increase in the numbers of horses available for breeding comes the possibility and necessity for selecting horses suitable for breeding. If the characteristics of the species, such as colour and conformation are to be maintained, then certain animals will have to be discarded from the breeding pool when they have reached three years of age (it is impossible to judge a Przewalski horse on its conformation before this age). The question as to what constitutes a typical Przewalski horse and what should be done with unsuitable horses should be discussed by all owners of Przewalski horses and the results of their conclusions be stringently applied.

Another important point where zoo conservation is concerned is the returning of the species to the wild. By doing this we can enrich nature with a species that is virtually extinct, we can provide natural conditions for the species that would ensure that the typical conformation of the species is maintained and we can see that zoo selection is to a certain extent replaced by natural selection. I have discussed this question with Professor Banikov of Moscow and he believes that it should be possible in the near future to establish a large protected breeding reserve for the Przewalski horse in the central Asian part of the Soviet Union.

Finally, I should like to stress how important I believe it is for us to start similar breeding programmes and stud-books for other endangered species of animals. I should therefore like to ask members of the Symposium to recommend to the I.U.C.N. and the International Union of Zoo Directors that stud-books should be started for all species that are rare in captivity and endangered in the wild.

#### Appendix (b).

Contributed by Dr. W. Lane-Petter, Laboratory Animals Centre, Medical Research Council Laboratories, Carshalton, Surrey.

Medical research uses primates in numbers to be reckoned in thousands a year; but in recent years the use of rhesus and other macaques, of cercopithecus species, and even of baboons, for the preparation and testing of poliovaccine, has required many tens, probably hundreds of thousands of animals each year. The rhesus monkeys come mainly from India, other macaques from further east, and the cercopithecus and baboons from Africa.

The drain from India has been going on for the longest time, but there is no evidence that the rhesus population there, where it is an agricultural pest, is being reduced. Certain trapping grounds may be less used to-day than formerly: partly because healthier monkeys are available from jungle rather than inhabited areas; and partly because the loose social groups are in any event migratory.

The various methods of trapping collect all ages, but only monkeys 4—10 lbs. are usually needed. Trapping, and extricating the animals from the traps, are almost certain to cause some wounds and broken bones, and this in not a pretty part of the operation. In India the adults are nearly always released, because of the Indian distaste for killing any animals, especially monkeys: but in the Philippines there is a market (other than for laboratory use) for monkeys of all ages and sizes.

Until the introduction of jet air services on the far east run, the monkeys travelled from Malaya, Burma and India by animal freighter planes, which could hold up to 1600 monkeys, packed in boxes of 8—10 per box, and took 36 hours or more to London, and 12—24 hours more to New York. Mortality en route could be anything from nil to over 50%, with further mortality during the 2 or 3 weeks after arrival at the final destination. Mortality in the concentration compounds in Delhi and elsewhere varied greatly at different times of the year—being greatest during the monsoon—and according to the numbers held and the duration of holding. Some 10% of animals delivered to the concentration compounds might be rejected on account of age or health, and an unknown but certainly not inconsiderable mortality occurred between trapping and delivering to the concentration area.

Since 1955, when the Medical Research Council produced the first recommendations about the carriage of laboratory monkeys by air, to be followed in 1959 by the first of the British Standards Institution recommendations (B.S. 3149, Pt. 1), there has been a steady improvement in the condition of packing and air carriage. Credit for this must be shared between the various user organisations—research institutes and Pharmaceutical firms for the most part; the carriers—British and American air lines have played a prominent part; and Government agencies in the countries mainly concerned at any stage of the journey, who have laid down and done their best to improve standards.

More recently, there has been a growing use of the cargo holds of passenger jet aircraft, which are ventilated and more or less efficiently heated. The journey from Delhi to London is now hours rather than days: only about 400 monkeys are carried in any one plane: and the service is more regular. The effect has been to reduce mortality during the flight and immediately afterwards, and it is suggested that this is due mainly to the following causes:—

1. Shorter flight time, leading to a shorter period without proper observation and care, a shorter period of the stress of confinement in travelling boxes, aircraft noise, etc., and less handling en route.
2. Quicker throughput of animals in the concentration areas, reducing both the population in the concentration compounds and the time spent there.
3. Smaller consignments make it easier to give proper care to all the animals at both ends of the flight.

The monkey traffic, as a result of the development of poliovaccine, reached enormous proportions, but necessarily concerned only very common species. No one could contemplate using an uncommon species for such work: or if this were absolutely unavoidable, to risk its extermination. At the same time, breeding animals like macaques in large numbers in captivity is not yet economically or technically possible.

Perhaps the main lessons to be learned from the traffic in these monkeys in recent years are as follows:

1. So long as the trapping of common species, like the rhesus monkey, is economically feasible, it may be regarded as a cropping operation, with no serious effect on the population reservoir.
2. Humane and efficient methods of collection, transportation and care can be developed, if those concerned will co-operate.
3. The transportation of animals in these large numbers presented an opportunity to study many relevant problems in care, caging, social sorting and redistribution, cross-infection, etc.: much was made of this continuing opportunity but more could have come out of it if the traffic had not been bedevilled by emotional and commercial issues.

## Appendix (c).

### “Capture Losses.”

During the course of the Symposium, as well as in correspondence received both before and after it, considerable concern was expressed at some of the methods of capture employed by native trappers and others in Africa and Asia. Facts and figures quoted during the Symposium did little to allay this concern, but other speakers were emphatic that both the cruelties and the losses are unnecessary.

The two notes below further emphasise this point and give added weight to the need for an organisation which would assist in channelling demand into the hands of those who can show that they are able to capture and handle wild animals humanely and with the minimum of loss and injury.

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### “Some Notes on the Capture of Wild Animals.”

By John Seago. Nairobi.

The movement of large groups of wild animals from threatened areas into safer places, such as National Parks, is now more than just an idea. Operations of this type are taking place, but if they are to be successful there must be assurance that both mortality and injuries can be kept within reasonable proportions.

During the discussion on the capture and export of wild animals the Chief Game Warden of Kenya gave some figures of mortality from information available to him regarding some aspects of the business in Kenya and delegates were shocked by them. I do know that the losses incurred by some capture units have been very heavy but my own experience is that heavy losses are unnecessary.

There is a tendency to regard the capture of animals as an unskilled job which can be done by anyone with little or no knowledge or previous experience. But it is, in fact, a highly skilled job calling for good team work by a competent unit which has been properly trained. The training is costly but pays from all points of view.

The type of men employed is important. Admittedly one has occasionally to take the best man available when an additional pair of hands is wanted in a hurry, but the regular team should be composed of men who are good stockmen and who really like working with animals. The man to whom the supposed glamour of the job is the main appeal may not be at all ideal.

It is an established fact that the personalities of the men employed are important in zoos, in stables and in cow sheds, and care is given to their selection. The same care is sometimes lacking in the selection of men for animal catching and nervous animals which fail to survive are the result. The degree of nervous tension suffered by newly caught animals is not always appreciated. It is here that the quiet confident stockman is so important.

The design of the pens in which newly caught animals are confined is also important. Properly designed pens can help animals to recover confidence and stability, and it is vital that they should be given time. Three months should be allowed for acclimatisation to captivity and during that time they need the same care as nervous thoroughbreds.

Animals for export must be trained to undergo frequent spraying and must be introduced carefully to their travelling crates and to the new food they will have to eat. Again time is important but if proper care is taken at this stage the animals do not fuss and losses are obviated.

Unfortunately the work is often seasonal or spasmodic and it is therefore difficult and expensive to keep a team of workers together and to have continuous development of techniques, but if it can be done the results justify it.

Speaking as an experienced trapper and trader in wild animals I am quite sure that it is possible to capture and move animals to zoos and also to establish populations in safe areas without such losses that the value of the operations can be questioned. It is important to remember that most animals are conservative by nature and habit, and that time for acclimatisation in a new home is as important as the period of acclimatisation into captivity.

In Kenya both the Game Department and the Veterinary Department have introduced sound regulations to safeguard the captive animals and the zoos which purchase them, and losses would be reduced if the regulations were always adhered to.

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#### **"The Capture and Transport of Monkeys from India."**

By G. E. Joss, M.R.C.V.S. Veterinary Consultant to B.O.A.C.

As the result of criticisms and questions asked by the Littlewood Committee I went to India to see for myself just how these rhesus monkeys were caught, transported from the jungle to the holding farms and finally shipped to the U.K. I went to the jungle about 300 miles north of Delhi in the Himalayas and watched monkeys being caught by the net method. This method is as humane as it possibly can be. Only monkeys in first class condition of the right age are kept, the others are turned loose again. They are then taken, usually by lorry, to the holding farm just outside Delhi. They are examined upon arrival for any signs of illness, injury or disease. This is done very carefully, each monkey is run into a small tunnel-like cage between two larger cages. The average time lapse between being caught and arriving at the farm is just under a week. They are kept at these farms in large well ventilated open air cages, protected from excessive heat, draughts, etc. Hygiene is good. Just prior to shipment, again usually within the week, they are again carefully selected and each one examined individually and weighed. They are then put into boxes holding on an average about nine each, these boxes are disposable.

They are placed in the bellyhold of the jet plane, the temperature range in these holds is 40°F. to 50°F. whilst flying. The journey to London takes about 10 hours, they are met there by special transport (heated in the winter) and taken direct to the laboratory. I have examined many thousands of these monkeys prior to and after landing and I have never seen any serious or extensive wounds from fighting or bad handling. These reports about fractures, open wounds etc., are just not true. The Indian Government has made strict regulations about this whole monkey trade and these regulations are always carried out. I have always found that those engaged in this trade are very conscious of possible criticism and this alone keeps them on their toes. Airline operators for the same reason are extra careful with these monkey cargoes, the only possible exception are a few private operators who are not too careful with ventilation and overcrowding. Fortunately should any of these monkeys arrive dead or in a bad condition this is soon reported in the press with dire results for the airline concerned.

Since these monkeys have been carried in jet planes the mortality has dropped from 5% when carried in older freighters that took up to three days on the journey, to 0.01%. In other words deaths during air transport are really a thing of the past. This is due to better selection of monkeys for health and fitness, slightly lower temperatures in transit, less humidity, and chiefly the reduction in flying time.

Appendix (d).

“The Transport of Wild Animals.”

None of the subjects discussed at the Symposium has produced a greater volume of correspondence than that of “transport”. But very little of this comment relates to transport by sea and it must therefore be assumed that on the whole that situation is reasonably satisfactory.

However, transport of wild animals by sea is generally limited nowadays to the larger animals which are too big and heavy to be carried by air, and the great bulk of animal transport is by air. The International Air Transport Association recommends “basic packaging requirements” for a wide variety of species but these requirements are only for a minimum standard designed to ensure the effective confinement of animals within their containers. They take little account of the requirements of the animals concerned.

In recent years certain authorities have prepared detailed recommendations for the carriage of animals by air and the most advanced of these are the work of the British Standards Institution. They cover detailed instructions on the type and size of containers for a very wide variety of species, and deal with the practical aspects of ventilation, temperature, feeding and watering. But they are far from being universally adopted.

On this subject the Manager of the hostel for animals which is maintained at London Airport by the Royal Society for the Prevention of Cruelty to Animals, comments, *inter alia*, as follows:—

“During the twelve years I have been at the Airport Hostel I have seen great changes in the transportation of animals by air. Time of travel has decreased from days to hours, better attention is provided en route, a number of animal transit depots have been opened, and various types of suitable concentrated foods have become available.

But one thing has not kept pace with the general improvement in air travel and that is the crating of wild animals. Many mammals and birds, including rare species, still travel in boxes or cages which are quite unsuitable. Both mammals and birds from certain countries usually travel in old whisky cases and often arrive in very poor condition. But a few weeks later the same creatures may be re-exported in the same boxes without any alterations having been made to them.

Well-known zoos consign animals abroad and then there is a delay! We get frantic telephone calls from the Zoo for help because no facilities have been provided for feeding or watering the animals in their crates. Many zoos, dealers and private collectors are lulled into false security by the timetables issued by the Air Companies and make no provision for delays due to technical faults or—most important—the elements. Animals and birds that should complete their journeys in a matter of hours may take days and have little chance of survival.

I do feel that the whole question of crating livestock for air travel needs re-viewing on an international basis.”

The British Airline Pilots Association has produced a draft policy for the carriage of animals and the following are abridged quotations from it:—

“Conditions for the packaging, care and attention of animal consignments vary widely. Some companies apparently have no instructions for their staff on the carriage of animals. . . . . Some consignors only make crude provision for their consignments. . . . . Governmental legislation on the subject is conspicuously absent with the notable exception of Germany.

“There is still need for basic research into the requirements of animals in transit. . . . . There then remains the problem of obtaining international acceptance of these standards. . . . . Consignments of animals often form a minor part of a cargo and are not readily distinguishable as containing living creatures.”

A number of detailed policy recommendations are then put forward, and the document continues:—

“In pursuance of this policy the following suggestions are offered on the design of an International Animal Freight Label. . . . . The Label must be so distinct as to be readily recognisable by all who may be involved in handling the consignments. . . . . The Label should clearly display information in English, French and Spanish on the nature of the consignment and the basic requirements for its well-being. . . . . The documents should also provide a form of log so that, whenever a change of carrier or location is involved, the attention previously given will have been recorded for the guidance of the next handler.”

Appendix (e).

"Some selected trade figures."

During the three months preceding the Symposium a brief examination was made of the trade in wild animals with a view to obtaining information about (a) the countries which keep detailed returns of their trade in wild animals and in which import and/or export controls are therefore feasible; (b) the extent of the trade in a representative cross-section of countries.

After consultation with the International Zoo Yearbook office, thirty-two countries were selected and were approached either directly or through their Embassies or High Commissions in London.

Five countries never replied: Colombia, Philippines, Poland, Sierra Leone, Tanganyika.

Three countries promised figures but never sent them: Argentine, Ethiopia, France.

The following is a summary of returns from the remaining twenty-four countries, many of which went to considerable trouble to provide the information requested.

*Note:* Sterling values are based on rates of exchange current in May—June, 1964.

<b>Australia.</b>	Wild animals and birds, excluding "live hair and feathered game". 1962: Imports £59,200; Exports £17,900. No detailed breakdown available.
<b>Belgium.</b>	1963: Imports £193,300; Exports £139,600. Details are available of the countries with which the trade is carried on but not of the types of mammals and birds involved.
<b>Brazil.</b>	Reports "Not a very active trade", and "Very few animals or birds exported live."
<b>Czechoslovakia.</b>	Has a closely controlled trade in "hunting" and "game" animals and birds. A detailed breakdown is available of numbers and types involved, dating back to 1949.
<b>Denmark.</b>	1963: Imports £55,400; Exports £88,500. No breakdown available.
<b>Finland.</b>	No separate figures kept in Foreign Trade Statistics for wild animals and birds.
<b>Germany.</b>	1962: Imports £777,900; Exports £364,100. Under the heading "animals other than productive livestock." The 1961 figures were slightly lower.
<b>Hungary.</b>	A small trade, strictly controlled, in game birds with neighbouring countries, but no appreciable foreign trade in wild animals.

<b>India.</b>	Export of certain species prohibited. Export of others confined to registered exporters dealing with bona fide zoos and scientific institutions within specified ceilings. Control details available but no figures.																								
<b>Indonesia.</b>	Trade in "protected" animals is illegal while trade in "non-protected" animals is subject to the supervision of the Ministry of Agriculture (Forestry Section). Permission to capture and export is only given against firm orders from approved purchasers.																								
<b>Italy.</b>	1963: Imports £154,400; Exports £2,350. Under the heading "Zoological animals". 1962 figures were slightly lower.																								
<b>Japan.</b>	1960: Imports £444; Exports £275. Under the heading "Live animals not for food." Excludes horses, asses and mules which are listed separately.																								
<b>Kenya.</b>	The trade is closely controlled and very strictly limited on "the principle that Capture and Export permits are only issued against firm orders from approved scientific and educational institutions." Full particulars of exports are available.																								
<b>Netherlands.</b>	No information available covering either the import or export of wild animals or birds. Veterinary regulations are applied.																								
<b>Nigeria.</b>	Statistics cover "live animals and birds not for food" and are not detailed. Certificates are required for the export of both live animals and "trophies". Export figures by quantity for "animals and birds" were: 1960—5,306; 1961—3,780; 1962—5,330; 1963, Jan.—Aug.—3,373.																								
<b>Norway.</b>	Strict control is exercised over all imports and detailed particulars are available of numbers and species. Exports are also closely controlled and numbers are very small. Polar bears may only be exported against firm orders from recognised zoos.																								
<b>Russia.</b>	Has no published trade figures for wild animals and birds. The extent of the trade is stated to be insignificant.																								
<b>Singapore.</b>	No figures are available of the trade in birds, but detailed particulars of mammals are available by numbers and species. Figures for 1963 are as follows: <table border="0" style="margin-left: 2em;"> <tr> <td>Imports:</td> <td>Monkeys</td> <td>871.</td> </tr> <tr> <td></td> <td>Other mammals</td> <td>59.</td> </tr> <tr> <td>Exports:</td> <td>Monkeys/Apes/Gibbons</td> <td>1985.</td> </tr> <tr> <td></td> <td>Guinea pigs and mice</td> <td>1240.</td> </tr> <tr> <td></td> <td>Other mammals</td> <td>102.</td> </tr> <tr> <td>Transshipment:</td> <td>Monkeys/Apes/Gibbons</td> <td>6941.</td> </tr> <tr> <td></td> <td>Hamsters and mice</td> <td>2457.</td> </tr> <tr> <td></td> <td>Other mammals</td> <td>42.</td> </tr> </table>	Imports:	Monkeys	871.		Other mammals	59.	Exports:	Monkeys/Apes/Gibbons	1985.		Guinea pigs and mice	1240.		Other mammals	102.	Transshipment:	Monkeys/Apes/Gibbons	6941.		Hamsters and mice	2457.		Other mammals	42.
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- South Africa.** Strict import control, primarily for conserving foreign exchange. Export control regulations do not cover wild animals and birds but control is exercised through Provincial legislation. Bulk particulars are recorded under the headings "Birds" and "Other animals", but no detailed particulars are available.
- Sweden.** Strict veterinary control over imports is enforced. Detailed particulars of numbers and species are available.
- Thailand.** 1961: Imports £1,565 of which £1,063 was birds. Exports £79,271 of which £15,944 was birds. A detailed breakdown is available of the countries with which the trade is carried on and a partial breakdown of the species of mammals. Birds are shown separately in bulk.
- Uganda.** Strict control of exports is enforced. Other than monkeys for research purposes and certain common varieties of parrots for pets, the numbers involved are very small.
- United Kingdom.** Detailed particulars available by numbers and species and final destinations of animals imported "for exhibition", together with countries of origin. Similar figures available for exports. A large traffic, mainly transit, passes through the hostel for wild animals at London Airport. Very detailed particulars are kept and the following is a summary for 1963:
- |   |                                      |
|---|--------------------------------------|
| Birds (wild and pets)                                   | 184,618 (including 125,805 finches). |
| Wild mammals (other than apes and monkeys) and reptiles | 901 (total mortality 9).             |
| Apes and monkeys  | 42,726 (total mortality 143).        |
- U.S.A.** 1962: Imports £1,034,800; Exports £1,256,800. Under the heading "wild animals and birds." A committee of A.A.Z.P.A. has been examining the trade in America and has collected a mass of information which is now being analysed.